

**Ordinance and Regulation for the
Integrated-PhD (I-PhD) in Physics
Program**

Nov 2022



Programme Level	Post Graduate
Year of Commencement	2015
Programme Duration	6 Years (12 Semesters)
Senate Meeting Reference	10.4/19.4/37.7

**School of Physical Sciences
Indian Institute of Technology Mandi**

O.1 Name of the Degree Program:

Integrated PhD in Physics

O.2 Abbreviation:

I-PhD (Physics)

O.3 Duration: Six years. Program duration may be extended with the permission of Dean (Academic) or Chairman Senate.

O.4 Credits to be earned:

The students have to earn minimum of 89 credits for the I-PhD in Physics degree, of which minimum 80 credits are to be completed within first four semesters.

O.5 Credit Distribution: Candidate would have to complete a minimum of 89 credits for the successful completion of I-PhD degree.

<u>Semester-I</u>	<u>Total: 24 credits</u>
Common Core Courses:	$1 \times 1 + 2 \times 4 + 2 \times 3 = 15$ Credit
Common Laboratory Courses:	$1 \times 3 = 3$ Credit
Research Projects	$1 \times 2 + 1 \times 4 = 6$ Credit
<u>Semester-II</u>	<u>Total: 24 credits</u>
Common Core Courses:	$2 \times 4 + 2 \times 3 = 14$ Credit
Common Laboratory Courses:	$1 \times 4 = 4$ Credit
Research Projects	$2 \times 3 = 6$ Credit
<u>Semester-III</u>	<u>Total: 17 credits</u>
Common Core Courses:	$1 \times 3 = 3$ Credit
Common Laboratory Courses:	$1 \times 3 = 3$ Credit
Elective Courses:	$2 \times 3 = 6$ Credit
Research Practicum:	$1 \times 2 + 1 \times 3 = 5$ Credit
<u>Semester-IV</u>	<u>Total: 15 credits</u>
Common Core Courses:	$1 \times 4 = 4$ Credit
Elective Courses:	$1 \times 3 = 6$ Credit
Research Practicum:	$1 \times 8 = 8$ Credit
<u>Semester-III-VI</u>	<u>Total: 9 credits</u>
Elective Courses:	$3 \times 3 = 9$ Credit

Total: 32 (T) + 10 (L) + 22 (R) + 15 (E) + 1 (TC) + 9 (AE) = 89 Credits

* Students are required to complete minimum 6 credits from the electives outside physics discipline and minimum 6 credits from physics elective.

** Details of the courses for each semester is given in Annexure -I

O.6 Eligibility:

Candidates who have qualified for the award of a three/four year Bachelor degree (B.Sc. or equivalent, after 10+2 or equivalent schooling) with Physics and Mathematics as two of the subjects, from a recognized university or Institute with at least 55 % marks (or 6.0 CGPA on a scale 10), and a valid JAM (Joint Admission test for Master program) or JEST (Joint Entrance Screening Test) score are eligible to apply for admission to the program.

For admission to I-PhD program, the concerned School shall adopt qualifying criteria for short-listing for written and/or interview and prepare a merit list of selected candidate. Reservation in the admission for the candidates belonging to the EWS/OBC/SC/ST/PWD candidates will be applicable as per the Govt. of India norms.

O.7 Number of seats: As approved by the Senate.

O.8 Assistantship (Fellowship/Scholarship)

The award of assistantship shall be in accordance with prevailing norms of the Institute.

O.9 Award of Degree

Award of the I.PhD in Physics degree shall be in accordance with the regulation of the Senate in relation to the requirements of the given program.

O.10 Academic Events

The dates of academic events scheduled during the academic session shall be specified in the academic calendar.

O.11 Campus Stay

Students admitted to the degree programs are required to stay in campus for at least first two years to participate and complete all credit requirements of the program.

O.12 Exception

Any exception to above clauses will require approval of the Senate or by the Chairman, Senate.

Annexure-I

Name of the Courses and their Distribution:

Semester I [Total: 20 + 4 Credit]

Mathematical Physics (PH511)	[4-0-0-4]
Classical Physics (PH512)	[4-0-0-4]
Quantum Mechanics (PH513)	[3-0-0-3]
Electronics (PH514)	[3-0-0-3]
Physics Laboratory (PH515P)	[0-0-5-3]
Research Project 1 (PH516P)	[0-0-4-2]
Technical Communication	[1-0-0-1]
Research Project 2 (PH517P) (During winter)	[0-0-8-4]

Semester II [Total: 21 + 3 Credit]

Electromagnetic Theory (PH521)	[4-0-0-4]
Statistical Mechanics (PH522)	[4-0-0-4]
Condensed Matter Physics (PH523)	[3-0-0-3]
Atomic & Molecular Physics (PH524)	[3-0-0-3]
Computational Methods for Physicists (PH621)	[2-0-4-4]
Research Project 1 (PH526P)	[0-0-6-3]
Research Project 2 (PH527P) (During Summer)	[0-0-6-3]

Semester III [Total: 17 Credit]

Electronics Laboratory Practicum (PH525P)	[0-0-5-3]
Special Topics in Quantum Mechanics (PH613)	[3-0-0-3]
Seminar and Report (PH614)	[0-0-4-2]
Mini Thesis I (PH615)	[0-0-6-3]
Elective-1	[3-0-0-3]
Elective-2	[3-0-0-3]

Semester IV [Total: 15 Credit]

Experimental Research Techniques (PH611P)	[0-0-7-4]
Mini Thesis II (PH622)	[0-0-16-8]
Elective-3	[3-0-0-3]

Semester III-VI [Total: 9 Credit]

Elective	[3-0-0-3]
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Regulation for I-PhD (Physics) Program

R.1 Categories of Admission

For I-PhD program, there shall be one type of student i.e., regular full time student.

R.2 Eligibility for Admission

R.2.1 The minimum educational qualifications for admission to the I-PhD program are as follows:

- Candidates who have qualified for the award of a three year Bachelor degree (B.Sc. or equivalent, after 10+2 or equivalent schooling) with Physics and Mathematics as two of the subjects, from a recognized university or Institute with at least 55 % marks (or 6.0 CGPA on a scale 10), are eligible to apply for admission to the program. and a valid JAM (Joint Admission test for Master program) or JEST (Joint Entrance Screening Test) score are eligible to apply for admission to the program.

R. 3 Selection for Admission

- For admission to I-PhD program, the concerned School shall adopt qualifying criteria for short-listing for written and/or interview and prepare a merit list of selected candidate. Reservation in the admission for the candidates belonging to the EWS/OBC/SC/ST/PWD candidates will be applicable as per the Govt. of India norms.

R.4 Registration & Enrollment

The enrolment for the first semester will take effect after the payment of prescribed fees. From the second semester onwards, all the students have to enroll on the first day of the beginning of the semester as per the Institute guidelines or as per the dates decided by the Institute. The student will become eligible for enrolment only if he/she satisfies **R.13.0** and in addition he/she has cleared all dues to the Institute, Hostel and the Library up to the end of the previous semester, provided he/she is not debarred from enrolment by the Institute on disciplinary grounds. If the student fails to register during the specified period, the student has to pay the fine as per Institute norms.

R.5 Course Coordinator/Course Interest Groups

A program coordinator will be appointed for I-PhD program by the Chairman, Senate on recommendation of Dean (Academics). A program faculty group (PFG) may also be formed consisting of faculty members who have taught courses for the particular program in the past,

doing so currently, or scheduled to do so in the immediate future or as per IIT Mandi regulations approved by the Senate for PFG.

R.6. Faculty Adviser

To help students in planning their courses of study and for getting general advice on the academic program, the Dean (Academics) shall appoint a faculty member as a Faculty Advisor for each group of students until the allotment of PhD supervisor.

R.7 Class Committee

The execution of the courses offered under I-PhD program will be monitored by the class committee constituted by Associate Dean (Courses).

R.8 Duration of the Program

Duration of the program would be six years. However it may be extended with the permission of Dean (Academic) or Chairman Senate.

R.9 Assessment Procedures

R.9.1 Letter Grades: Letter grades will be used in evaluation of performance of students in all academic activities for which he/she has registered in a semester for a degree program.

R.9.2 Definitions: The definitions of credit, grade, Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA) for these programs will be same as that of B.Tech Program.

R.9.3 Performance Evaluation (Courses): The assessment of lecture and/or tutorial based courses shall be continuous. Two quizzes may be conducted during the semester besides an end semester final examination or as per the prevailing norms of institute notified by the Dean (Academic) office. In addition, a combination of assignments, projects, in class quizzes, seminars, class presentations and other tasks may be used for training and assessing the students. The assessment scheme shall be announced in the class by the teacher at the beginning of the semester and this shall be confirmed during the first class committee meeting.

R.9.4 Project work: A continuous evaluation process will be followed to evaluate the project work progress to award letter grades for the credits assigned to project component. The assessment should include evaluation by the research supervisor(s) and the committee of internal/external members formed by the school chair.

The detailed assessment process will be framed by the PFG/School. However, in these assessments, the contribution of supervisor evaluation should not exceed 50% and the contribution of the evaluation committee should not be less than 50%.

Based on the performance, each student is awarded a final letter grade at the end of the semester for each of the project.

A student is deemed to have completed a course successfully and earned the specified credits if he/she secures in the course a letter grade other than F, which implies a failure.

R 9.5 Backlog Examination: Backlog examinations will be conducted for the program following the same process as that of institute's B.Tech Program.

R.10 Makeup Examination

Students who have missed the quizzes, test or end semester examination for any genuine reasons, the teacher may allow the students for makeup quiz or examination.

R.11 Attendance

The minimum attendance requirement is 70% for a student to pass a course, unless otherwise specified by the course Instructor. A student who has an attendance lower than 70% whatever may be the reason for the shortfall in attendance will not be permitted to appear in the end semester examination and will be awarded F grade in the course in which the shortfall exists.

R.12 Temporary Withdrawal from the Program

Student may be permitted by the Institute to withdraw from the program for a semester or longer due to ill health or on other valid grounds. Normally student will be permitted to discontinue from the program only for a maximum continuous period of two semesters. The period of leave shall be counted towards the duration of the program.

R.13 Minimum Requirement to Continue the Program

A student must maintain a minimum CGPA of 7.0 at the end of second semester to continue in the I-PhD program. If the CGPA is less than 7.0 after two semesters, then he/she shall be allowed to exit the program with M.Sc. (Physics) degree subject to fulfilling criteria for M.Sc. (Physics). Candidates continuing with I-PhD program, need to maintain an overall CGPA of 7.0 in order to appear in the comprehensive exam.

R.13.1 Eligibility for the Award of M.Sc. Degree

Student who is not able to maintain minimum CGPA will be required to fulfil following criteria to be eligible for the award of M.Sc. (Physics) degree, while exiting the program:

- Student has registered and successfully completed all the academic requirements of M. Sc. degree including prescribed courses and credits etc.
- Student has successfully acquired the minimum number of CGPA (5.5) for M.Sc. program, vide R.13 prescribed in the regulation of M.Sc. curriculum within the stipulated time.
- Student has no dues to the Institute, Library and Hostels.
- Student has no disciplinary action pending against him/her.

R.14 Guide Allocation

Guide allocation to the I-PhD students would be done by the course coordinator in consultation with the faculty advisor, at the beginning of the second academic year. Thereafter a doctoral committee will be formed for the student, which will monitor the progress of student's research work in line with the same guidelines as for the regular PhD students.

R.15 Exit option from the Program

The students who are admitted to I-PhD program may be allowed to exit the program (if they wish to), as per the following guidelines:

- Such students are required to intimate about their choice of exit from I-PhD program before the end of first academic year.
Student who wants to exit from the I-PhD program are allowed to convert their program to Master of Science (MS) by Research. Student exercising this option will continue with their course work for the second academic year, followed by one-year additional research work. They have to complete total 80 credits with CGPA 7.0. Such students will be allotted the research supervisor before the start of second academic year in the same manner as the regular I-PhD student, who will guide him/her for the second and third year research work.
- The MS thesis should be submitted for evaluation by the student at least two weeks prior to the End-Semester examination of their 6th semester. A three membered internal committee including MS thesis supervisor as its convener to be formed (by the School Chairperson) for the evaluation of the MS thesis. The evaluation process should involve a public presentation of the thesis work followed by a viva-voce examination conducted by the same evaluation committee. The evaluation committee has to recommend Acceptance or Non- acceptance of the thesis. In case the MS thesis is not accepted by the evaluation committee, student should resubmit the thesis after revising it as per the suggestions of the evaluation committee.

R.16 Fellowship norm

The fellowship guideline for the students registered in the program will be as per the following:

- The students joining the I-PhD program would be given the fellowship of Rs 8,000 per month for the first year. The fellowship will be converted to HTRA fellowship (JRF) from the second academic year, subject to the fulfillment of the all requirements such as CGPA, guide allocation, etc. The I-PhD students will be given fellowship for a maximum of 6 years from the date of registration.
- Students who opt to exit from the program with 'MS by Research' will get a HTRA fellowship equivalent to the fellowship of MS by Research program for the maximum of two more academic years only. Students opting for MS by Research will be given fellowship for a maximum of 3 years from the date of registration.
- Students who have failed to achieve the minimum CGPA at the end of first academic year and are being terminated with MSc degree will not get any fellowship from second year onward.
- The fellowship may be stopped if the CGPA went below the number decided by the institute for M.Tech. (by Research)/M.S. (by research)/PhD.

R.17 Degree and Transcripts

- The students would be awarded a single transcript for the program and two separate degrees (Master of Science in Physics and Doctor of Philosophy) after the completion of the program.
- The students who are voluntarily opting for the exit from the program will be awarded a single transcript and the degree of Master of Science by Research after the completion of program.
- The students who failed to achieve minimum required CGPA to continue the I-PhD program, will be given one transcript and degree of Master of Science in Physics if they fulfill all the requirements of the same.

R.17 Leave Rules

The leave rules will be as per the Institute leave norms for the students.

R.18 Discipline

The students should strictly follow the 'Student Code of Conduct' of IIT Mandi.

R. 19 Power to Modify

Notwithstanding all that has been stated above, the Senate has the right to modify any of the regulations from time to time.