Sardar Vallabhbhai National Institute of Technology (SVNIT) Surat Department of Physics

Five Years Integrated M.Sc. Physics

(Minor modifications as approved as Reso. 4 of 61st Senate of SVNIT dated 30.04.2024)

No. First Semester (1st year of MSc) L-T.P (Min.) (Approx.) hours of Learning (Approx.) 1 Waves and Mechanics PH103 3-0-0 4 70 2 Basic Electronics PH103 3-1-0 4 85 3 Thermodynamics and Statistical Physics PH107 3-1-0 4 70 4 Numerical Methods and Computer Programming PH107 3-0-2 4 85 5 Mathematics for Physical Sciences-1 MA123 3-1-0 4 70 6 Indian Value System and Social Consciousness H5120 2-0-0 2 35 7 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHV01 70-0-10 5 200 (20 x 10) 8 Semiconductor physics PH104 3-0-2 4 85 9 Second Semester (1st year of MSc) PH104 3-0-2 4 85 1 Electromagnetic Theory-I PH102 3-1-0 4 70 2 Semiconductor physics <td< th=""><th>Sr.</th><th>Subject</th><th>Code</th><th>Scheme</th><th>Credits</th><th>Notional</th></td<>	Sr.	Subject	Code	Scheme	Credits	Notional
First Semester (1st year of MSc)	No.			L-T-P	(Min.)	hours of
First Semester (1st year of MSc)						Learning
1 Waves and Mechanics PH101 3-1-0 4 70 2 Basic Electronics PH103 3-0-2 4 85 3 Thermodynamics and Statistical Physics PH105 3-1-0 4 70 4 Numerical Methods and Computer Programming PH107 3-0-2 4 85 5 Mathematics for Physical Sciences-I MA123 3-1-0 4 70 6 Indian Value System and Social Consciousness HS120 2-0-0 2 35 7 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PH401 / PHP01 0-0-10 5 200 (20 x 10) 8econd Semester (1** year of MSC) Telectromagnetic Theory-I PH102 3-1-0 4 70 1 Electromagnetic Theory-I PH104 3-0-2 4 85 3 Mathematics for Physical Sciences-II MA118 3-1-0 4 70 4 Fundamentals of Electrical Engineering EE110 3-0-2 4 85 5 Engli						(Approx.)
Basic Electronics						
Thermodynamics and Statistical Physics		Waves and Mechanics	PH101		4	
Numerical Methods and Computer Programming PH107 3-0-2 4 85		Basic Electronics	PH103	3-0-2	4	85
Mathematics for Physical Sciences-I MA123 3-1-0 4 70	3	Thermodynamics and Statistical Physics	PH105	3-1-0	4	70
Indian Value System and Social Consciousness	4	Numerical Methods and Computer Programming	PH107	3-0-2	4	85
Total 22 415 7 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHP01 0-0-10 5 200 (20 x 10) 5		Mathematics for Physical Sciences-I	MA123	3-1-0	4	70
7 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHV01 / PHP01 0-0-10 5 200 (20 x 10) Second Semester (1x* year of MSc) 1 Electromagnetic Theory-I PH102 3-1-0 4 70 2 Semiconductor physics PH104 3-0-2 4 85 3 Mathematics for Physical Sciences-II MA118 3-1-0 4 70 4 Fundamentals of Electrical Engineering EE110 3-0-2 4 85 5 English and Professional Communication HS110 3-1-0 4 70 6 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHV02 / PhP02 0-0-10 5 200 (20 x 10) Third Semester (2 nd year of MSc) 1 Solid State Physics PH201 3-0-2 4 85 2 Classical Mechanics PH203 3-1-0 4 70 3 Optics PH203 3-1-0 4 70 4 State and Properties of Matter <td>6</td> <td>Indian Value System and Social Consciousness</td> <td>HS120</td> <td>2-0-0</td> <td>2</td> <td>35</td>	6	Indian Value System and Social Consciousness	HS120	2-0-0	2	35
Coptional (Mandatory for Exit) PHP01 O-O-10 S (20 x 10)				Total	22	415
COptional (Mandatory for Exit)	7	Vocational Training / Professional Experience	PHV01 /	0.0.10	-	200
Electromagnetic Theory-		(Optional) (Mandatory for Exit)	PHP01	0-0-10	5	(20 x 10)
2 Semiconductor physics PH104 3-0-2 4 85 3 Mathematics for Physical Sciences-II MA118 3-1-0 4 70 4 Fundamentals of Electrical Engineering EE110 3-0-2 4 85 5 English and Professional Communication HS110 3-1-0 4 70 Total 20 380 6 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PH202 / PHP02 0-0-10 5 200 (20 x 10) Third Semester (2 nd year of MSc) Third Semester (2 nd year of MSc) PH201 3-0-2 4 85 2 Classical Mechanics PH203 3-1-0 4 70 3 Optics PH205 3-0-2 4 85 4 State and Properties of Matter CY205 3-1-2 5 100 5 Discrete Mathematical Structure MA205 3-1-0 4 70 6 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PH003 7 70-0-10 5		Second Semester (1st year of MSc)				
Mathematics for Physical Sciences-II	1	Electromagnetic Theory-I	PH102	3-1-0	4	70
4 Fundamentals of Electrical Engineering EE110 3-0-2 4 85 5 English and Professional Communication HS110 3-1-0 4 70 Total 20 380 6 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHV02 / PHP02 0-0-10 5 200 (20 x 10) Third Semester (2 nd year of MSc) 1 Solid State Physics PH201 3-0-2 4 85 2 Classical Mechanics PH203 3-1-0 4 70 3 Optics PH205 3-0-2 4 85 4 State and Properties of Matter CY205 3-1-2 5 100 5 Discrete Mathematical Structure MA205 3-1-0 4 70 6 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHV03 / PHV03 / PHP03 0-0-10 5 200 (20 x 10) 7 Fourth Semester (2 nd year of MSc) PH202 3-1-0 4 70 2 Quantum Mechanics-1 PH204 3-1-0 4 70 <tr< td=""><td>2</td><td>Semiconductor physics</td><td>PH104</td><td>3-0-2</td><td>4</td><td>85</td></tr<>	2	Semiconductor physics	PH104	3-0-2	4	85
5 English and Professional Communication HS110 3-1-0 4 70 6 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHV02 / PHP02 0-0-10 5 200 (20 x 10) Third Semester (2 nd year of MSc) 1 Solid State Physics PH201 3-0-2 4 85 2 Classical Mechanics PH203 3-1-0 4 70 3 Optics PH205 3-0-2 4 85 4 State and Properties of Matter CY205 3-1-2 5 100 5 Discrete Mathematical Structure MA205 3-1-0 4 70 6 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHV03 / PHP03 0-0-10 5 200 (20 x 10) 7 Fourth Semester (2 nd year of MSc) PH202 3-1-0 4 70 2 Quantum Mechanics-I PH204 3-1-0 4 70 3 Electromagnetic Theory-II PH206 3-0-2 4 85 4 Laser and photonics PH208 3-1-0 4 <td>3</td> <td>Mathematics for Physical Sciences-II</td> <td>MA118</td> <td>3-1-0</td> <td>4</td> <td>70</td>	3	Mathematics for Physical Sciences-II	MA118	3-1-0	4	70
Total 20 380	4	Fundamentals of Electrical Engineering	EE110	3-0-2	4	85
6 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHV02 / PHP02 0-0-10 5 200 (20 x 10) Third Semester (2 nd year of MSc) 1 Solid State Physics PH201 3-0-2 4 85 2 Classical Mechanics PH203 3-1-0 4 70 3 Optics PH205 3-0-2 4 85 4 State and Properties of Matter CY205 3-1-2 5 100 5 Discrete Mathematical Structure MA205 3-1-0 4 70 6 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHV03 / PHP03 0-0-10 5 200 (20 x 10) 7 Fourth Semester (2 nd year of MSc) PH202 3-1-0 4 70 1 Mathematical Methods in Physics PH204 3-1-0 4 70 2 Quantum Mechanics-I PH204 3-1-0 4 70 3 Electromagnetic Theory-II PH208 3-1-0 4 70	5	English and Professional Communication	HS110	3-1-0	4	70
Coptional) (Mandatory for Exit)				Total	20	380
Third Semester (2 nd year of MSc) PH201 3-0-2 4 85	6	Vocational Training / Professional Experience	PHV02 /	0.0.10	-	200
1 Solid State Physics PH201 3-0-2 4 85 2 Classical Mechanics PH203 3-1-0 4 70 3 Optics PH205 3-0-2 4 85 4 State and Properties of Matter CY205 3-1-2 5 100 5 Discrete Mathematical Structure MA205 3-1-0 4 70 6 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHV03 / PHP03 0-0-10 5 200 (20 x 10) Fourth Semester (2 nd year of MSc) 1 Mathematical Methods in Physics PH202 3-1-0 4 70 2 Quantum Mechanics-I PH204 3-1-0 4 70 3 Electromagnetic Theory-II PH206 3-0-2 4 85 4 Laser and photonics PH208 3-1-0 4 70 5 Data Structure CS102 3-1-2 5 100 5 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHV04 / PHP04 0-0-10 5 200 (20 x 10) <		(Optional) (Mandatory for Exit)	PHP02	0-0-10	5	(20 x 10)
2 Classical Mechanics PH203 3-1-0 4 70 3 Optics PH205 3-0-2 4 85 4 State and Properties of Matter CY205 3-1-2 5 100 5 Discrete Mathematical Structure MA205 3-1-0 4 70 6 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHV03 / PHP03 0-0-10 5 200 (20 x 10) Fourth Semester (2 nd year of MSc) PH202 3-1-0 4 70 1 Mathematical Methods in Physics PH202 3-1-0 4 70 2 Quantum Mechanics-I PH204 3-1-0 4 70 3 Electromagnetic Theory-II PH206 3-0-2 4 85 4 Laser and photonics PH208 3-1-0 4 70 5 Data Structure CS102 3-1-2 5 100 6 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHV04 / PHP04 0-0-10		Third Semester (2 nd year of MSc)				
3 Optics PH205 3-0-2 4 85 4 State and Properties of Matter CY205 3-1-2 5 100 5 Discrete Mathematical Structure MA205 3-1-0 4 70 Total 21 410 6 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHV03 / PHP03 0-0-10 5 200 (20 x 10) Fourth Semester (2 nd year of MSc) 1 Mathematical Methods in Physics PH202 3-1-0 4 70 2 Quantum Mechanics-I PH204 3-1-0 4 70 3 Electromagnetic Theory-II PH206 3-0-2 4 85 4 Laser and photonics PH208 3-1-0 4 70 5 Data Structure CS102 3-1-2 5 100 6 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHV04 / PHP04 0-0-10 5 200 (20 x 10) Fifth Semester (3"d year of MSc) <td>1</td> <td>Solid State Physics</td> <td>PH201</td> <td>3-0-2</td> <td>4</td> <td>85</td>	1	Solid State Physics	PH201	3-0-2	4	85
4 State and Properties of Matter CY205 3-1-2 5 100 5 Discrete Mathematical Structure MA205 3-1-0 4 70 Total 21 410 6 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHV03 / PHP03 0-0-10 5 200 (20 x 10) Fourth Semester (2 nd year of MSc) 1 Mathematical Methods in Physics PH202 3-1-0 4 70 2 Quantum Mechanics-I PH204 3-1-0 4 70 3 Electromagnetic Theory-II PH206 3-0-2 4 85 4 Laser and photonics PH208 3-1-0 4 70 5 Data Structure CS102 3-1-2 5 100 6 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHV04 / PHP04 0-0-10 5 200 (20 x 10) Fifth Semester (3 rd year of MSc)	2	Classical Mechanics	PH203	3-1-0	4	70
5 Discrete Mathematical Structure MA205 3-1-0 4 70 6 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHV03 / PHP03 0-0-10 5 200 (20 x 10) Fourth Semester (2 nd year of MSc) 1 Mathematical Methods in Physics PH202 3-1-0 4 70 2 Quantum Mechanics-I PH204 3-1-0 4 70 3 Electromagnetic Theory-II PH206 3-0-2 4 85 4 Laser and photonics PH208 3-1-0 4 70 5 Data Structure CS102 3-1-2 5 100 5 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHV04 / PHP04 0-0-10 5 200 (20 x 10) Fifth Semester (3 rd year of MSc)	3	Optics	PH205	3-0-2	4	85
Total 21 410	4	State and Properties of Matter	CY205	3-1-2	5	100
6 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHV03 / PHP03 0-0-10 5 200 (20 x 10) Fourth Semester (2 nd year of MSc) 1 Mathematical Methods in Physics PH202 3-1-0 4 70 2 Quantum Mechanics-I PH204 3-1-0 4 70 3 Electromagnetic Theory-II PH206 3-0-2 4 85 4 Laser and photonics PH208 3-1-0 4 70 5 Data Structure CS102 3-1-2 5 100 5 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHV04 / PHP04 0-0-10 5 200 (20 x 10) Fifth Semester (3 rd year of MSc)	5	Discrete Mathematical Structure	MA205	3-1-0	4	70
(Optional) (Mandatory for Exit) PHP03 0-0-10 5 (20 x 10) Fourth Semester (2 nd year of MSc) 1 Mathematical Methods in Physics PH202 3-1-0 4 70 2 Quantum Mechanics-I PH204 3-1-0 4 70 3 Electromagnetic Theory-II PH206 3-0-2 4 85 4 Laser and photonics PH208 3-1-0 4 70 5 Data Structure CS102 3-1-2 5 100 5 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHV04 / PHP04 0-0-10 5 200 (20 x 10) Fifth Semester (3 rd year of MSc)				Total	21	410
Coptional (Mandatory for Exit)	6	Vocational Training / Professional Experience	PHV03 /	0.0.10	-	200
1 Mathematical Methods in Physics PH202 3-1-0 4 70 2 Quantum Mechanics-I PH204 3-1-0 4 70 3 Electromagnetic Theory-II PH206 3-0-2 4 85 4 Laser and photonics PH208 3-1-0 4 70 5 Data Structure CS102 3-1-2 5 100 6 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHV04 / PHP04 0-0-10 5 200 (20 x 10) Fifth Semester (3 rd year of MSc)			PHP03	0-0-10	5	(20 x 10)
1 Mathematical Methods in Physics PH202 3-1-0 4 70 2 Quantum Mechanics-I PH204 3-1-0 4 70 3 Electromagnetic Theory-II PH206 3-0-2 4 85 4 Laser and photonics PH208 3-1-0 4 70 5 Data Structure CS102 3-1-2 5 100 6 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHV04 / PHP04 0-0-10 5 200 (20 x 10) Fifth Semester (3 rd year of MSc)		Fourth Semester (2 nd year of MSc)				
3 Electromagnetic Theory-II PH206 3-0-2 4 85 4 Laser and photonics PH208 3-1-0 4 70 5 Data Structure CS102 3-1-2 5 100 6 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHV04 / PHP04 0-0-10 5 200 (20 x 10) Fifth Semester (3 rd year of MSc)	1		PH202	3-1-0	4	70
4 Laser and photonics PH208 3-1-0 4 70 5 Data Structure CS102 3-1-2 5 100 Total 21 395 6 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHV04 / PHP04 0-0-10 5 200 (20 x 10) Fifth Semester (3 rd year of MSc)	2	Quantum Mechanics-I	PH204	3-1-0	4	70
5 Data Structure CS102 3-1-2 5 100 Total 21 395 6 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) PHP04 7 0-0-10 5 200 (20 x 10) Fifth Semester (3 rd year of MSc)	3	Electromagnetic Theory-II	PH206	3-0-2	4	85
Total 21 395 6 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) Fifth Semester (3 rd year of MSc) Total 21 395 0-0-10 5 200 (20 x 10)	4	Laser and photonics	PH208	3-1-0	4	70
6 Vocational Training / Professional Experience (Optional) (Mandatory for Exit) Fifth Semester (3 rd year of MSc) PHV04 / PHP04 0-0-10 5 200 (20 x 10)	5	Data Structure	CS102	3-1-2	5	100
(Optional) (Mandatory for Exit) PHP04 O-0-10 5 (20 x 10) Fifth Semester (3 rd year of MSc)				Total	21	395
(Optional) (Mandatory for Exit) PHP04 O-0-10 5 (20 x 10) Fifth Semester (3 rd year of MSc)	6	Vocational Training / Professional Experience	PHV04 /	0.0.40	-	200
			PHP04	0-0-10	5	(20 x 10)
		Fifth Semester (3 rd year of MSc)	•			
1 1 1 1 1	1	Quantum Mechanics-II	PH301	3-1-0	4	70

Subject Code: ##nXX; ##: Department Identity, n: Year, XX: Subject Sequence number XX: last digit 0 (subject offered in both ODD and EVEN semesters, XX: 01 to 30 – last digit ODD and EVEN for ODD and EVEN semesters (Mandatory Core), XX: 31 to 50 (Optional Core), XX: 51 to 99 (Elective), Subjects list for Minor and Honor (M/H#1-4), Subjects list for Specialization track (#1-4) EG: Engineering Subject, SC: Science Subject (offered combinedly by departments) (SVNIT Surat)

Curriculum SVNIT Surat (58th Senate, 31 May 2023; Minor modification: 61st Senate, 30 April 2024)

Sardar Vallabhbhai National Institute of Technology (SVNIT) Surat Department of Physics

Five Years Integrated M.Sc. Physics

			,		
2	Atomic and Molecular Physics	PH303	3-1-0	4	70
3	Nuclear Physics	PH305	3-0-2	4	85
4	Elective	PH3AA	3-X-X	3/4	55/70/85
5	Elective	PH3BB	3-X-X	3/4	55/70/85
			Total	18-20	335-395
6	Vocational Training / Professional Experience	PHV05 /	0-0-10	5	200
	(Optional) (Mandatory for Exit)	PHP05	0-0-10		(20 x 10)
	Sixth Semester (3 rd year of MSc)				
1	Plasma Physics	PH302	3-1-0	4	70
2	Elective	PH3CC	3-X-X	3/4	55/70/85
3	Elective	PH3DD	3-X-X	3/4	55/70/85
4	Artificial Intelligence	CS332	3-0-2	4	85
5	Interpretative Molecular Spectroscopy	CY302	3-1-0	4	70
			Total	20	335-395
6	Vocational Training / Professional Experience	PHV06 /	0.0.10		200
	(Optional) (Mandatory for Exit)	PHP06	0-0-10	5	(20 x 10)
	Seventh Semester (4 th year of MSc)				
1	Statistical Mechanics	PH401	3-1-0	4	70
2	Digital Electronics	PH403	3-0-2	4	85
3	Condensed Matter Physics	PH405	3-1-0	4	70
4	Elective	PH4AA	3-X-X	3/4	55/70/85
5	Elective	PH4BB	3-X-X	3/4	55/70/85
			Total	20	335-395
6	Vocational Training / Professional Experience	PHV07 /	0.0.40	_	200
	(Optional) (Mandatory for Exit)	PHP07	0-0-10	5	(20 x 10)
	Eighth Semester (4 th year of MSc)				
1	Computational Physics	PH402	3-0-4	5	115
2	Particle Physics	PH404	3-1-0	4	70
3	Elective	PH4CC	3-1-0	4	70
4	Elective	PH4DD	3-X-X	3/4	55/70/85
5	Elective	PH4EE	3-X-X	3/4	55/70/85
			Total	20-21	365-425
	Ninth Semester (5 th year of MSc)	1			1
1	Dissertation Final (FD)	DUDGG	0.0.40	20	800
		PHP09	0-0-40	20	(20 X 40)
			Total	20	800
	Tenth Semester (5 th year of MSc)	1	<u> </u>		1
1	Dissertation Final (FD)	5115:5			800
	,	PHP10	0-0-40	20	(20 X 40)
			Total	20	800
	I .	1			

Subject Code: ##nXX; ##: Department Identity, n: Year, XX: Subject Sequence number XX: last digit 0 (subject offered in both ODD and EVEN semesters, XX: 01 to 30 – last digit ODD and EVEN for ODD and EVEN semesters (Mandatory Core), XX: 31 to 50 (Optional Core), XX: 51 to 99 (Elective), Subjects list for Minor and Honor (M/H#1-4), Subjects list for Specialization track (#1-4) EG: Engineering Subject, SC: Science Subject (offered combinedly by departments) (SVNIT Surat)

Curriculum SVNIT Surat (58th Senate, 31 May 2023; Minor modification: 61st Senate, 30 April 2024)

Sardar Vallabhbhai National Institute of Technology (SVNIT) Surat Department of Physics

Five Years Integrated M.Sc. Physics

Sr.	Elective	Code	Scheme
No.			L-T-P
1	Basic Course on Relativity	PH351	3-1-0
2	Material Science	PH352	3-1-0
3	Basic of Astronomy and Astrophysics	PH353	3-1-0
4	Solar Cell Technology	PH354	3-1-0
5	Nanoscience and Nanotechnology	PH355	3-1-0
6	Electronics and optical communication	PH356	3-1-0
7	Remote sensing	PH357	3-1-0
8	Many Body Physics and Relativistic Quantum Mechanics	PH358	3-1-0
9	Astrophysics and space science	PH451	3-1-0
10	Microprocessor and Microcontrollers	PH452	3-0-2
11	Characterization Techniques	PH453	3-0-2
12	Density Functional Theory	PH454	3-1-0
13	Elementary Excitation in Solids	PH455	3-1-0
14	Green's Function and Partial Differential Equations	PH456	3-1-0
15	Simulations and Modelling	PH457	3-1-0
16	Advanced Crystallography	PH458	3-1-0
17	Electromagnetic Communication	PH459	3-1-0
18	Global Navigation Satellite System	PH460	3-0-2
19	Quantum Field Theory	PH461	3-1-0
20	Thin Films and Vacuum Technology	PH462	3-1-0
21	Nuclear Science and Techniques	PH463	3-0-0
22	Non-Destructive Testing	PH464	3-0-0
13	Microwave Plasma	PH465	3-0-0

Subject Code: ##nXX; ##: Department Identity, n: Year, XX: Subject Sequence number XX: last digit 0 (subject offered in both ODD and EVEN semesters, XX: 01 to 30 – last digit ODD and EVEN for ODD and EVEN semesters (Mandatory Core), XX: 31 to 50 (Optional Core), XX: 51 to 99 (Elective), Subjects list for Minor and Honor (M/H#1-4), Subjects list for Specialization track (#1-4) EG: Engineering Subject, SC: Science Subject (offered combinedly by departments) (SVNIT Surat)

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