

SAURASHTRA UNIVERSITY



Accredited Grade 'A' by NAAC

Faculty of Science
Syllabus for M.Sc. (Applied Physics) Integrated
(Based on UGC-CBCS-2015)

Under

Department of Nano science
&
Advanced Materials

Effective from June -2016

Saurashtra University,
University Road, University Campus
Rajkot- 360005
Gujarat, India

www.saurashtrauniversity.edu

M.Sc. (Applied Physics) Course

Master of Science (M.Sc.) in Applied Physics of Saurashtra University is a Choice Based Credit System (CBCS) programming comprising of total **sixteen (16) theory papers** [Classified as TEN Core (Compulsory) theory papers, FOUR ELECTIVE Theory papers and TWO INTERDISCIPLINARY theory papers] and FOUR (04) Practical Courses. Under CBCS pattern, a student can select any FOUR elective papers out of set of TWELVE elective papers offered (Group A, B, C & D) and TWO interdisciplinary papers.

Each semester will have FOUR theory papers and one practical course. Each theory paper will be of 100 marks with external examination of 70 marks of 2:30 hrs. duration and internal examination of 30 marks of 1 hr. duration. Each practical examination will be of 200 marks with 150 marks of practical and/or project work and 50 marks for viva – voice examination.

Regarding practical course, Students of Semester I & II will perform general practicals related to Applied Physics while Semester III & IV students will perform advanced practicals and also undertake small projects (experimental or theoretical) related to advanced materials, communication and Nano materials. In case of project work, students are required to submit the dissertation (Project Report) & make its presentation at the end of Semester – IV.

M.Sc. (Applied Physics) CBCS is a fulltime Post - Graduate degree course and is divided into FOUR Semesters (TWO years). Term grant (admission to examination) will be based on the satisfactory attendance of the student, as per Saurashtra University rules.

The course structure for M.Sc. (Applied Physics) CBCS program semester I to IV has been summarized as below.

B.Sc/M.Sc. (Applied Physics) Integrated Semester-I

Sr. No	Paper No.	Title	Credits	Details	
				Theory	Lab
1	Paper-I	Foundation course (Communication Skills)	03	03	--
2	Paper-II	Foundation of Mathematics	09	06	03
3	Paper-III	Applied Physics-I (Mechanics, Fluid, Heat, waves & vibrations)	09	06	03
4	Paper-IV	Applied Physics-II (Sound, Acoustics, Ultrasonics, Electrostatics, DC Electricity)	09	06	03
Total Credits			30		

B.Sc/M.Sc. (Applied Physics) Integrated Semester-II

Sr. No	Paper No.	Title	Credits	Details	
				Theory	Lab
1	Paper-V	Environmental Studies	03	02	01
2	Paper-VI	Applied Mathematics	09	06	03
3	Paper-VII	Modern Physics-I (Atomic Structure, Wave Mechanics up to Schrodinger)	09	06	03
4	Paper-VIII	Basic Electronics	09	06	03
Total Credits			30		

B.Sc/M.Sc. (Applied Physics) Integrated Semester-III

Sr. No	Paper No.	Title	Credits	Details	
				Theory	Lab
1	Paper-IX	Non-conventional Energy Resources	03	03	--
2	Paper-X	Applied Electronics	09	06	03
3	Paper-XI	Basic Nuclear Physics	09	06	03
4	Paper-XII	Modern Physics-II (Techniques of Modern Physics, Particle Accelerators)	09	06	03
Total Credits			30		

B.Sc/M.Sc. (Applied Physics) Integrated Semester-IV

Sr. No	Paper No.	Title	Credits	Details	
				Theory	Lab
1	Paper-XIII	Modern computational Techniques & Programming	03	02	01
2	Paper-XIV	Applied Nuclear Physics [Nuclear Reactors, Fusion, Fission, Particle Physics]	09	06	03
3	Paper-XV	Fundamentals of Materials Science	09	06	03
4	Paper-XVI	Electrodynamics & Plasma Physics	09	06	03
Total Credits			30		

B.Sc/M.Sc. (Applied Physics)Integrated Semester-V

Sr. No	Paper No.	Title	Credits	Details	
				Theory	Lab
1	Paper-XVII	Statistical Physics	09	06	03
2	Paper-XVIII	Advanced Electronics	09	06	03
3	Paper-XIX	Applied Condensed Matter Physics	09	06	03
4	Paper-XX	Applied Physics Projects	03	-	03
Total Credits			30		

B.Sc/M.Sc. (Applied Physics)Integrated

Semester-VI

Sr. No	Paper No.	Title	Credits	Details	
				Theory	Lab
1	Paper-XXI	Elements of Nano science and Nano Technology	09	06	03
2	Paper-XXII	Experimental Techniques in Physics	09	06	03
3	Paper-XXIII	Digital communication and Electronics	09	06	03
4	Paper-XIV	Applied Physics Projects	03	-	03
Total Credits			30		

Total Credits for Semester I-VI shall be 180

B.Sc/M.Sc. (Applied Physics) Integrated Semester-VII

Sr. No	Paper No.	Title	Credits	Details	
				Theory	Lab
1	Core -1 Paper -I	Mathematical methods in Physics	04	3	1
2	Core - 2 Paper-II	Applied Quantum Mechanics	04	3	1
3	Core -3 Paper-III	Semiconductor Devices and Applications	04	3	1
4	Core -4 Paper-IV	Advanced Materials and Applications	04	3	1
5	Practicals	General Practicals of Applied Physics	08	--	8
Total Credits			24		

B.Sc/M.Sc. (Applied Physics) Integrated Semester-VIII

Sr. No	Paper No.	Title	Credits	Details	
				Theory	Lab
1	Core -5 Paper-V	Vacuum Technology and Thin film	04	3	1
2	Core - 6 Paper-VI	Nano materials -I: Synthesis and Types	04	3	1
3	Core - 7 Paper-VII	Signal Processing and Communication	04	3	1
4	Core - 8 Paper - VIII	Advanced Experimental Techniques for Materials Characterization	04	3	1
5	Practicals	General Practicals of Applied Physics	08	--	08
Total Credits			24		

B.Sc/M.Sc. (Applied Physics) Integrated Semester-IX

Sr. No	Paper No.	Title	Credits	Details	
				Theory	Lab
1	Core – 9 Paper-IX	Nano Materials –II: Properties and Applications	04	3	1
2	ID - 1 Paper-X	Numerical Techniques for computational Analysis	04	3	1
3	Elective –1 Paper-XI	One from Elective Groups A, B, C, D	04	3	1
4	Elective –2 Paper-XII	One from Elective Groups A, B, C, D	04	3	1
5	Practicals	Advanced Practicals of Applied Physics & Communication	08	--	08
Total Credits			24		

B.Sc/M.Sc. (Applied Physics) Integrated

Semester-X

Sr. No	Paper No.	Title	Credits	Details	
				Theory	Lab
1	Core – 10 Paper-XIII	Nano structuring with Ion beams	04	3	1
2	ID – 2 Paper-XIV	Nano Technology and Environment	04	3	1
3	Elective –3 Paper-XV	One from Elective Groups A, B, C, D	04	3	1
4	Elective –4 Paper-XVI	One from Elective Groups A, B, C, D	04	3	1
5	Project Work	Experimental or Theoretical Projects related to Advanced Materials and Nano Materials	08	--	08
Total Credits			24		

Commencing from Academic Year 2016-17

Elective Groups:

Group A

1. Functional Nano materials and Devices
2. Nano ceramics and Applications
3. Nano Biomaterials and Applications
4. Nanocomposites & Applications

Group B

5. Digital Electronics and Microprocessors
6. Digital Signal Processing (DSP)
7. Wireless Communication and Computer Network
8. Fiber optic Communication

Group C

9. Physics of Accelerators
10. Material Modifications with Low Energy Ion Beams (LEIB)
11. Swift Heavy Ions (SHI) for Material Modifications
12. Nano structuring with Ion beams

Group D

13. Electron optics and its applications
14. Analytical techniques and applications
15. Applied Instrumentation

Regulations:

1. In order to help the students to evaluate and improve continuously, the internal examinations would be arranged and conducted throughout the semester by the Department. The Comprehensive Continuous Assessment (internal evaluation) may have components like internal tests, assignments, seminars, presentations, projects, industrial and institutional visits and other innovative methods of examination, and any combinations of these.
2. There shall be an educational tour comprising of visit to Industry/National Institute/ National laboratories etc. at the end of semester V and Semester IX. The department will arrange the educational tour at the risk and cost of the students excluding contributory share of the University as per provision made in PG rules of the University.

Question paper style for Semesters I-VI
M.Sc (Applied Physics) Integrated Programme

Marks	
70 External	30 Internal

Sr. No.		Marks per Question	Nos.	Marks	
1	Short Questions	2	10	20	
2	As per recommendation of the science faculty meeting 27/2/2016				
Total					100 Marks

Question paper style for Semesters VII-X
M.Sc (Applied Physics) Integrated Programme

Marks	
70 External	30 Internal

Sr. No.		Marks per Question	Nos.	Marks	
1.	Short Questions(Compulsory)	02	07	14	
2.	Unit -I & II	07 07	01 01	14	
3.	Unit -II & III	04 03 07	01 01 01	14	
4.	Unit -III & IV	07 07		14	
5.	Unit -IV & V	07 07		14	
				70	30
Total					100 Marks

