

*Progressive Education Society's*

**Modern College of Arts, Science and Commerce (Autonomous),**

**Shivajinagar, Pune 5**

**(An Autonomous College Affiliated to SavitribaiPhule Pune University)**

## **Framework of Syllabus**

**For**

**B.Sc. (Biotechnology)**

(Based on NEP 2020 framework)

## Semester 1 (First Year)

Course Type	Course	Course code	Course / Paper Title	Hours / Week	Credit	CIA	ESE	Total
<b>Major Mandatory (4 + 2)</b>	Major Paper 1 (Theory)	23ScBIOU1101	Basics of Biotechnology I (Plant sciences and Physics)	4	4	40	60	100
	Major Paper 2 (Practical)	23ScBIOU1102	Lab Course on 23ScBIOU1101	4	2	20	30	50
<b>Major Electives</b>	-							
<b>Minor</b>	-							
<b>OE (2 + 2)</b>	Theory	23ScBIOU1401	Biotechnology and Human welfare I	4	4	40	60	100
	Theory	23CpCopU1402	Democracy, Election and Governance					
<b>VSC (2)</b>	Major Specific Practical I	23ScBIOU1501	Lab Course on Analytical Techniques	4	2	20	30	50
<b>SEC (2)</b>	Skill Paper 1 (Theory)	23ScBIOU1601	Basics of Chemistry and Biochemistry	4	2	20	30	50
<b>AEC(2),</b>	MIL	23CpCopU1701 /23CpCopU1701	MIL (Hindi )/ MIL (Marathi)	2	2	20	30	50
<b>VEC (2)</b>	EVS Theory	23CpCopU1801	Environment Science I	2	2	20	30	50
<b>IKS (2)</b>	Major Specific Theory	23ScBIOU1901	Application of IKS in Biotechnology	2	2	20	30	50
<b>CC (2)</b>	CC-I Course	23CpCopU1001	Online Course Based on Yoga	2	2	20	30	50
<b>Total</b>				28	22	220	330	550

## Semester 2 (First Year)

Course Type	Course	Course code	Course / Paper Title	Hours / Week	Credit	CIA	ESE	Total
<b>Major Mandatory (4 + 2)</b>	Major Paper 3 (Theory)	23ScBIOU2101	Basics of Biotechnology II (Animal Sciences and Microbiology)	4	4	40	60	100
	Major Paper 4 (Practical)	23ScBIOU2102	Lab Course on 23ScBIOU2101	4	2	20	30	50
<b>Major Electives</b>	-							
<b>Minor</b>	Minor Paper I (Theory)	23ScBIOU2301	Applied Biotechnology I ( Biophysics and Instrumentation)	2	2	20	30	50
<b>OE (2 + 2)</b>	Theory	23ScBIOU2401	Biotechnology and Human welfare II	4	4	40	60	100
	Theory	23CpCopU2402	Fundamentals of Music					
<b>VSC (2)</b>	Major Specific Practical II	23ScBIOU2501	Practicals in Biophysics and Instrumentation	4	2	20	30	50
<b>SEC (2)</b>	Skill Paper 1I (Theory)	23ScBIOU2601	Basics of Mathematics and Statistics	4	2	20	30	50
<b>AEC(2),</b>	English Theory	23CpCopU2703	English Communication Skills I	2	2	20	30	50
<b>VEC (2)</b>	EVS Theory	23CpCopU2801	Environment Science II	2	2	20	30	50
<b>IKS (2)</b>	-		-	-	-	-	-	-
<b>CC (2)</b>	CC-II Course	23CpCopU2001 / 23CpCopU2011 / 23CpCopU2021 / 23CpCopU2031 / 23CpCopU2041 / 23CpCopU2051 / 23CpCopU2061 / 23CpCopU2071	Physical Education / Cultural Activities / NSS / NCC / Fine Arts / Applied Arts / Visual Arts / Performing Arts	2	2	20	30	50
<b>Total</b>				28	22	220	330	550

### Semester 3 (Second Year)

Course Type	Course	Course code	Course / Paper Title	Hours / Week	Credit	CI A	ESE	Total
<b>Major Mandatory (4 + 4)</b>	Major Core Paper 5 (Theory + Practical)	23ScBIOU3101	Cell and Molecular Biology I (T + P)	2	4	40	60	100
				4				
	Major Paper 6 (Theory + Practical)	23ScBIOU3102	Animal Development and Physiology (T + P)	2	4	40	60	100
				4				
<b>Major Electives</b>	-							
<b>Minor (4)</b>	Minor Paper II ( Theory + Practical)	23ScBIOU3301	Applied Biotechnology II (Immunology) (T + P)	2	4	40	60	100
				4				
<b>OE (2)</b>	Theory	23ScBIOU3401	Biotechnology and Human welfare III	4	4	40	60	100
<b>VSC (2)</b>	Major Specific Practical II	23ScBIOU3501	Lab Course on Molecular Diagnostics	4	2	20	30	50
<b>SEC (2)</b>	--		--	--	--	--	--	--
<b>AEC(2),</b>	English Theory	23CpCopU3703	English Communication Skills II	2	2	20	30	50
<b>VEC (2)</b>	--		--	--	--	--	--	--
<b>IKS (2)</b>	--		--	--	--	--	--	--
<b>FP/CEP (2)</b>	FP –I	23ScBIOU3002	Field Project I	2	2	20	30	50
<b>CC (2)</b>	CC-III Course	23CpCopU3001	Fitness	2	2	20	30	50
<b>Total</b>				32	22	220	330	550

### Semester 4 (Second Year)

Course Type	Course	Course code	Course / Paper Title	Hours / Week	Credit	CIA	ESE	Total
<b>Major Mandatory (4 + 4)</b>	Major Paper 7 (Theory + Practical)	23ScBIOU4101	Cell and Molecular Biology II ( T+P)	2	4	40	60	100
				4				
	Major Paper 8 (Theory + Practical)	23ScBIOU4102	Plant Development and Physiology ( T + P)	2	4	40	60	100
				4				
<b>Major Electives</b>	-							
<b>Minor (4)</b>	Minor Paper III (Theory)	23ScBIOU4301	Applied Biotechnology III (Genetics)	4	4	40	60	100
<b>OE (2)</b>		23ScBIOU4401	Biotechnology and Human welfare IV	4	4	40	60	100
<b>VSC (2)</b>	--		--	--	--	--	--	--
<b>SEC (2)</b>	Skill Paper III (Theory)	23ScBIOU4601	Metabolism	2	2	20	30	50
<b>AEC(2)</b>	MIL	23CpCopU4701/ 23CpCopU4702	MIL (Hindi ) / MIL (Marathi)	2	2	20	30	50
<b>VEC (2)</b>	--		--	--	--	--	--	--
<b>IKS (2)</b>	--		--	--	--	--	--	--
<b>FP / CEP(2)</b>	CEP –I	23ScBIOU4003	Community Engagement Project I	4	2	20	30	50
<b>CC (2)</b>	CC-IV Course	23CpCopU4001	Health and Wellness	2	2	20	30	50
<b>Total</b>				30	22	220	330	550

### Semester 5 (Third Year)

Course Type	Course	Course code	Course / Paper Title	Hours / Week	Credit	CIA	ESE	Total
<b>Major Mandatory (4 + 4 + 2)</b>	Major Core Paper 9 (Theory + Practical)	23ScBIOU5101	Microbial Biotechnology (T + P)	2	4	40	60	100
				4				
	Major Paper 10 (Theory + Practical)	23ScBIOU5102	Bioinformatics (T + P)	2	4	40	60	100
				4				
	Major Paper 11 (Theory)	23ScBIOU5103	Protein Biology	2	2	20	30	50
	<b>Major Electives</b>	Elective I (Theory + Practical)	23ScBIOU5201	Environment Ecology and Biodiversity (T + P)	2	4	40	60
4								
Elective II (Theory + Practical)		23ScBIOU5202	Nanotechnology (T + P)	2	4	40	60	100
				4				
<b>Minor (4)</b>	Minor Paper IV (Theory + Practical)	23ScBIOU5301	Applied Biotechnology IV (Plant Tissue Culture) (T + P)	4	4	40	60	100
<b>OE (2)</b>	--		--	--	--	--	--	--
<b>VSC (2)</b>	Major Specific Practical III	23ScBIOU5501	Lab Course on Critical analysis of scientific papers and Scientific Writing	4	2	20	30	50
<b>SEC (2)</b>	--		--	--	--	--	--	--
<b>AEC(2),</b>	--		--	--	--	--	--	--
<b>VEC (2)</b>	--		--	--	--	--	--	--
<b>IKS (2)</b>	--		--	--	--	--	--	--
<b>FP / CEP(2)</b>	FP –II	23ScBIOU5002	Field Project II	4	2	20	30	50
<b>Total</b>				32	22	220	330	550

### Semester 6 (Third Year)

Course Type	Course	Course code	Course / Paper Title	Hours / Week	Credit	CIA	ESE	Total
<b>Major Mandatory (4 + 4 + 2)</b>	Major Paper 12 (Theory + Practical)	23ScBIOU6101	Biophysical and Biochemical Techniques (T + P)	2	4	40	60	100
				4				
	Major Paper 13 (Theory + Practical)	23ScBIOU6102	RDT (T + P)	2	4	40	60	100
				4				
	Major Paper 14 (Theory)	23ScBIOU6103	Bio-safety, Bioethics and IPR	2	2	20	30	50
	<b>Major Electives</b>	Elective II (Theory + Practical)	23ScBIOU6201	Food Biotechnology (T + P)	2	4	40	60
4								
Elective II (Theory + Practical)		23ScBIOU6202	Agricultural Biotechnology (T + P)	2	4	40	60	100
				4				
<b>Minor (4)</b>	Minor Paper IV (Theory + Practical)	23ScBIOU6301	Applied Biotechnology V (Animal Tissue Culture ) (T + P)	2	4	40	60	100
				4				
<b>OE (2)</b>	--		--	--	--	--	--	--
<b>VSC (2)</b>	--		--	--	--	--	--	--
<b>SEC (2)</b>	--		--	--	--	--	--	--
<b>AEC(2),</b>	--		--	--	--	--	--	--
<b>VEC (2)</b>	--		--	--	--	--	--	--
<b>OJT (4)</b>	OJT	23ScBIOU6004	On job Training	8	4	40	60	100
<b>FP / CEP(2)</b>	--		--	--	--	--	--	--
<b>Total</b>				26	22	220	330	550

OE : Open Elective

AEC: Ability Enhancement Course

VEC: value Education Courses

CC : Co-Curricular Courses

IKS : Indian Knowledge System

OJT : On Job Training

FP : Field Project

VSC : Vocational Skill Courses

CEP : Community Engagement Project

