MATLS 4KA3 & 4KB3 2021-2022 syllabi

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Although there are no official office hours, you may contact me either in person of *via* Microsoft Teams. I suggest to use e-mail in extraordinary situations only.

This academic year is special, because all students enrolled in 4KA3 are also taking 4KB3, which means that for all students, 4KB3 research activities will be continuations of what was started in 4KA3. This circumstance is reflected in Table 1. It is clear from this table that despite a continuity of research efforts, marks for 4KA3 and for 4KB3 may (and likely will) differ.

Table 1. Schedule of events and mark breakdown

Event	Format	Date[1]	Mark breakdown	Comment
Term 1 MATLS 4KA3				
Formulation of research problem	Written	September 17 Friday	6	3 pages maximum
Defence of research proposals[2]	Oral	October 4, Monday 15:00-18:30	30	20-minute presentation plus 15 minutes Q&A
Literature review[3]	Written	October 22 Friday	24	5 pages minimum
Mid-point report[4]	Oral	November 30, Tuesday 15:00-19:00	40	25-minute presentation plus 15 minutes Q&A
Term 2 MATLS 4KB3				
Progress report 1[5]	Written	January 28 Friday	10	3 pages maximum

[1] detailed schedules of presentations including time slots for each student will be announced well in advance
[2] refer to Defence of research proposals on page 5
[3] refer to Literature review on page 6
[4] refer to Mid-point report on page 7
[5] refer to A brief note about progress reports7

Event	Format	Date[1]	Mark breakdown	Comment
Progress report 2	Written	February 28 Monday	20	5 pages maximum
Thesis defence[6]	Oral	April 1 Friday 15:00-18:30	30	20-minute presentation plus 15 minutes Q&A
Thesis submission[7]	Written	April 9	40	50 pages maximum

Regulations, policies, procedures and guidelines

ACADEMIC INTEGRITY

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. It is your responsibility to understand what constitutes academic dishonesty.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university. For information on the various types of academic dishonesty please refer to the *Academic Integrity Policy*, located at https://secretariat.mcmaster.ca/university-policies-procedures-guidelines/

The following illustrates only three forms of academic dishonesty:

- plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
- improper collaboration in group work.
- copying or using unauthorized aids in tests and examinations.

AUTHENTICITY/PLAGIARISM DETECTION

Some courses may use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g. A2L, etc.)

[6] refer to Thesis defense on page 8
[7] refer to Written thesis on page 9

using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection so ftware must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, other software, etc.). For more details about McMaster's use of Turnitin.com please go to www.mcmaster.ca/academicintegrity.

COURSES WITH AN ON-LINE ELEMENT

Some courses may use on-line elements (e.g. e-mail, Avenue to Learn (A2L), LearnLink, web pages, capa, Moodle, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

ONLINE PROCTORING

Some courses may use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/ software during tests or exams. This software may be required to be installed before the test/exam begins.

CONDUCT EXPECTATIONS

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning and working communities. These expectations are described in the *Code of Student Rights & Responsibilities* (the "Code"). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, whether in person or online.

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very

seriously and will be investigated. Outcomes may include restriction or removal of the involved students' access to these platforms.

ACADEMIC ACCOMMODATION OF STUDENTS WITH DISABILITIES

Students with disabilities who require academic accommodation must contact Student Accessibility Services (SAS) at 905-525-9140 ext. 28652 or sas.mcmaster.ca to make arrangements with a Program Coordinator. For further information, consult McMaster University's *Academic Accommodation of Students with Disabilities* policy.

REQUESTS FOR RELIEF FOR MISSED ACADEMIC TERM WORK

McMaster Student Absence Form (MSAF): In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar "Requests for Relief for Missed Academic Term Work".

ACADEMIC ACCOMMODATION FOR RELIGIOUS, INDIGENOUS OR SPIRITUAL OBSERVANCES (RISO)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the *RISO* policy. Students should submit their request to their Faculty Office ***normally within 10 working days*** of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

COPYRIGHT AND RECORDING

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, **including lectures** by University instructors

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

EXTREME CIRCUMSTANCES

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.

Defence of research proposals

On the 4th of October, you will make a 20-minute presentation, and then you will spend the next 15 minutes answering questions. This will be a public event[8], which means that graduate students, post-doctoral fellows, researchers and professors at our Department will be invited to join a corresponding Teams meeting.

In a case of an oral presentation, it is neither necessary nor even sensible to impose rigid conditions onto talk's format and content. In contrast to technical reports or manuscripts submitted to peer-reviewed journals, oral presentations usually have both scientific and theatrical sides. They allow you to make jokes, to revisit concepts or results again and again to ensure that an audience gets them right, to slow down if you see puzzled faces, to use non-scientific analogies *etc.* Such flexibility and informality are in fact necessary, because in contrast to readers of the technical reports and the papers in the scientific periodicals, many of your listeners are not experts in your field. It is your duty as a presenter to find a proper balance between a depth of a scientific content and an understandability. Please realize that if people do not understand what you are taking about, then they cannot appreciate your achievements. Instead of enjoying your talk and be intellectually stimulated or provoked by it, they will mainly try to suppress yawns if they are enveloped with unfamiliar terms, if they are overwhelmed with jargon, abbreviations, a rapid succession of slides. Also, your talk will never be applauded if it mainly contains text. It is well known that people do not read slides' content, that they prefer illustrations. During an oral presentation, words are pronounced, not written.

I am sure that as a senior student, you will be able to deliver an excellent talk without detailed instructions from me. The list below is nothing, but an attempt to refrain you from making trivial mistakes. Let me emphasize that this list is not a compendium of unbendable rules; you may depart from it as you wish. However, I shall mark your presentation. Your score will not be stellar if the talk is scientifically shallow or if it is overwhelmingly incomprehensible.

- Ensure that credit is given to your predecessors who worked on the same problem or similar problems. Don't pretend that you are a pathfinder if you are not.
- If a duration of a talk in n minutes, then a number of slides, N, is to be approximately $n+4$. N exceeding $\frac{3}{2}n$ is reproachable, $N > 2n$ is inadmissible.
- Number all slides sequentially
- Avoid excessive animation
- Minimize amount of text, minimize number of tables
- Do not place complete bibliographic references in footnotes. A name of a person and a publication year will suffice.
- Don't use a too-fanciful background
- No need to equip each slide with McMaster logo or a date of presentation
- No need to thank individuals or list industrial partners or other institutions

[8] Mid-point report and thesis defence are also public events.

- No need to pay too much attention to future work. Sometimes an announcement of intentions sounds as an empty promise. Focus on what has been already achieved.
- Avoid abbreviations. You may take it for granted that listeners will be irritated or even angered by them even in a smallish amount. Abbreviations and oral presentations are incompatible.
- There is no such thing as too large a font. Make sure that everything is clearly visible. No need to use multiple fonts and employ various colours.
- Not more than two figures/plots per slide unless a sophisticated comparison has to be made.
- Refrain form self advertisement. For instance, declaring that a result is interesting is immodest. Introduce the result, explain how it was obtained and let your listeners decide whether the result is interesting or not. Another example is the usage of the terms "advanced" and "novel". It is not up to you to declare that an "advanced material" was fabricated; it is up to the audience to arrive at such a verdict after listening to your talk. To the best of knowledge, humbleness has not killed even a single person. The same cannot be said about self-aggrandizement.
- It is awfully irritating when a speaker uses such turns of speech as "my/our samples", "my/our model", "my/our calculations", "my/our measurements" *etc.* Avoid "my" and "our".
- Don't speak too fast, you are not a machine gun, and your words are not bullets.
- While answering a question, stick to the point, and don't be too wordy. Remember that that there are other people wanting to ask you something, but that time allocated to Q&A is finite.
- While answering a question, don't deviate in your answer from the essence of what you were asked. Be precise and specific.

I guess that there is no need to make this list ridiculously long. You understand what I am getting at, don't you?
I look forward to enjoying your scientifically non-trivial yet understandable talk!

Literature review

Let me start with a reminder that your will have to e-mail a literature review to me not later than on the 22nd of October.
Please ensure that your favourite personal bibliographic manager (such as *Zotero* or *Mendeley* or *EndNote*) is integrated with a word processor (such as Microsoft Word) and that it is used consistently while you are working on documents with citations of literature sources.
It is recommended to divide the literature review into the following sections.

Key publications in your research area

It is likely that there are several influential works underpinning your research project. Anyone either working in the same field or having similar scientific interests is supposed to be intimately familiar with the contents of those venerable and frequently cited papers. You have to identify 2-4 such publications and narrate their essence clearly explaining why they are of a paramount importance for your project. It is worth accentuating that publication years are not overly important; real masterpieces is ageless.

Most important papers, which appeared during the last 5 years

It is almost certain that there are contemporary papers closely related to what you are doing. In particular, your academic advisor could recently publish something revolving around major themes of your research project. Also, it is quite probable that the advisor has already attracted your attention to some recent articles in peer-reviewed journals. Furthermore, you personally could come across relevant and interesting publications while working on the defence of research proposals. It is hardly important how exactly you ended up with a list of works deserving an intent attention. What matters is that such a list containing 4-7 works is compiled, and that you discuss them one by one revealing their importance and explaining how exactly they are linked to your research. It is to be emphasized that in the case of these 4-7 publications, there should be no doubt in their usefulness and significance.

Publications, which will have been studied by the end of the project

By using your favourite bibliographic interface, you should find 8-14 papers, which will be digested during the next 5-6 months. You unearth these potentially useful publications by designing a Boolean string and then executing a bibliographic search followed by an analysis of abstracts of publications retrieved. It can be taken for granted that even if the Boolean string is constructed really cleverly, an initial search will yield dozens if not hundreds of possibly relevant works, and it is your duty to shorten a list generated to a manageable size. It is not easy to decide what publications to retain in the list, and if you experience difficulties making such a decision, then, of course, you should seek assistance from your academic advisor.

Bibliographic alerts

In order to be duly informed about just published relevant publications in the real-time mode, you will have to set one or several bibliographic alerts, which some people call saved searches. In your literature review, particularities of your actions resulted in active alerts must be explained. If necessary, use screenshots.

Mid-point report

As you undoubtedly remember, you are orally presenting your results on the 30th of November. This public mid-point report is an important event, which must be taken seriously.

I am not going to impose format- and content-related constraints. Instead, I'd like to reiterate and accentuate that you must find a proper balance between a scientific depth and an understandability, that you should not overwhelm your listeners with unnecessary details, specialized terminology and abbreviations.

There is no need to re-introduce the problem; focus on your achievements. Please no Gantt chart and no talking about intentions/future work. A focus should be on results obtained so far and nothing else.

If a progress is mediocre or non-existing, then you will have to explain why and then outline actions to be undertaken to avoid an embarrassing disaster a few months later.

If you have questions regarding the mid-point report, then let us have a Teams conversation.

A brief note about progress reports

There are two words: "progress" and "report". Of course, the quality of technical writing ("report") will be taken into account, but your mark will mainly reflect your recent achievements ("progress"). Try to saturate each progress report not with generalities and trivialities, but with no-nonsense descriptions of your most recent accomplishments. No need to remind me about project's

scope and objectives. Avoid a heavy usage of a specialized terminology and abbreviations, make your reports understandable.
After reading of your report, it should become obvious for anyone that you didn't waste time, that you spent 9 hours per week working on your thesis.

Thesis defense

It is believed that by now you are experienced in delivering oral presentations and know how to keep an audience interested. Consequently, it would be unreasonable to interfere with your undoubtedly existing ideas of how to defend a thesis with flying colours. Instead of imposing constraints upon you, I merely want to share a couple of thoughts and suggestions with you. Who knows, maybe they will help you to be even more successful in impressing spectators with your achievements.

1. You are not talking at a conference where participants will experience no difficulties understanding and analyzing your results. You are talking to a heterogeneous group whose members may have scientific interests different from yours. Certainly, almost all of your listeners are well educated, but this does not guarantee that they will be able to follow your explanations unless you find a way to make your lecture both understandable and scientifically non-trivial. It is a high art to find a proper balance.
2. Do not try to amaze the audience with how industrious you were. Hard-working itself is hardly applaudable if nothing interesting or useful has been yielded. People are not fools, they will notice a lack of results and will not be deceived by a claim that you worked from sunrises to sunsets. They will notice meaningful results and instantly realize that they could not be obtained unless you worked from dawns to dusks.
3. Categorize! Do not devote comparable times to core findings and trifles. Identify truly important discoveries and talk about them extensively. Explain what triggered ideas, how experiments were planned and how their outcomes were rationalized. Elucidate how your activities resulted in a better understanding of how Mother Nature operates. Maybe the best way to keep your listeners engaged and intrigued is to talk about stuff, which genuinely surprised and exited you. Almost always burning feelings such as a joy of research and a pride of achievements are infectious in the sense that other people start feeling them while listening to your presentation.
4. Do not burden slides with unnecessary details. A slide is not an adequate substitution for a deep thought, it merely is a mean to share the thought in a clear and understandable fashion.
5. It can be taken for granted that people seldom read text. All these text boxes and bullet lists are not appropriate for an oral presentation; they will all be ignored. Pictures, plots and tables is what is needed. Of course, it is a sheer stupidity to saturate your slides with complex mathematical expressions. Once you start pumping more and more and more into your slides, a lucidity is lost. If you have doubts whether a particular item (figure, graph, table) is to be shown on a slide, then do not show it. If you have even a slightest reservation about a particular slide, then mercilessly delete it from a corresponding PowerPoint file. Since a duration of your lecture is 20 minutes, it would be strange to have more than 30 slides in total.
6. Give credit to your predecessors. Briefly narrate the most important results, which had been already published prior to September 2020. If there was a paper, which was especially influential, which defined a direction of your research, then devote a couple of minutes to summarizing its content.

7. Distinguish between your own results and those yielded through collaboration with other people. Arguably, team work is important, but what's about demonstrating a potency of your own intellect? It mattered and will always matter who actually generated an idea, pioneered an approach, looked at a problem from an unusual angel.
8. Compare your original plans and intentions with what was actually achieved. If there are serious discrepancies, then explain what they were caused by. Do not overemphasize the virus factor.
9. Since the event will not be recorded (it is too time consuming to get consents from all listeners), write down comments and suggestions on a sheet of paper. This will help in polishing the thesis, which, as you remember, will have to be submitted on the 9th of April.
10. If you have a chance, then practice. Ask your academic advisor to allow you to rehearse by speaking to graduate students. A usefulness of such an event, which is not tricky to organize, can hardly be overestimated. You should do everything imaginable to minimize a risk of jeopardizing of your scientific reputation, which, of course, will suffer if you deliver a mediocre presentation.
11. Allow me to reiterate that although it is not mandatory to get the green light from your academic advisor, it would be prudent to seek her/his opinion by sending a PowerPoint file a week before the presentation and kindly asking to review it.

Written thesis

In the case of a written thesis, almost everything is in your hands. Why almost? Because there are non-negotiable formatting requirements:

1. Not more than 50 pages in total. This means including a title page, table of content, a list of bibliography, appendices, acknowledgements…
2. All margins (top, bottom, left, right) are 1 inch.
3. Line spacing is 1.5.
4. A Word file rather than a PDF file must be submitted even if its size is huge.

I recommend that you send a draft of the thesis to your academic advisor shortly after an oral presentation and ask for criticism. Specifically, I suggest that you do so on April 5. The advisor will then have two days for formulating thoughts, and you will have April 8 and 9 to shape your writing into the final version.