

# **SRI KRISHNA ARTS AND SCIENCE COLLEGE**

An Autonomous College, Affiliated to Bharathiar University  
Coimbatore – 641 008, Tamil Nadu, India.

## **LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (LOCF)**

**B.Sc. Microbiology  
(III to VI SEMESTER)**

**for 2022 - 2023 admitted students**

**DEPARTMENT OF BIOSCIENCE**



# SRI KRISHNA ARTS AND SCIENCE COLLEGE

COIMBATORE – 641008

## DEPARTMENT OF MICROBIOLOGY

(2022 - 2023)

### I. PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO 1	Get ability to apply the process of science by formulating hypotheses and design experiments based on the scientific method.
PEO 2	Analyze and interpret results from a variety of microbiological methods and using quantitative reasoning by using mathematical calculations and graphing skills to solve problems in microbiology.
PEO 3	Communicate and collaborate with other disciplines by effectively communicating the fundamental concepts of microbiology in written and oral format.
PEO 4	Understand the relationship between science and society by recognizing and discussing logical, scientific and ethical issues in microbiology.

### II. PROGRAMME LEARNING OUTCOMES (PLOs)

No.	The Graduates of B.Sc. Microbiology programme will be able to:
PLO1	<b>Knowledge:</b> To acquire current/recent specific knowledge in the respective discipline with proficiency in practical skills and leadership skills for a successful career. <i>(Cognitive)</i>
PLO2	<b>Critical Thinking:</b> Critical thinking ability by way of solving problems with analytical approaches and data analytics using basic microbiology and biochemistry or chemistry concepts. <i>(Cognitive)</i>
PLO3	<b>Practical Skills:</b> Demonstrate the basic experimental techniques and methods in the areas of microbiology, biotechnology and chemistry/biochemistry. <i>(Psychomotor)</i>
PLO4	<b>Teamwork Skills:</b> Develop an overall personality by making them participate in various social and cultural activities voluntarily. <i>(Affective)</i>
PLO5	<b>Communication Skills:</b> Communicate effectively with the computing community as well as society to comprehend effective documentation and presentation. <i>(Affective)</i>
PLO6	<b>Digital Skills:</b> Incorporate advanced digital skills in designing, developing, managing and deploying in media and technical field. <i>(Affective)</i>
PLO7	<b>Numeracy skills:</b> Analyze the given scientific data critically and systematically and the ability to draw the objective conclusions. <i>(Cognitive)</i>
PLO8	<b>Leadership Skills:</b> To learn, adapt and disseminate knowledge in a world of constantly evolving technology. <i>(Affective)</i>
PLO9	<b>Lifelong Learning:</b> Recognize the need and ability to involve independent and life-long learning in the changing era of technology. <i>(Affective)</i>
PLO10	<b>Entrepreneurial Skills:</b> Successful candidates will be able to analyze, design standards, resolve and troubleshoot problems in implementation or standardization of Life sciences protocols coping up to suit in a position in academia or industry or Institutions and to pursue a career in research. <i>(Affective)</i>
PLO11	<b>Ethics and Professionalism:</b> Successful candidates will be aware of their role and responsibility in handling and use of microbes including genetically modified microorganisms. <i>(Affective)</i>

III. PROGRAMME LEARNING OUTCOMES VS GRADUATE ATTRIBUTES VS TAXONOMY OF VERBS														
PLO	Graduate Attributes											Blooms		
	Knowledge	Critical Thinking	Practical Skills	Teamwork Skills	Communication Skills	Digital Skills	Numeracy Skills	Leadership Skills	Lifelong Learning	Entrepreneurial Skills	Ethics & Professionalism	Cognitive	Psychomotor	Affective
1	✓											✓		
2		✓										✓		
3			✓										✓	
4				✓		✓								✓
5					✓	✓								✓
6						✓								✓
7							✓					✓		
8								✓			✓			✓
9									✓		✓			✓
10										✓	✓			✓
11											✓			✓

IV. PROGRAMME LEARNING OUTCOMES VS PROGRAMME EDUCATIONAL OBJECTIVES				
PLO	PEO 1	PEO 2	PEO 3	PEO 4
PLO 1	✓			
PLO 2	✓			
PLO 3	✓			✓
PLO 4		✓		
PLO 5			✓	
PLO 6			✓	✓
PLO 7			✓	
PLO 8		✓		
PLO 9			✓	✓
PLO 10		✓		✓
PLO 11		✓		✓

V. ADDITIONAL PROGRAMME OUTCOMES (APOs)	
<b>APO 1</b>	The skills of observations and drawing logical inferences from the scientific experiments. Analyzed the given scientific data critically and systematically and the ability to draw the objective conclusions.
<b>APO 2</b>	Developed scientific outlook not only with respect to science subjects but also in all aspects related to life.
<b>APO 3</b>	Imbined ethical, moral and social values in personal and social life leading to highly cultured and civilized personality.
<b>APO 4</b>	Realized how developments in any science subject helps in the development of other science subjects and vice-versa and how interdisciplinary approach helps in providing better solutions and new ideas for the sustainable developments.
<b>APO 5</b>	Been able to think creatively (divergently and convergent) to propose novel ideas in explaining facts and figures or providing new solution to the problems

**VI. PROGRAMME SPECIFIC OUTCOMES (PSO's)**

<b>PSO 1</b>	Understand the nature and basic concepts of Microbiology, Microbial biochemistry, Microbial ecology and to analyze the relationships among microbes and plants/ animals/ humans
<b>PSO 2</b>	Gain familiarity with applications of microbes for synthesis of valuable products through fermentation and to explore the application of genetic engineering to create GMO, transgenic plants, animals, Gene therapy, etc.,

## VII. Curriculum Structure for B. Sc. Microbiology

### Course Components, Credits & Marks Distribution

Part No	Group	Basic Structure: Distribution of Courses	Number of Courses	Total Marks	Total Credits
I - IV	1	AEC – Ability Enhancement Courses	10	1000	31
III & IV	2	DSC – Discipline Specific Courses	18	1500	55
	3	DSE – Discipline Specific Electives	10	1000	38
	4	GEC – Generic Elective Courses	5	500	16
IV	5	ANCC I & II – Audit Non - Credit Courses	3	-	-
V		ANCC III – Audit Non - Credit Course	1	Completed	
-	6	DTC – Drive Through Courses (SWAYAM - NPTEL, Coursera, any courses certified by statutory bodies, etc)	Any number	-	Addl. Credits
<b>Total</b>				<b>4000</b>	<b>140</b>

#### Group 1. Ability Enhancement Courses (AECs) (10 Courses)

AEC are the courses based upon the content that leads to knowledge enhancement. Ability Enhancement Courses (AEC) are the following:

S. No.	Course Code	Course Title	Semester	Ownership Department	Contact Hours	Credits	Marks
1	22AEC02/ 22AEC07/ 22AEC11/ 22AEC17/ 22AEC21	<b>AEC Part I:</b> Language – I Tamil-I – Tamizhum Ariviyalum/ Hindi - I/ French - I/ Malayalam - I/ Sanskrit - I	I	Language Dept.	6	3	100
2	22AEC26	<b>AEC Part II:</b> English - I: English for Professional Communication	I	English Dept.	6	3	100
3	22AEC04/ 22AEC08/ 22AEC12/ 22AEC18/ 22AEC22	<b>AEC Part I:</b> Language – II Tamil - II – Panpattu Padhivugalum Ariviyalargaum/ Hindi - II/ French - II/ Malayalam - II/ Sanskrit – II	II	Language Dept.	6	3	100
4	22AEC28	<b>AEC Part II:</b> English – II: Campus to Corporate	II	English Dept	6	3	100
5	22AEC35	<b>AEC Part III:</b> Academic Skills for Bioscience	II	Bioscience Dept.	3	3	100

6	22AEC05/ 22AEC09/ 22AEC13/ 22AEC19/ 22AEC23	<b>AEC Part I:</b> Language – III Tamil - III – Kappiyamum Meippadukalum/ Hindi - III/ French - III/ Malayalam - III/ Sanskrit - III	III	Language Dept.	6	3	100
7	22AEC29	<b>AEC Part II:</b> English - III: English through Literature	III	English Dept	6	3	100
8	22AEC06/ 22AEC10/ 22AEC14/ 22AEC20/ 22AEC24	<b>AEC Part I:</b> Language – IV Tamil - IV – Vazhakkarakalum Urainadaium/ Hindi - IV/ French - IV/ Malayalam - IV/ Sanskrit - IV	IV	Language Dept.	6	3	100
9	22AEC30	<b>AEC Part II:</b> English - IV: Anthology of Literature	IV	English Dept	6	3	100
10	22AEC55	<b>AEC Part III:</b> Capstone Project for Bioscience	IV	Bioscience Dept.	-	4	100
<b>Total</b>						<b>31</b>	<b>1000</b>

## Group 2. Discipline Specific Courses (DSCs) (18 Courses)

These courses are to be studied compulsorily by the students as a core requirement. The students are required to take DSCs across six semesters. The courses designed under this category aim to cover the basics that a student is expected to imbibe in the particular discipline. It includes Major project.

S. No.	Course Code	Course Title	Semester	Contact Hours	Credits	Marks
1	22MBU01	<b>DSC - 1:</b> Integral Microbiology	1	4	3	100
2	22MBU02/ 22BTU02	<b>DSC - 2:</b> Biochemistry	1	4	3	100
3	22BTU03	<b>DSC - 3:</b> Lab in Cell Biology and Biochemistry	1	5	3	50
4	22MBU04	<b>DSC - 4:</b> Microbial Diversity	2	3	3	100
5	22MBU05	<b>DSC - 5:</b> Microbial Physiology and Metabolism	2	3	3	100
6	22MBU06	<b>DSC - 6:</b> Lab in Microbial Physiology and Metabolism	2	4	3	50
7	22MBU07	<b>DSC - 7:</b> Microbial Genetics and Molecular Biology	3	3	3	100
8	22MBU08/ 22BTU08	<b>DSC - 8:</b> Immunology	3	3	3	100
9	22MBU09	<b>DSC - 9:</b> Lab in Immunology and Molecular Biology	3	3	3	50
10	22MBU10	<b>DSC - 10:</b> Clinical Biochemistry	3	3	3	100
11	22MBU11/ 22BTU11	<b>DSC - 11:</b> rDNA Technology	4	3	3	100
12	22MBU12	<b>DSC - 12:</b> Fermentation Technology	4	3	3	100
13	22MBU13	<b>DSC - 13:</b> Lab in rDNA and Fermentation Technology	4	4	3	50
14	22MBU14	<b>DSC - 14:</b> Environmental and Agricultural Microbiology	5	4	4	100
15	22MBU15	<b>DSC - 15:</b> Food Microbiology	5	5	4	100
16	22MBU16	<b>DSC - 16:</b> Lab in Environmental, Agricultural and Food Microbiology	5	5	4	100
17	22MBU17/ 22BTU17	<b>DSC - 17:</b> Internship Training	5	Completed		

18	22MBU18/ 22BTU18	<b>DSC - 18:</b> Project Work	6	5	4	100
<b>Total</b>					<b>55</b>	<b>1500</b>

### Group 3. Discipline Specific Elective (DSEs) (10 Courses)

Discipline Specific Elective courses offered under the main discipline of study which may be specialized or advanced or supportive to the discipline of study. Students can choose any TEN courses from the following list.

S. No.	Course Code	Course Title	Ownership Department	Contact Hours	Credits	Marks
1	22MBU19/ 22BTU19	<b>DSE - 1:</b> Biophysics and Bioinstrumentation	Biotechnology	5	4	100
2	22MBU20/ 22BTU20	<b>DSE - 2:</b> Bioentrepreneurship	Biotechnology			
3	22MBU21/ 22BTU21	<b>DSE - 3:</b> Bioethics, Biosafety and IPR	Microbiology	3	3	100
4	22MBU22/ 22BTU22	<b>DSE - 4:</b> Industrial Exposure Training	Biotechnology/ Microbiology	4 Weeks		
5	22MBU23/ 22BTU23	<b>DSE - 5:</b> Human Physiology and Anatomy	Microbiology	5	4	100
6	22MBU24	<b>DSE - 6:</b> Therapeutic Microbiology	Microbiology			
7	22MBU25/ 22BTU25	<b>DSE - 7:</b> Ayush	Biotechnology	4	3	100
8	22MBU26/ 22BTU26	<b>DSE - 8:</b> Bionanotechnology	Biotechnology	4	3	100
9	22MBU27	<b>DSE - 11:</b> Medical Virology and Parasitology	Biotechnology	6	5	100
10	22MBU28	<b>DSE - 12:</b> Medical Bacteriology and Mycology	Microbiology	6	5	100
11	22MBU29	<b>DSE - 13:</b> Lab in Medical Microbiology	Microbiology	6	5	100
12	22MBU30	<b>DSE - 9:</b> Molecular Diagnosis	Microbiology	4	3	100
13	22MBU31	<b>DSE - 10:</b> Marine Microbiology	Microbiology			
14	22MBU32/ 22BTU32	<b>DSE - 14:</b> Bioinformatics	Bioinformatics	3	3	100
15	22MBU33/ 22BTU33	<b>DSE - 15:</b> Biocompost Technology and Bioinoculant	Microbiology			
Total (Any 10 Courses)						1000

### Industrial Exposure Training (IET):

Students can opt for Industrial Exposure Training during fifth semester for a period of 4 weeks, in such case one DSE course will be exempted.

The Continuous Internal Assessment mark distribution for IET is as follows:

Component	Mode of Conduct	Project Coverage	Marks
3 Reviews	Presentation	Phase by Phase	<b>25</b>
Work Diary	Written	Phase by Phase	<b>10</b>
Report	Submission	Entire Process	<b>15</b>

<b>Total</b>	<b>50</b>
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Viva-voce Marks for the Industrial Exposure Training will be given based on the report and viva-voce examination, conducted by the Department.

**Report : 30 Marks**  
**Viva-voce : 20 Marks**

### Project Work:

During the Sixth semester, each student should undertake a project work and submit the report. A guide will be allotted to each student by the Department. A student can select any research topic in discussion with the guide. The project report will be evaluated jointly by the internal and external examiners for **50 Marks** and Viva-voce examination shall be conducted jointly for **50 Marks**.

Three Reviews should be conducted and marks have to be entered in Myclassroom portal as follows:

<b>Review</b>	<b>– 25 Marks</b>
<b>Work Dairy</b>	<b>– 10 Marks</b>
<b>Report</b>	<b>– 15 Marks</b>
<b>Total</b>	<b>– 50 (Internal) Marks</b>

End Semester Viva-Voce will be conducted for 50 (External) Marks.  
**(Dissertation - 30 Marks & Viva - voce - 20 Marks)**

### Group 4. Generic Elective Courses (GECs) (5 Courses)

Generic Elective Courses are interdisciplinary in nature. They are additional courses based on expertise, specialization, requirements, scope, and need of the department. The student has to subscribe any 5 courses in the following list:

Sl. No.	Course Code	Course Title	Semester	Ownership Department	Contact Hours	Credits	Marks
1	22GEU16A	<b>GEC - 1:</b> Biostatistics and Research Methodology	II	Mathematics	3	2	<b>50</b>
	22GEU16B	Biostatistics and Research Methodology lab			2	2	<b>50</b>
2	22GEU17A	Statistics for Bioscience			III	English	3
	22GEU17B	Statistics for Bioscience Lab	2	2			<b>50</b>
3	22GEU07	<b>GEC - 2:</b> English for Research Writing	III	English	3	3	<b>100</b>
4	22GEU08	English for Persuasive Communication					
5	22GEC01/ 22GEC02/ 22GEC03/ 22GEC04/ 22GEC05	<b>GEC - 3:</b> Spoken Hindi/ Spoken Tamil/ Spoken Telugu/ Spoken Malayalam/ Spoken French	IV	Languages	3	2	<b>100</b>
8	22GEU54	<b>GEC-4:</b> A. Programming in ANSI C	IV	ICT	3	2	<b>50</b>
	22GEU55	B. Programming in ANSI C Lab			2	2	<b>50</b>

9	22GEU56/ 22GEU57	A. Perl Programming B. Perl Programming Lab			3	2	50
					2	2	50
6	22GEU22	GEC - 5: Basic Mathematics for Competitive Examinations	V	Mathematics	3	3	100
7	22GEU23	Talent Enhancement Course: Logical Reasoning and Aptitude					
<b>Total</b>						<b>16</b>	<b>500</b>

### Group 5. Audit Non - Credit Courses (ANCC)

Non - Credit Courses are intended for students who want to gain general knowledge, learn a new skill, upgrade existing skills, enrich their understanding of a wide range of topics, or develop personal interests. A student has to complete any two courses during Semester I and II.

Part IV - ANCC		
S. No.	Course Code	Course Name
<b>Semester I - ANCC 1</b>		
1.	22ANC01	Environmental Studies
<b>Semester II - ANCC 2 - Values &amp; Ethics</b>		
2.	22ANC02	Human Rights
3.	22ANC03	Women's Rights
4.	22ANC04	Yoga for Human Excellence
5.	22ANC05	Indian Culture and Heritage
6.	22ANC06	Introduction to Cyber Security
7.	22ANC07	Consumer Protection
8.	22ANC08	Constitution of India
9.	22ANC09	Waste Management

Student has to take part in any one extension activity during their course of study.

Part V - ANCC 3 - Extension Activities		
S. No.	Course Code	Course Name
1.	22ANC10	National Service Scheme
2.	22ANC11	National Cadet Corps
3.	22ANC12	Youth Red Cross
4.	22ANC13	Red Ribbon Club
5.	22ANC14	Rotaract Club
6.	22ANC15	Sports
7.	22ANC16	Association Activities
8.	22ANC17	Club Activities

### Group 6.

#### i) Drive - Through Course (DTC) I & II – Additional Credits

These courses are intended to bring out and promote the self-learning initiative of the students – where their own motivation is what drives them to complete the course and not external compulsions. This fosters the habit of keeping oneself updated always by means of self-study. It gives opportunities to the students to explore new areas of interest and earn additional credits. Students can take any number of courses under this cafeteria system. The credits will not be taken for CGPA calculation. Additional 4 credits per Course will be given on submission of certificate.

1. SWAYAM - NPTEL
2. Coursera

3. Any courses certified by statutory bodies.

**ii) Drive - Through Course (DTC – III) – To be Completed**

**Internship Training / Mini Project / Spoken Tutorial / Economic Talent test etc.**

Students individually or with the maximum of four members per batch should take up either Internship training or mini project for a period of fifteen days during IV Semester vacation. The report will be evaluated and viva-voce examination will be conducted during 5<sup>th</sup> semester. Otherwise, the students have to complete one spoken tutorial course or any certification course suggested by the department.

**VIII. Semester - wise Scheme**

Semester I										
Course Code	Course Title	T/P/E	ESE Dur. Hrs	Ins. Hrs/Week	CIA Marks	ES Marks	Total Marks	Credits	SD/EM/EN	G/L/R/N
22AEC02/ 22AEC07/ 22AEC11/ 22AEC17/ 22AEC21	<b>AEC Part I:</b> Language – I Tamil - I – Tamizhum Ariviyalum/ Hindi - I/ French - I/ Malayalam - I/ Sanskrit - I	T	3	6	50	50	100	3	SD	L
									SD	N
									SD	G
									SD	R
									SD	N
22AEC26	<b>AEC PART II:</b> <b>English - I:</b> English for Professional Communication	T	3	6	50	50	100	3	SD	G
22MBU01	<b>DSC - 1:</b> Integral Microbiology	T	3	4	50	50	100	3	SD	G
22MBU02/ 22BTU02	<b>DSC - 2:</b> Biochemistry	T	3	4	50	50	100	3	SD	N
22MBU03	<b>DSC - 3:</b> Lab in Microbiology and Biochemistry	P	3	5	25	25	50	3	SD	N
22MBU19/ 22BTU19	<b>DSE - 1:</b> Biophysics and Bioinstrumentation	T	3	5	50	50	100	4	SD	G
22MBU20/ 22BTU20									<b>DSE - 2:</b> Bioentrepreneurship	EN
<b>DTC - I - Additional Credit Courses (NPTEL/Coursera)</b>								4		
22ANC01	<b>ANCC - 1 (NF2F)</b> Environmental Studies	T	-	2	-	-	Completed		SD	G
<b>Total</b>				<b>30+2</b>			<b>550</b>	<b>19 + 4</b>		
Semester II										
Course Code	Course Title	T/P/E	ESE Dur. Hrs	Ins. Hrs/Week	CIA Marks	ES Marks	Total Marks	Credits	SD/EM/EN	G/L/R/N
22AEC04/ 22AEC08/ 22AEC12/ 22AEC18/ 22AEC22	<b>AEC Part I:</b> Language – II Tamil - II – Panpattu Padhivugalum Ariviyalalargaum/ Hindi - II/ French - II/	T	3	6	50	50	100	3	SD	L
										N
										G

	Malayalam - II/ Sanskrit - II									R N
22AEC28	<b>AEC PART II:</b> <b>English - II:</b> Campus to Corporate	T	3	6	50	50	100	3	SD	G
22AEC35	<b>AEC - 5</b> Academic Skills for Bioscience	T	3	3	50	50	100	3	SD	N
22MBU04	<b>DSC - 4:</b> Microbial Diversity	T	3	3	50	50	100	3	SD	G
22MBU05	<b>DSC - 5:</b> Microbial Physiology and Metabolism	T	3	3	50	50	100	3	SD	G
22MBU06	<b>DSC - 6:</b> Lab in Microbial Physiology and Metabolism	P	3	4	25	25	50	3	SD	G
	<b>GEC - 1:</b>									
22GEU16A	Biostatistics and Research Methodology	T	3	3	25	25	50	2	EN	G
22GEU16B	Biostatistics and Research Methodology Lab	P	3	2	25	25	50	2		
22GEU17A	Statistics for Bioscience	T	3	3	25	25	50	2		
22GEU17B	Statistics for Bioscience Lab	P	3	2	25	25	50	2		
22ANC02 22ANC03 22ANC04 22ANC05 22ANC06 22ANC07 22ANC08 22ANC09	<b>ANCC-2 (NF2F)</b> Human Rights Women's Rights Yoga for Human Excellence Indian Culture and Heritage Introduction to Cyber Security Consumer Protection Constitution of India Waste Management*	T	-	2	-	-	Completed	-	SD	G N G N G N N G
<b>DTC II : Additional Credit Courses (NPTEL/Coursera)</b>								4		
<b>Total</b>				<b>30+2</b>			<b>650</b>	<b>22+4</b>		
<b>Semester III</b>										
Course Code	Course Title	T/P/E	ESE Dur. Hrs	Ins. Hrs/Week	CIA Marks	ES Marks	Total Marks	Credits	SD/EM/EN	G/L/R/N
22AEC05/ 22AEC09/ 22AEC13/ 22AEC19/ 22AEC23	<b>AEC Part I:</b> Language – III: Tamil - III – Kappiyamum Meippadukalum/ Hindi - III/ French - III/ Malayalam - III/ Sanskrit - III	T	3	6	50	50	100	3	SD	L N G R N
22AEC29	<b>AEC - 7</b> <b>English - III:</b> English through Literature	T	3	6	50	50	100	3	SD	G
22MBU07	<b>DSC - 7:</b> Microbial Genetics and Molecular Biology	T	3	3	50	50	100	3	SD	G
22MBU08/ 22BTU08	<b>DSC - 8:</b> Immunology	T	3	3	50	50	100	3	SD	G
22MBU09	<b>DSC - 9:</b> Lab in Immunology and	P	3	3	25	25	50	3	SD	G

	Molecular Biology									
22MBU10	<b>DSC - 10:</b> Clinical Biochemistry	T	3	3	50	50	100	3	EM	G
22MBU21/ 22BTU21	<b>DSE - 3:</b> Bioethics, Biosafety and IPR	T	3	3	50	50	100	3	SD	N
22GEC06	<b>GEC - 2:</b> English for Research Writing	T	3	3	50	50	100	3	SD	G
22GEC08	English for Persuasive Communication									
<b>Total</b>				<b>30</b>			<b>750</b>	<b>24</b>		
<b>Semester IV</b>										
Course Code	Course Title	T/P/E	ESE Dur. Hrs	Ins. Hrs/Week	CIA Marks	ES Marks	Total Marks	Credits	SD/EM/EN	G/L/R/N
22AEC06/ 22AEC10/ 22AEC14/ 22AEC20/ 22AEC24	<b>AEC Part I:</b> Language – IV Tamil - IV – Vazhakkarukalum Urainadaium/ Hindi - IV/ French - IV/ Malayalam - IV/ Sanskrit - IV	T	3	6	50	50	100	3	SD	L N G R N
22AEC30	<b>AEC- 9 English - IV:</b> Anthology of Literature	T	3	6	50	50	100	3	SD	G
22AEC55	<b>AEC – 10</b> Capstone Project for Bioscience	T	3	-	50	50	100	4	EM	N
22MBU11/ 22BTU11	<b>DSC - 11:</b> rDNA Technology	T	3	3	50	50	100	3	SD	G
22MBU12	<b>DSC - 12:</b> Fermentation Technology	T	3	3	50	50	100	3	EN	G
22MBU13	<b>DSC - 13:</b> Lab in rDNA and Fermentation Technology	P	3	4	25	25	50	3	EN	G
22GEC01/ 22GEC02/ 22GEC03/ 22GEC04/ 22GEC05	<b>GEC - 3:</b> Spoken Hindi/ Spoken Tamil/ Spoken Telugu / Spoken Malayalam/ Spoken French	T	3	3	50	50	100	2	SD	L N R R G
22GEU54	<b>GEC - 5:</b> A. Programming in ANSI C B. Programming in ANSI C Lab	T	3	3	25	25	50	2	SD	G
22GEU55		P	3	2	25	25	50	2		
22GEU56	A. Perl Programming B. Perl Programming Lab	T	3	3	25	25	50	2		
22GEU57		P	3	2	25	25	50	2		
<b>Total</b>				<b>30</b>			<b>750</b>	<b>25</b>		
<b>Semester V</b>										
Course Code	Course Title	T/P/E	ESE Dur. Hrs	Ins. Hrs/Week	CIA Marks	ES Marks	Total Marks	Credits	SD/EM/EN	G/L/R/N

									EN	
22MBU22/ 22BTU22	<b>DSE - 4:</b> Industrial Exposure Training	P	3	4 Weeks	50	50	100	4	EN	N
OR										
22MBU23/ 22BTU23	<b>DSE - 5:</b> Human Physiology and Anatomy	T	3	5	50	50	100	4	EM	N
22MBU24	<b>DSE - 6:</b> Therapeutic Microbiology								SD	G
AND										
22MBU14	<b>DSC - 14:</b> Environmental and Agricultural Microbiology	T	3	4	50	50	100	4	SD	G
22MBU15	<b>DSC - 15:</b> Food Microbiology	T	3	5	50	50	100	4	SD	G
22MBU16	<b>DSC - 16:</b> Lab in Environmental, Agricultural and Food Microbiology	P	5	5	50	50	100	4	EN	G
22MBU25/ 22BTU25/	<b>DSE - 7:</b> Ayush	T	3	4	50	50	100	3	EM	N
22MBU26/ 22BTU26	<b>DSE - 8:</b> Bionanotechnology	T	3	4	50	50	100	3	SD	G
22GEU22	<b>GEC - 4:</b> Basic Mathematics for Competitive Examinations	T	3	3	50	50	100	3	EM	G
22GEU23	<b>Talent Enhancement Course:</b> Logical Reasoning and Aptitude									
22MBU17/ 22BTU17	<b>DTC - III: DSC - 17:</b> Internship Training	P	-	-	-	-	Completed		EM	N
<b>Total</b>				<b>30</b>			<b>700</b>	<b>25</b>		
<b>Semester VI</b>										
Course Code	Course Title	T/P/E	ESE Dur. Hrs	Ins. Hrs/Week	CIA Marks	ES Marks	Total Marks	Credits	SD/EM/EN	G/L/R/N
22MBU27	<b>DSE - 9:</b> Medical Virology and Parasitology	T	3	6	50	50	100	5	SD	G
22MBU28	<b>DSE - 10:</b> Medical Bacteriology and Mycology	T	3	6	50	50	100	5	SD	G
22MBU29	<b>DSE - 11:</b> Lab in Medical Microbiology	P	9	5	50	50	100	5	EM	G
22MBU18/ 22BTU18	<b>DSC - 18:</b> Project Work	P	3	5	50	50	100	4	EM	g
22MBU30/ 22BTU30	<b>DSE - 12</b> Molecular Diagnosis	T	3	4	50	50	100	3	EM	N
22MBU31	<b>DSE - 13:</b> Marine Microbiology								SD	G
22MBU32/ 22BTU32	<b>DSE - 14:</b> Bioinformatics	T	3	4	50	50	100	3	SD	G
22MBU33/ 22BTU33	<b>DSE - 15:</b> Biocompost Technology and								EN	N

	Bioinoculant										
22ANC10	<b>ANCC3: Extension Activities</b> National Service Scheme/									N	
22ANC11	National Cadet Corps/									N	
22ANC12	Youth Red Cross/	-	3	-	-	-	Grade	-	SD	N	
22ANC13	Red Ribbon Club/									N	
22ANC14	Rotaract Club/									L	
22ANC15	Sports/									N	
22ANC16	Association Activities									L	
22ANC17	Club Activities									L	
<b>Total</b>				<b>30</b>			<b>600</b>	<b>25</b>			
		<b>Total</b>					<b>4000</b>	<b>140 +8</b>			
<b>Drive-Through Course (DTC):</b> Courses offered in SWAYAM-NPTEL, Coursera OR Any courses certified by statutory bodies.		Additional 4 credits per Course will be given on submission of Certificate				During Semester I to Semester VI					

<b>The Courses focuses the following needs:</b>				
<b>Needs</b>	<b>G - Global</b>	<b>N - National</b>	<b>R - Regional</b>	<b>L - Local</b>
SD	Skill Development			
EM	Employability			
EN	Entrepreneurship			

#### Semester-wise Distribution of Marks and Credits:

<b>Semester</b>	<b>Total Marks</b>	<b>Total Credits</b>
I	550	19 + 4
II	650	22 + 4
III	750	24
IV	750	25
V	700	25
VI	600	25
<b>Total</b>	<b>4000</b>	<b>140 + 8</b>

#### **OFFERED BY**

##### List of Courses Offered by Languages Department

<b>Semester</b>	<b>Course Code</b>	<b>Course Name</b>	<b>Programme</b>	<b>T/P/ E</b>	<b>Ins. hrs</b>	<b>CIA</b>	<b>ES</b>	<b>Total Marks</b>	<b>Credit</b>
IV	22GEC01/ 22GEC02/ 22GEC03/ 22GEC04/ 22GEC05	Spoken Hindi/ Spoken Tamil/ Spoken Telugu / Spoken Malayalam/ Spoken French	B.Sc. MB	T	3	100	-	100	2

##### List of Courses Offered by Mathematics Department

<b>Sem</b>	<b>Course Code</b>	<b>Course Name</b>	<b>Programme</b>	<b>T/P/ E</b>	<b>Ins. hrs</b>	<b>CIA</b>	<b>ES</b>	<b>Total Marks</b>	<b>Credit</b>
II	22GEU16A	Biostatistics and Research Methodology	B.Sc. MB	T	3	25	25	50	2

	22GEU16B	Biostatistics and Research Methodology Lab	B.Sc. MB	P	2	25	25	50	2
	22GEU17A	Statistics for Bioscience	B.Sc. MB	T	3	25	25	50	2
	22GEU17B	Statistics for Bioscience Lab	B.Sc. MB	P	2	25	25	50	2
V	22GEU22	<b>Talent Enhancement Course:</b> Basic Mathematics for Competitive Examinations	B.Sc. MB	T	3	50	50	100	3
	22GEU23	Logical Reasoning and Aptitude	B.Sc. MB	T	3	50	50	100	3

#### List of Courses Offered by Computer Technology Department

Sem	Course Code	Course Name	Programme	T/P/ E	Ins. hrs	CIA	ES	Total Marks	Credit
IV	22GEU54	Programming in ANSI C	B.Sc. MB	T	3	25	25	50	2
	22GEU55	Programming in ANSI C Lab	B.Sc. MB	P	2	25	25	50	2
	22GEU56	Perl Programing	B.Sc. MB	T	3	25	25	50	2
	22GEU57	Perl Programming Lab	B.Sc. MB	P	2	25	25	50	2

#### List of Courses Offered by Biotechnology Department

Sem	Course Code	Course Name	Programme	T/P/ E	Ins. hrs	CIA	ES	Total Marks	Credit
I	22MBU19/ 22BTU19	Biophysics and Bioinstrumentation	B.Sc. MB	T	5	50	50	100	4
I	22MBU20/ 22BTU20	Bioentrepreneurship	B.Sc. MB	T	5	50	50	100	4
V	22MBU25/ 22BTU25	Ayush	B.Sc. MB	T	4	50	50	100	3
V	22MBU26/ 22BTU26	Bionanotechnology	B.Sc. MB	T	4	50	50	100	3

#### List of Courses Offered by Bioinformatics Department

Sem	Course Code	Course Name	Programme	T/P/ E	Ins. hrs	CIA	ES	Total Marks	Credit
V	22MBU32/ 22BTU32	Bioinformatics	B.Sc. MB	T	3	50	50	100	3

**OFFERED TO**

**List of Courses Offered to Biotechnology Department**

Sem	Course Code	Course Name	Programme	T/P/E	Ins. hrs	CIA	ES	Total Marks	Credit
III	22MBU21/ 22BTU21	Bioethics, Biosafety and IPR	B.Sc. BT	T	3	50	50	100	3
V	22MBU23/ 22BTU23	Human Physiology and Anatomy	B.Sc. BT	T	5	50	50	100	4
V	22MBU30/ 22BTU30	Molecular Diagnosis	B.Sc. BT	T	3	50	50	100	3
VI	22MBU33/ 22BTU33	Biocompost Technology and Bioinoculant	B.Sc. BT	T	3	50	50	100	3