Malaviya National Institute of Technology Jaipur

Program Structure for M. Sc. Physics

Course Structure

Semester	Courses	Total Credits
I	Taught Courses	**20-24**
II	Taught Courses/ Seminar	**20-24**
III	Taught Courses / Dissertation	**20-24**
IV	Taught Courses / Dissertation	**10-18**

Note:

1. **Total credit requirement for M. Sc. program ranges between 80-90.**
2. **Credit distribution among different types of courses is as under:**

Program Core	**30-50**
Program Elective (PE)	**15-24**
Open Elective (OE)	**0-6**
Research project/Dissertation	**10-16**

Malaviya National Institute of Technology Jaipur

Department of Physics

1. Course Structure

Semester- I								
S. No.	**Course Code**	**Course Title**	**Course Category**	**Type**	**Credit**	**L**	**T**	**P**
1.	21PHT501	Classical Mechanics	CORE	CORE	4	**3**	**1**	**0**
2.	21PHT504	Mathematical Methods in Physics	CORE	CORE	4	**3**	**1**	**0**
3.	21PHT502	Electronics	CORE	CORE	4	**3**	**1**	**0**
4.	21PHT505	Quantum Mechanics	CORE	CORE	4	**3**	**1**	**0**
5.	21PHP503	Electronics Lab	CORE	CORE	4	**0**	**0**	**8**
Total semester credits					**20**			

Semester- II								
S. No.	**Course Code**	**Course Title**	**Course Category**	**Type**	**Credit**	**L**	**T**	**P**
1.	21PHT507	Electrodynamics	CORE	CORE	4	**3**	**1**	**0**
2.	21PHT506	Atomic & Molecular Spectroscopy	CORE	CORE	4	**3**	**1**	**0**
3.	21PHT510	Statistical Mechanics	CORE	CORE	4	**3**	**1**	**0**
4.	21PHT508	Nuclear and Particle Physics	CORE	CORE	4	**3**	**1**	**0**
5.	21PHP509	Nuclear Physics & Spectroscopy Lab	CORE	CORE	4	**0**	**0**	**8**
Total semester credits					**20**			

Semester- III								
S. No.	**Course Code**	**Course Title**	**Course Category**	**Type**	**Credit**	**L**	**T**	**P**
1.	21PHT602	Solid State Physics	CORE	CORE	4	**3**	**1**	**0**
2.	XXPHTXXX	Program Elective 01	Program Elective	Program Elective	3	**3**	**0**	**0**
3.	XXPHTXXX	Program Elective 02	Program Elective	Program Elective	3	**3**	**0**	**0**
4.	XXPHTXXX	Program Elective 03	Program Elective	Program Elective	3	**3**	**0**	**0**
5.	21PHP603	Solid State Physics Lab	CORE	CORE	4	**0**	**0**	**8**
6.	21PHD601	Dissertation 1	Dissertation	Dissertation	6	**0**	**0**	**12**
Total semester credits					**23**			

Semester- IV								
S. No.	**Course Code**	**Course Title**	**Course Category**	**Type**	**Credit**	**L**	**T**	**P**
1.	XXPHTXXX	Program Elective 04	Program Elective	Program Elective	3	**3**	**0**	**0**
2.	XXPHTXXX	Program Elective 05	Program Elective	Program Elective	3	**3**	**0**	**0**
3.	XXX XXX	Open Elective	Open Elective	Open Elective	3	**3**	**0**	**0**
4.	21PHD604	Dissertation 2	Dissertation	Dissertation	9	**0**	**0**	**18**
Total semester credits					**18**			

Total credits of all semesters	**81**

2. Program Outcomes

1. Learn and understand the core principles of Physical Sciences, both theoretical and experimental.
2. Demonstrate sufficient competency and motivation to pursue Physics research at the global frontier.
3. Identify and analyze outstanding problems in diverse areas of Physics, conduct experiments and research to reach novel solutions.
4. Be motivated to pursue higher studies at competitive institutions across the globe.
5. Demonstrate critical thinking skills and recognize the need for continuous learning throughout their professional career.
6. Understand and commit to professional ethics in any chosen career.
7. Demonstrate the ability to communicate clearly and effectively to both peers and non-experts.
8. Function effectively in a team setting, both as a member and a leader.

3. Core Courses (Theory)

S. No.	Course Code	Course Title	Course Coordinator
1.	21PHT501	Classical Mechanics	Dr. Akhilesh Nautiyal
2.	21PHT504	Mathematical Methods in Physics	Dr. Anees Ahmed
3.	21PHT502	Electronics	Dr. Anirban Dutta
4.	21PHT505	Quantum Mechanics	Prof. Kanupriya Sachdev
5.	21PHT507	Electrodynamics	Dr. Anirban Dutta
6.	21PHT506	Atomic & Molecular Spectroscopy	Dr. Rajnish Dhiman
7.	21PHT510	Statistical Mechanics	Dr. Subhayan Mandal
8.	21PHT508	Nuclear and Particle Physics	Dr. Kavita Lalwani
9.	21PHT602	Solid State Physics	Dr. Manoj Kumar
10.	21PHD601	Dissertation 1	Dr. Srinivasa Rao Nelamarri
11.	21PHD604	Dissertation 2	Dr. Srinivasa Rao Nelamarri

4. Lab Courses

S. No.	Course Code	Course Title	Course Coordinator
1.	21PHP503	Electronics Lab	Dr. Kamakshi Pandey
2.	21PHP509	Nuclear Physics and Spectroscopy Lab	Prof. Kanupriya Sachdev
3.	21PHP603	Solid State Physics Lab	Dr. Debasish Sarkar

5. Program Elective Courses

5.1 Program Elective Courses for Semester III (PE-01, PE-02, and PE-03)

S. No.	Course code	Course Title	Course Coordinator
1.	21PHT801	Advanced Quantum Mechanics	Dr. K Venkataratnam Kamma
2.	21PHT802	Advanced Techniques for Materials Characterization	Dr. Manoj Kumar
3.	24PHT807	Basic LabVIEW Programming	Dr. Anirban Dutta
4.	24PHT803	Basics of Astronomy & Astrophysics	Dr. Subhayan Mandal
5.	21PHT809	Introduction To Quantum Field Theory	Dr. Anees Ahmed
6.	24PHT805	Machine Learning in Physics	Dr. Kavita Lalwani
7.	24PHT808	Membrane Technology for Energy Applications	Dr. Kamakshi Pandey
8.	21PHT812	Nanostructured Materials and Applications	Dr. Srinivasa Rao Nelamarri
9.	21PHT814	Numerical Methods and Computer Programming	Dr. Rahul Singhal
10.	21PHT817	Semiconductor Physics and Devices	Prof. Kanupriya Sachdev
11.	24PHT806	Soft Materials	Dr. Kamlendra Awasthi
12.	21PHT819	Solar Energy and Applications	Dr. Debasish Sarkar
13.	21PHT821	Surface Physics	Dr. Rajnish Dhiman
14.	26PHTXXX	Monte Carlo Simulations using Geant4	Dr. Kavita Lalwani
15.	26PHTXXX	Electrochemical Energy Storage	Dr. Rajnish Dhiman
16.	26PHPXXX	Applied Physics Lab	Dr. Manoj Kumar

5.2 Program Elective Courses for Semester IV (PE-04, and PE-05)

S. No.	Course code	Course Title	Course Coordinator
1.	24PHT802	Energy Materials and Devices	Dr. Debasish Sarkar
2.	21PHT806	General Theory of Relativity	Dr. Akhilesh Nautiyal
3.	21PHT716	Materials Science and Engineering	Dr. Rahul Singhal
4.	21PHT813	Nanotechnology for Energy Applications	Dr. Kamlendra Awasthi
5.	21PHT816	Plasma Physics	Dr. Subhayan Mandal
6.	24PHT801	Spintronics for Quantum Technology	Dr. Manoj Kumar
7.	26PHTXXX	Quantum Computing using Quantum Physics	Dr. Kavita Lalwani
8.	26PHTXXX	Quantum Materials and Applications	Dr. Manoj Kumar
9.	26PHTXXX	Statistical Data Analysis in Physics	Dr. Kavita Lalwani