Department of Intelligent Systems– Doctor of Philosophy (Ph.D.) Program Requirements

The Department of Intelligent Systems is actively engaged in cutting-edge research across all current areas related to intelligent systems such as machine learning, data science, natural language processing, computer vision, cyber-physical systems, robotics, and related fields. The focus of our PhD program is on intensive research training with a high level of specialization. The objective of this training is to equip our PhD students with deep expertise in their respective areas, enabling them to pursue careers in academia, research, or industry in the rapidly evolving field of intelligent systems.

Advising

Each PhD student is advised by a faculty member from the department. In some exceptional cases, a student may have a secondary advisor together with the primary advisor. At the time of admission, a newly admitted PhD student will be provided with one or more options for the PhD advisor. These are the faculty members who show interest in mentoring the student in her PhD research work. The student has to choose one of them as her primary advisor before registering with the PhD program. Upon the advice of the primary advisor, a secondary advisor may also be chosen later. The student is expected to start her coursework in consultation with her advisors.
In certain unavoidable cases, the advisors may be changed upon written request from the student. It is important that the student finds an alternative advisor before submitting a change of advisor request.

Major Fields

A PhD student in the department is expected to conduct research on a topic within a broad range of research areas, including but not limited to:

- Artificial Intelligence
- Machine Learning and Algorithms
- Data Science and Big Data Analytics
- Natural Language Processing
- Computer Vision and Pattern Recognition
- Embedded and Cyber-Physical Systems
- Optimization and Control
- Robotics and Autonomous Systems
- Pervasive and Mobile Computing
- Computer Security
- Software Engineering
- Human-Computer Interaction

Credit Requirement and Coursework

For PhD students who have an M.Tech. degree, the minimum requirement is 144 credits, out of which at least 36 credits should be through regular post-graduate courses and at least 72 credits should be through research.
In case of PhD students holding a B.Tech. degree, the minimum requirement is 216 credits, out of which 36 credits should be through post-graduate courses and at least 72 credits should be through research.
A typical course is considered to be of 9 credits. All the courses in the PhD program are electives. A large number of electives are offered each semester. The exact courses offered will depend on the availability of faculty members in a particular semester.
To continue in the PhD program, the student needs to maintain a CPI of at least 6.5.

Comprehensive Examination

Students registered in the Ph.D. programme must pass a comprehensive examination designed to test the overall comprehension of the student in the various subjects. A student can appear in the comprehensive examination only after he/she has completed the course requirements and satisfied the minimum specified CPI requirement. The comprehensive exam is conducted by a committee that includes the thesis advisor(s), at least two other members from the department and one institute faculty member outside the department.

The examination will be in the oral form but may be supplemented with a written component. The specific format of the comprehensive examination is decided by the committee.

A PhD student must pass the comprehensive examination within four months of completing the minimum credits through coursework. In no case, the date of passing the comprehensive examination should go beyond four semesters after the first registration.

State-of-the-art Seminar

Once a PhD student passes the comprehensive examination successfully, she is admitted to the candidacy for the Ph.D. degree. Every Ph.D. candidate is required to give a general seminar in the department covering the *State of Art* of the area of research. This seminar must be given within six months of passing the comprehensive examination.

Doctoral Dissertation

Each doctoral student must produce a dissertation that demonstrates their ability to conduct original, independent research and make a meaningful contribution to the body of knowledge in their main field of study. Ideally, the dissertation should be based on research papers published in reputable venues related to intelligent systems, including but not limited to conferences such as AAAI, IJCAI, AAMAS, ICAPS, ICML, NeurIPS, ICLR, SIGIR, WWW, KDD, ACL, EMNLP, NAACL, CVPR, ICCV, EMSOFT, RTSS, RTAS, ICCPS, HSCC, CDC, ACC, ICRA, IROS, RSS, MobiCom, MobiSys, SenSys, CCS, IEEE S&P, USENIX Security, FSE, ICSE, ASE, CHI, and UBICOMP.

Open Seminar

Before proceeding to finalize the thesis, each Ph.D. student must deliver a seminar open to faculty and students in which the research work will be presented to obtain comments and criticism which may be incorporated in his/her thesis.

Thesis Submission and Review

The thesis has to be submitted within six months of delivering the open seminar. Once the student submits her thesis, it is sent to the oral board which includes the thesis advisor(s) and three other members. At least two members of the thesis board (other than the supervisor(s)) must be from outside the Institute and at least one of these two must be from within the country.

Final Oral Examination (Defense of the Thesis)

Once the reviews from the members of the oral board are received, the student has to address all the comments provided by them and submit the revised thesis to the PhD oral board. PhD oral board consists of four members in addition to the thesis supervisor(s). Of the four, three shall be from among the faculty members of the institute (including those, if any, on the thesis board) and one shall be from among the members of the thesis board within the country but outside the institute. Of the three members from IIT Kanpur, at least one shall be from a different department or IDP.
Finally, the student has to deliver a seminar defending her thesis in front of an open audience. The members of the oral board will attend the seminar. Upon successfully passing the oral examination, the student is conferred the PhD degree.

Financial Assistance

Non-sponsored candidates admitted to the regular full-time PhD Program who are Indian Nationals are eligible for financial assistance. Each Ph.D student is given a stipend of Rs. 37,000 per month for the first two years which increases to Rs. 42,000 per month for the next three years. Each PhD student receiving financial assistance from the institute is required to be involved in teaching activities such as being a teaching assistant or tutor for a course or research activities as assigned by the department. Any such involvement will be restricted to eight hours per week.

The PhD students are also encouraged to participate in existing funded research projects in the department/school, which may provide additional financial support to the student.