

Physics Student's Guide to the Doctoral Programs at HBNI-IMSc

HBNI-IMSc Office

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1 Welcome

Dear Student,

Congratulations on being selected for a Doctoral program of HBNI at IMSc and Welcome to IMSc!

This booklet contains step-by-step information about getting your Ph. D. Please read carefully and familiarise yourself with the requirements and procedures.

The qualification for the Ph. D. degree has several components - qualifying grade in course work, successfully clearing the *Written and the Oral General Comprehensive Examination*, getting a supervisor and working on a thesis topic leading to *at least one original publication and one at least on archive*, and finally writing a thesis to be examined by experts in the field. Each of these is detailed below.

Shortly after your joining, you will be registered with HBNI. Your normal tenure is *five years* for Ph.D. students and *seven years* for Integrated Ph.D. students (effective from 1st January, 2019) with a conditional extension possible for a maximum of another two years. You will be assigned a *Monitoring Committee* to advise and assist you during your course work till you find a Ph. D. supervisor/guide. Thereafter a *Doctoral Committee* will monitor your progress of your research. Till the time your Doctoral Committee is formed, you will receive the *Junior Research Fellowship* (JRF) and upon the recommendation of the Doctoral Committee, you will receive the enhanced, *Senior Research Fellowship* (SRF).

You are expected to meet the *Chair* of your monitoring committee once a month and the full committee at the end of each semester. *This is your opportunity to seek any clarifications, give your feedback on the course work and communicate any academic difficulties you face.* Your monitoring committee will be glad to assist you.

2 The Course Work

2.1 Syllabi

The detailed course structure as well as syllabi are available on the web-site. The Ph. D program has *one year* of Course Work while the Integrated Ph. D. (I.Ph.D.) program has *two years* of Course Work enabling getting a Master's Degree at the end of the two year course work.

In the final semester of the course work, there is a project to be completed. You have to write a project report, which constitutes the Master's thesis for the Integrated Ph. D. students. This will be examined by a faculty member other than your project supervisor. Your Monitoring Committee may require you to present your work as a seminar and give appropriate grade as for the other courses. *This is your opportunity to seek a potential guide and get familiar with research methodologies.*

The project should be submitted to the Monitoring Committee Chair, no later than May 31st so that the project evaluation can be completed before June 15.

In case you feel that you have already studied a particular course and are proficient in it, you could seek exemption from the Course after satisfying the teacher who may give you an exam at the beginning of the course.

2.2 Evaluation

The course teachers will formulate and convey to you the evaluation method for their respective courses. Typically, it will involve home assignments, a mid-term examination and a final examination with some suitable weightage for each component.

2.3 Qualifying grades

You are expected to be regular in attending the lectures, doing the home works and maintain an average *qualifying grade* throughout the Course Work.

The grades \leftrightarrow marks correspondence is as follow: 'A' \leftrightarrow (90 - 100 %), 'B' \leftrightarrow (80 - 89 %), 'C' \leftrightarrow (70 - 79 %), 'D' \leftrightarrow (60 - 69 %), 'F' \leftrightarrow (< 60 %). The *Grade Point Average* is computed by assigning 4 points to an 'A', 3 points to a 'B', 2 to a 'C' and 1 to a 'D' and taking the average.

The *Qualifying GPA* are:

- A single 'F' will result in termination of the registration and the student will have to leave the Institute.
- Qualifying GPA for proceeding to Ph. D. is ≥ 2.0 ;
- For Integrated Ph D students, a GPA ≥ 1.0 qualifies for the Master's Degree.

3 The Comprehensive Examination

This is the second important component for qualifying for Ph. D. research work. The Comprehensive Examination is divided in two parts - the written comprehensive examination and the oral comprehensive examination. The purpose of the written comprehensive examination is to assess if the student has adequate mastery of the core subjects: classical mechanics, electromagnetism, quantum mechanics and statistical mechanics. The purpose of the oral comprehensive examination is to assess if the student has acquired skills relevant for the research to be undertaken, the project work provides a natural opportunity to develop these skills. The details of both these examinations are given in a separate guide - *Guide To Comprehensive Examination*. **Please refer to this important guide.**

The important point to note is that the Written Comprehensive Examination must be cleared **within one year joining** of the of the Ph. D. program or **within two years of joining** of the Integrated Ph. D. program. The Oral Comprehensive Exam must be cleared within **two-three months** of completing the course work.

As per the existing guidelines of the physics department of IMSc – applicable for all the students (both Ph.D. as well as I.Ph.D.) of physics who joined (or, will join) IMSc after 31st July, 2018 – each student will get **maximum two chances** to clear the examination of each of the four papers (Classical Mechanics, EM Theory, Quantum Mechanics, and Statistical Mechanics) of the written general comprehensive exam within a period of *one year* of joining IMSc as a Ph.D. student (or, within a period of *two years* of joining IMSc as an I.Ph.D. student.)

Failure to clear the Comprehensive Examination will foreclose your option of going for the Doctoral research and your registration will be terminated.

4 Doctoral Research

Apart from successfully completing the course work and clearing the Comprehensive Examination, it is crucial to **arrange with a faculty member of IMSc to be your Doctoral advisor**. You may begin exploration of possible advisor by discussing with faculty members of IMSc any time during your course work or even after the course work. However, you **must have confirmed with an advisor within one and a half year of your joining** in the Ph. D. Program or within **two and a half year of your joining** in the Integrated Ph. D. Program.

You will not get extension to the next academic year without constitution of the Doctoral Committee by this date.

As per the HBNI rules, the guide/advisor must be chosen from within IMSc while the *co-guide* (if any) may be selected from within IMSc or some other institution (like IIT-Madras, CMI, etc.) with which IMSc (as a constituent institute of HBNI) has an MoU. More specifically, *both Ph.D. as well as I.Ph.D. students of IMSc must stick to the following guidelines while looking for his/her Ph.D. guide(s).*

1. IMSc students are required to have their primary supervisor/guide from IMSc and not from another institute.
2. Students admitted to each group (physics, mathematics, theoretical computer science, computational biology) are expected to explore all possibilities and research areas within that group for their future research work. The monitoring committee for each student, if required, will play an advisory role in identification of research topic and supervisor.
3. Collaborative research with faculty in other institutions, as co-supervisors or otherwise, is welcomed with the understanding that an IMSc faculty member will be the primary supervisor. The IMSc supervisor and the doctoral committee constituted at IMSc are responsible for monitoring the progress of the student.
4. Any arrangement of co-supervision by a faculty member from another institution **MUST** be done as per the relevant MoU between HBNI and that institution, including obtaining relevant permissions from both institutions. The HBNI MoUs with various institutions are available at: <http://www.hbni.ac.in/main>
5. Students who want to work exclusively at another institution may transfer/seek admission there as per that institution's procedures. The HBNI MoU permits credits for courses at IMSc to be recognized at the other institution, but each institution has its own course requirements which may differ from IMSc's. Students seeking a transfer are responsible for following the other institution's procedures correctly.
6. The above is applicable to all the 2017-batch I.Ph.D. students as well as for all thoses students, from 2018-batch onward (both Ph.D. as well as I.Ph.D.), seeking to start their doctoral research henceforth.

After arranging with an advisor, the Advisor/Dean will constitute a Doctoral Committee. This will meet *at least* once in an academic year to monitor your progress and advise you accordingly.

Your thesis supervisor and you, will formulate a suitable thesis topic. You will receive guidance from your supervisor and the Doctoral Committee. However, please be aware, *succeeding in the research work is primarily your responsibility*. The Doctorate degree declares that you have the necessary competence to undertake and carry through independent research.

The normal tenure of registration is **five years** for Ph.D. students – after joining IMSc. An *academic* extension to the sixth year is possible upon the recommendation of the Doctoral Committee and subject to the approval by the Director, although *continuation of fellowship for the 6th year (or, a part thereof)* will be governed by the existing rule of IMSc. A further (academic) extension for another year could only be obtained by the approval of the Board of Studies and the Director. The Ph.D. student, seeking for the 7th year extension of his/her academic tenure, is supposed to pay the fee online at HBNI Central Office. With high probability, the Ph.D. student will not receive any fellowship from IMSc during the 7th year of his/her tenure. These extensions are permissible only under exceptional conditions and on well justified grounds. The registration of the Ph.D. student with HBNI will get over by the end of the 7th year of his/her tenure – as per the existing rule.

The normal tenure of registration is **seven years** for I.Ph.D. students (based on new fellowship rules of DAE, effective from 1st January, 2019) – after joining IMSc. An *academic* extension to the eighth year is possible upon the recommendation of the Doctoral Committee and subject to the approval by the Director, although *continuation of fellowship for the 8th year (or, a part thereof)* will be governed by the existing rule of IMSc. A further (academic) extension for another year could only be obtained by the approval of the Board of Studies and the Director. The I.Ph.D. student, seeking for the 9th year extension of his/her academic tenure, is supposed to pay the fee online at HBNI Central Office. With high probability, the I.Ph.D. student will not receive any fellowship from IMSc during the 9th year of his/her tenure. These extensions are permissible only under exceptional conditions and on well justified grounds. The registration of the I.Ph.D. student with HBNI will get over by the end of the 9th year of his/her tenure – as per the existing rule.

Your advisor and the Doctoral Committee will determine if you have done adequate work for writing your thesis and advise you accordingly. It is a requirement of the UGC, that there should be at least *one publication* before a thesis may be submitted. The Board of Studies (BoS) in Physical Sciences of HBNI will have, in general, higher requirement compared to this UGC criterion.

A separate booklet is available on the web-site for basics of research methodologies as well as for the ethical aspects of doing and publishing research work. Each Ph.D. thesis, needs to go through a plagiarism-detecting software (approved by HBNI) before being sent finally to the HBNI Central Office.

Note: You are expected to be a Teaching Assistant for one of the courses, for one semester during your tenure. There is a financial compensation for these duties.

4.1 The Thesis Submission Process

Here are the steps in the thesis submission process:

1. Submit a synopsis to your advisor (a template is available on the web-site);

2. Advisor submits your synopsis and a list of 6 examiners to the HBNI Cell;
3. The Dean sends the papers to the Board of Studies for approval and a selection of 4 examiners. This conveyed back to the IMSc Dean;
4. The thesis is prepared (template available on the web-site) and submitted to the HBNI Cell *within three months* of synopsis submission;
5. The Dean, IMSc coordinates the evaluation process. Upon receiving two examiner's reports, a viva examination is organised;
6. After the viva examination, the final copy of the thesis is prepared incorporating all suggestions of the examiners. **Three** bound copies and a soft copy is to be submitted to the HBNI Cell. **A one page abstract of your thesis** (for HBNI annual report, as a .doc file), a list of publications and *your name in Devanagari Script* (for inclusion in the Degree certificate) is also required to be submitted to HBNI;
7. The advisor gives a certification that the modifications/revisions recommended by the thesis examiners are incorporated in the final submitted copy of the thesis. The certification is *not* included in the final copy of the thesis but is included in the student's file.

The second page of the *Viva Board Recommendation* form is required to be filled in and signed by the Viva Board members.

Please have **five copies** of the signature page in the thesis as well as the viva board recommendation form. Three copies will go into the hard bound thesis copies, one should be with the student and one could be as a spare, in case a need arises. Since getting signatures could be time consuming (e.g. skype based viva), this is a precautionary suggestion.

8. The Dean-Academic, IMSc issues a certificate of completion of the viva to the student. HBNI cell sends the necessary papers to HBNI, central office who after a scrutiny sends a provisional certificate to the HBNI Cell. The final Degree Certificate is sent directly to the student and the communication address given by the student.

With the Doctorate Degree, you begin your research career.

Wish you all the best for a successful tenure at IMSc.