



PhD program

Curriculum and Courses

The PhD curriculum at IISER Tirupati has course work for a minimum of 16 credits to be completed in the first two semesters or one year followed by research work in the remaining semesters. The course work follows a credits based semester system with two semesters in each academic year. The courses offered to PhD students are of two types, with 4 credits and 3 credits. The ones with **4 credits** course are core courses having 40 lectures /contact hours in one semester. They are aimed at providing basic and in depth understanding of the subject. The courses with **3 credits** get 30 lectures/contact hours in one semester and they can be interdisciplinary or advanced or specialized in contents. In addition, a few **Modular Courses**, are offered which are advanced courses of 2 credits, meant to impart focused training and skill development in specialized topics required for research students.

The courses offered with their codes, names and credits (in brackets) are listed below. The details of courses offered like contents, assessment pattern, and books for study and reference will be provided before the start of each semester. Students choose courses following discipline specific guidelines after discussion with supervisor or PhD coordinator in the discipline.

PhD program- Courses offered

Biology

- BIO611 - Introductory Immunology (4)
- BIO613 - Evolution (4)
- BIO615 - Molecular Plant Physiology (4)
- BIO616 - Neurobiology (4)
- BIO618 - Genetics (4)
- BIO619 - Behavioural Ecology (4)
- BIO621 - Microbiology (4)
- BIO622 - Biochemistry (4)
- BIO624 - Animal Physiology (4)
- BIO625 - Cancer Biology (4)
- BIO627 - Advanced Ecology (4)
- BIO628 - Advanced Molecular Biology (4)
- BIO637 - Pandemics-Disease and Prevention (3)
- BIO641 - Cell Biology (4)
- BIO712 - Animal Developmental Biology (4)
- BIO713 - Big Data in Biology (4)
- BIO726 - Plant Developmental Biology (4)
- BIO727 - Bioinformatics Lab (4)
- BIO731 (CHM731) - Fluorescence in Biology (3)

BIO733 - Plant Stress Biology for Sustainable Agriculture (3)
BIO735 - Infection Biology (3)
BIO741 - Biophysics (3)
BIO742 - Elements of Structural Biology (4)
BIO745 - Advanced Neuroscience (3)
BIO824 - Genome Editing (2)
BIO825 - Communicating Biology (2)
BIO723- Applied Plant Biology (4)

Chemistry

CHM611 - Quantum Chemistry I (4)
CHM612 - Physical Organic Chemistry (4)
CHM613 - Main Group Chemistry (4)
CHM615 - Forensic Science (4)
CHM621 - Statistical Thermodynamics (4)
CHM622 - Organic Synthesis I (4)
CHM623 - Organometallic Chemistry (4)
CHM625 - Chemical Kinetics and Surface Chemistry (4)
CHM626 - Electrochemistry (4)
CHM631 - Solid State Chemistry (3)
CHM632 (BIO639) - Separation Science & Techniques (3)
CHM711 - Molecular Symmetry and Spectroscopy (4)
CHM712 - Medicinal Chemistry (4)
CHM713 - Bio-Inorganic Chemistry (4)
CHM714 - Transition Metal Chemistry (4)
CHM715 (BIO716) - Biophysical Chemistry (4)
CHM721 - Quantum Chemistry II (4)
CHM722 - Organic Synthesis II (4)
CHM723 - Chemistry of d- and f-block Elements (4)
CHM732 (PHY732) - Materials Science (3)
CHM733 - Organic Spectroscopy (3)
CHM741 - Inorganic Spectroscopy (3)
CHM742 - Nano Science (3)
CHM744 (BIO744) - Chemical Biology (3)
CHM763 - Simulation and Modelling (3)
CHM764 - Astrochemistry (3)
CHM821 - NMR Spectroscopy in Structural Analyses (2)

Earth and Climate Science

ECS611-Solid Earth Geophysics(4)
ECS711 - Atmospheric Thermodynamics & Cloud Physics (4)
ECS712 - Advanced Mineral Sciences (4)
ECS720 - Computational Techniques for Earth and Climate Sciences (4)
ECS721 - Igneous Petrology (4)
ECS722 - Atmospheric Dynamics (4)

Mathematics

MTH611 - Algebra I (4)
MTH612 - Analysis I (4)
MTH613 - Topology I (4)
MTH621 - Algebra II (4)
MTH622 - Analysis II (4)
MTH623 - Topology II (4)
MTH627 - Differential Geometry (4)

Physics

PHY611 - Classical Mechanics (4)
PHY612 - Electrodynamics (4)
PHY614 - Mathematical Methods in Physics (4)
PHY615 - Astrophysics (4)
PHY621 - Quantum Mechanics II (4)
PHY623 - Optics (4)
PHY641 - Fluid Dynamics (3)
PHY711 (CHM716) - Advanced Statistical Mechanics (4)
PHY713 - Atomic & Molecular Physics (4)
PHY716 - Experimental Methods in Physics (4)
PHY717 - Computational Methods in Physics (4)
PHY721 - Nuclear & Particle Physics (4)
PHY723 - Gravitation & Cosmology (4)
PHY724 - Advanced Condensed Matter Physics (4)
PHY726 - Nonlinear Dynamics (4)
PHY733 - Quantum Field Theory (3)
PHY734 (CSA734) - Data Science I (3)
PHY739 - Complex Systems (3)
PHY743 - Soft Matter Physics (3)
PHY762 (CSA762) - Data Science II (3)