Annexure-I

Sarvodaya Kelavani Samaj managed,

Shri Manibhai Virani and Smt. Navalben Virani Science College

(Autonomous)

(Affiliated to Saurashtra University, Rajkot)

Re-Accredited at 'A' Level by NAAC

STAR college Scheme & Status by MST-DBT

UGC-College with Potential for Excellence (CPE)

UGC-DDU KAUSHAL Kendra

GAAA –Grade A-1 by KCG, Government of Gujarat

GPCB-Government of Gujarat approved Environment Audit Center

Nodal Center for capacity building by GSBTM

Department of Chemistry

B.Sc. Chemistry

SCHEME OF LEARNING AND EVALUATION

Department of Chemistry

B. Sc. Chemistry

OBJECTIVES OF THE PROGRAM: B.Sc. Chemistry

Courses offered in this program are geared towards providing students with an overall understanding of general chemistry so that they can enter the workforce with the necessary knowledge and skills. It will enable students to gain familiarity with the current industry practices and technologies.

The objectives are to:

- Train graduates with the requisite knowledge and skill to pursue M.Sc. & Ph.D. degrees in Chemistry.
- Turn out graduates who can teach the subject in secondary and tertiary level of education in the county.
- Train graduates who can be employed in Industry and the other sectors of the economy.

- **Graduate attributes for Under Graduate Programs (B.Sc. Chemistry)**
    - **Academic excellence**: Ability to identify key questions, research and pursue rigorous evidence-based arguments
    - **Critical Thinking and Effective communications:** Analysis and evaluation of information to form a judgement about a subject or idea and ability to effectively communicate the same in a structured form.
    - **Global Citizenship:** Mutual understanding with others from diverse cultures, perspectives and backgrounds
    - **Life Long Learning:** Open, curious, willing to investigate, and consider new knowledge and ways of thinking

PROGRAM EDUCATIONAL OBJECTIVES (PEO): B.Sc. Chemistry Our programme will produce Graduates who will attain following PEOs after few years of graduation		
PEO_1	**Core competency**	Understand and apply the fundamental core of chemistry to a broad variety of chemical problems.
PEO_2	**Breath of knowledge**	Competent chemistry graduates with strong fundamental knowledge to cater the needs of GOs and NGOs related to chemical science domain.
PEO_3	**Preparedness**	Demonstrate ability to use necessary tools & techniques of applied chemistry domain.
PEO_4	**Professionalism**	Graduates who can work individually or in teams to interpret chemical literature and propose solutions for problems significant to industries and society as a whole.
PEO_5	**Learning environment**	Inculcate the aptitude to engage in life- long learning from social, economic, and scientific activities of the time.

PROGRAM OUTCOMES:

After successful completion of the programme the Graduate will be able to :		
PO 1	**:**	**Domain knowledge:** Demonstrate an understanding of concepts, principles and applications of chemistry in various fields. Conduct experiments and analyze data, while maintaining responsible and ethical scientific conduct.
PO 2	**:**	**Problem analysis:** Employ critical thinking and efficient problem-solving skills in the basic areas of chemistry.
PO 3	**:**	**Design/development of solutions:** Using appropriate tools and techniques as well as approaches to arrive at viable conclusions/solutions pertaining to Chemical Science.
PO 4	**:**	**Conduct investigations of complex problems:** Cultivate the skills to Employ modern library search tools to locate and retrieve scientific information about a problem relating to Chemistry.
PO 5	**:**	**Modern tool usage:** Ability to handle/Use appropriate chemistry experiments using tools/techniques/ basic laboratory equipment with an understanding of the standard operating procedures, safety aspects/limitations.
PO 6	**:**	**The Chemistry Professional and society:** Understand own's role in scientific developments for society and act in an honest and consistent manner based on a strong sense of self and personal values
PO 7	**:**	**Environment and sustainability:** Understand complex environmental issues and their interrelationships and requirement of interdisciplinary domains for sustainable development
PO 8	**:**	**Ethics:** Commitment to professional ethics and responsibilities.
PO 9	**:**	**Individual and team work:** Able to function effectively as individual and as a member or leader in multidisciplinary settings.
PO 10	**:**	**Communication:** Communicate effectively using different modes (viz. written, verbal and digital) not only with scientific community but also with the society at large
PO 11	**:**	**Project management and finance:** Understand the principles of management of finance and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**:**	**Life-long learning:** Able to recognize the need to undertake life-long learning and acquire the capacity to do so

PROGRAM SPECIFIC OUTCOMES (PSO): B.Sc. Chemistry After successful completion of the program the Graduate will be:	
PSO_1	Acquire knowledge on the fundamentals aspects of chemistry leading to functional understanding of emerging concepts and technologies in chemical sciences.
PSO_2	Able to pursue higher education and research in the institutes of national and international repute.
PSO_3	Apply conceptual knowledge of Chemistry to identify practical & innovative solutions for socio-economically relevant issues.
PSO_4	Demonstrate ability to skilfully utilize the chemical literature to identify existing problems and employ tools & techniques of applied chemistry for finding sustainable & ethical solutions.
PSO_5	Acquire the ability to engage in life- long learning in the broadest context of socio-technological changes.

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Semester I									
Course Code	**Course**	**Contact Hrs/ Week**			**SEE Duration (Hours)**	**Maximum Marks**			**Credits**
						CIA	**SEE**	**Total**	
Part - I: Language course		**T**	**Tu**	**P**					
21ULCEN101	Development of Functional English	3	-	-	3	40	60	100	3
	Part-I Total	**3**	**-**	**-**		**40**	**60**	**100**	**3**
Part- II: Discipline Specific Courses									
21UCHCC101	**Core 1:** Introductory Inorganic and Analytical Chemistry (F)	4	-	-	3	30	70	100	4
21UCHCC102	**Core 2:** Introductory Organic and Physical Chemistry (F)	4	-	-	3	30	70	100	4
21UCHIC101	**IDC 1:** Physics: Electricity & Modern Physics (F)	3	-	-	3	30	70	100	3
21UCHCC103	**Core Practical 1:** Combined Practical	-	-	12	6	40	60	100	4
21UCHIC102	**IDC Practical 1:** Physics: Electricity & Modern Physics (F)	-	-	6	3	40	60	100	3
	Core Enrichment Course/Component 1: Concept to Practice	-	1	-	-	(20)	Evaluation at the end of 4th Semester		-
	Part-II Total	**11**	**1**	**18**		**170**	**330**	**500**	**18**
Part-III: Ability Enhancement Courses									
21AESD101	**AECC I :** Introduction to SDG (online course)	-	-	-	-	Remarks			Audit course
	AECC II: Environmental Conservation and Sustainable Development	1	-	-	-	Evaluation at the end of 2nd Semester			-
	AECC III: Human Values for Holistic Living	1	2*	-	-	Evaluation at the end of 2nd Semester			-
	FS 3: Career Acceleration Program	2*	-	-	-	Cumulative evaluation at the end of Semester V			-
	Part-III Total	**2**	**2***	**-**			**-**		**-**
	Total (Part-I to Part-III)	**16**	**1+2***	**18**		**210**	**390**	**600**	**21**
		35+4*				**600**			

* Beyond academic Hours

( ) Final evaluation for 100 marks be made at the end of Semester IV, Which includes 20 marks CIA in Semester I, II, II each and 40 marks in Semester IV.

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. **B. Sc. Chemistry**

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For the students admitted from A.Y. 2021-2022 & onwards

Semester II									
Course Code	**Course**	**Contact Hrs/ Week**			**SEE Duration (Hours)**	**Maximum Marks**			**Credits**
						CIA	**SEE**	**Total**	
Part-I: Language course		**T**	**Tu**	**P**					
21ULCEN201	Functional English	3	-	-	3	40	60	100	3
	Part-I Total	**3**	**-**	**-**	**3**	**40**	**60**	**100**	**3**
Part-II: Discipline Specific Courses									
21UCHCC201	**Core 3:** Conceptual Inorganic and Analytical Chemistry (F)	4	-	-	3	30	70	100	4
21UCHCC202	**Core 4:** Conceptual Organic and Physical Chemistry (F)	4	-	-	3	30	70	100	4
21UCHIC201	**IDC 2:** Physics: Electronics and radiation Physics	3	-	-	3	30	70	100	3
21UCHCC203	**Core Practical 2:** Combined Practical	-		12	6	40	60	100	4
21UCHIC202	**IDC Practical 2:** Physics: Electronics and radiation Physics	-		6	3	40	60	100	3
	Core Enrichment Course/Component 1: Concept to Practice	-	1	-	-	(20)	Evaluation at the end of 4th Semester		-
	Part-II Total	**11**	**1**	**18**		**170**	**330**	**500**	**18**
Part-III: Ability Enhancement Courses									
21AEES201	**AECC II:** Environmental Conservation and Sustainable Development	1	-	-	-	Remarks			2
21AEVE202	**AECC III:** Human Values for Holistic Living	1	2*	-	-	Remarks			3
	FS 3: Career Acceleration Program	2*	-	-	-	Cumulative evaluation at the end of Semester V			
	Part-III Total	**2**	**2***	**-**		**-**	**-**	**-**	**5**
	Total (Part-I to Part-III)	**16 +2 ***	**1+2***	**18**		**210**	**390**	**600**	**26**
		35+4*				**600**			

* Beyond academic Hours

( ) Final evaluation for 100 marks be made at the end of Semester IV, Which includes 20 marks CIA in Semester I, II, II each and 40 marks in Semester IV.

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Semester III									
Course Code	**Course**	**Contact Hrs/ Week**			**SEE Duration (Hours)**	**Maximum Marks**			**Credits**
						CIA	**SEE**	**Total**	
Part-I: Language course		**T**	**Tu**	**P**					
21ULCEN301	Advanced English & Correspondence	3	-	-	3	40	60	100	3
	Part-I Total	**3**	**-**	**-**	**3**	**40**	**60**	**100**	**3**
Part-II: Discipline Specific Courses									
21UCHCC301	**Core 5:** Inorganic Chemistry (Ad)	4	-	-	3	30	70	100	4
21UCHCC302	**Core 6:** Analytical Chemistry (Ad)	4	-	-	3	30	70	100	4
21UCHCC303	**Core 7:** Petrochemicals and Polymers (Ad)	4	-	-	3	30	70	100	4
21UCHDE301	**DSE-1-C1:**##	3	-	-	-	40	60	100	3
21UCHCC304	**Core Practical 3:** Combined Practical (Core 5/6/7)	-	-	12	9	40	60	100	3
21UCHDE301	**DSE-1-C1 Practical 1##:**			4/6	3	40	60	100	2
	Core Enrichment Course/Component 1: Concept to Practice	-	1	-		(20)	Evaluation at the end of 4th Semester		-
21UCHCR301	**Core Enrichment Course/Component 2:** **Internship/Training/Mini Project –1 (Industrial/Social Immersion)**	-	1	-	-	100	-	100	1
	Part-II Total	**15**	**2**	**16**		**310**	**390**	**700**	**21**
Part-III: Ability Enhancement Courses									
	FS 3: Career Acceleration Program	-	2*	-		-	-	-	Audit course
	Part-III Total	**-**	2*	**-**					
	Total (Part-I to Part-III)	**18**	**2+2***	**16**		**350**	**450**	**800**	**24**
		36+2*				**800**			

* Beyond academic Hours

**Minimum one month internship pertaining to learning for concept to practice/prototype or product development for start-up/mini and final semester project/skilling in the summer vacation/combination of semester break and summer vacation in industry/premier research institute/NGO, etc.

DSE-1-C1: Discipline Specific Elective Course 1 (T & P) From cluster 1 in semester III

( ) Final evaluation for 100 marks be made at the end of Semester IV, Which includes 20 marks CIA in Semester I, II, II each and 40 marks in Semester IV.

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Semester IV									
Course Code	**Course**	**Contact Hrs/ Week**			**SEE Duration (Hours)**	**Maximum Marks**			**Credits**
						CIA	**SEE**	**Total**	
Part-I: Language course		**T**	**Tu**	**P**					
	Effective Communicative Skills								
	Part-I Total								
Part-II: Discipline Specific Courses									
	Core 8: (Ad)								
	Core 9: (Ad)								
	Core Elective 1: (Ad)								
	DSE-C 2:## (Ad)								
	TDE 1:								
	Core Practical 4: Combined Practical								
	Core Elective Practical 1:								
	DSE-C Practical 2:								
	Core Enrichment Course/Component 1: Concept to Practice	-	1	-	-	40	-	100	1
	Part-II Total								
Part-III: Ability Enhancement Courses									
	FS 3: Career Acceleration Program								
	Part-III Total								
	Total (Part-I to Part-III)								

* Beyond academic Hours

**Minimum one month internship pertaining to learning for concept to practice/prototype or product development for start-up/mini and final semester project/skilling in the summer vacation/combination of semester break and summer vacation in industry/premier research institute/NGO etc.

DSE cluster -1 & 2: Mathematics for Chemist/Life molecules/ Industrial chemistry/ Statistics

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Semester V									
Course Code	**Course**	**Contact Hrs/ Week**			**SEE Duration (Hours)**	**Maximum Marks**			**Credits**
						CIA	**SEE**	**TOTAL**	
Part-II: Discipline Specific Courses		**T**	**Tu**	**P**					
	Core 10: (Ad)								
	Core 11: (Ad)								
	Core 12: (Self-Study) (Ap)								
	Core 13: CRT								
	Core Elective 2: (Ap)								
	TDE 2:								
	Core Practical 5: Combined Practical								
	Core Elective Practical 2:								
	Core Enrichment Course/Component 3: Internship/Training/ Industrial visit/Mini Project 2:								
	Core Enrichment Course/Component 4: Minor Project/Dissertation / Review Article / Instrumental Training								
	Part-II Total								
Part-III: Ability Enhancement Courses									
	FS 3: Career Acceleration Program								
	Part-III Total								
	Total (Part-I to Part-III)								

* Beyond academic Hours

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Semester VI									
Course Code	**Course**	**Contact Hrs/ Week**			**SEE Duration (Hours)**	**Maximum Marks**			**Credits**
						CIA	**SEE**	**Total**	
Part- II: Discipline Specific Courses									
		T	**Tu**	**P**					
	Core 14: (Ap)								
	Core 15: (Ad)								
	Core 16: (Ad)								
	Practical: Skill Training /start up Practical								
	***Core Enrichment Course/Component 5:** Project / Skill training / Start-up (Ap)								
	Part-II Total								
	Total (Part-II)								

***** Students can opt for Core 15, Core 16 and practical 6 **or** Core Enrichment 4.

If students wish to continue their previous semesters project in Semester VI as a major project then they have to must select Core enrichment 4 instead of advance papers.

Formation of Part-III

Course Code	Semester	Course / Component	Contact Hrs	No. of Courses	Credit/ Course	Total Credits
A. Ability Enhancement Course (AEC)						
(i) Ability Enhancement Compulsory Course (AECC)						
	I	**AECC I :** Introduction to SDG (online course)	-	1	Remarks	Audit Course
	I & II	**AECC II:** Environmental Conservation and Sustainable Development	1 Hr / Week / Semester	1	1+1	2
	I & II	**AECC III:** Human Values for Holistic Living	1 T + 2 Tu /Week /Semester	1	1+1+1	3
					Sub Total	**5 + Audit course**
(ii) ***Skill Enhancement Course (SEC)***						
As per common list	Any Semester between II – V	**SEC-I** *Value Added Courses	40 Hrs	1	1	1
	Any Semester between III – V	**SEC-II** **Co-Curricular Course	80 to 120 Hrs	1	2	2
					Sub Total	**3**
B. Finishing School						
		FS I *to* FS IV *Compulsory to Earn Degree.*				
	I	**FS I:** Student Induction Program	3 weeks Phase 1, Phase 2, Phase 3	-	Remark	Audit course
	Across I & II Semesters	**FS II:** Fundamentals of Design Thinking (Online/Offline)#	40 to 60 Hrs	1	Remark	Audit course
	Semesters I to V	**FS III:** Career Acceleration Program	2 Hrs / Week /Semester	As per syllabus	Remarks	Audit course
	Semester V	**FS IV:** Community Engagement	Twice a month	1	Remarks	Audit course
		FS V *to* FS VIII *Options for Advanced Learners*				
	Any semester	**FS V:** Indian & Foreign	-	Any number of	Remarks	Audit course

	from II to V	Languages		courses		
	Any semester from II to V	**FS VI:** Any number of Online course(s) from select MOOC platforms	-	Any number of courses	Remarks	Credit as per provider/audit course
	Any semester from III to V	**FS VII:** Advanced Design Thinking	-	1	Remarks	Audit course
	Any semester from I to VI	**FS VIII: #Extra Credit Course** Any number of courses from any UG program across the College	Self study	Any number of courses	As per course offered	As per credit(s) earned across all courses opted
					Grand Total	

Part of Core Enrichment Course/Component 1,2: Concept to Practice

***Value Added Courses** - Option to student to choose at least 1 from a list of courses offered by any department across the College.

****Co-Curricular Courses** - Option to students to choose 1 from a list of courses offered by any department across the College.

Student may opt for any course of the odd/even prevailing semester from any UG program across the College with the following guidelines:

a. Attending class not mandatory.
b. May be mentored by the course teacher.
c. Preparation through self-study.
d. CIA not mandatory; evaluated for total marks at the end of the semester.
e. Indicates options to appear for the course through examination application and payment of examination fees of that course.
f. Credits earned through each course indicated in the consolidated mark sheet as extra credits; not included for CGPA, percentage marks and classification.

TOTAL MARKS & CREDIT DISTRIBUTION TO EARN THE DEGREE

S. No	PART	Total Marks	Total Credits
1.	**PART I:** Language Course	400	12
2.	**PART II:** Core, Core Elective, IDC, DSE, TDE, CBT	4100	128
3.	**PART III:** AECC-I, II & III SEC- I & II FS I, II, III & IV	Remarks	8+Credit Audit
	TOTAL	**4500**	**148**

VALUE ADDED COURSES (VAC) OFFERED BY THE DEPARTMENT

Sr. No.	Course Code	Course Title	Course Duration	Credits
1		Formulation of detergent & toiletries	40 hrs	1
2		Surface Coating	40 hrs	1

CO-CURRICULAR COURSES (CoC) OFFERED BY THE DEPARTMENT

Sr. No.	Course Code	Course Title	Course Duration	Credits
1		Quantitative aptitude and logical reasoning for government and bank exam	160 hrs	2

Discipline Specific Elective (DSE 1) Cluster

Sr.	Track / Cluster	Offering Department	Course Name	Course Code
1				
2				
3				
4				
5				
6				
7				
8				

Enclosure-BMTI

Shree Manibhai Virani and Smt. Navalben Virani Science College, Rajkot (Autonomous)
Affiliated to Saurashtra University, Rajkot
Department of Mathematics
B.Sc. Mathematics

Vision of the Department:

To be recognized for excellence in Teaching – Learning adjunct by empowering graduating students to compete in and contribute to the developing needs of the society.

Mission of the Department:

To provide quality teaching-learning, research and service opportunities leading to holistic development of students through collegial exchange of ideas, independent thought, and the highest ethical standards.

Goals:

a. Provide high quality academic experiences through comprehensive & relevant curriculum at all UG & PG levels.

b. Foster problem solving ability and research aptitude by extending instructional and infrastructural support and research guidance.

c. Inculcate the values of multi-disciplinary approach and innovative thinking by facilitating learning experiences in the field of mathematics and its allied fields

d. Produce graduates with ability to solve real life problems and ability to face the emerging challenges for careers in academia, industry and GOs/NGOs.

e. Promote ethical and professional environment amongst faculties and students of the department.

GRADUATE ATTRIBUTES

- **Academic excellence**: Ability to identify key questions, research and pursue rigorous evidence-based arguments
- **Critical Thinking and Effective communications:** Analysis and evaluation of information to form a judgement about a subject or idea and ability to effectively communicate the same in a structured form.
- **Global Citizenship:** Mutual understanding with others from diverse cultures, perspectives and backgrounds
- **Life Long Learning:** Open, curious, willing to investigate, and consider new knowledge and ways of thinking

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs) FOR B. Sc. MATHEMATICS

Our programme will produce Graduates who will attain following PEOs after few years of graduation

PEO 1 : **Core competency:** will develop the competency to pursue higher education or successful professional career with synergistic combination of the knowledge and skills of mathematics and allied sciences.

PEO 2 : **Breadth of knowledge:** will show capabilities of independently designing, executing and interpreting mathematical problems by integrating the interdisciplinary knowledge of Mathematics and other domains.

PEO 3 : **Preparedness:** will reflect professional behaviour and have the potential to show preparedness to take any task or assignment in the capacity of a leader or team member in their chosen occupations or careers and communities.

PEO 4 : **Professionalism:** will reflect values and responsibilities in the character to make them fit to work in a multidisciplinary team and to become socio-ethically responsible citizen.

PEO 5 : **Learning environment:** will show attitude of self-learning abilities and keep themselves abreast with new development in all spheres of life.

PROGRAM OUTCOMES (POs) FOR B. Sc. MATHEMATICS

After completion of the programme the Graduate will be able to:

PO 1 : **Domain knowledge:** Demonstrate the knowledge of concepts, principles and applications of Mathematics in various fields.

PO 2 : **Problem analysis:** Acquire critical thinking skills to understand and solve contemporary problems with knowledge and skills.

PO 3 : **Design/development of solutions:** Make decisions to develop solutions to given situations/questions, formulate strategies to identify, define and solve problems including, as necessary, global perspectives.

PO 4 : **Conduct investigations of complex problems:** Gain ability to design, conduct experiments, analyse and interpret data for investigating problems in Mathematics and allied sectors

PO 5 : **Modern tool usage:** The ability to acquire, develop, employ and integrate a range of technical, practical and professional skills, in appropriate and ethical ways within a professional context, autonomously and collaboratively and across a range of disciplinary and professional areas.

PO 6 : **The Mathematics Professional and society:** An awareness of the role of science within a global culture and willingness to contribute to the shaping of community views on complex issues where the methods and findings of science are relevant.

PO 7 : **Environment and sustainability:** Understand complex environmental issues and their interrelationships and requirement of interdisciplinary domains for sustainable development

PO 8 : **Ethics:** Apply ethical principles and commit to professional ethics, responsibilities and norms.

PO 9 : **Individual and team work:** Able to function effectively as individual and as a member in multidisciplinary settings.

PO 10 : **Communication:** Communicate effectively using different modes (viz. written, verbal and digital) not only with scientific community but also with the society at large.

PO 11 : **Project management and finance:** Understand the principles of management of finance and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12 : **Life-long learning:** Able to recognize the need to undertake life-long learning and acquire the capacity to do so.

PROGRAMME SPECIFIC OUTCOME (PSOs) FOR B. Sc. MATHEMATICS PROGRAMME

After completion of the programme the Graduate will:

PSO 1 : Understand the advanced concepts of mathematics and demonstrate the ability to apply the knowledge of mathematics at an advanced level.

PSO 2 : Collect, organize and adapt contemporary knowledge effectively and utilize appropriate computational tools independently and analyse and perform a broad variety of mathematical experiments using mathematical software and internet.

PSO 3 : Develop and apply new theories of mathematics to solve a broad variety of problems involving mathematics.

PSO 4 : Apply critical thinking skills for the sustainable development and develop the knowledge and skills to secure employment.

PSO 5 : Exhibit the capacity to identify, formulate, and solve problems pertaining to mathematics through research and critically evaluate the theoretical results and recognize the need for, and an ability to engage in life−long learning.

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Semester I									
Course Code	**Course**	**Contact Hrs/ week**			**SEE Duration (Hours)**	**Maximum Marks**			**Credits**
						CIA	**SEE**	**Total**	
Part-I		**T**	**Tu**	**P**					
21ULCEN101	Development of Functional English	3	-	-	3	40	60	100	3
	Part-I Total	**3**	**0**	**0**		**40**	**60**	**100**	**3**
Part-II									
21UMTCC101	**Core 1:** Differential Calculus (F)	3	-	-	3	30	70	100	3
21UMTCC102	**Core 2:** Matrix Algebra (F)	3	-	-	3	30	70	100	3
21UMTID101	**IDC 1:** Electricity & Modern Physics	3	-	-	3	30	70	100	3
21UMTCC103	**Core Practical 1**: Practical on Differential Calculus and Matrix Algebra including mathematical software	-		12#	3	40	60	100	6
21UMTID102	**IDC 1 Practical**: Electricity & Modern Physics	-		6@	3	40	60	100	3
	Core Enrichment 1: Concept to Practice Course	-	1	-	-	(20)	Evaluation at the end of semester - 4		
	Part-II Total	**9**	**1**	**18**		**190**	**330**	**500**	**18**

Semester I									
Course Code	**Course**	**Contact Hrs/ week**			**SEE Duration (Hours)**	**Maximum Marks**			**Credits**
						CIA	**SEE**	**Total**	
		T	**Tu**	**P**					
Part-III: Ability Enhancement Courses									
21AESD101	**AECC I:** Introduction to SDG (online course)	-	-	-	-	Remarks			Audit course
-	**AECC II:** Environmental Conservation and Sustainable Development	1	-	-	-	Evaluation at the end of 2nd Semester			-
-	**AECC III:** Human Values for Holistic Living	1	2*	-	-	Evaluation at the end of 2nd Semester			-
	FS 3: Career Acceleration Program	2*	-	-	-	Cumulative evaluation at the end of Semester V			
	Part-III Total	**2**	**2***	**0**		**0**	**0**	**0**	**0**
	Total (Part-I to Part-III)	**14+2***	**1+2***	**18**		**230**	**390**	**600**	**21**
		33+2*+2*				**600**			

*Out of working Hours. | # 3 hours each on Day 1, 2 3 and 4. | @ 3 hours each on Day 1 and 2
( ) Final evaluation for 100 marks be made at the end of Semester IV which includes 20 marks CIA in Semester I, II, III each and 40 marks in Semester IV.

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For the students admitted from A.Y. 2021-2022 & onwards

Semester II									
Course Code	**Course**	**Contact Hrs/ week**			**SEE Duration (Hours)**	**Maximum Marks**			**Credits**
						CIA	**SEE**	**Total**	
Part-I		**T**	**Tu**	**P**					
21ULCEN201	Functional English	3	-	-	3	40	60	100	3
	Part-I Total	**3**	**0**	**0**	**3**	**40**	**60**	**100**	**3**
Part-II									
21UMTCC201	**Core 3**: Differential Equations (Ap)	4	-	-	3	30	70	100	4
21UMTCC202	**Core 4:** Advanced Calculus (Ad)	4	-	-	3	30	70	100	4
21UMTID201	**IDC 2:** Physics: Electronics, sound and modern physics	3	-	-	3	30	70	100	3
21UMTCC203	**Core Practical 2**: Practical on Differential equations and Advanced Calculus including mathematical software	-	-	8#	3	40	60	100	4
21UMTID202	**IDC 2 Practical:** Physics Practical: Electronics, sound and modern physics	-	-	6@	3	40	60	100	3
	Core Enrichment 1: Concept to Practice Course	-	1	-	-	(20)	Evaluation at the end of semester - 4		
	Part-II Total	**11**	**1**	**14**		**190**	**330**	**500**	**18**

Semester II									
Course Code	**Course**	**Contact Hrs/ week**			**SEE Duration (Hours)**	**Maximum Marks**			**Credits**
						CIA	**SEE**	**Total**	
		T	**Tu**	**P**					
Part-III: Ability Enhancement Courses									
21AEES201	**AECC II:** Environmental Conservation and Sustainable Development	1	-	-	-	Remarks			2
21AEVE202	**AECC III:** Human Values for Holistic Living	1	2*	-	-	Remarks			3
	FS 3: Career Acceleration Program	2*	-	-	-	Cumulative evaluation at the end of Semester V			
	Part-III Total	**2+ 2***	**2***	**0**	**-**	**0**	**0**	**0**	**5**
	Total (Part-I to Part-III)	**16+ 2***	**1+ 2***	**14**		**230**	**390**	**600**	**26**
		31+2*+2*				**600**			

*Out of working Hours. | # 2 hours each on Day 1, 2, 3 and 4. | @ 3 hours each on Day 1 and 2

( ) Final evaluation for 100 marks be made at the end of Semester IV which includes 20 marks CIA in Semester I, II, III each and 40 marks in Semester IV.

Minimum one-month internship pertaining to learning for concept to practice/prototype or product development for start-up/mini and final semester project/skilling in the summer vacation/combination of semester break and summer vacation in industry/premier research institute/NGO, etc.

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Semester III									
Course Code	**Course**	**Contact Hrs/ week**			**SEE Duration (Hours)**	**Maximum Marks**			**Credits**
						CIA	**SEE**	**Total**	
Part-I		**T**	**Tu**	**P**					
21ULCEN301	Advanced English & Correspondence	3	-	-	3	40	60	100	3
	Part-I Total	**3**	**-**	**-**	**3**	**40**	**60**	**100**	**3**
Part-II		**T**	**Tu**	**P**					
21UMTCC301	**Core 5:** Fundamentals of Mathematical Analysis (F)	3	-	-	3	30	70	100	3
21UMTCC302	**Core 6:** Complex Variables (F)	3	-	-	3	30	70	100	3
21UMTCC303	**Core 7:** Discrete Mathematics (Ad)	3	-	-	3	30	70	100	3
21UMTDC301	**DSE 1:** Basic Mathematics/ Basic Physics/ Basic Botany/ Basic Zoology.	3	-	-	-	30	70	100	3
21UMTCC304	**Core Practical 3**: Computer Aided Mathematics.	-	-	8#	3	40	60	100	4
21UMTDA301	**DSE 1 Practical:**	-	-	6@	3	40	60	100	3
	Core Enrichment 1: Concept to Practice Course	-	1	-	-	(20)	Evaluation at the end of semester - 4		
21UMTCC305	**Core Enrichment 2:** Internship 1/ Training/ Project	-	-	-		100	-	100	1
	Part-II Total	**12**	**1**	**14**		**320**	**400**	**700**	**20**

Semester III									
Course Code	**Course**	**Contact Hrs/ week**			**SEE Duration (Hours)**	**Maximum Marks**			**Credits**
						CIA	**SEE**	**Total**	
		T	**Tu**	**P**					
Part-III: Ability Enhancement Courses									
-	**FS III:** Career Acceleration Program	-	2*	-					Audit course
	Part-III Total		**2***			**0**	**0**	**0**	
	Total (Part-I to Part-III)	**15**	**1+ 2***	**14**		**360**	**460**	**800**	**23**
						800			

2 hours each on Day 1, 2, 3 and 4.

( ) Final evaluation for 100 marks be made at the end of Semester IV which includes 20 marks CIA in Semester I, II, III each and 40 marks in Semester IV.

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Semester IV									
Course Code	**Course**	**Contact Hrs/ week**			**SEE Duration (Hours)**	**Maximum Marks**			**Credits**
						CIA	**SEE**	**Total**	
Part-I		**T**	**Tu**	**P**					
21ULCEN401	Effective Communicative Skills	3	-	-	3	40	60	100	3
	Part-I Total	**3**	**-**	**-**	**3**	**40**	**60**	**100**	**3**
Part-II		**T**	**Tu**	**P**					
21UMTCC401	**Core 8:**	3	-	-	3	30	70	100	3
21UMTCC402	**Core 9:**	3	-	-	3	30	70	100	3
21UMTCC403	**Core Elective 1:**	3	-	-	3	30	70	100	3
21UMTDA401	**DSE 2:**	3	-	-	-	30	70	100	3
21UMTTD401	**TDE 1:**	2	-	-		100	-	100	2
21UMTCC404	**Core Practical 4:**	-	-	8#	3	40	60	100	4
21UMTDA402	**DSE 2 Practical:**	-	-	6@	3	40	60	100	3
21UMTCC406	**Core Enrichment 1:** Concept to Practice Course	-	1	-	-	40	-	100	1
	Part-II Total	**14**	**1**	**14**		**340**	**400**	**800**	**22**
Part-III: Ability Enhancement Courses									
-	**FS III:** Career Acceleration Program	-	2*	-					Audit course
	Part-III Total		**2***			**0**	**0**	**0**	
	Total (Part-I to Part-III)	**17**	**1+ 2***	**14**		**380**	**460**	**900**	**25**
						900			

Minimum one month internship pertaining to learning for concept to practice/prototype or product development for start-up/mini and final semester project/skilling in the summer vacation/combination of semester break and summer vacation in industry/premier research institute/NGO etc.

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Semester V									
Course Code	**Course**	**Contact Hrs/ week**			**SEE Duration (Hours)**	**Maximum Marks**			**Credits**
						CIA	**SEE**	**TOTAL**	
Part-II		**T**	**Tu**	**P**					
21UMTCC501	**Core 10:**	3	-	-	3	30	70	100	3
21UMTCC502	**Core 11:**	4	-	-	3	30	70	100	4
21UMTCC503	**Core 12:**	4	-	-	3	30	70	100	4
21UMTCC504	**Core 13:** (Self-Study Course)	1	-	-	3	30	70	100	4
21UMTCC505	**Core 14:** Concept Recapitulation Test (CRT)	-	-	-	3	100		100	1
21UMTCC506	**Core Elective 2:**	3	-	-	3	30	70	100	3
21UMTTD501	**TDE 2:**	2	-	-		100		100	2
21UMTCC507	**Core Practical 5:**	-	-	12#	3	40	60	100	6
21UMTCC508	**Core Enrichment 3:** Internship /Training	-	-	-		100		100	1
21UMTCC509	**Core Enrichment 4:** Mini Project	-	-	2	-	100	-	100	4
	Part-II Total	**17**	**0**	**14**		**590**	**410**	**1000**	**32**
Part-III: Ability Enhancement Courses									
21AEFS501	**FS III:** Career Acceleration Program	-	2*	-		Remarks			Audit course
	Part-III Total	**0**	**2***	**0**	**-**	**0**	**0**	**0**	
	Total (Part-I to Part-III)	**17**	**2***	**14**		**590**	**410**	**1000**	**32**
						1000			

2 hours each on day of the week.

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SCHEME OF LEARNING AND EVALUATION

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Semester VI									
Course Code	**Course**	**Contact Hrs/ week**			**SEE Duration (Hours)**	**Maximum Marks**			**Credits**
						CIA	**SEE**	**TOTAL**	
Part-II		**T**	**Tu**	**P**					
21UMTCC601	**Core 15:**	4	-	-	3	30	70	100	4
Core Enrichment 5:									
	Project / Skill training / Start-up/ OR Two Advanced Applied Theory courses & One practical (Core 16, Core 17 & Core Practical 6)	-	20	-				300	14
21UMTCC602	**Core 16:**	4	-	-	3	30	70	100	4
21UMTCC603	**Core 17:**	4	-	-	3	30	70	100	4
21UMTCC604	**Core Practical 6:**	-	-	12 #	3	40	60	100	6
	Part-II Total	**12**		**12**	**-**	**130**	**270**	**400**	**18**
Part-III: Ability Enhancement Courses									
-	**FS III:** Career Acceleration Program	-	2*	-		Remarks			Audit course
	Part-III Total	**0**	**2***	**0**	**-**	**0**	**0**	**0**	
	Total (Part-I to Part-III)	**12**	**2***	**12**		**130**	**270**	**400**	**16**
		26				**400**			

Formation of Part-III

Course Code	Semester	Course / Component	Contact Hrs	No. of Courses	Credit/ Course	Total Credits
A. Ability Enhancement Course (AEC)						
(i) Ability Enhancement Compulsory Course (AECC)						
	I	**AECC I :** Introduction to SDG (online course)	-	1	Remarks	Audit Course
	I & II	**AECC II:** Environmental Conservation and Sustainable Development	1 Hr / Week / Semester	1	1+1	2
	I & II	**AECC III:** Human Values for Holistic Living	1 T + 2 Tu /Week /Semester	1	1+1+1	3
					Sub Total	**5 + Audit course**
(ii) ***Skill Enhancement Course (SEC)***						
As per common list	Any Semester between II – V/VII	**SEC-I** *Value Added Courses	40 Hrs	1	1	1
	Any Semester between III – V/VII	**SEC-II** **Co-Curricular Course	80 to 120 Hrs	1	2	2
					Sub Total	3
B. Finishing School						
		FS I *to* FS IV *Compulsory to Earn Degree.*				
	I	**FS I:** Student Induction Program	3 weeks Phase 1, Phase 2, Phase 3	-	Remark	Audit course
	Across I & II Semesters	**FS II:** Fundamentals of Design Thinking (Online/Offline)	40 to 60 Hrs	1	Remark	Audit course
	Semesters I to V / VII	**FS III:** Career Acceleration Program **(CAP)** (Placement training)	2 Hrs / Week /Semester	As per syllabus	Remarks	Audit course

	Semester V (3 yrs program) Semester VI (4 yrs program)	**FS IV:** Community Engagement	Twice a month	1	Remarks	Audit course
		FS V *to* FS VIII *Options for Advanced Learners*				
	Any semester from II to V/VII	**FS V:** Indian & Foreign Languages	-	Any number of courses	Remarks	Audit course
	Any semester from II to V/VII	**FS VI:** Any number of Online course(s) from select MOOC platforms	-	Any number of courses	Remarks	Credit as per provider/ audit course
	Any semester from III to V/VII	**FS VII:** Advanced Design Thinking	-	1	Remarks	Audit course
	Any semester from I to VI/VIII	**FS VIII: #Extra Credit Course** Any number of courses from any UG program across the College.	Self-Study	Any number of courses	As per course offered	As per credit(s) earned across all courses opted
					Grand Total	

***Value Added Courses** - Option to student to choose at least 1 from a list of courses offered by any department across the College.

****Co-Curricular Courses** - Option to students to choose 1 from a list of courses offered by any department across the College.

Student may opt for any course of the odd/even prevailing semester from any UG program across the College with the following guidelines:

a. Attending class not mandatory.
b. May be mentored by the course teacher.
c. Preparation through self-study.
d. CIA not mandatory; evaluated for total marks at the end of the semester.
e. Indicates options to appear for the course through examination application and payment of examination fees of that course.
f. Credits earned through each course indicated in the consolidated mark sheet as extra credits; not included for CGPA, percentage marks and classification.

TOTAL MARKS & CREDIT DISTRIBUTION TO EARN THE DEGREE

S. No	PART	Total Marks	Total Credits
1.	**PART I:** Language Course	400	12
2.	**PART II:** Core, IDC, DSE, TDE	3900	128
3.	**PART III:** AECC-I, II & III SEC- I & II FS I, II, III & IV	Remarks	8+ audit course
	TOTAL	**4300**	**148**

COURSES OFFERED BY THE DEPARTMENT FOR OTHER PROGRAMS

Sr. No.	Name of Program	Semester	Course Code	Course Title	Contact Hrs/Week	Credits
1.	B.Sc. Chemistry	III	**21UMTDC301**	Basic Mathematics	**3**	**3**
2.	B.Sc. Chemistry	III	**21UMTDC302**	Practical on Basic Mathematics	**3**	**1**

VALUE ADDED COURSES (VAC) COURSES OFFERED BY THE DEPARTMENT

Sr. No.	Course Code	Course Title	Course Duration	Credits
1		Vedic Mathematics	40	1

CO-CURRICULAR COURSES (CoC) COURSES OFFERED BY THE DEPARTMENT

Sr. No.	Course Code	Course Title	Course Duration	Credits
1.		Quantitative Aptitude & logical reasoning for industrial placement	80 to 120	2
2.		Preparation for Gujarat State Competitive Exams	100 Hours	2

Sarvodaya Kelavani Samaj Managed

Shree Manibhai Virani & Smt. Navalben Virani Science College, Rajkot

(Autonomous)

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Reaccredited at the "A" Level (CGPA 3.28) by NAAC

"STAR" College Scheme & Status by MST-DBT

A College with Potential for Excellence – CPE (Phase - II) by UGC

Accredited at the G-AAA Highest Grade 'A-1' Level by KCG, Govt. of Gujarat

UGC-DDU KAUSHAL Kendra

GPCB-Government of Gujarat approved Environmental Audit Centre

SCHEME OF LEARNING AND EVALUATION

Of

B. Sc. MICROBIOLOGY

(W.e.f June 2021)

Shree Manibhai Virani and Smt. Navalben Virani Science College, Rajkot
(Autonomous)
Affiliated to Saurashtra University, Rajkot
Department of Microbiology

B. Sc. MICROBIOLOGY
Regulations for Students Admitted from A.Y. 2021-2022 & Onwards

ELIGIBILITY

Candidate who has passed Higher Secondary Certificate (10+2) examination with Science subjects in respective streams of Gujarat State or any other examination recognized as equivalent thereto with a good academic record, shall be eligible for admission, subject to such other conditions prescribed by the Parent University and State Government from time to time. All admissions are provisional and subject to the approval of Parent University.

LATERAL ENTRY

Candidates seeking admission directly in third semester of B.Sc. Microbiology must have passed examination of Diploma in Pharmacy or relevant subjects will be eligible for admission. A result of this type of candidate will be declared by considering his/her marks of semester 3 to 6 in aggregate and accordingly class will be awarded.

DURATION OF THE PROGRAMME

The Program
1. Shall extend over a period of three years comprising of six semesters for lateral entrants
2. Comprises of two semesters in one academic year wherein each semester normally will be of minimum 90 teaching days.

CHOICE BASED CREDIT SYSTEM (CBCS)

The CBCS provides an opportunity for the students to choose courses from the prescribed courses based on their interest. Mainly, each course is worth a certain number of credit points, determined by different criteria including learning outcome, contact hours etc.

The following mechanism is adopted for the purpose of computation of credits earned by the students:

a) 1 hour instruction of Theory = 1 Credit
b) 2-3 hours instruction of Tutorial = 1 Credit
c) 2-3 hours instructions of Practical = 1 Credit

OUTCOME BASED EDUCATION (OBE)

Outcome based education is based on revised Bloom Taxonomy and is a learner-centric teaching and learning methodology in which the course delivery and assessment are planned to achieve stated

objectives and outcomes. It focuses on measuring students performance i.e. outcomes at different levels. OBE method of learning is adopted.

STRUCTURE OF THE PROGRAMME

UG program shall have a curriculum comprising theory and practical (separate / in built with theory) courses with a specified syllabus. The curriculum of the program is a blend of Language Courses, Core Courses, Interdisciplinary Courses (IDC), Discipline Specific Electives (DSE), Trans-disciplinary Electives (TDE) and Ability Enhancement Courses (AEC) shall be offered.

MEDIUM OF INSTRUCTION AND EXAMINATIONS

The medium of instruction and examinations shall be English, except for courses on Languages other than English.

EVALUATION

The evaluation shall generally comprise of Continuous Internal Assessment (CIA) and Semester End Examination (SEE) with percentage weightage as specified below, unless specified otherwise in the Scheme of Learning and Evaluation.

Components	Theory Courses	Practical Courses
Continuous Internal Assessment (**CIA**)	Varies from 30 percent to 60 percent based on the nature of course.	Varies from 40 percent to 100 percent based on the nature of course.
Semester End Examination (**SEE**)	Varies from 70 percent to 40 percent based on the nature of course.	Varies from 40 percent to 60 percent based on the nature of course.

COMPLETION OF PROGRAM TO EARN THE DEGREE CERTIFICATE

The University shall publish the result after evaluation and with the recommendations of Result Passing Board at the end of each semester. On approval / ratification of the results by the Academic Council, the student will be recommended to Governing Body for the award of the degree provided that the student have earned all the credits towards mandatory course / components as mentioned in Scheme of Learning and Evaluation.

MINIMUM QUALIFICATION FOR APPOINTMENT OF FACULTY MEMBER

As per norms of UGC and./or other related Regulatory body

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Department of Microbiology
B. Sc. MICROBIOLOGY

VISION OF THE DEPARTMENT

Our vision is to produce highly qualified and competent microbiologists with expertise in all the relevant areas, to develop and maintain a strong and supportive research programme to complement our national needs while strengthening local relevance and to rise as centre of excellence and knowledge in the subject of Microbiology

MISSION OF THE DEPARTMENT

The Mission of Microbiology Department is to promote good quality education, research and to provide the most rigorous and inspiring training in the discipline of Microbiology with greater significance of application in all relevant areas. The Department strives to educate and mentor students to:

- Acquire practical skills necessary for operation and maintenance of small and medium scale industry and research institute,
- Be aware of the role of microorganisms in various aspects of life processes and understand their importance in agriculture, environment, food, health, and other areas,
- Apply microbiological techniques and technologies to the betterment of human life, environment and national economy,
- Contribute to the pursuit of knowledge by contributing meaningfully in the area of Research in Microbiology

OBJECTIVES OF THE PROGRAMME

The Curriculum is designed to attain the following learning goals which students shall accomplish by the time of their graduation:

1. This programme will enable students to understand the basic anatomy, physiology, diversity, and genetics of microorganisms including viruses, bacteria, protozoa, algae and fungi, and exploit their interactions with environment and human beings.
2. The Curriculum is designed to impart to students the skill to operate basic and advanced instruments used for analysis of various biomolecules.
3. This programme will enable students to acquire knowledge on the Microbiology, Cell Biology, Microbiology, Immunology, Bioprocess Technology and Molecular Biology to enable them to understand emerging and advanced concept in modern biology and help them to take their career in this field.
4. After completion of the programme, the students will be able to acquire the necessary theoretical and practical competencies in Microbiology to enable them to undertake higher studies in recognized Institutions of advance learning and engage gainful self-employment.
5. The Programme is intended to help the students to be the innovative and versatile personalities in the field of Life Science with quality education and provide the skilled manpower required by Research and Development, Institutions of Higher Learning and Industry.

GRADUATE ATTRIBUTES

- **Academic excellence**: Ability to identify key questions, research and pursue rigorous evidence-based arguments.
- **Critical Thinking and Effective communications**: Analysis and evaluation of information to form a judgment about a subject or idea and ability to effectively communicate the same in a structured form.
- **Global Citizenship**: Mutual understanding with others from diverse cultures, perspectives and backgrounds
- **Life Long Learning**: Open, curious, willing to investigate, and consider new knowledge and ways of thinking

PROGRAM EDUCATIONS OBJECTIVES (PEOs)

This programme will produce Graduates who will attain following PEOs after few years of graduation		
PEO 1	**:**	**Core competency:** will develop the competency to pursue higher education, successful professional career, or be an entrepreneur with synergistic combination of the knowledge and skills of Microbiology and allied sciences
PEO 2	**:**	**Breadth of knowledge**: will show the ability to critically analyse scientific data, drawing objective conclusions from it and apply this knowledge to independently design, and execute small research problems with the help of integrated knowledge of Microbiology and other domains for societal and human welfare.
PEO 3	**:**	**Preparedness:** will have the potential to take any task or assignment in the capacity of a leader or team member in the chosen occupations or careers and will reflect an aptitude and ability for contribution in academics, entrepreneurship, and research, equipped with good communication skills.
PEO 4	**:**	**Professionalism:** will possess strong professional ethics and expertise to fulfil moral duties towards their profession, community, society and nation at large.
PEO 5	**:**	**Learning environment:** will show readiness for lifelong learning necessary to meet the ever evolving professional, social and personal demands through ethical, interpersonal and team skills.

PROGRAM OUTCOMES:

After completion of the B.Sc. Microbiology programme, the Graduate will be able to:		
PO 1	**:**	**Domain knowledge:** Demonstrate an understanding of fundamental principles of Microbiology, its applications and scope, along with an ability to identify beneficial and harmful role of microorganisms for the benefit of Science and Society
PO 2	**:**	**Problem analysis:** Accurately identify and critically analyse pertinent problems in the field of Applied Microbiology and various domains of Biological sciences.
PO 3	**:**	**Design/development of solutions:** Search for and successfully arrive at viable conclusions/solutions pertaining to various aspects of life sciencesusing right approach and appropriate tools and techniques
PO 4	**:**	**Conduct investigations of complex problems:** Ability to investigate any complex problems related to Microbiology and other life science with the use of appropriate experimentaltools/techniques/equipment.
PO 5	**:**	**Modern tool usage:**Understand standard operating procedures, safety measures and acquire in-depth technical competence to handle the basic laboratory instruments, and develop the skills to locate and retrieve scientific information with modern data search tools.
PO 6	**:**	**The Microbiologist and Society:** Demonstrate the ability to understand the role of scientific developments in a changing world from the disciplinary perspective as well as in relation to its professional and everyday use, withan insight into one's role in society and act in an honest and consistent manner based on a strong sense of self and personal values.
PO 7	**:**	**Environment and sustainability:** Analyse the impact of scientific and technological advances on the environment and society and the need for sustainable development.
PO 8	**:**	**Ethics:** Commitment to professional ethics and responsibilities.
PO 9	**:**	**Individual and team work:** Exhibit the potential to effectively accomplish tasks as a leader or a member of a team as well as independently in multidisciplinary settings.
PO 10	**:**	**Communication:** Communicate effectively in spoken and written forms as well as through digital media with scientific community, society, and fellow mates.
PO 11	**:**	**Project management and finance:** Demonstrate knowledge and scientific understanding to design a research project and manage its execution to generate new scientific insights, innovations in Microbiology research and exhibit organizational skills for able management of time and resources.
PO 12	**:**	**Life-long learning:** Able to recognize the need to undertake life-long learning and acquire the capacity to build on critical thinking skills for periodic updating of scientific knowledge and its application.

PROGRAM SPECIFIC OUTCOMES (PSOs) for B. Sc. Microbiology programme

After completion of the programme, the Graduate will:		
PSO1	**:**	Acquire knowledge on the fundamentals of Microbiology for sound and solid base which enables them to understand the emerging and advanced concepts in life sciences
PSO2	**:**	To equip the students with knowledge, skill and inspiration to pursue higher education and research in Microbiology and allied fields in reputed institutes at national and international level.
PSO3	**:**	Be able to understand fundamental principles of Microbiology to find innovative solutions for environment, agriculture, and health related issues at local and global level.
PSO4	**:**	Apply the knowledge of Microbiology, preferably with the synergistic application of basic understanding of other allied fields, for finding sustainable ethical solutions to existing global problems in compliance to the SDGs
PSO5	**:**	Become competent and eligible to appear in various competitive exams, getting placement in government and private sectors of academia, research and industries, and become a successful Microbiologist serving the Nation.

Enclosure - I

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B. Sc. MICROBIOLOGY
SCHEME OF LEARNING AND EVALUATION
For the students admitted from the A.Y. 2021-22 & onwards

Semester–I									
Course Code	**Course**	**Contact Hrs/wk.**			**SEE Duration Hrs**	**Maximum Marks**			**Credits**
						CIA	**SEE**	**Total**	
		T	**Tu**	**P**					
Part–I									
21ULCEN101	English-I – Development of Functional English	3	-	-	3	40	60	100	3
	Part-I Total	**3**	**0**	**0**		**40**	**60**	**100**	**3**
Part–II									
21UMBCC101	**Core1**: Fundamentals of Microbiology **(F1)**	4	-	-	3	30	70	100	4
21UMBCC102	**Core2**:Microbial Growth and Control **(F2)**	4	-	-	3	30	70	100	4
21UMBID101	**IDC-1**: **Zoology-1 Systematics and Anatomy**	3	-	-	3	30	70	100	3
21UMBCC103	**Core Practical-1** Basic Microbial Techniques	-	-	6	6#	40	60	100	4
21UMBID102	**IDC- Practical - 1**: **Zoology-1: Systematics and Anatomy**	-	-	6	3	40	60	100	2
	Core Enrichment – 1: Concept to Practice Course		1	-	-	(20)	Evaluation at the end of Semester - IV		
	Part-II Total	**11**	**1**	**12**		**170**	**330**	**500**	**17**
Part-III: Ability Enhancement Courses									
21AESD101	**AECC I :** Introduction to SDG (online course)	-	-	-	-		-	Remarks	Audit course
	AECC II: Environmental Conservation and Sustainable Development	1	-	-	-	Evaluation at the end of 2nd Semester			-

	AECC III: Human Values for Holistic Living	1	2*	-	-	Evaluation at the end of 2nd Semester			-
	FS 3: Career Acceleration Programme	2*							
	Part-III Total	**2**	**-**	**-**		**100**	**0**	**0**	**0**
	Total (Part-I to Part-III)	**16**	**1**	**12**	**-**	**210**	**390**	**600**	**20**
		29				**600**			

\# 3hrs on day1 and 3 hrs on day 2;

* Beyond Academic hours

( ) Final evaluation for 100 marks be made at the end of Semester IV, which include 20 marks CIA in Semesters I, II, and III each, and of 40 marks in Semester IV.

Semester–II									
Course Code	**Course**	**Contact Hrs/wk.**			**SEE Duration hrs**	**Maximum Marks**			**Credits**
		T	**Tu**	**P**		**CIA**	**SEE**	**Total**	
Part –I									
21ULCEN201	English II – Functional English	3	-	-	3	40	60	100	3
	Part-I Total	**3**	**0**	**0**		**40**	**60**	**100**	**3**
Part-II									
21UMBCC201	**Core3**: Microbial Taxonomy and diversity (F)	4	-	-	3	30	70	100	4
21UMBCC202	**Core4:**Basic Biochemistry (F)	4	-	-	3	30	70	100	4
21UMBCC203	**Core 5:** Cell Structure and Organization (F)	4	-	-	3	30	70	100	4
21UMBID201	**IDC-2**: Botany – Medicinal Botany	3	-		3	30	70	100	3
21UMBCC204	**Core Practical - 2** Microbial Diversity and Biochemistry	-	-	6	6#	40	60	100	2
21UMBID202	**IDC-2**: Practical: Botany	-	-	6	3	40	60	100	2
	Core Enrichment – 2: Concept to Practice Course		1		-	(20)	Evaluation at the end of Semester - IV		
	Part-II Total	**15**	**1**	**12**		**200**	**400**	**600**	**19**
Part-III: Ability Enhancement Courses									
21xxx	**AECC II:** Environmental Conservation and Sustainable Development	1	-	-	-	Remarks			2
21xxxx	**AECC III:** Human Values for Holistic Living	1	2*	-	-	Remarks			3
	FS 3: Career Acceleration Programme	2*							
	Part-III Total	**2**	**-**	**-**		**0**	**0**	**0**	**5**
	Total (Part-I to Part-III)	**20**	**1**	**12**	**-**	**240**	**460**	**700**	**27**
		33				**700**			

3 hrs on day1 and 3 hrs on day 2;

* Beyond Academic hours

(Final evaluation for 100 marks be made at the end of Semester IV, which include 20 marks CIA in Semesters I, II, and III each, and of 40 marks in Semester IV.)

Minimum one-month internship pertaining to learning for concept to practice/prototype or product development for start-up/mini and final semester project/skilling in the summer vacation/combination of semester break and summer vacation in industry/premier research institute/NGO, etc.

Semester–III									
Course Code	**Course**	**Contact Hrs /wk.**			**SEE Duration hrs**	**Maximum Marks**			**Credits**
		T	**Tu**	**P**		**CIA**	**SEE**	**Total**	
Part – I									
	English III –	3	-	-	3	40	60	100	3
	Part-I Total	**3**	**0**	**0**		**40**	**60**	**100**	**3**
Part–II									
21UMBCC301	**Core 6**: Applied and Environmental Microbiology	4	-	-	3	30	70	100	4
21UMBCC302	**Core 7**: Agricultural Microbiology	4	-		3	30	70	100	4
21UMBCC303	**Core 8**: Bioinstrumentation Techniques	4	-		3	30	70	100	4
21UMBIDC301	**DSE 1: Sustainability and Conservation (Zoology-2)**	3	-	-	3	30	70	100	3
21UMBCC304	**Core practical – 3 – Applied and Analytical Microbiology**	-	-	6	6	40	60	100	2
21UMBIDC302	**DSE 1: Practical Sustainability and Conservation (Zoology-2)**	-	-	6	3	40	60	100	2
<No course code>	**Core Enrichment – 3: Concept to Practice Course**		1	-	-	20	Evaluation at the end of Semester - IV		
	Core Enrichment 2: Internship 1	-	-	-		100		100	1
	Part-II Total	**15**	**1**	**12**		**300**	**400**	**700**	**20**
Part-III: Ability Enhancement Courses									
	FS 3: Career Acceleration Programme (CAP)	-	2	-					Audit course
	Part-III Total	-	2	-		0	0	0	
	Total (Part-I to Part-III)	**18**	**3**	**12**	**-**	**340**	**460**	**800**	**23**
		33				**800**			

Semester– IV									
CourseCode	Course	Contact Hrs/wk.			SEEDurationhrs	Maximum Marks			Credits
		T	Tu	P		CIA	SEE	Total	
Part – I									
	English IV –	3	-	-	3	40	60	100	3
	Part-I Total	**3**	**0**	**0**		**40**	**60**	**100**	**3**
Part–II									
21UMBCC401	**Core 9**:	4	-	-	3	30	70	100	4
21UMBCC202	**Core10**:	4	-		3	30	70	100	4
	Coreelective 1:<1> <2>	4	-		3	30	70	100	4
	TDE 1	2	-	-	3	30	70	100	2
	DSE:2 –	3	-	-	3	30	70	100	3
	Core Practical – 4 –			6	6	40	60	100	3
21UMBCC403	**Core elective Practical**			4	3	40	60	100	2
	DSE:2 – Practical			6	3	40	60	100	2
21xxx	**Core Enrichment – 1: Concept to Practice Course**		1	-	-	40	-	100	-
	Part-II Total	**17**	**1**	**18**		**270**	**530**	**800**	**24**
Part-III: Ability Enhancement Courses									
<no subject code>	**FS 3:**Career Acceleration Programme (CAP)	-	2	-					Audit course
	Part-III Total	**0**	**2**	**0**					
	Total (Part-I to Part-III)	**20**	**3**	**18**	**-**	**310**	**590**	**900**	**27**
		37				**900**			

Minimum one month internship pertaining to learning for concept to practice/prototype or product development for start-up/mini and final semester project/skilling in the summer vacation/combination of

semester break and summer vacation in industry / premier research institute/ NGO etc.

Semester– V									
CourseCode	Course	**Contact Hrs/wk.**			**SEED uratio nhrs**	**Maximum Marks**			**Credits**
						CIA	**SEE**	**Total**	
		T	**Tu**	**P**					
Part–II									
21UMBCC501	**Core11:**	4	-	-	3	30	70	100	4
21UMBCC502	**Core12**:	4	-	-	3	30	70	100	4
21UMBCC503	**Core 13: (Self-study) –**	1	-	-	3	30	70	100	4
21UMBCC504	**Core 14:** Concept Recapitulation Test (CRT) for **Core** Courses of Semester I to V				2	100	-	100	1
	Core elective 2: <1><2>	4	-		3	30	70	100	4
	TDE 2:	2	-	-	3	30	70	100	2
21UMBCC505	**Core Practical – 5 -**			9	6	40	60	100	3
	Core Elective Practical			4	3	40	60	100	2
	Core Enrichment 3: Internship 2	-	-	-		100		100	1
	Core Enrichment 4: Mini Project /Skill Enhancement	-	2	4	-	100	-	100	4
	Part-II Total	**15**	**2**	**17**		**530**	**470**	**1000**	**29**
Part-III: Ability Enhancement Courses									
<no subject code>	**FS-3** Career Acceleration Programme (CAP)	-	2	-		Remarks			Audit course
	Part-III Total	**0**	**2**	**-**		**0**	**0**	**0**	
	Total (Part-II to Part-III)	**15**	**4**	**17**	**-**	**530**	**470**	**1000**	**29**
		34				**1000**			

Semester–VI									
Course Code	**Course**	**Contact Hrs /wk.**			**SEE Duration hrs**	**Maximum Marks**			**Credits**
		T	**Tu**	**P**		**CIA**	**SEE**	**Total**	
Part–II(Project + a Compulsory course/ Advanced Courses + a Compulsory course)									
	Core 15: (Compulsory course)	5	-	-	3	30	70	100	5
	Core 16:	5	-	-	3	30	70	100	5
	Core – 17:	5	-	-	3	30	70	100	5
	Core Practical – 6 – Skill Training / Start up	-	-	9	6	40	60	100	4
	Core Enrichment 5: Project / Dissertation	-	-	20				300	14
		24/25						**400**	**19**
	Part-II Total							**400**	**19**
						Total Marks:400			

It is expected that student should spend *4hrs each day for 6 days

Formation of Part-III

Course Code	Semester	Course / Component	Contact Hrs	No. of Courses	Credit/ Course	Total Credits
A. Ability Enhancement Course (AEC)						
(i) Ability Enhancement Compulsory Course (AECC)						
	I	**AECCI: Introduction** to SDG (online course)	-	1	Remarks	Audit Course
	I & II	**AECC II:** Environmental Conservation and Sustainable Development	1 Hr / Week / Semester	1	1+1	2
	I & II	**AECC III:** Human Values for Holistic Living	1 T + 2 Tu /Week /Semester	1	1+1+1	3
					Sub Total	**5 + Audit course**
(ii) ***Skill Enhancement Course (SEC)***						
As per common list	Any Semester between II –V/VII	**SEC-I** *Value Added Courses	40 Hrs	1	1	1
	Any Semester between III – V/VII	**SEC-II** **Co-Curricular Course	80 to 120 Hrs	1	2	2
					Sub Total	3
B. Finishing School						
FS I *to* FS IV *Compulsory to Earn Degree.*						
	I	**FS I:** Student Induction Program	3 weeks Phase 1, Phase 2, Phase 3	-	Remark	Audit course
	Across I & II Semesters	**FS II:** Fundamentals of Design Thinking (Online/Offline)	40 to 60 Hrs	1	Remark	Audit course
	Semesters I to V / VII	**FS III:** Career Acceleration	2 Hrs / Week /Semester	As per syllabus	Remarks	Audit course

		Programme – CAP (Placement Training)				
	Semester V (3 yrs program) Semester VI (4 yrs program)	**FS IV:** Community Engagement	Twice a month	1	Remarks	Audit course
FS V *to* FS VIII *Options for Advanced Learners*						
	Any semester from II to V/VII	**FS V:** Indian & Foreign Languages	-	Any number of courses	Remarks	Audit course
	Any semester from II to V/VII	**FS VI:** Any number of Online course(s) from select MOOC platforms	-	Any number of courses	Remarks	Credit as per provider/ audit course
	Any semester from III to V/VII	**FS VII:** Advanced Design Thinking	-	1	Remarks	Audit course
	Any semester from I to VI/VIII	**FS VIII: #Extra Credit Course** Any number of courses from any UG program across the College	Self-study	Any number of courses	As per course offered	As per credit(s) earned across all courses opted

***Value Added Courses** - Option to student to choose at least 1 from a list of courses offered by any department across the Institution.

****Co-Curricular Courses** - Option to students to choose 1 from a list of courses offered by any department across the Institution.

Student may opt for any course of the odd/even prevailing semester from any UG program across the Institution with the following guidelines:

a. Attending class not mandatory.
b. May be mentored by the course teacher.
c. Preparation through self-study.
d. CIA not mandatory; evaluated for total marks at the end of the semester.
e. Indicates options to appear for the course through examination application and payment of

examination fees of that course.

f. Credits earned through each course indicated in the consolidated mark sheet as extra credits; not included for CGPA, percentage marks and classification.

TOTAL MARKS & CREDIT DISTRIBUTION TO EARN THE DEGREE

S. No	PART	Total Marks	Total Credits
1.	**PART I:** Language Course	400	12
2.	**PART II:** **Core**, IDC, DSE, TDE	4000	128
3.	**PART III:** AECC-I, II & III SEC- I & II FS I, II, III & IV	Remarks	08 + Credit audit
TOTAL		**4400**	**148**

VALUE ADDED COURSES (VAC) COURSES OFFERED BY THE DEPARTMENT

Sr. No.	Course Code	Course Title	Course Duration	Credits
1	21UMBVA01	Mushroom Cultivation	40 Hrs	1

CO-CURRICULAR COURSE (CCC) OFFERED BY THE DEPARTMENT

Sr. No.	Course Code	Course Title	Course Duration	Credits
1	21UMBCCC1	Biofertilizers	80 Hrs	1

Sarvodaya Kelavani Samaj Managed

Shri Manibhai Virani & Smt.Navalben Virani Science College, Rajkot

(Autonomous)

Affiliated to Saurashtra University, Rajkot

Reaccredited at the "A" Level (CGPA 3.28) by NAAC

"STAR" College Scheme & Status by MST-DBT

A College with Potential for Excellence – CPE (Phase - II) by UGC

Accredited at the G-AAA Highest Grade 'A-1' Level by KCG, Govt. of Gujarat

UGC-DDU KAUSHAL Kendra

GPCB-Government of Gujarat approved Environmental Audit Centre

SCHEME OF LEARNING AND EVALUATION

Of

B. Sc. Biochemistry

(w.e.f June 2021)

Enclosure-II

Shri Manibhai Virani and Smt.Navalben Virani Science College, Rajkot
(Autonomous)
Affiliated to Saurashtra University, Rajkot

Department of Biochemistry

B.Sc. BIOCHEMISTRY

VISION:

To be a prime centre in area of biochemical sciences by enhancing the quality of life through holistic education and research

MISSION:

- To encourage innovation and creativity towards better understanding of life at molecular level.
- To foster the culture of scientific understanding,curiosity and critical thinking for professional as well as academic excellence.
- To promote quality research and other scholarly activities for sustainable industrial development and healthy life style.
- To inculcate leadership,morality,spirituality,accountability,integrity and social equality among the students.

OBJECTIVES OF THE PROGRAMME:

The Curriculum is designed to attain the following learning goals which students shall accomplish by the time of their graduation:

1. Understand the basic concepts of life Science from molecular to organisms' level.
2. Apply basic principle of analytical techniques and use effectively basic and modern laboratory instruments.
3. Effectively use knowledge of Biochemistry in healthy living and better management of diseases.
4. Design, perform simple experiments in clinical biochemistry and interpret data to derive conclusion.

- **Graduate attributes**
    - **Academic excellence**: Ability to identify key questions, research and pursue rigorous evidence-based arguments
    - **Critical Thinking and Effective communications:** Analysis and evaluation of information to form a judgement about a subject or idea and ability to effectively communicate the same in a structured form.
    - **Global Citizenship:** Mutual understanding with others from diverse cultures, perspectives and backgrounds

- **Life Long Learning:** Open, curious, willing to investigate, and consider new knowledge and ways of thinking

PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

Our programme will produce Graduates who will attain following PEOs after few years of graduation		
PEO 1	**:**	**Core competency:** will be competent in the field of biochemistry and allied areas by providing them hands on experience in basic tools and techniques.
PEO 2	**:**	**Breadth of knowledge**: will critically analyse scientific data, draw objective conclusions and apply this knowledge for human welfare.
PEO 3	**:**	**Preparedness:** Will reflect ability for research and entrepreneurship along with strong ethics and communication skills.
PEO 4	**:**	**Professionalism:** will reveal strong professional ethics and moral duties that will positively affect their profession, community, society and Nation at large.
PEO 5	**:**	**Learning environment:** will show attitude of lifelong learning to meet the ever evolving professional demands by developing ethical, interpersonal and team skills.

PROGRAM OUTCOMES:

After completion of the programme the Graduate will be able to :		
PO 1	**:**	**Domain knowledge:** Demonstrate an understanding of fundamental biochemistry principles, including topics specific to chemistry and biochemistry.
PO 2	**:**	**Problem analysis:** Identify and critically analyse pertinent problems in the various domains of life sciences.
PO 3	**:**	**Design/development of solutions:** using appropriate tools and techniques as well as approaches to arrive at viable conclusions/solutions pertaining to life sciences.
PO 4	**:**	**Conduct investigations of complex problems:** Cultivate the skills to Employ modern library search tools to locate and retrieve scientific information about a problem relating to biochemistry.
PO 5	**:**	**Modern tool usage:** Ability to handle/use appropriate chemical and biochemical experiments using tools/techniques/equipment with an understanding of the standard operating procedures, safety aspects/limitations.
PO 6	**:**	**The Biochemist and society:** Demonstrate the ability to understand the role of scientific developments, particularly, biological sciences in a changing world from the disciplinary perspective as well as in relation to its professional and everyday use.

PO 7	**:**	**Environment and sustainability:** Analyse the impact of scientific and technological advances on the environment and society and the need for sustainable development.
PO 8	**:**	**Ethics:** Commitment to professional ethics and responsibilities.
PO 9	**:**	**Individual and team work:** Exhibit the potential to effectively accomplish tasks independently and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**:**	**Communication:** Communicate effectively in spoken and written form as well as through electronic media with the scientific community as well as with society at large. Demonstrate the ability to write dissertations, reports, make effective presentations and documentation.
PO 11	**:**	**Project management and finance:** Demonstrate knowledge and scientific understanding to identify research problems, design experiments, generation of new scientific insights or to the innovation of new applications of Biochemistry research and provide solutions. Exhibit organizational skills and the ability to manage time and resources.
PO 12	**:**	**Life-long learning:** Ability to retain and build on critical thinking skills, and use them to update scientific knowledge and apply them in day to day business.

PROGRAM SPECIFIC OUTCOMES (PSOs) for B. Sc. Biochemistry program

After completion of the program the Graduate will:		
PSO1	**:**	Communicate the fundamental concepts of biomolecules, enzymes, cell structure, organ system and metabolism.
PSO2	**:**	Undertake the experiments and derive conclusions by using classical and advanced instruments employed in the area of biochemistry, biotechnology, molecular biology and immunology.
PSO3	**:**	Understand, identify, formulate and solve the problems of endocrine disorders in the area of hormone biochemistry.
PSO4	**:**	Appreciate and apply understandings and skills of molecular diagnosis as well as analytical techniques for the development of professional and research career in environment, industry, agriculture and healthcare sector.
PSO5	**:**	Become competent and eligible to appear in various competitive exams, doing jobs in government and private sector of academia, research and industries

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Department of Biochemistry

B.Sc. BIOCHEMISTRY
SCHEME OF LEARNING AND EVALUATION

For the students admitted from A.Y. 2021-2022 & onwards

Semester I									
Course Code	**Course**	**Contact Hrs/ week**			**SEE Duration (Hours)**	**Maximum Marks**			**Credit(s)**
						CIA	**SEE**	**Total**	
Part-I		**T**	**Tu**	**P**					
21UEN101	Development of Functional English	3	-	-	3	40	60	100	3
	Part-I Total	**3**	**0**	**0**		**40**	**60**	**100**	**3**
Part-II									
21UBCCC101	**Core-1:** Foundations of Biochemistry (F)	4	-	-	3	30	70	100	4
21UBCCC102	**Core-2**: Molecules of life (F)	4	-	-	3	30	70	100	4
21UBCID101	**IDC-1:** Botany	3	-	-	3	30	70	100	3
21UBCCC103	**Core Practical-1**: Basic Biochemistry Practical	-	-	6	6	40	60	100	3
21UBCID102	**IDC-1 Practical**:	-	-	6	3	40	60	100	2
	Core Enrichment 1: Concept to Practice Course	-	1	-	-	20	Evaluation at the end of Semester - IV		
	Part-II Total	**11**	**1**	**12**	**--**	**190**	**330**	**500**	**16**
Part-III: Ability Enhancement Courses									
	AECC I: Introduction to SDG (Online course)	-	-	-	-	-	-	Remarks	Audit course
21UAEES101	**AECC II:** Environmental Conservation and Sustainable Development	1	-	-	-	Evaluation at the end of Semester II			-
	AECC III: Human Values for Holistic	1	2*	-	-	Evaluation at the end of Semester II			-

	Living								
	Part-III Total	**2**	**2***	**0**		**00**	**0**	**0**	**0**
	Total (Part-I to Part-III)	**16**	**1+2***	**12**		**230**	**390**	**600**	**19**
		29				**600**			

* Out of working Hours

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SCHEME OF LEARNING AND EVALUATION

For the students admitted from A.Y. 2021-2022 & onwards

Semester II									
Course Code	**Course**	**Contact Hrs/ week**			**SEE Duration (Hours)**	**Maximum Marks**			**Credit(s)**
						CIA	**SEE**	**Total**	
Part-I		**T**	**Tu**	**P**					
	Functional English	3	-	-	3	40	60	100	3
	Part-I Total	**3**	**0**	**0**	**3**	**40**	**60**	**100**	**3**
Part-II									
21UBCCC201	**Core-3:** Foundation Course	4	-	-	3	30	70	100	4
21UBCCC202	**Core-4:** Foundation Course	4	-	-	3	30	70	100	4
21UBCCC203	**Core-5:** Advance Course	4	-	-	3	30	70	100	4
21UBCID201	**IDC-2:**	3	-	-	3	30	70	100	3
21UBCCC204	**Core Practical-2**: Foundation Course Practical#	-	-	6	6	40	60	100	3
21UBCID202	**IDC Practical-2:**	-	-	6	3	40	60	100	2
	Core Enrichment 1: Concept to Practice Course	-	1	-	-	20	Evaluation at the end of Semester – IV		
	Part-II Total	**15**	**1**	**12**	**--**	**220**	**400**	**600**	**20**
Part-III: Ability Enhancement Courses									
21UAEES201	**AECC II:** Environmental Conservation and Sustainable Development	1	-	-	-	Remarks			2
	AECC III: Human Values for Holistic Living	1	2*	-	-	Remarks			3
	Part-III Total	**2**	**2***	**0**	**-**	**0**	**0**	**0**	**5**
	Total (Part-I to Part-III)	**20**	**1+2***	**12**	**-**	**260**	**460**	**700**	**28**
		33			**-**	**700**			

*Out of working Hours

3 hours each on Day1 and Day 2.

Minimum one month internship pertaining to learning for concept to practice/prototype or product development for start-up/mini and final semester project/skilling in the summer vacation/combination of semester break and summer vacation in industry/premier research institute/NGO, etc.

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B.Sc. BIOCHEMISTRY

SCHEME OF LEARNING AND EVALUATION

For the students admitted from A.Y. 2021-2022 & onwards

Semester III									
Course Code	**Course**	**Contact Hrs/ week**			**SEE Duration (Hours)**	**Maximum Marks**			**Credit(s)**
						CIA	**SEE**	**Total**	
Part-I		**T**	**Tu**	**P**					
	Advanced English Language-I	3	-	-	3	40	60	100	3
	Part-I Total	**3**	**0**	**0**	**3**	**40**	**60**	**100**	**3**
Part-II									
21UBCCC301	**Core-6:** Advance Course	4	-	-	3	30	70	100	4
21UBCCC302	**Core-7:** Advance Course	4	-	-	3	30	70	100	4
21UBCCC303	**Core-8:** Applied Course	4	-	-	3	30	70	100	4
21UBCDC301	**DSE-1:**	3	-	-	3	30	70	100	3
21UBCCC304	**Core Practical-3**: Advance + Applied Course Practical#	-	-	6	6	40	60	100	3
21UBCDC302	**DSE-1 Practical:**	-	-	6	3	40	60	100	2
	Core Enrichment 1: Concept to Practice:	-	1	-	-	20	Evaluation at the end of Semester – IV		
	Core Enrichment 2: Internship 1/ Training/ Project	-	-	-	-	100	-	100	1
	Part-II Total	**15**	**1**	**12**	**--**	**320**	**400**	**700**	**21**
Part-III: Ability Enhancement Courses									
	FS 3: Career Acceleration Programme –CAP (Placement Training)	-	2	-	-				Audit course
	Part-III Total	**0**	**2**	**0**	**-**	**0**	**0**	**0**	**0**

	Total (Part-I to Part-III)	**18**	**3**	**12**	**-**	**360**	**460**	**800**	**24**
		33			**-**	**800**			

*Out of working Hours

3 hours each on Day1 and Day 2.

Minimum one month internship pertaining to learning for concept to practice/prototype or product development for start-up/mini and final semester project/skilling in the summer vacation/combination of semester break and summer vacation in industry/ premier research institute/NGO, etc.

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SCHEME OF LEARNING AND EVALUATION

For the students admitted from A.Y. 2021-2022 & onwards

Semester IV									
Course Code	**Course**	**Contact Hrs/ week**			**SEE Duration (Hours)**	**Maximum Marks**			**Credit(s)**
						CIA	**SEE**	**Total**	
Part I		**T**	**Tu**	**P**					
	Advanced English Language-II	3	-	-	3	40	60	100	3
	Part-I Total	**3**	**0**	**0**	**3**	**40**	**60**	**100**	**3**
Part-II									
21UBCCC401	**Core-9:** Advance Course	4	-	-	3	30	70	100	4
21UBCCC402	**Core-10:** Advance Course	4	-	-	3	30	70	100	4
21UBCDC401/ 21UBCDC402	**Core Elective 1:** Advance Course/ Advance Course	4	-	-	3	30	70	100	4
21UBCDC401	**DSE 2:**	3	-	0	3	30	70	100	3
21UBCTD401	**TDE 1:**	2	-	-	-	100	-	100	2
21UBCCC403	**Core Practical-4:** Advance Course Practicals#	-	-	6	6	40	60	100	3
21UBCDC403/ 21UBCDC404	**Core Elective Practical-1** Advance Course/ Advance Course Practicals	-	-	4	3	40	60	100	2
21UBCDC402	**DSE-2 Practical**	-	-	4	2	40	60	100	2
	Core Enrichment 1: Concept to Practice Course	-	1	-	-	40	-	100	1
	Part-II Total	**17**	**1**	**14**	**-**	**380**	**460**	**900**	**25**
Part-III: Ability Enhancement Courses									
	FS 3: Career Acceleration Programme –CAP (Placement Training)	-	2	-	-				Audit course
	Part-III Total	**0**	**2**	**0**	**-**	**0**	**0**	**0**	**0**
	Total (Part-I to Part III)	**20**	**1+ 2***	**14**	**-**	**420**	**520**	**1000**	**28**

		35 + 2*	**-**	**1000**	

*Out of working Hours

Minimum one month internship pertaining to learning for concept to practice/prototype or product development for start-up/mini and final semester project/skilling in the summer vacation/combination of semester break and summer vacation in industry/premier research institute/NGO etc.

3 hours each on Day1 and Day 2.

DSE cluster -1 & 2:

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Semester V									
Course Code	**Course**	**Contact Hrs/ week**			**SEE Duration (Hours)**	**Maximum Marks**			**Credit(s)**
						CIA	**SEE**	**TOTAL**	
Part-II		**T**	**Tu**	**P**					
21UBCCC501	**Core-11:** Applied Course	4	-	-	3	30	70	100	4
21UBCCC502	**Core-12:** Applied Course	4	-	-	3	30	70	100	4
21UBCCC503	**Core-13:** Advance Course - Self study	4	-	-	3	30	70	100	4
21UBCCC504	**Core-14:** Concept Recapitulation Test (CRT)	-	-	-	3	100	-	100	1
21UBCDC501/ 21UBCDC502	**Core Elective 2:** Applied Course/ Applied Course	4	-	-	3	30	70	100	4
21UBCTD501	**TDE 2:**	2	-	-	0	100	0	100	2
21UBCCC505	**Core Practical-5** Applied Course Practical#	-	-	6	6	40	60	100	3
21UBCDC503/ 21UBCDC504	**Core Elective Practical-2** Applied Course / Applied Course Practicals	-	-	4	3	40	60	100	2
	Core Enrichment 3: Internship /Training/Mini Project 2:	-	-	-	-	100	-	100	1
	Core Enrichment 4: Minor Project/Dissertation / Review Article / Instrumental Training	-	-	3	-	100	-	100	2
	Part-II Total	**18**	**0**	**13**	**-**	**600**	**400**	**1000**	**27**

Part-III: Ability Enhancement Courses									
	FS 3: Career Acceleration Programme –CAP (Placement Training)	-	2*	-	-	Remarks			Audit course
	Part-III Total	**0**	**2***	**0**	**-**	**0**	**0**	**0**	**0**
	Total (Part-I to Part-III)	**18**	**2***	**13**	**-**	**600**	**400**	**1000**	**27**
		31			**-**	**1000**			

*Out of working Hours

3 hours each on Day1 and Day 2.

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Semester VI									
Course Code	**Course**	**Contact Hrs/ week**			**SEE Duration (Hours)**	**Maximum Marks**			**Credit(s)**
						CIA	**SEE**	**Total**	
Part- II		**T**	**Tu**	**P**					
21UBCCC601	**Core-16:** Applied Course *	5	-	-	3	30	70	100	5
21UBCCC602	**Core-17:** Advance Course **	5	-	-	3	30	70	100	5
21UBCCC603	**Core-18:** Applied Course **	5	-	-	3	30	70	100	5
21UBCCC604	**Core Practical-6** Advance +Applied Course Practical**			8	6	40	60	100	4
	Core Enrichment 5: Project **/ Skill training**	-	18*	-	0	300	0	300	14
	Part-II Total	**15**	18*	**8**		**130/ 330**	**270/ 70**	**400**	**19**
	Total (Part-II)	**15**	18*	**8**		**130/ 330**	**270/ 70**	**400**	**19**
		23				**400**			

* Compulsory for all

** Students can opt for Core-17, Core-18 and Core practical 6 **or** Core Enrichment 5.

Formation of Part-III

Course Code	Semester	Course / Component	Contact Hrs	No. of Courses	Credit/ Course	Total Credit(s)
		A. Ability Enhancement Course (AEC)				
(i) Ability Enhancement Compulsory Course (AECC)						
	I	**AECC I: Introduction** to SDG (online course)	-	1	Remarks	Audit Course
	I & II	**AECC II:** Environmental Conservation and Sustainable Development	1 Hr / Week / Semester	1	1+1	2
	I & II	**AECC III:** Human Values for Holistic Living	1 T + 2 Tu /Week /Semester	1	1+1+1	3
					Sub Total	**5 + Audit course**
(ii) ***Skill Enhancement Course (SEC)***						
As per common list	Any Semester between II – V/VII	**SEC-I** *Value Added Courses	40 Hrs	1	1	1
	Any Semester between III – V/VII	**SEC-II** **Co-Curricular Course	80 to 120 Hrs	1	2	2
					Sub Total	3
		B. Finishing School				
		FS I *to* FS IV *Compulsory to Earn Degree.*				
	I	**FS I:** Student Induction Program	3 weeks Phase 1, Phase 2, Phase 3	-	Remark	Audit course
	Across I & II Semesters	**FS II:** Orientation to Design Thinking (Online/Offline)	40 to 60 Hrs	1	Remark	Audit course
	Semesters I to V / VII	**FS III:** Career Acceleration Programme – CAP (Placement Training)	2 Hrs / Week /Semester	As per syllabus	Remarks	Audit course
	Semester	**FS IV:**	Twice a	1	Remarks	Audit course

	V (3 yrs program) Semester VI (4 yrs program)	Community Engagement	month			
		FS V *to* FS VIII *Options for Advanced Learners*				
	Any semester from II to V	**FS V:** Indian & Foreign Languages	-	Any number of courses	Remarks	Audit course
	Any semester from II to V	**FS VI:** Any number of Online course(s) from select MOOC platforms	-	Any number of courses	Remarks	Credit as per provider/audit course
	Any semester from III to V	**FS VII:** Advanced Design Thinking	-	1	Remarks	Audit course
	Any semester from I to VI	**FS VIII: #Extra Credit Course** Any number of courses from any UG program across the University	Self study	Any number of courses	As per course offered	As per credit(s) earned across all courses opted
					Grand Total	

***Value Added Courses** - Option to student to choose at least 1 from a list of courses offered by any department across the University.

****Co-Curricular Courses** - Option to students to choose 1 from a list of courses offered by any department across the University.

Student may opt for any course of the odd/even prevailing semester from any UG program across the University with the following guidelines:

a. Attending class not mandatory.
b. May be mentored by the course teacher.
c. Preparation through self-study.
d. CIA not mandatory; evaluated for total marks at the end of the semester.
e. Indicates options to appear for the course through examination application and payment of examination fees of that course.
f. Credits earned through each course indicated in the consolidated mark sheet as extra credits; not included for CGPA, percentage marks and classification.

TOTAL MARKS & CREDIT DISTRIBUTION TO EARN THE DEGREE

S.No	PART	Total Marks	Total Credits
1.	**PART I:** Language Course	**400**	**12**
2.	**PART II:** Core, IDC, DSE, TDE	**4000**	**128**
3.	**PART III:** AECC-I, II & III SEC- I & II FS I, II, III & IV	**Remarks**	**8 + Credit Audit**
	TOTAL	**4400**	**148**

COURSES OFFERED BY THE DEPARTMENT FOR OTHER PROGRAMS

Sr. No.	Name of Program	Semester	Course Code	Course Title	Contact Hrs/Week	Credits

VALUE ADDED COURSES (VAC) COURSES OFFERED BY THE DEPARTMENT

Sr. No.	Course Code	Course Title	Course Duration	Credits
1		**Food Adulteration**	**40 Hours**	
2				

CO-CURRICULAR COURSES (CoC) COURSES OFFERED BY THE DEPARTMENT

Sr. No.	Course Code	Course Title	Course Duration	Credits
1		**Medical Lab Techniques**	**80 Hours**	
2				

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Of

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(w.e.f June 2021)

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Semester I									
Course Code	**Course**	**Contact Hrs/ week**			**SEE Duration (Hours)**	**Maximum Marks**			**Credit(s)**
						CIA	**SEE**	**Total**	
Part-I		**T**	**Tu**	**P**					
21UEN101	Development of Functional English	3	-	-	3	40	60	100	3
	Part-I Total	**3**	**0**	**0**		**40**	**60**	**100**	**3**
Part-II									
21UBCCC101	**Core-1:** Fundamentals of Biochemistry (F)	4	-	-	3	30	70	100	4
21UBCCC102	**Core-2**: Molecules of life (F)	4	-	-	3	30	70	100	4
21UBCID101	**IDC-1:** Botany	3	-	-	3	30	70	100	3
21UBCCC103	**Core Practical-1**: Basic Biochemistry Practical	-	-	6	6	40	60	100	3
21UBCID102	**IDC-1 Practical**: Botany	-	-	6	3	40	60	100	2
	Core Enrichment 1: Concept to Practice Course	-	1	-	-	(20)	Evaluation at the end of Semester - IV		
	Part-II Total	**11**	**1**	**12**	**--**	**190**	**330**	**500**	**16**
Part-III: Ability Enhancement Courses									
21AESD101	**AECC I:** Introduction to SDG (Online course)	-	-	-	-	-	-	Remarks	Audit course
	AECC II: Environmental Conservation and Sustainable Development	1	-	-	-	Evaluation at the end of Semester II			-
	AECC III: Human Values	1	2*	-	-	Evaluation at the end of Semester II			-

	for Holistic Living								
	FS 3: Career Acceleration Program	2*	-	-	-	Cumulative Evaluation at the end of Semester V			-
	Part-III Total	**2**	**2***	**0**		**00**	**0**	**0**	**0**
	Total (Part-I to Part-III)	**16**	**1+2***	**12**		**230**	**390**	**600**	**19**
		29				**600**			

* Out of working Hours

( ) Final Evaluation for 100 marks be made at the end of Semester IV, which includes 20 marks CIA in Semester I, II, III each and 40 marks in Semester IV.

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Semester II									
Course Code	**Course**	**Contact Hrs/ week**			**SEE Duration (Hours)**	**Maximum Marks**			**Credit(s)**
						CIA	**SEE**	**Total**	
Part-I		**T**	**Tu**	**P**					
	Functional English	3	-	-	3	40	60	100	3
	Part-I Total	**3**	**0**	**0**	**3**	**40**	**60**	**100**	**3**
Part-II									
21UBCCC201	**Core-3:** Cell Biology	4	-	-	3	30	70	100	4
21UBCCC202	**Core-4:** Human Physiology I	4	-	-	3	30	70	100	4
21UBCCC203	**Core-5:** Human Physiology II & Endocrinology	4	-	-	3	30	70	100	4
21UBCID201	**IDC-2:** Zoology	3	-	-	3	30	70	100	3
21UBCCC204	**Core Practical-2**: Cell Biology & Human Physiology Practicals	-	-	6	6	40	60	100	3
21UBCID202	**IDC Practical-2: Zoology**	-	-	6	3	40	60	100	2
	Core Enrichment 1: Concept to Practice Course	-	1	-	-	(20)	Evaluation at the end of Semester – IV		
	Part-II Total	**15**	**1**	**12**	**--**	**220**	**400**	**600**	**20**
Part-III: Ability Enhancement Courses									
21AEES201	**AECC II:** Environmental Conservation and Sustainable Development	1	-	-	-	Remarks			2
	AECC III: Human Values for Holistic Living	1	2*	-	-	Remarks			3
21AEVE201	**FS 3:** Career Acceleration Program	2*	-	-	-	Cumulative Evaluation at the end of Semester V			-

Semester II									
Course Code	Course	Contact Hrs/ week			SEE Duration (Hours)	Maximum Marks			Credit(s)
						CIA	SEE	Total	
	Part-III Total	2	2*	0	-	0	0	0	5
	Total (Part-I to Part-III)	20	1+2*	12	-	260	460	700	28
		33			-	700			

*Out of working Hours

3 hours each on Day1 and Day 2.

( ) Final Evaluation for 100 marks be made at the end of Semester IV, which includes 20 marks CIA in Semester I, II, III each and 40 marks in Semester IV.

Minimum one month internship pertaining to learning for concept to practice/prototype or product development for start-up/mini and final semester project/skilling in the summer vacation/combination of semester break and summer vacation in industry/premier research institute/NGO, etc.

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Semester III									
Course Code	**Course**	**Contact Hrs/ week**			**SEE Duration (Hours)**	**Maximum Marks**			**Credit(s)**
						CIA	**SEE**	**Total**	
Part-I		**T**	**Tu**	**P**					
	Advanced English Language-I	3	-	-	3	40	60	100	3
	Part-I Total	**3**	**0**	**0**	**3**	**40**	**60**	**100**	**3**
Part-II									
21UBCCC301	**Core-6:** Protein Biochemistry (Ad)	4	-	-	3	30	70	100	4
21UBCCC302	**Core-7:** Enzymology (Ad)	4	-	-	3	30	70	100	4
21UBCCC303	**Core-8:** Analytical Biochemistry (Ap)	4	-	-	3	30	70	100	4
21UBCDC301	**DSE-1: Cluster**	3	-	-	3	30	70	100	3
21UBCCC304	**Core Practical-3**: Enzymology and Bioanalytical Practicals #	-	-	6	6	40	60	100	3
21UBCDC302	**DSE-1 Cluster Practical:**	-	-	6	3	40	60	100	2
<No course code>	**Core Enrichment 1:** Concept to Practice:	-	1	-	-	-	-	-	-
	Core Enrichment 2: Internship 1/ Training/ Project	-	-	-	-	100	-	100	1
	Part-II Total	**15**	**1**	**12**	**--**	**300**	**400**	**700**	**21**
Part-III: Ability Enhancement Courses									

	FS 3: Placement Training	-	2	-	-				Audit course
	Part-III Total	**0**	**2**	**0**	**-**	**0**	**0**	**0**	**0**
	Total (Part-I to Part-III)	**18**	**3**	**12**	**-**	**340**	**460**	**800**	**24**
		33			**-**	**800**			

*Out of working Hours

3 hours each on Day1 and Day 2.

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DSE cluster -1 & 2: