



SHIV NADAR UNIVERSITY

SCHOOL OF NATURAL SCIENCES

Department of Physics

Ph.D. Degree Program

The Department of Physics in the School of Natural Sciences at SNU is an active and growing research center with focus in the fields of experimental and theoretical condensed matter physics, nanotechnology and development of novel materials for energy and environmental applications, and in experimental and theoretical particle physics. It offers a vibrant and rigorous graduate program drawing on its many strengths:

- It is a part of the SNS which encourages and facilitates interdisciplinary research activities.
- Many of the faculty members have worked in some of the leading international research institutes. Some of them are part of large international research collaborations.
- The department encourages collaborative research with industry and some of the faculty members are exploring joint research program with leading technological companies.

Eligibility: Candidate should have a masters degree in science or engineering with a minimum of 60% marks (first class) or an equivalent grade point. For a candidate having a 4-year BS/ BTech. or an M.Tech. degree in engineering, the norm may be relaxed if s/he can demonstrate sufficient mastery of the fundamentals through written tests, interview, etc. These criteria may be relaxed further for candidates having a valid score in any one of the following National Examinations: CSIR-UGC NET-JRF, GATE-JRF or JEST.

Physics department will enroll Ph.D. scholars twice every year, at the beginning of the Monsoon (starting in August) and Spring (starting in January) semesters. For details, please visit the university website: www.snu.edu.in.

Research Advisor: Every new graduate student will be assigned a research advisor. This will be a faculty member whose research interests overlap with that of the student. The advisor will help in initiating the student's research program.

Faculty:

- Dr. Sankar Dhar, Professor & Head of the Department <sankar.dhar@snu.edu.in>
- Dr. Susanta Sinha Roy, Associate Professor <susanta.roy@snu.edu.in>
- Dr. Aloke Kanjilal, Associate Professor <aloke.kanjilal@snu.edu.in>
- Dr. Samarendra P. Singh, Assistant Professor <samarendra.singh@snu.edu.in>
- Dr. Vaibhav Shrivastava, Assistant Professor <vaibhav.shrivastava@snu.edu.in>
- Dr. Syed Mohammad Kamil, Assistant Professor <kamil.syed@snu.edu.in>
- Dr. Priya Johari, Assistant Professor <priya.johari@snu.edu.in>
- Dr. Santosh Kumar, Assistant Professor <Santosh.kumar@snu.edu.in>
- Dr. Bhaskar Kaviraj, Assistant Professor <bhaskar.kaviraj@snu.edu.in>
- Dr. Sajal Ghosh, Assistant Professor <sajal.ghosh@snu.edu.in>
- Dr. Dimitris G. Kaskaoutis, Assistant Professor <dimitris.kaskaoutis@snu.edu.in>

The research interests of the faculty are summarized at http://www.snu.edu.in/naturalsciences/natural_sciences_physics_faculty.aspx

Graduate Student Advisor of the Department of Physics: Dr. Susanta Sinha Roy susanta.roy@snu.edu.in

Coursework: The aim of the coursework is to ensure that a graduate scholar has the required foundation for starting his/her research work. The coursework comprises core, elective and research exploratory courses. Each scholar is expected to take a minimum of 12 credits per semester and teaching/research assistantship throughout the graduate program. A scholar is expected to complete five core and three elective courses according to his/her research interest during the first two semesters. The Graduate Student Advisor will assist all the Ph.D. scholars in this process.

The Foundation				
Semester 1	PHY 502 Classical Dynamics Credit 3 (3:0:0)	PHY 5XX* Physics Elective Credit 3 (3:0:0)	PHY 5XX* Physics Elective Credit 3 (3:0:0)	PHY 599 Explorations in Research Credit 3 (3:0:0)
Semester 2	PHY 503 Quantum Mechanics Credit 3 (3:0:0)	PHY 505 States of Matter Credit 3 (3:0:0)	PHY 5XX* Physics Elective Credit 3 (3:0:0)	PHY 599 Explorations in Research Credit 3 (3:0:0)
Research				
Semester 3	DTD 899: Ph.D. Thesis (12 credits)		Comprehensive Examination	
Semester 4	Advancement to Candidacy		DTD 899: Ph.D. Thesis (12 credits)	
Semester 5	DTD 899: Ph.D. Thesis (12 credits)			
Semester 6	DTD 899: Ph.D. Thesis (12 credits)		Synopsis submission (any time after 5 th semester but within 10 th semester)	Thesis submission (any time after 5 th semester but within 10 th semester)
Semester 7	DTD 899: Ph.D. Thesis (12 credits)			
Semester 8	DTD 899: Ph.D. Thesis (12 credits)			
Semester 9	DTD 899: Ph.D. Thesis (12 credits)			
Semester 10	DTD 899: Ph.D. Thesis (12 credits)			
Doctoral Thesis Defense				
Minimum Credit Requirements: Course Work- 24 & Ph.D. Thesis - 48				

*may take non-departmental electives subject to the approval of both graduate student advisor and research advisor.

Graduate Core Courses

PHY 502: Classical Dynamics -- 3 Credits: 3 Lectures/week
 PHY 503: Quantum Mechanics -- 3 Credits: 3 Lectures/week
 PHY 505: States of Matter -- 3 Credits: 3 Lectures/week
 PHY 599: Explorations in Research -- 3 Credits
 PTC 899: Practicum in Teaching
 DTD 899: Ph.D. Thesis

Graduate Elective Courses

PHY 550: Condensed Matter Physics -- 3 Credits: 3 Lectures/week
 PHY 551: Nanomaterials and Nanophysics -- 3 Credits: 3 Lectures/week
 PHY 553: Soft Matter Physics-- 3 Credits: 3 Lectures/week
 PHY 554: Advanced Statistical Physics -- 3 Credits: 3 Lectures/week
 PHY 556: Introduction to Quantum Field Theory -- 3 Credits: 3 Lectures/week
 PHY 558: Semiconductor Physics and Devices -- 3 Credits: 3 Lectures/week
 PHY 560: Particle Physics Phenomenology -- 3 Credits: 3 Lectures/week
 PHY 562: Experimental Techniques in Particle Physics -- 3 Credits: 3 Lectures/week
 PHY 563: Computational and Numerical Analysis -- 3 Credits: 2 Lectures+1 hour lab/week
 PHY 564: Advanced Simulation Techniques -- 3 Credits: 3 Lectures/week
 PHY 566: Introduction to String Theory -- 3 Credits: 3 Lectures/week
 PHY 568: Multiferroics and Shape Memory Alloys -- 3 Credits: 2 Lectures+2 hours lab./week
 PHY 570: Biosensors: General Principles and Advanced Sensing Techniques -- 3 Credits: 3 Lectures/week
 PHY 574: Characterization of Materials-I -- 3 Credits: 3 Lectures/week
 PHY 575: Characterization of Materials-II -- 3 Credits: 3 Lectures/week
 PHY 576: Electronic Transport in Mesoscopic Systems -- 3 Credits: 3 Lectures/week
 PHY 578: Introduction to Thin Films -- 3 Credits: 3 Lectures/week
 PHY 588: Fundamentals of Ion-Solid Interactions -- 3 Credits: 3 Lectures/week
 PHY 589: Ion Beam Based Materials Characterization Techniques -- 3 Credits: 3 Lectures/week
