

*Progressive Education Society's*  
**Modern College of Arts, Science and Commerce (Autonomous),**  
**Shivajinagar, Pune 5**

**(An Autonomous College Affiliated to Savitribai Phule Pune University)**

## **Framework of Syllabus**

**For**

**B.Sc . (Physics)**

(Based on NEP 2020 framework)

(To be implemented from the Academic Year 2023-24)

### Semester 1 (First Year)

Course Type	Course	Course Code	Course / Paper Title	Hours / Week	Credit	CIA	ESE	Total
Major Mandatory (4 + 2)	Major Paper 1 (Theory)	23ScPhyU1101	Mechanics and Properties of Matter	4	4	40	60	100
	Major Paper 2 (Practical)	23ScPhyU1102	Lab Course based on 23ScPhyU1101	4	2	20	30	50
Major Electives	-							
Minor	-							
OE (2 + 2)	Theory	23ScPhyU1401	Renewable Energy: Global Scenario	2	4	40	60	100
	Theory	23CpCopU1402	Democracy, Election and Governance	2				
VSC (2)	Major Specific Practical I	23ScPhyU1501	Energy Studies I	4	2	20	30	50
SEC (2)	Skill Paper 1 (Practical)	23ScPhyU1601	Basic Instrumentation Skills	4	2	20	30	50
AEC(2)	MIL Theory	23CpCopU1701/ 23CpCopU1702	MIL (Hindi ) I/ MIL (Marathi ) I	2	2	20	30	50
VEC (2)	EVS Theory	23CpCopU1801	Environment Science I	2	2	20	30	50
IKS (2)	Generic IKS	23CpCopU1901	Generic IKS	2	2	20	30	50
CC (2)	CC-I Course	23CpCopU1001	Online Course Based on Yoga	2	2	20	30	50
Total				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)	23ScPhyU2101	Electricity and Magnetism	4	4	40	60	100
	Major Paper 4 (Practical)	23ScPhyU2102	Lab Course based on 23ScPhyU2101	4	2	20	30	50
<b>Major Electives</b>	-							
<b>Minor</b>	Minor Paper I (Practical)	23ScPhyU2301	Lab Course for Physics Minor	4	2	20	30	50
<b>OE (2 + 2)</b>	Theory	23ScPhyU2401	Conventional and Non conventional energy sources	2	4	40	60	100
	Theory	CpCopU2402	Fundamentals of Music	2				
<b>VSC (2)</b>	Major Specific Practical II	23ScPhyU2501	Energy Studies II	4	2	20	30	50
<b>SEC (2)</b>	Skill Paper II (Practical)	23ScPhyU2601	Computational Physics Skills I	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>				<b>30</b>	<b>22</b>	<b>220</b>	<b>330</b>	<b>550</b>

### Semester 3 (Second Year)

Course Type	Course	Course Code	Course / Paper Title	Hours / Week	Credit	CIA	ESE	Total
Major Mandatory (4 + 4)	Major Core Paper 5 (Practical)	23ScPhyU3101	Lab Course on 23ScPhyU3102	8	4	40	60	100
	Major Paper 6 (Theory)	23ScPhyU3102	Oscillations, Waves and Optics	2	2	20	30	50
	Major Paper 7 (Major Specific IKS)	23ScPhyU1901	Astronomy in India	2	2	20	30	50
Major Electives	-							
Minor (4)	Minor Paper II (Theory + Practical)	23ScPhyU3301	Physics Minor I (Mechanics) (T + P)	2	4	40	60	100
				4				
OE (2)	Theory	23ScPhyU3401	Energy Storage Systems	2	2	20	30	50
VSC (2)	Major Specific Practical III	23ScPhyU3501	Electrical Circuits and Network Skills	4	2	20	30	50
SEC (2)	--		--	--	--	--	--	--
AEC(2),	MIL	23CpCopU3703	English Communication Skills II	2	2	20	30	50
VEC (2)	--		--	--	--	--	--	--
IKS (2)	--		--	--	--	--	--	--
FP/CEP (2)	FP –I	23ScPhyU3002	Field Project in Physics	4	2	20	30	50
CC(2)	CC III	23CpCopU3001	Fitness	2	2	20	30	50
<b>Total</b>				<b>32</b>	<b>22</b>	<b>220</b>	<b>330</b>	<b>550</b>

### 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 Core Paper 8 (Theory) Section 1	23ScPhyU4101	Thermal Physics and Electronics	4	4	40	60	100
	Major Paper 9 (Practical) on Section 1	23ScPhyU4102	Lab Course based on 23ScPhyU4101	8	4	40	60	100
<b>Major Electives</b>	-							
<b>Minor (4)</b>	Minor Paper III (Theory)	23ScPhyU4301	Physics Minor II(Electricity and Magnetism)	2	4	40	60	100
	Minor Paper III (Practical)		Lab Course based on 23ScPhyU4301	4				
<b>OE (2)</b>		23ScPhyU4401	Biomass and Wind Energy	2	2	20	30	50
<b>VSC (2)</b>	--		--	--	--	--	--	--
<b>SEC (2)</b>	Skill Paper III (Practical)	23ScPhyU4601	Computational Physics Skills II	4	2	20	30	50
<b>AEC(2),</b>	MIL	23CpCopU4701/ 23CpCopU4702	MIL-II (Hindi ) / MIL-II (Marathi)	2	2	20	30	50
<b>VEC (2)</b>	--		--	--	--	--	--	--
<b>IKS (2)</b>	--		--	--	--	--	--	--
<b>FP / CEP(2)</b>	CEP –I	23ScPhyU4003	Community Engagement Project I (Physics)	4	2	20	30	50
<b>CC(2)</b>	CC-4	23CpCopU4001	Health and Wellness	2	2	20	30	50
<b>Total</b>				<b>32</b>	<b>22</b>	<b>220</b>	<b>330</b>	<b>550</b>

### Semester 5 (Third Year)

Course Type	Course	Course Code	Course / Paper Title	Hours / Week	Credit	CIA	E S E	Total
<b>Major Mandatory (4 + 4 + 2)</b>	Major Core Paper 10 (Theory)	23ScPhyU5101	Classical Mechanics and Statistical Mechanics	4	4	40	60	100
	Major Paper 11 (Theory) Section 1	23ScPhyU5102	Quantum Mechanics I and Atomic and Molecular Physics	2	4	40	60	100
	Major Paper 11(Theory) Section 2			2				
	Major Paper 12 (Practical)	23ScPhyU5103	Lab Course on 23ScPhyU5101 & 23ScPhyU5102	4	2	20	30	50
<b>Major Electives</b>	Elective I (Theory + Practical)	23ScPhyU5201	Electronics and Instrumentation ( T + P )	2	4	40	60	100
				4				
	Elective II (Theory + Practical)	23ScPhyU5202	Physics of Semiconductor Devices	2	4	40	60	100
				4				
<b>Minor (4)</b>	Minor Paper IV (Theory + Practical)	23ScPhyU5301	Physics Minor III (Thermodynamics) ( T + P )	2	4	40	60	100
				4				
<b>OE (2)</b>	--	23ScPhyU5401	--	--	--	--	--	--
<b>VSC (2)</b>	Major Specific Practical IV	23ScPhyU5501	Experimental Techniques in Physics	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	23ScPhyU5002	Field Project II	4	2	20	30	50
<b>Total</b>				<b>38</b>	<b>22</b>	<b>220</b>	<b>330</b>	<b>550</b>

### 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 Core Paper 13(Theory)	23ScPhyU6101	Mathematical Methods in Physics I	4	4	40	60	100
	Major Paper 14 (Theory)	23ScPhyU6102	Solid State Physics and Nuclear Physics	4	4	40	60	100
	Major Paper 15 (Practical)	23ScPhyU6103	Lab Course on 23ScPhyU6101 & 23ScPhyU6102	4	2	20	30	50
<b>Major Electives</b>	Elective III (Theory + Practical)	23ScPhyU6201	Material Science and Physics of Nanomaterials ( T + P )	2	4	40	60	100
				4				
	Elective IV (Theory + Practical)	23ScPhyU6202	Medical and Biophysics (T + P)	2	4	40	60	100
				4				
<b>Minor (4)</b>	Minor Paper V (Theory + Practical)	23ScPhyU6201	Physics Minor IV(Modern physics) (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>IKS (2)</b>	--		--	--	--	--	--	--
<b>FP / CEP(2)</b>	--		--	--	--	--	--	--
<b>OJT(4)</b>	OJT	23ScPhyU6004	On Job Training	8	4	40	60	100
<b>Total</b>				<b>38</b>	<b>22</b>	<b>220</b>	<b>330</b>	<b>550</b>

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