

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.
- Physics 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: A candidate should have a Master's degree in the appropriate science discipline, with a minimum of 60% marks or an equivalent grade point. Candidates, who have qualified for CSIR-UGC- NET-JRF, GATE, JEST, ICMR-JRF, or NBHM Fellowship, are preferred. Physics department admits Ph.D. scholars twice in a 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: At least one faculty research advisor is assigned with each new graduate student according to his/her research interests. 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. Bijan Bagchi, Professor & UGC Emeritus Fellow <bijan.bagchi@snu.edu.in>
- Dr. Susanta Sinha Roy, Associate Professor <susanta.roy@snu.edu.in>
- Dr. Alope 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>
- Dr. Subhra Sen Gupta, Assistant Professor <subhra.sengupta@snu.edu.in>

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

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 of 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 two elective courses according to his/her research interests during the first two semesters. The Physics Graduate Advisor will assist all the Ph.D. scholars in this process.

| The Foundation | | | | |
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| Semester 1 | PHY 506 Review of Classical Mechanics Credit 1.5 (1.5:0:0) | PHY 507 Review of Statistical Mechanics Credit 1.5 (1.5:0:0) | PHY 550 Condensed Matter Physics Credit 3 (3:0:0) OR PHY 560 High Energy Physics Credit 3 (3:0:0) | PHY 599 Explorations in Research Credit 3 (3:0:0) |
| | PHY 508 Review of Quantum Mechanics Credit 1.5 (1.5:0:0) | PHY 509 Review of Classical Electrodynamics Credit 1.5 (1.5:0:0) | | |
| Semester 2 | PHY 5XX* Physics Elective Credit 3 (3:0:0) | DTD 899: Ph.D. Thesis (9 credits) | | |
| 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) | | | |

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| 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- 15 & Ph.D. Thesis - 45 | | | |

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

Graduate Core Courses

PHY 506: Review of Classical Mechanics – 1.5 Credits: 3 Lectures/week
 PHY 507: Review of Statistical Mechanics – 1.5 Credits: 3 Lectures/week
 PHY 508: Review of Quantum Mechanics – 1.5 Credits: 3 Lectures/week
 PHY 509: Review of Classical Electrodynamics -- 1.5 Credits: 3 Lectures/week
 PHY 599: Explorations in Research -- 3 Credits
 PTC 899: Practicum in Teaching
 DTD 899: Ph.D. Thesis

More Graduate 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: High Energy Physics -- 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 569 Complex Fluids -- 3 Credits: 3 Lectures/week
PHY 570: Biosensors: General Principles and Advanced Sensing Techniques -- 3 Credits: 3 Lectures/week
PHY 572: Soft Matter Physics -- 3 Credits: 3 Lectures/week
PHY 573: Characterization of Materials -- 3 Credits: 2 Lectures/week & 1 Lab
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

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