K794 PhD Course
Advances in Information Systems Research:
Artificial Intelligence and Big Data Analytics
Winter 2022 Course Outline

Information Systems Area
DeGroote School of Business
McMaster University

COURSE OBJECTIVE

The objective of this course is to present and discuss some of the latest advances and issues in information systems. Specifically, this course is designed to discuss IS research issues in artificial intelligence (AI) and big data analytics (BDA). Artificial intelligence (AI) refers to machines performing the cognitive functions typically associated with humans, including perceiving, reasoning, learning, interacting, etc. AI is not confined to one or a few applications, but rather is a pervasive economic, societal, and organizational phenomenon. Examples of AI technologies include robotics and autonomous vehicles, facial recognition, natural language processing, virtual agents, and machine learning, which are being deployed in a variety of problem domains ranging from cybersecurity to fintech to education to healthcare. AI provides businesses with unprecedented opportunities for designing intelligent products, devising novel service offerings, and inventing new business models and organizational forms. At the same time, the rapid accumulation of data in diverse forms and from various sources has been driving an increasing interest in big data and business analytics. Applications of a variety of analytical techniques have gained much attention in recent years. Businesses are exploring the new possibility of uncovering hidden knowledge, improving decision making, and supporting strategic planning from big data. Although substantial resources have been invested in big data and analytics (BDA) and anecdotal evidence of both success and failure have been reported, there has been little substantial research on the strategic contributions of BDA. In this course students will learn the technical, applicational, and managerial aspects of AI and BDA through paper reading, seminar presentation and class discussion. Students will also learn how to do research by writing a research paper. MBA students may attend this course with specific permission from the instructor.

INSTRUCTOR AND CONTACT INFORMATION

Dr. Yufei Yuan
Instructor
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Office: DSB A204
Office Hours:
By appointment.
Tel: (905) 525-9140 x23982

Class Location: Virtual class through Zoom meetings
Meeting Time: Tuesdays 1:30 - 4:30 pm
Zoom Website:
https://mcmaster.zoom.us/j/98574695028?pwd=L0RFWGhuMlh4T1c4M3JJU1VLdlNEQT09
Course Website: http://avenue.mcmaster.ca

COURSE ELEMENTS

Credit Value:	3	Team skills:	Yes	IT skills:	Yes	Global:	Yes
Avenue:	Yes	Verbal skills:	Yes	Numeracy:	No	Political:	No
Participation:	Yes	Written skills:	Yes	Innovation:	Yes	Social:	Yes

COURSE DESCRIPTION

In this advanced PhD course, students will learn technical, behavioral, and managerial aspects of artificial intelligence (AI) and big data analytics (BDA) through paper reading, seminar presentation, and class discussion. Each student will be required to make two seminar presentations and write a research paper on a selected topic of AI or BDA. MBA students may attend this course with specific permission from the instructor.

LEARNING OUTCOMES

Upon completion of this course, students will be able to learn the following topics:

➢ The basic concept and technology of AI

➢ The application and impact of AI in our society

➢ User interaction with AI

➢ Management issue of AI applications in business

➢ Trend and application of Big data and Business Analytics

➢ User behavior with BDA

➢ Management issues of BDA in organization

REQUIRED COURSE MATERIALS AND READINGS

Lecture notes will be posted on the A2L course web site

OPTIONAL COURSE MATERIALS AND READINGS

Reference Papers

Artificial Intelligence

Benbya, H., Davenport, T. H., & Pachidi, S. (2020). Artificial Intelligence in Organizations: Current State and Future Opportunities. *MIS Quarterly Executive*, 19(4).

Borges, A. F., Laurindo, F. J., Spínola, M. M., Gonçalves, R. F., & Mattos, C. A. (2020). The strategic use of artificial intelligence in the digital era: Systematic literature review and future research directions. *International Journal of Information Management*, 102225.

Brynjolfsson, E., and Mitchell, T. 2017. "What Can Machine Learning Do? Workforce Implications," *Science* (358:6370), pp. 1530-1534.

Davenport, T. H. (2018). From analytics to artificial intelligence. *Journal of Business Analytics*, 1(2), 73-80.

Davenport, T. H. (2021). Enterprise adoption and management of artificial intelligence, *Management and Business Review*, 1(1). https://mbrjournal.com/2021/01/26/enterprise-adoption-and-management-of-artificial-intelligence/

Desouza, K. C., Dawson, G. S., & Chenok, D. (2020). Designing, developing, and deploying artificial intelligence systems: Lessons from and for the public sector. *Business Horizons*, 63(2), 205-213.

Dirican, C. (2015). The impacts of robotics, artificial intelligence on business and economics. *Procedia-Social and Behavioral Sciences*, 195, 564-573.

Glikson, E., & Woolley, A. W. (2020). Human trust in artificial intelligence: Review of empirical research. *Academy of Management Annals*, 14(2), 627-660.

He, J., Baxter, S. L., Xu, J., Xu, J., Zhou, X., & Zhang, K. (2019). The practical implementation of artificial intelligence technologies in medicine. *Nature medicine*, 25(1), 30-36.

Keding, C. (2020). Understanding the interplay of artificial intelligence and strategic management: four decades of research in review. *Management Review Quarterly*, 1-44.

Laird, J. E., Lebiere, C., & Rosenbloom, P. S. (2017). A standard model of the mind: Toward a common computational framework across artificial intelligence, cognitive science, neuroscience, and robotics. *AI Magazine*, 38(4), 13-26.

Li, B. H., Hou, B. C., Yu, W. T., Lu, X. B., & Yang, C. W. (2017). Applications of artificial intelligence in intelligent manufacturing: a review. *Frontiers of Information Technology & Electronic Engineering*, 18(1), 86-96.

Li, M., & Suh, A. (2021, January). Machinelike or Humanlike? A Literature Review of Anthropomorphism in AI-Enabled Technology. In Proceedings of the 54th Hawaii International Conference on System Sciences (p. 4053).

Lu, Y. (2019). Artificial intelligence: a survey on evolution, models, applications and future trends. *Journal of Management Analytics*, 6(1), 1-29.

Luger, E., & Sellen, A. (2016). " Like Having a Really Bad PA" The Gulf between User Expectation and Experience of Conversational Agents. In *Proceedings of the 2016 CHI conference on human factors in computing systems* (pp. 5286-5297).

Rahwan, I., Cebrian, M., Obradovich, N., Bongard, J., Bonnefon, J. F., Breazeal, C., ... & Wellman, M. (2019). Machine behaviour. *Nature*, 568(7753), 477-486.

Ramakrishna, K., Verma, I., Goyal, M. I., & Agrawal, M. M. (2020). Artificial intelligence: Future employment projections. *Artificial Intelligence*, 7(05), 2020.

Shi, F., Wang, J., Shi, J., Wu, Z., Wang, Q., Tang, Z., ... & Shen, D. (2020). Review of artificial intelligence techniques in imaging data acquisition, segmentation and diagnosis for covid-19. *IEEE reviews in biomedical engineering*.

Siau, K., & Wang, W. (2018). Building trust in artificial intelligence, machine learning, and robotics. *Cutter Business Technology Journal*, 31(2), 47-53.

Vinuesa, R., Azizpour, H., Leite, I., Balaam, M., Dignum, V., Domisch, S., ... & Nerini, F. F. (2020). The role of artificial intelligence in achieving the Sustainable Development Goals. *Nature communications*, 11(1), 1-10.

Wang, Y., Kwong, S., Leung, H., Lu, J., Smith, M. H., Trajkovic, L., ... & Kinsner, W. (2020). Brain-inspired systems: A transdisciplinary exploration on cognitive cybernetics, humanity, and systems science toward autonomous artificial intelligence. *IEEE Systems, Man, and Cybernetics Magazine*, 6(1), 6-13.

Zhang, B., & Dafoe, A. (2019). Artificial intelligence: American attitudes and trends. Available at SSRN 3312874. https://www.researchgate.net/publication/330525002_Artificial_Intelligence_American_Attitudes_and_Trends

Zhu, Song-Chun (2020) *AI: The Era of Big Integration Unifying Disciplines within Artificial Intelligence*, https://dm.ai/wp-content/uploads/ebook-ai-the-era-of-big-integration.pdf

Zhu, Y., Gao, T., Fan, L., Huang, S., Edmonds, M., Liu, H., ... & Zhu, S. C. (2020). Dark, beyond deep: A paradigm shift to cognitive ai with humanlike common sense. *Engineering*, 6(3), 310-345.

Big Data Analytics

Anand, A., Sharma, R., & Kohli, R. (2020). The Effects of Operational and Financial Performance Failure on BI&A-Enabled Search Behaviors: A Theory of Performance-Driven Search. *Information Systems Research*, 31(4), 1144–1163.

Chen, H., Chiang, R. H., & Storey, V. C. (2012). Business intelligence and analytics: From big data to big impact. *MIS Quarterly*, 1165–1188.

Davenport, T. H., Godfrey, A. B., & Redman, T. C. (2020). To fight pandemics, we need better data. *MIT Sloan Management Review*, 62(1), 1-4.

Dremel, C., Wulf, J., Herterich, M. M., Waizmann, J. C., & Brenner, W. (2017). How AUDI AG Established Big Data Analytics in Its Digital Transformation. *MIS Quarterly Executive*, 16(2).

Dremel, C., Herterich, M. M., Wulf, J., & Vom Brocke, J. (2020). Actualizing big data analytics affordances: A revelatory case study. *Information & Management*, 57(1), 103121.

Ghasemaghaei, M., Hassanein, K., & Turel, O. (2017). Increasing firm agility through the use of data analytics: The role of fit. *Decision Support Systems*, 101, 95–105.

Ghasemaghaei, M., & Turel, O. (2021). Possible negative effects of big data on decision quality in firms: The role of knowledge hiding behaviours. *Information Systems Journal*. 268–293.

Grover, V., Chiang, R. H., Liang, T.-P., & Zhang, D. (2018). Creating strategic business value from big data analytics: A research framework. *Journal of Management Information Systems*, 35(2), 388–423.

Günther, W. A., Mehrizi, M. H. R., Huysman, M., & Feldberg, F. (2017). Debating big data: A literature review on realizing value from big data. *The Journal of Strategic Information Systems*, 26(3), 191–209.

Hindle, G., Kunc, M., Mortensen, M., Oztekin, A., & Vidgen, R. (2020). Business analytics: Defining the field and identifying a research agenda. *European Journal of Operational Research*, 281 (3), 483-490.

Jones, M. (2019). What we talk about when we talk about (big) data. *The Journal of Strategic Information Systems*, 28(1), 3–16.

Lehrer, C., Wieneke, A., Vom Brocke, J. A. N., Jung, R., & Seidel, S. (2018). How big data analytics enables service innovation: Materiality, affordance, and the individualization of service. *Journal of Management Information Systems*, 35(2), 424–460.

Leicht-Deobald, U., Busch, T., Schank, C., Weibel, A., Schafheitle, S., Wildhaber, I., & Kasper, G. (2019). The challenges of algorithm-based HR decision-making for personal integrity. *Journal of Business Ethics*, 160(2), 377–392.

Motiwalla, L., Deokar, A. V., Sarnikar, S., & Dimoka, A. (2019). Leveraging data

analytics for behavioral research. *Information Systems Frontiers*, *21*(4), 735-742.

Shilo, S., Rossman, H., & Segal, E. (2020). Axes of a revolution: challenges and promises of big data in healthcare. *Nature medicine*, *26*(1), 29-38.

Sivarajah, U., Kamal, M. M., Irani, Z., & Weerakkody, V. (2017). Critical analysis of Big Data challenges and analytical methods. *Journal of Business Research*, *70*, 263-286.

Vidgen, R., Hindle, G., & Randolph, I. (2020). Exploring the ethical implications of business analytics with a business ethics canvas. *European Journal of Operational Research*, *281*(3), 491-501.

EVALUATION

Learning in this course results primarily from lecturing, reading, in-class discussion, specific topic presentation, and research paper. All work will be evaluated on an individual basis. Your final grade will be calculated as follows:

Components and Weights

Class participation	Attend and join class discussion, search and share information	10%
Specific Topic Presentation	Each student will make two one-hour presentation on selected topics	30%
Research paper	Require quality for journal or conference submission	60%
Total		100%

Grade Conversion

At the end of the course your overall percentage grade will be converted to your letter grade in accordance with the following conversion scheme.

LETTER GRADE	PERCENT
A+	90-100
A	85-89
A-	80-84
B+	77-79
B	73-76
B-	70-72
F	0-69

COMMUNICATION AND FEEDBACK

Students that are uncomfortable in directly approaching an instructor regarding a course concern may choose to send a confidential and anonymous email to the respective Area Chair at:

http://www.degroote.mcmaster.ca/curr/emailchairs.aspx

Students who wish to correspond with instructors directly via email must send messages that originate from their official McMaster University email account. This protects the confidentiality and sensitivity of information as well as confirms the identity of the student.

Instructors should conduct an informal course review with students by Week #4 to allow time for modifications in curriculum delivery. Instructors should provide evaluation feedback for at least 10% of the final grade to students prior to Week #8 in the term.

ACADEMIC DISHONESTY

It is the student's responsibility to understand what constitutes academic dishonesty. Please refer to the University Senate Academic Integrity Policy at the following URL:

http://www.mcmaster.ca/univsec/policy/AcademicIntegrity.pdf

This policy describes the responsibilities, procedures, and guidelines for students and faculty should a case of academic dishonesty arise. Academic dishonesty is defined as to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. Please refer to the policy for a list of examples. The policy also provides faculty with procedures to follow in cases of academic dishonesty as well as general guidelines for penalties. For further information related to the policy, please refer to the Office of Academic Integrity at:

http://www.mcmaster.ca/academicintegrity

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http://library.mcmaster.ca/about/copying.pdf

MISSED TESTS AND ASSIGNMENTS

The Faculty of Business has approved the following policy:

> When students miss a regularly scheduled mid-term exam for legitimate reasons, as adjudicated by the Academic Programs Office (APO), the weight for that exam will be redistributed across other evaluative components of the course as deemed most appropriate by the instructor.
>
> There is one exception to this "no make-up" rule.
>
> If a student has a documented stress-related or retention-related disability (assessed through the Centre for Student Development) that is in conflict with mark redistribution, then a make-up exam may be given. In such cases, the test/exam will be administered through the CSD.
>
> When a student cannot write a final exam for documented, legitimate reasons, the student will be granted a deferred exam privilege.
>
> Instructors cannot themselves allow students to unofficially write make-up exams/tests for finals. Adjudication of the request must be handled by the APO.

For any other issues pertaining to missed exams, tests or assignments, please contact the APO.

STUDENTS WITH A DISABILITY

Students with disabilities are required to inform the Centre for Student Development (CSD) of accommodation needs for examinations on or before the last date for withdrawal from a course without failure (please refer to official university sessional dates). Students must forward a copy of such CSD accommodation to the instructor immediately upon receipt. If a disabled student chooses NOT to take advantage of a CSD accommodation and chooses to sit for a regular exam, a petition for relief may not be filed after the examination is complete. The CSD website is:

http://csd.mcmaster.ca

RESEARCH USING HUMAN SUBJECTS

Research involving human participants is premised on a fundamental moral commitment to advancing human welfare, knowledge and understanding. As a research intensive institution, McMaster University shares this commitment in its promotion of responsible research. The fundamental imperative of research involving human participation is respect for human dignity

and well-being. To this end, the University endorses the ethical principles cited in the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans:

http://www.pre.ethics.gc.ca/english/policystatement/policystatement.cfm

McMaster University has mandated its Research Ethics Boards to ensure that all research investigations involving human participants are in compliance with the Tri-Council Policy Statement. The University is committed, through its Research Ethics Boards, to assisting the research community in identifying and addressing ethical issues inherent in research, recognizing that all members of the University share a commitment to maintaining the highest possible standards in research involving humans.

If you are conducting original research, it is vital that you behave in an ethical manner. For example, everyone you speak to must be made aware of your reasons for eliciting their responses and consent to providing information. Furthermore, you must ensure everyone understands that participation is entirely voluntary. Please refer to the following website for more information about McMaster University's research ethics guidelines:

http://www.mcmaster.ca/ors/ethics

Organizations that you are working with are likely to prefer that some information be treated as confidential. Ensure that you clarify the status of all information that you receive from your client. You **MUST** respect this request and cannot present this information in class or communicate it in any form, nor can you discuss it outside your group. Furthermore, you must continue to respect this confidentiality even after the course is over.

ONLINE COURSE DELIVERY

In this course we will be using online teaching tools to conduct leaning activities. Students should be aware that when they access the electronic components of this course, 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 this course will be deemed consent to this disclosure.

If you have any questions or concerns about such disclosure, please discuss this with the course instructor.

LEARNING ACTIVITIES	DELIVERY	DESCRIPTION	TOOL(S)
Live Lectures	Synch	3 hr. live session; opportunity to elaborate on content, present challenges, engage discussion	**Zoom** Every week during virtual class time
Self-Study	Asynch	Read lecture note posted in	**Avenue to Learn**

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		Avenue and specified research papers	At your own time over the week
Discussion	Asynch	Participate in online discussion forum. Post and answer questions, share papers	**Avenue to Learn** At your own time over the week
Student Seminar presentation and Discussions	Synch	Student online seminar presentation and discussion	**Zoom** Selected week during virtual class time

CLASS SCHEDULE (SUBJECT TO POSSIBLE MODIFICATION)

Week	Date	Topic	Readings/Assignments
1	Jan. 11	Introduction to AI and Business Analytics	Davenport (2018), Davenport (2021)
2	Jan. 18	The technology, application, and impact of AI	Zhu (2020), He (2019), Vinuesa et al (2020)
3	Jan. 25	User interaction with AI	Siau & Wang (2018), Zhu et al. (2020), Luger & Sellen (2016)
4	Feb. 1	Student Presentation: Special topic on AI	
5	Feb. 8	Management Issue of AI applications	Keding (2020), Koeszegi (2020)
6	Feb. 14-18	Spring break	No class
7	Feb 22	Trend of big data and business analytics	Chen et al. (2012), Dremel et al. (2020), Sivarajah et al. (2017)
8	Mar. 1	BDA applications and impact	Davenport et al. (2020), Lehrer et al. (2018),

			Shilo et al. (2020)
9	Mar. 8	Student Presentation: Special topic on BDA	
10	Mar. 15	User behavior study with BDA	Leicht-Deobald et al. (2019) Motiwalla et al. (2019)
11	Mar. 22	Management issue with BDA applications	Grover et al. (2018), Ghasemaghaei & Turel (2021) Dremel et al. (2017) Vidgen et al. (2020)
12	Mar. 29	Research topic discussion	
13	Apr. 5	Research paper presentation	Research paper due

Specific Topic Presentation Guidelines

Objective: To make a seminar presentation that addresses a current issue on the use of AI and BDA in business. The presentations are mainly based on literature review. Each student will be required to make two presentations (one hour each) on two different fields.

Topic Selection: Following are the schedule of student presentation. Each topic will be presented by up to three students. Each student can select two topics from the list. You may select a subtopic based on the recommendation or your own interests. Please make sure your subtopics are not overlap with each other.

Presentation Schedule			
Week		**Topic**	**Subtopics**
4	Feb. 1	Specific topics in AI	• Users' interaction and attitude towards AI • Organization's power change and coordination shift as AI tools are used • Ethical implications of AI deployment • Effectiveness of AI applications • Management and coordination of AI development
9	Mar. 8	Specific topics in BDA	• User's attitude towards BDA deployment • BDA applications and impact • BDA strategy • BDA management issues • BDA trust, privacy and ethical issues

Presentation and paper sharing: For each subtopic, please prepare a PowerPoint presentation and provide a copy of most valuable papers (three to four) and a list of references for students to share.

Research Paper Guidelines

Objective:

To write a research paper that addresses a current issue on security, privacy and trust in electronic business. The topic of your research paper can overlap with your seminar presentation but should be more in-depth study. Students are expected to work more closely with the instructor for possible conference or journal publication.

Topic Selection:

The topic of your research paper may be on any contemporary issue relating to security, privacy, and identity theft in electronic business. A one-page proposal of your research topic must be handed in by the third week. You may build a theoretical framework or evaluate existing technologies. Your topic should not cover too broad a field, since your report will not be long enough to do justice to the material and will result in a poor mark. For example, "Network Security" is too broad as a topic, while "Hackers on Internet" is considerably narrower, and "Intrusion detection techniques" has an even sharper focus.

Guidelines:

1. Since many students will not have much experience within their selected topic, most of the material for the research paper will be gathered from literature surveys. The University library has many books and journals which may be of use, and your instructor may also help you in your search if you are short of material. Your best sources of information will likely be the World Wide Web and the electronic libraries available in the Innis Room. **Do not** consult your instructor until you have looked at topics from this source. Books are good sources of material, but to obtain up-to-date material, journals should also be consulted.

2. Since the purpose of this research paper is to show that you have studied a particular topic area well, do not simply repeat information you find in your literature review. In particular, beware of the unbridled enthusiasm on many topics often appearing in the popular press. This may be a mask to cover a lack of facts. You should not consider yourself as a reporter, but as an analyst. Present your own views on the material gathered, since this develops your ability to think logically and creatively. Remember, marks are given for originality.

3. Your report must be typed. It should be a minimum of 20 (maximum of 35) double spaced 8 x 11 typewritten pages, (not including references, figures, and appendices). However, you will not be penalized if you can put forward a good presentation in less than 20 pages.

4. Your report should be written in a concise, crisp, business-like style such as would be used in writing a report for high level management. Try to use diagrams and tables to get your point of view across and to "dress up" your report's appearance.

5. Your report should include the following sections:

   - A cover page which includes the title, the course name and number, the date, and the author's' name.

   - Abstract: The abstract should cover the most important points presented in your paper as well as any conclusions that should be derived from the report.

   - Introduction: This section includes background material to bring the reader "up to speed" before launching into the main thrust of your report. It should also briefly discuss a general outline of the report which follows.

   - Report body: The body of the report should be broken into reasonably sized sections on various aspects of the topic under consideration. Each section should be numbered and given an appropriate heading.

- Major findings and conclusions: This section should reflect the important results that the reader should have learned from the paper.

- References: You must show several references from more advanced literature (you may also reference the popular press, but it may tend towards uncritical enthusiasm). Guidelines for reference format are provided below.

- Appendices: If appropriate, appendices should be included after your reference section.

6. Jargon should not be used unless the words are carefully defined when they are first used in your report. In general, make sure you carefully define your topic, assuming that potential readers may have little or no background knowledge within the area.

7. References to gender should not appear in the paper, unless referring to an actual person. A minimal use of "he or she" is permitted instead of "he" or "she", but it is normally possible to eliminate such references entirely. For example, consider the following sentence: "The manager will normally rely on his secretary to perform her work as rapidly as possible, regardless of whether or not she has access to a word processor". A statement like this one will cost you marks in your paper, so consider the following statement as a replacement: "Managers will normally rely on their secretaries to work as rapidly as possible, regardless of whether they have access to word processors". There are other ways to achieve this effect, but this should demonstrate what is desired.

8. Sources for your material must be referenced. If you develop original material in your report, be sure to substantiate the grounds upon which you build your arguments, through references to other published material or personal communications. All of your reference material should be referred to by numbers in square brackets, corresponding to numbers used in your reference list at the end of your paper. In your reference section, references should be listed in alphabetic order of the first author's last name. An example of proper reference format is shown below:

Cofta, P. (2007), *Trust, Complexity and Control: Confidence in a Convergent World*, Wiley &Sons, 2007.

Pollach, I. (2007), What's Wrong with Online Privacy Policies? *Communications of the ACM*, September 2007, Vol. 50, No. 9, pp. 103- 108.

9. Short footnotes may be used, provided that they are referenced on the same page with a special symbol such as a dagger or an asterisk. Longer footnotes should be included as appendices, to avoid breaking the continuity of the presentation.

10. Figures or tables should be numbered and should appear as soon as possible after they are referenced in the paper. However, if a large number of tables or figures are referenced in one place, it is best to move all the tables and/or figures to the end of the report.

11. Appendices should have titles and be numbered using Roman numerals.

12. All pages of the report, except the title page, should be numbered.

13. Equations should be numbered if they are referred to elsewhere in the report.

14. Grammar, spelling, sentence and paragraph structure are important. A good general reference which may be useful is the Harbrace College Handbook published by Longman Canada Limited. Other references which contain helpful sections on business report writing style are:

- Ewing, E.W. (1979), Writing For Results, New York: Wiley, 1979.

- Himstreet, W.C., and W.M. Baty (1977) Business Communications, Belmont, California : Wadsworth, 1977.

- Smith, R.S. (1976), Written Communications For Data Processing, New York: Van Nostrand, 1976.

- Weiss, A. (1977), Write What You Mean, New York: Amacom, 1977.

15. PowerPoint presentation. You should prepare and submit (email me) your PowerPoint presentation document one day before the scheduled presentation time. You will have 25 minutes presentation followed by 10 minutes discussion.