

Course structure for ICTS I-Ph. D student (2015)

(Numbers mentioned are credits)

Semester 1 (Aug-Nov): Total credits ---- 24

Classical Mechanics (IISc., core, 4)
Quantum Mechanics - I (IISc., core, 4)
Mathematical Methods of Physics (IISc., core, 4)
Fundamentals of astrophysics (IISc., core, 4)
General Physics Lab (core, 8)

Semester 2 (Jan-Apr) : Total credits ---- 20

Statistical Mechanics (IISc., core, 4)
Quantum Mechanics - II (IISc., core, 4)
Electromagnetic theory (IISc., core, 4)
Condensed matter physics - I (IISc., core, 4)
Numerical and statistical methods – (ICTS, core, 4)

Summer (May-June)

Experimental Project (ICTS/IISc/NCBS/RRI/JNCASR, 8)

Semester 3 (Aug-Nov) : Total Credits ---- 16

Nuclear and particle physics (IISc., core, 4)
~~Graduate course 1 (elective, 4)~~ **Statistical Physics II (ICTS, Core, 4)**
Graduate course 2 (elective, 4)
Graduate Course 3 (elective, 4)

Possible graduate courses in this semester:

Advanced Statistical Physics (IISc), Condensed Matter Physics -II (IISc.), Quantum Mechanics III (IISc.), Quantum Field Theory-I (IISc), Nonlinear dynamics/Chaos and fluid dynamics (ICTS)

Semester 4 (Jan-Apr) : Total credits ---- 16

Theory Project 1 (ICTS, 8)
Graduate course 4 / Reading course (elective, 4)
Graduate course 5 / Reading course (elective, 4)

Possible graduate courses in this semester:

Quantum computation (IISc.), Quantum Field theory -II (IISc.), Advanced Mathematical Physics (IISc.), General relativity and Cosmology (IISc.)

Summer (May-June) + Semester 5 : Total credits 16

Theory Project 2 (ICTS, 8)

Theory Project 3 (ICTS, 8)

Total credits = 24+20+8+16+16+16 = 100

Course breakup --- 10 theory core courses (40), 1 expt. core course (8), 3 theory and 1 expt. project (32),

7 Graduate courses (including 2 reading and 3 elective courses) (20)

Some notes on core courses, reading courses and projects

- 1) Core courses are compulsory. If a student feels that he/she already knows the course well enough, they have the option of taking a drop test in the beginning of the course. A satisfactory performance ($> B$) then allows the student to automatically earn credits for the course.
- 2) Reading courses can be taken by students with any faculty member at ICTS. It is required that the course be graded through regular assignments or through two exams (mid-term and final) or a combination of these. Based on these a final mark and grade will be given.
- 3) Projects can be done with any faculty member at ICTS. The student will be graded based on
 - (i) a project report to be examined by the project guide
 - (ii) a seminar presentation to be examined by a two member committee. The weightage on these will be equal and, based on these, a final mark and grade will be given.

Comprehensive examination

Int.-Ph.D students have to register for Ph.D before three years after joining ICTS. Before registering, students have to choose their prospective advisor. They are also required to give a comprehensive examination, whose structure is as follows:

1. The student will first give an oral presentation on his/her research/project work.
2. Then, the student will be orally assessed on a pre-set syllabus which includes three core courses, namely, classical mechanics, quantum mechanics and statistical physics, and one special course, which will be selected in consultation with the advisor.
3. Duration of the comprehensive exam will be about 2-3 hrs.
4. The assessment panel will comprise of the student's advisor, an external faculty and another ICTS faculty member. The panel will be chaired by the ICTS faculty member (non-advisor).

The students will receive a degree through the Physics /Subject Board of the Graduate School of TIFR.