# THE AIMS CURRICULUM

The AIMS Master's in Mathematical Sciences curriculum runs through three semesters:

Core courses are mandatory for all students for all programs, as well as an oral defence of the research project at the end of the academic year, followed by a graduation ceremony.

Semester I Skills Courses are compulsory and designed to provide introductory and foundational material to all students, to achieve predefined outcomes, with little flexibility in their content. In this phase, the various programs have many courses in common.

Semester II Review Courses include a wide range of topical issues and allow for flexibility in course design for each program.

The structured program includes courses like optimal control, topology and functional analysis, numerical method for PDEs, computational commutative algebra, elliptic curve and cryptography, differential geometry, general relativity, quantum computing etc. While the Co-operative (co-op) program includes courses in machine learning, deep learning, neural network, computer security, data mining/web mining/text mining, biomathematics, database, mathematical modelling for network security, computational finance with python, case studies from industries in big data and computer security etc.
Students are required to complete two out of the three available review courses in each time slot.
The ongoing communication skills, entrepreneurship and leadership skills, as well as computing classes, are compulsory for all programs.

Semester III is designed for work placement for co-op students and a simultaneous research phase for all programs.
Co-op Students are required to spend six months of internship in a local or international company, to gain hands-on experience and prepare for future career opportunities. Co-op students are required to submit internship reports at the end of the work term. The research phase begins one month before the work placement and resumes in November at the end of the internship phase.

Students enrolled in the structured program are required to define their research projects by January-February. During this phase, they get familiarized with the project, get to know their supervisors and start reading in their free time. As from April to the end of the program in June, structured program students focus solely on research.

After defending their research projects before a jury composed of professors from universities in the host country and abroad, research students graduate in June, while co-op students graduate in February of the following year.

Core courses are mandatory for all students for both programs, as well as an oral defence of the research project at the end of the academic year, followed by a graduation ceremony.

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## ASSESSMENT AND EVALUATION

The academic assessment of students for the Master's in Mathematical Sciences is completed in the following ways:

- Continuous assessment through written assignments, tutorials, short test and presentations set by lecturers;
- The mark awarded for a given course is determined by the lecturer concerned in consultation with the tutors involved;
- During the skill phase, group work and individual growth are emphasised in a less formal context and for these courses, the mark obtained is a Good Pass (i.e. 70% and above) or a fail;
- During the review and research phases, marks obtained are classified as follows:
  1. Distinction: 85–100% 2. Good Pass: 70–84%
  3. 3. Pass: 60–69%
  4. 4. Fail: less than 60%
- Each of the courses in the review phase is 3 credits, while the research project is 6 credits.
- The student is required to orally defend a written research essay to a panel of examiners. This panel includes the AIMS Director, the Academic Director, the Supervisor, Tutors and External Examiners;
- To obtain the AIMS Master's in Mathematical Sciences with distinction requires:
  - a Good Pass for the skill courses,
  - at least 6 Distinctions for the review phase,
  - a Distinction for the essay phase.
- In extraordinary circumstances where the quality of the essay is highly exceptional, fewer review distinctions may be required when awarding the degree with distinction.
- In order to successfully complete the AIMS MSc degree, a pass is required for each of the phases.
- External evaluation of each student's performance and all aspects of the programme is conducted by six senior academics representing the different mathematical sciences disciplines (including Physics). The outcome of the integrated assessment reported to each university for those students registered in their science faculties. The assessment and evaluation scheme

## INTEGRATED ASSESSMENT

A portfolio for each student is compiled, containing the grades achieved for each of the courses at tended, observations on their presentations, all their assignments, completed exercises and their final essay. External evaluation of each student's performance and all aspects of the program is conducted by six senior academics representing the different mathematical sciences disciplines (including Physics).

The outcome of the integrated assessment is reported to each university for those students registered in their science faculties.

## TEACHING ASSISTANTS

AIMS appoints between six and eight advanced postgraduate students as teaching assistants. Briefly, the duties of the teaching assistants are to provide assistance to the Academic Director and lecturers in matters concerning the academic programme and the assessment of students. Teaching assistants attend the lecture courses; arrange additional tutorials; assist with the marking of assignments; and assist the students with computing and essay writing. Teaching assistants also provide useful information to assist the Academic Manager and lecturers when writing references for the students. Teaching assistants are recruited via an announcement through AIMS' mailing lists. Academic achievement, ability to speak relevant languages, and familiarity with the AIMS teaching programme are criteria considered for selection.