

AIMS Network Quality Assurance 2022

AIMS Research Essay Requirements & Evaluation Procedures

What is expected in the essay

The main purpose of an AIMS research project is:

- to give students the opportunity to work with an expert supervisor on a research project;
- to go through the process of reviewing, understanding and explaining scientific or mathematical material, providing the student therefore with a step towards becoming intellectually independent;
- to optionally perform experiments/simulations — on a computer or otherwise — and report the results;
- to write a scientific report, which for instance could serve as a document people can use to judge the student for their future positions/applications.

The research project should be on a topic in the Mathematical Sciences (Mathematics, including Applied Mathematics and Statistics; Physics; Computer Sciences; Bio Sciences; and Engineering) and contain at least some important parts that are formulated in terms of mathematics. Topics with practical applications are also welcome and even encouraged.

Students are not expected to absolutely do original work to achieve a passing grade. However, the criterion for an outstanding project is broadly that it could constitute an early but important part of a Research Master's thesis. For example, it could be publishable, or form an outstanding introduction to the field for use by those wishing to enter it. Research essay grade descriptors are contained in a separate document.

Projects should be of an appropriate scope to allow students to do the necessary reading, work, and writing in this time. **We strongly expect the supervisor to be available** during the period of the research project, to guide the student and respond in a timely manner to queries and to comment on drafts.

Format

The basic essay format is: title and abstract page; followed by an introductory/motivational chapter; followed by chapters containing the body of the essay, which will include methods, main scientific items and results, etc; then a conclusion with a discussion of the essay contents; and finally the list of references. Total length of essays vary, but typically they are between 25 to 35 pages.

For the bibliography, ensure that sources and the technology (software in particular) that was used explicitly are listed. Online sources such as Wikipedia may be used, but should NOT be cited in the bibliography, as items can change from day-to-day and because it is not (yet) reliable enough to meet scientific standards. Instead, cite books and papers that may have been found via Wikipedia. Also, it is good style to list items in the bibliography in that sequence in which they are first referred to in the text, or simply listing alphabetically by last name of the first author of an item.

Procedures for Essay Evaluation

The oral presentation and research essay will be evaluated by an academic jury. The Jury (online and/or face to face) shall be comprised of the Centre President and/or Academic Director/Manager, the research essay Supervisor, at least one additional examiner (at least one of which will be an external examiner), and an academic tutor from the centre (who can provide input on Jury deliberations, but does not have voting rights on grading decisions). The Jury will possibly include other members or officials, based on academic needs or partner university requirements. The Jury will be chaired by the Centre President, the Academic Director/Manager, or another academic such as a Research Chair based at the centre.

The Supervisor and external examiner(s) are each requested by the Academic Director/Manager to write a detailed report, with a number of specific questions to assess and propose a final mark (see “Request and List of Specific Questions to Supervisor and Examiner(s)” below*).

The Academic Director/Manager is requested to read/evaluate the essay, together with the Supervisor’s and the examiner’s report and decide either to schedule the oral presentation, or to request for an additional evaluation before deciding, or to request a significant revision to be implemented on the essay before admitting the student for the oral presentation. The Academic Director/Manager can only schedule the oral presentation if the Supervisor and examiner(s) give at least a passing grade in their individual essay evaluation report.

The Jury will prepare a final report containing appraisal of the essay as well as the examiner(s) report, the supervisor report, the Jury oral presentation grade, the Jury essay grade, as well as the Master final grade. Those three grades will be determined using the following guidelines:

- The Oral Presentation Grade.

During the oral presentation, each Jury member is requested to fill in a form containing 5 questions called the “Oral Presentation Form” (4 marks for each), where numeric mark over 4 should be given to each question plus additional comments justifying the mark. The chair will collect all the forms after the student presentation,

and calculate the average of the oral presentation marks from all the Jury members, which is then consider as the consolidated Jury's oral presentation mark, pending the Jury's moderation where necessary.

- The Research Essay Grade.

The overall mark for the essay will then be the average of the examiner(s) mark, the supervisor mark and the Jury's oral presentation mark, pending the Jury's moderation, where necessary. To have a passing mark on the essay, the student should have at least a passing grade on the Jury's essay oral presentation mark. NB: If required by partner university regulations, the Supervisor might not be involved in the essay grading, even though a member of the Jury.

- The Master Final Grade.

The Master final grade will be decided by the Jury using the AIMS grade determination regulations in force. The Jury members will have full access during the jury deliberations, to the student assignments and quiz papers done through the full year.

- If a student is not admitted for the oral presentation by the Academic Director/Manager and Supervisor or fails at the essay oral presentation, then the student will have one additional chance to pass. An essay resubmission and defense must normally be completed within 6 months of the end of the academic year, and the defense can be held in-person or online/remotely. If successful, then the student will graduate with the next cohort.

***Request and List of Specific questions to Supervisor and Examiner:**

In your report, I would kindly ask you to:

1. summarize the problem treated, where it fits in the current scientific environment, describe the methodology and give your impression on what exactly the student contribution is;
2. address individually the following six questions and rate each question up to 3 marks except question 7 which is rated at up to 2 marks:
 1. Has the candidate clearly identified and described the research problem and its significance in the field of study?
 2. Does the candidate exhibit sufficient knowledge of pertinent literature and are sources correctly acknowledged?
 3. Does the candidate master the techniques and methods required for the project?

4. Does the project exhibit critical discussion and sound analysis of results obtained, relevance and importance of findings and original contribution to knowledge by way of examples or results?
5. Are the candidate's conclusions and/or recommendations clearly formulated and justified?
6. Does the student contribution go beyond the known literature and if yes will this work lead to a new result after possible additional investigation?
7. Is the thesis grammatically correct and is the overall presentation structurally sound?
3. Conclude your appraisal with a mark (cumulative mark from the above 7 questions) and deduce a grade according to the following scale:

0-59% Fail

60-69% Pass

70-79% Good Pass

80-84% Very Good Pass

85-100% Distinction

Oral Presentation Form Example

List of Questions for the Jury members for the oral presentation evaluation (up to 4 marks each)

1. General presentation at the oral examination: Presence of mind, confidence, communication and articulation.
2. Understanding of subject matter: Showing a grasp of theoretical basis of problems and related research issues etc.
3. Response to questions: Mastery of research questions and skills, ability to explain research data however anomalous and ability to link data to findings etc.
4. Scientific content: Exhibition of which tools from the Mathematical Sciences were used in the work, and showing grasp of the possible applications of the essay material.
5. Originality: Spelling out the student's contribution to the project as an addition to the pre-existing body of research.

AIMS Structured Master's Degree Basic Grade Descriptors for Research Essay

85 – 100	Distinction	<ul style="list-style-type: none"> - Outstanding, comprehensive and thorough knowledge and grasp of subject matter. - Original and creative ideas and new perspective or insight. - Logically argued and presented with ideas clearly expressed. - The contents of the essay could be adapted or expanded for an original publication in a peer-reviewed journal, or constitute the preliminary chapter in a Research Master's or PhD thesis, or form an outstanding introduction to the field for use by those wishing to enter it.
80 – 84	Very Good Pass	<ul style="list-style-type: none"> - Very good knowledge and grasp of subject matter but falls slightly short of outstanding. - Coherently organized and logically presented material and paper with flashes of brilliance or originality. - Creative ideas and new perspective or insight. - Ideas clearly expressed but with a few blemishes.
70 – 79	Good Pass	<ul style="list-style-type: none"> - Good knowledge and grasp of subject matter. - Well organized and presented material and paper. - Moderate level of logical flaws and errors.
60 – 69	Pass	<ul style="list-style-type: none"> - Acceptable knowledge of subject matter. - Fairly well organized and presented material and paper. - Level of logical flaws and errors, while undesirable, is at an acceptable level.
0 – 59	Fail	<ul style="list-style-type: none"> - Weak grasp and command of subject matter. - Weak level of organization and presentation of material and paper with significant flaws and errors.