Chapter 1

Introduction

1.1 The course and this Manual

The purpose of this course is to teach technical writing. You will learn about typical requirements for research and technical papers and about some computer typesetting and graphical tools used to produce technical reports of professional quality.

You will be offered four projects (laboratories) to work on. In those projects you will have to carry out a mathematical investigation of the given problem or situation, to perform computer simulations, to produce illustrations, and to write a report.

A schedule for the four projects will be handed out on the first day of classes along with a description of the first laboratory. Laboratories 2 to 4 will be made available as the course progresses. All documents related to the course (including the most recent version of this Manual) will be available on the course web page

`http://www.math.mun.ca/~m2130`

Three major topics that you will be mastering in this course and the corresponding chapters in this Manual are:

- Composition of technical, mathematics-intense papers — Ch. 2;
- LATEX typesetting system (LaTeX) — Ch. 3;
- Computer programming and computer-generated graphics — Ch. 4.

An attempt has been made in this Manual to isolate the discussion in Chapters 2–4 from particulars of the computing environment. Chapter 5 provides details about computer facilities on campus available to Math 2130 students and about software pertaining to this course.

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1.2 Submissions

Students are required to submit a neatly stapled **printed copy** of the report and also to submit all reports **electronically**.

Section 5.1 explains the purpose and procedure of electronic submission. The electronic submission must contain a master LaTeX file and all files that the master file refers to (in most cases, these will be `eps` graphics files). In addition, the electronic submission must include computer code(s) written to produce the reported results.

Two sections in this Manual specifically deal with **report format**.

Section 2.3 contains recommendations about a **logical structure** and size of the reports.

Section 3.2 describes the standard report **layout** and LaTeX commands used to produce it.

1.3 Policies

1.3.1 Evaluation

Grades in the course are based on four projects each requiring a written report submitted in printed form and electronically. There is no final examination. The first three reports will be returned to the student, while the final one will be retained by the instructor.

The typical weights of the reports are 15 marks, 25 marks, 30 marks and 30 marks respectively. However, your instructor's first day handout takes priority in regard to the method of evaluation.

The following two paragraphs apply to Labs 1 to 3.

Late submissions are subject to penalty. A submission within a week past the due date will result in a deduction of 5 marks. Thus a second lab worth 22 out of 25 marks will receive a final grade of 17 out of 25 if it is just one day late. Further delays result in a deduction of 5 marks per week of lateness.

Within a week or two following the submission date you will be asked to **meet with your instructor** to go over your paper. At the meeting, the instructor will suggest possible improvements in the paper, while you must be prepared to explain mathematical details, the workings of a computer program, sources of information, collaboration, etc. The results of such interviews can affect your grade on the project.

The **evaluation criteria** for the projects address quality of contents and presentation. But before anything else the instructor will check whether you have **completed the assigned task**. In a laboratory that asks to write a computer program that does so and so, neither an amusing narration and fancy graphics nor five pages of mathematical definitions and theorems will help if your program doesn't work or doesn't solve the problem as required.

As long as that principal condition is met, further criteria pertaining to **contents** typically include the following:

- Usefulness of the paper (relevance, informativeness, mathematical and factual correctness);
- Research quality (understanding of underlying mathematics, appropriateness and effectiveness of tools used, scope and depth of analysis);
- Quality of computer programs supporting the research (validity of code, efficiency of algorithm, readability — structure, comments, self-explanatory identifiers, etc.) and explanation of the program's workings.

Depending on the nature of a problem at hand, the relative importance of the listed elements may vary and other elements may be emphasized. If in doubt, ask your instructor what to pay attention to.

The criteria pertaining to **presentation** are very similar to those used in non-technical writing:

- Quality of exposition (structure, style, level appropriate to the assumed readership, clarity with which technical ideas are explained, consistent use of terminology and notation);
- Conformance to language standards (grammar, spelling);
- Conformance to typographical standards (LaTeX typesetting, quality of graphics);
- Proper citations and quotations.

Chapters 2–4 elaborate on many of these points.

This course gives you an opportunity to put the skills you acquired in other courses to work. Some students would try to excuse themselves for spelling and grammar errors saying that this is not a course in English; others with poor knowledge of programming would complain that creating a correctly working program carries so much weight. Such excuses and complaints will be rightfully dismissed by the instructor. Also it is very normal in this course to learn chunks of mathematics on the fly. Thus, if a project asks you to simulate a dynamics described by differential equations and you have not taken Math 3260, just look up a few relevant facts!

1.3.2 Academic integrity and academic misconduct

Academic integrity means honesty and courtesy in your course work and research. The opposite is academic misconduct. In our experience, situations occur in this course on a regular basis where students are at risk of violating academic integrity in the following ways:

- forging research results;
- plagiarizing.

A. Forging research results

A graph downloaded from the Internet and presented as the output of a student's own program is an example of a forged research result. But forging does not necessarily involve someone else's results; it can also occur as entirely one's own activity. If a student's program does not solve an equation as expected and the student decides to "correct" the program's output by hand, hoping to fool the instructor, that's a forge.

Sometimes the borderline between an involuntary mistake and a deliberate forge is shaky. An argument that pretends to be a mathematical proof but fails to be such due to a logical error can be treated as a forge if there is an evidence that the author has been aware of the error and has chosen to disregard it.

If you think that something goes wrong in your project, you should consult with your professor or laboratory assistant at the earliest opportunity. Their advice will likely get you on track. Yet quite a few students find themselves in a situation where the assignment is due the next day and things do not work their way. What should they do?

Desperately filling up pages with material that is not supported by your actual findings is a bad idea. One solution is to **to buy additional time** at the expense of losing 5 marks as allowed by the evaluation policy (Sect. 1.3.1). Another possibility is to **frankly admit** a problem and describe your approach in **as much detail as possible**. If you feel that your method/program is sound but perhaps some detail escaping your view prevents it from yielding satisfactory results, report the research as is. Do not beg for an excuse; instead, try to present an educated guess as to where a weak link could be.

B. Plagiarism

We urge all students to familiarize themselves with Section 4.11 (Academic Misconduct) in the Memorial University Calendar:

`http://www.mun.ca/regoff/calendar/`

In particular, read carefully Section 4.11.4 (Academic Offences) which defines what plagiarism is and details the range of consequences that result from an act of plagiarism.

This section is not intended to frighten you and to discourage sharing ideas with fellow students or using available information resources. The Calendar points out that "the properly acknowledged use of sources is an accepted and important part of scholarship." Just know the limits. They are sometimes subtle. The next two sections should help you develop a better understanding of situations routinely occurring in practice.

1.3.3 Collaborative work

During the course, students are encouraged to work together. Feel free to trade ideas about how to approach a given project, how to write programs, how to use Maple and LaTeX, etc.

All help received should be acknowledged (see Section 2.3.8) and all sources consulted must be referenced.

However, when the time comes to prepare a report, each student will see this activity as entirely his or hers. **Each student is completely responsible for the intellectual content of his or her report** and later may be asked to explain any material contained in the report. All reports must be written by students on their own. They cannot be based on any report previously submitted for this course (say, by a sister, a friend, or a tutor) or a report being submitted concurrently by a classmate. Also, if a student is repeating the course, reports are not permitted to be on the same topics as those submitted previously.

If a student is not able to explain and/or defend the contents of a report, the grade on that report may be adjusted. If there is evidence that written material in the report has been shared, the students concerned may receive a grade of 0 on that report. In the case of a last report, the student(s) may be given an incomplete grade and be required to return to campus for a follow-up interview. Finally, if there is a repetition of this sort of activity, a grade of zero in the course will be given.

1.3.4 Use of online materials

The Internet as a source of information can be great if used diligently.

Proper acknowledgements must be made to all resources cited.

Another thing to keep in mind is that for the purposes of this course "research" does not mean googling whatever (hopefully relevant) "stuff" is out there and copying it to your paper. Not all information on the Internet is credible and correct. Also the meaning of being correct is not absolute. A definition acceptable for a Ph.D. level research monograph may be inappropriate in your paper even if it refers to the same concept. On the other hand, a definition suitable for a common language dictionary may lack significant technical details and also be inappropriate for your purposes even if it comes from a reliable source.

Do not yet discard printed books, in particular, textbooks used in courses. They are generally more reliable and definitive sources of information; unlike many Internet sites, they have gone through a strict review process and multiple proofreadings.

1.4 MUN Writing Centre

Look up the Writing Centre webpage

`http://www.mun.ca/writingcentre/about/`

and consider dropping in there some day.

Students who experience problems with their writing may find their marks dramatically different depending on whether or not they show their work to a knowledgeable writing advisor before final submission.

If you consider yourself to be a good writer, the mark improvement through the use of the Writing Centre may not be a big issue. But it's a misconception that only weaker students should seek help there. Not quite so! In fact, the better you write, the more efficient the help can be; you and your advisor can concentrate on how to make your paper really enjoyable — and perfection has no end.

Remember however that people in the Writing Centre are not supposed to understand the technical content of your paper and they may not be familiar with specific requirements, traditions and habits of mathematical exposition. Those who help you ought to get due credit, but the remaining deficiencies are yours. No one but you is ultimately responsible for everything in your paper, including style, spelling and punctuation. And your instructor will have the last say in evaluating your writing.