YOUR RESEARCH PROJECT

Are you looking for a research topic?

On the ÉTS website, the Dean of Studies Office gives you access to a list of research projects for which professors are seeking graduate and post-graduate students. This approach enables you to find both a Thesis Supervisor and a research project at the same time. In addition, many of the projects listed offer financing for your studies.

How to properly describe your proposed research project in your scholarship application

In your scholarship application (with the exception of FRQNT at the Master level), you must describe the proposed research project that you plan to carry out during the course of your Master or Doctoral studies. Your goal is to clearly explain what you expect to accomplish, demonstrate why this objective is important and describe the methods that you will employ. To help you in formulating your original premises, you should answer the following three questions. Your responses will then form the framework of your project and help you to describe it clearly:

- ***What is the ultimate objective of the project?*** To develop a procedure, a mechanism, a system, etc. that will produce a theoretical or practical solution to a specific problem? To substantially improve the efficacy of a system? To reduce uncertainties, etc.?
- ***Why is this important?*** To enhance energy efficiency? To improve competitiveness? To enhance security? To reduce maintenance costs? To allow for future developments?
- ***What methods will you employ?*** Do you need to carry out a literature review? Will you be comparing a theoretical model or simulation to the results of experiments? Will you be generating all of the simulation and experimental data yourself? Will you produce documentation?

Describe your project

The next challenge is to synthesize your text within the space allowed, according to the specific competition. It is important to be direct and concise.

The description of your research project must present all of the following elements, in order:

- The title;
- The problem;
- The objectives;
- The experimental approach and methodology;
- The importance of the proposed research to one or more fields related to science or engineering;
- At least two bibliographical references (or more, depending on the organization's requirements).

The problem

It is extremely important to begin by positioning the problem within a larger context by describing certain technological, social, environmental, economic and other aspects with a view to demonstrating the importance of developing this topic and making a contribution.

You must then formulate the problem more precisely by showing that it represents a type of knot or bottleneck, or in other words, that it limits the current state of knowledge about or development of a system. In general, the description of the problem is largely based on a review of the literature that allows for identification of the current state of the art and the existing gaps in the field.

The objectives

You must precisely identify which problem or problems you are seeking to resolve, or the precise nature of the expected contribution of your research. Going back to the image of a knot, you must demonstrate how your research results will contribute to untangling the knot.

Therefore, it is important to describe the precise nature of the expected research results. Is it a procedure, a database, a mechanism, a design tool, etc.?

In terms of the size and scope of the project, it is important to show that the expected results are realistic, that they represent a real contribution and that they are attainable within the project timeframe. It is strongly recommended that you break down your main objective into secondary objectives, which in turn will be necessary (or at least useful) in describing your methodology. Here is an example taken from a scholarship application:

The main objective of the project is to develop a method for characterizing heterogeneous urban fill materials to allow for a representation of the spatial continuity of the physicochemical properties of these lands and to quantify the quality of this continuity. With a view to obtaining a spatially continuous characterization, the specific objectives of the project are as follows:

- *To characterize the spatial continuity of the internal physical structure of the urban fill materials,*
- *To characterize the spatial continuity of the concentrations of contaminants within the urban fill materials,*
- *To correlate the spatial continuity of the distribution of contaminants with the physical structure of the urban fill materials.*

The experimental approach or methodology

The methodology includes all of the steps that allow for the research objectives to be attained (literature review, collection of empirical data, development of simulation algorithms, validation of data for a theoretical model using experimental data, etc.).

However, it is extremely important to avoid reducing the methodology to a simple list of secondary objectives. The reader must be able to understand the logic behind the steps and their link to the main objective of the research project.

Ideally, the choice of the selected methodology rather than another methodology (e.g.: simulation vs experimentation) should be justified. Be sure to mention any weaknesses associated with the selected methodology. This demonstrates that you have a full understanding of the method and its limitations. In the same vein, the presentation of the methodology may give you an opportunity to demonstrate your existing knowledge and skills, which will be applied during the successful execution of your project.

Contribution to the advancement of knowledge (expected benefits)

This section contains a certain level of redundancy with the section entitled "The problem", because the goal is to show why your project represents a contribution or advancement within your field of research. Therefore, it is important to use this section strategically with respect to the section entitled "The problem" by avoiding any repetition of content. You can use this section to explain the nature of the expected contribution of your research in more detail, or to extrapolate on the possibilities that your results represent in terms of future developments within the field.

In this section, it is also important to highlight the **"consequences" of your research results**. For example, the results of your research may impact the following:

- Improved productivity in a specific industrial or economic sector;
- Enhancements in the quality or value of a class of products;
- Improved capacity for design, planning, prevention, etc.;
- Improved capacity for reducing energy consumption or detecting and measuring pollutants or mitigating damage.

It is also important that the reader is able to grasp **the scope of your contribution within the field**.

Does your project represent new and unique results (technological innovation)? Are your results transferable to other fields or sectors?

The response to one or both of these questions will help to explain the importance of the proposed research in one or more fields related to science and engineering.

Bibliographical references

At the end of your text, you must provide bibliographical references relevant to your proposed research project.

It is strongly recommended that you consult your Thesis Supervisor when drafting your research project. Submit your text to your Thesis Supervisor early enough in the process to obtain their comments so that your final version will comply with the organization's presentation standards.

To contact us: infobourses@etsmtl.ca or Dean of Studies Office (A-1700)