



Carleton
UNIVERSITY

SPROTT
SCHOOL OF BUSINESS

CARLETON UNIVERSITY
BUSI 4404 / A
2021/WINTER

IT INFRASTRUCTURE
Updated – January 12, 2021

Instructor: Sam Khataei
Office: Virtual Office
Office Hours: Fridays 15:30 – 17:00 Hrs. by appointment
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TA: TBA

Course meets:

Class Time		
Section	Day	Time
A	Thursday	18:05 – 20:55

Hosted on Zoom. Zoom meeting ID is shared on cuLearn.

Prerequisite(s): third-year standing and BUSI 2400 with a grade of C- or higher.
Lecture three hours a week.

Course Calendar description from the 2020/2021 University calendar:

Challenges and issues managers face in assembling the infrastructure for IT service delivery. IT Service levels, data communications, networks (LAN, MAN, WAN, wireless), internetworking, SOA, web services, SaaS, server and storage virtualization, network security, business continuity and disaster recovery.

Course Description:

Telecommunications and data networking technologies are transforming how IT services are delivered in organizations. People and organizations increasingly are conducting their work and operations across time and space using computing and telecommunication networks. The technologies and applications afforded by these networks present unique management challenges. Businesses now depend on information and telecommunications



Upon completion of this course, students will be able to:

1. Analyze a business problem and propose an IT enabled solution.
2. Explain the principles underlying layered systems architecture and their application to both computers and networks.
3. Distinguish the core elements of an IT infrastructure solution, such as clients, servers, other network devices, wired and wireless network links, systems software, and specialized security devices.
4. Discuss how IT infrastructure components are organized into infrastructure solutions in different organizational environments.
5. Examine the principles underlying operating systems and virtual networks and propose a network operating system given a business scenario.
6. Use practical examples to demonstrate how protocols are used to enable communication between computing devices connected to each other.
7. Configure an IT infrastructure solution for a small organization, including a network based on standard technology components, servers, security devices, and several different types of computing clients.
8. Apply the core concepts underlying IP networks to solve simple network design problems, including IP subnetting.
9. Illustrate the role of the emergent cloud computing & IoT technologies in business today.
10. Write about the opportunities that virtual computing service provision models, such as Virtual Machines and Virtual Networks, create for organizations

Learning Outcomes:

The course is designed for business students who need to develop an understanding of IT infrastructure technologies as well as the challenges and opportunities associated with them. While it does cover some technical aspects of data and telecommunications, the course is not designed to train computer and telecommunications networking engineers. The course will:

- Enable students to develop an understanding of the fundamental concepts of telecommunications, data communications and networking.
- Familiarize students with network technologies, protocols and standards.
- Explore the managerial considerations surrounding telecommunications and networking applications design, procurement and deployment.
- Address issues related to the impact of telecommunications and networking technologies on the globalization of business activity and electronic commerce

Reading(s)/Textbook(s)/Required Materials:

In this course Fitzgerald, J. and Dennis, A. (2020) Business Data Communications and Networking, 14th Edition, John Wiley and Sons. The e-book can be purchased directly online at:

<https://www.wiley.com/en-ca/Business+Data+Communications+and+Networking%2C+14th+Edition-p-9781119702665>

Having said that, the previous editions (12th and 13th) for Business Data Communications and Networking should also be sufficient.

In addition to the above textbooks, there are plenty of resources in IT domain on which are designed for business-oriented professionals. Though I found the following useful as well:



- Information Technology for Management: On-Demand Strategies for Performance, Growth and Sustainability a complementary textbook: <https://www.wiley.com/en-ca/Information+Technology+for+Management%3A+On+Demand+Strategies+for+Performance%2C+Growth+and+Sustainability%2C+11th+Edition-p-9781118890868>
- Cloud Technologies: An Overview of Cloud Computing Technologies for Managers: <https://www.wiley.com/en-ca/Cloud+Technologies%3A+An+Overview+of+Cloud+Computing+Technologies+for+Managers-p-9781119769521>

Course Requirements & Methods of Evaluation (including due dates):

	Date	Weight
Quizzes	Refer to the class schedule	25%
Group project	April 10th	30%
Individual project	April 10th	30% *
Class contribution	Refer to the class schedule	5%
Final Exam		15%

*5% bonus for individual project

Quizzes

Six quizzes will be given during the term at the dates listed in the schedule. Though the final mark is calculated based on your top five grades. There is no make-up for missed quizzes.

Group project

For the team project, students working in group of four (or five) will conduct a full IT review of a local company, not-for-profit organization, or government entity and are expected to do a complete technology review of the company. Particular attention should be paid to problems or challenges that the organization may be having with their IT infrastructure (technical or operational) which may be solve-able by making changes to some part of the IT infrastructure.

- You should also look at how the organization is leveraging modern technologies.
- The proposal to change the IT infrastructure must detail the planned solution and roadmap to implementation.
- The proposal must be in a form for presentation to upper management in order to secure sponsorship, support, and funding for the plan.
- The proposal must include key elements such as cost-benefit analysis, budget, expected timeline etc.

Group Project Deliverables

Deliverables for the team project include the following: a project proposal, project report, project presentation, and a peer evaluation.

1. Team Project Proposal: (10% of project grade)

The proposal should outline the business the team will be investigating and reporting on. It should contain the following: a title for the project, a short description and rationale, possible sources of information, resources that may be needed, technology areas that are going to be reviewed and modern technologies that may be applicable. I will review each project proposal to verify its appropriateness for the course. The proposals must be submitted by the third class meeting.

2. Project Report: (60% of project grade)

The project report should contain an overview of the business, its main activities, a summary of the IT infrastructure currently in use, current problems being faced, modern technologies being leveraged and include a detailed proposal for upgrade and request for funding, targeted at, and delivered in the language of, upper management.

The project report should contain at least the following:

- A title page
- An executive summary page
- Table of contents and list of figures
- Departmental/company overview (i.e. how the affected department fits within, and contributes to, the overall organization)
- Description of IT problems and how it may be negatively impacting the operations of the department/company
- Scope and requirements of proposed solution; short-list of vendors and vendor selection criteria (if applicable)
- Cost-benefit analysis for proposed solution. If investments are needed, include an estimated payback period with a minimum analysis horizon of one year
- Proposed implementation plan for the solution (including budget and timeline)
- References and appropriate appendices and illustrations

The report should not be more than 4000 words in length, excluding appendices and illustrations. You will lose 1 point for every 100 words over the allowed limit for the report.

Examples of emerging technical areas (Not an exhaustive list, you can pick something else):

Big Data / Hadoop etc.	Office automation / IoT
Robotics	RFID
Mobility solutions	Neural networks
AI / Machine Learning	Blockchain
Business Intelligence / Business Analytics	VOIP networks / telephony
Social media integration	Satellite / GPS
Remote work and VPN	Data Center / Virtualization
Managed Hosting / DR / HA	XaaS Frameworks
Network management services	Security
Desktop management and support services	Cloud and Distributed Computing
3 rd party authentication services	PKI / Encryption
Augmented reality	Real-time access to data

3. Project Presentation: (30% of project grade)

Each team will give an in-class presentation of its project. Time will be split between the actual presentation and sometime set aside for questions. The limited presentation time makes it imperative for the group to organize what is to be presented. The presentation must be well designed and clear. All team members should take part in the presentation. The audience is expected to participate and ask questions to the presenting teams (worth up to 5%).

4. Peer Evaluation:

Each student will be required to perform a peer evaluation of his or her peers' involvement and performance in the project team (involvement and performance in the project preparation and presentation, and team formation and development). The peer evaluation must be submitted by midnight, April 10, 2020 via cuLearn. The peer evaluation will be used to adjust your project grade downward by a

maximum of 20 points. Failure to submit an evaluation will lead to a loss of 10% of your project grade. The peer evaluation forms can be downloaded from the course resources page on cuLearn.

Individual project

The individual project consists of selecting a modern technology, conducting a critical evaluation on its impact to address an IT (technical/operational) problem and writing a paper. As you can imagine, group project could also leverage from the individual project contents. The audience for the paper is quite broad but in general, business stakeholders that want to keep up to speed on themes tied to digitization, security and etc. Trust in today's remote world can be a general theme though you can pick your own.

Here's the general format that is required:

1. Introduction: (10% of report grade)
General intro for the selected technology. What they are, what's happened, and why this is important for anyone looking to leverage from the technology.
2. Literature review: (25% of report grade)
A primer/summery on related recent literatures (at least 5) within this domain.
3. Gap analysis: (25% of report grade)
Discussion and evaluation. The section provides a way to identify suboptimal or missing strategies, structures, capabilities, processes, practices, technologies or skills.
4. Future studies and limitations: (25% of report grade)
Recommends future steps that will help to shape future researches as well as highlighting some of the limitations that you faced within your research.
5. Conclusion: (15% of report grade):
Summary of the main points of the report and conclude of your thoughts.
6. References (IEEE format): At least 15 references should be used in the paper.

The report expected to be 4000 words in length, excluding appendices and illustrations. You will lose 1 point for every 100 words lower the allowed limit for the report. There is no max limit in case the report goes more than 4000 words.

Class contribution

Students are expected to sign up for a presentation slot between Lecture 2 and Lecture 11 and prepare a short 15 minutes presentation. All time slots are filled on a first come first served basis. The presentation theme should be related to the same day lecture theme.

Final Exam

The traditional exam will take place during the formal examination period. It will cover the entire course and will be closed book. Maintaining average score of A+ before the exam, will waive the exam and automatically award the student with A+.

Course Schedule:

	Lecture theme	Presentation	Important dates
Lecture 1 14 Jan 2021	Welcome to the course – course administration and Introduction to Data Communications (Chapter 1)		
Lecture 2 21 Jan 2021	Application Layer (Chapter 2)	<ul style="list-style-type: none"> • STD#1 • STD#2 	Deadline to sign up for class contribution slot
Lecture 3 28 Jan 2021	Physical Layer (Chapter 3)	<ul style="list-style-type: none"> • STD#3 • STD#4 	Deadline to submit Quiz 1 (Chapter 1 – 2)
Lecture 4 4 Feb 2021	Data Link Layer Network and Transport Layer (Chapter 4, 5)	<ul style="list-style-type: none"> • STD#5 • STD#6 	Deadline to submit group and individual project proposal Deadline to sign up for group presentation slot
Lecture 5 11 Feb 2021	Network Design Wired and Wireless Local Area Networks (Chapter 6, 7)	<ul style="list-style-type: none"> • STD#7 • STD#8 	Deadline to submit Quiz 2 (Chapter 3 – 5)
Winter Break 18 Feb 2021	15-19 February. Classes are suspended.		
Lecture 6 25 Feb 2021	Backbone Networks (Chapter 8)	<ul style="list-style-type: none"> • STD#9 • STD#10 	
Lecture 7 4 Mar 2021	Wide Area Networks (Chapter 9)	<ul style="list-style-type: none"> • STD#11 • STD#12 	Deadline to submit Quiz 3 (Chapter 6 – 8)
Lecture 8 11 Mar 2021	Internet (Chapter 10)	<ul style="list-style-type: none"> • STD#13 • STD#14 	
Lecture 9 18 Mar 2021	Network Security (Chapter 11)	<ul style="list-style-type: none"> • STD#15 • STD#16 	Deadline to submit Quiz 4 (Chapter 9 – 10)
Lecture 10 25 Mar 2021	Network Management (Chapter 12)	<ul style="list-style-type: none"> • STD#17 • STD#18 	
Lecture 11 1 Apr 2021	Summary of the course and course take away	Presentation: <ul style="list-style-type: none"> • STD#19 • STD#20 • Group 1 	Deadline to submit Quiz 5 (Chapter 11 – 12)

		<ul style="list-style-type: none"> • Group 2 	
Lecture 12 8 Apr 2021	Final exam review	Presentation: <ul style="list-style-type: none"> • Group 3 • Group 4 • Group 5 	
10 Apr 2021			Deadline to submit Quiz 6 (all chapters) Deadline to submit group and individual reports Deadline to submit peer evaluation

ADDITIONAL INFORMATION

Course Sharing Websites

Materials created for this course (including presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the author(s). They are intended for personal use and may not be reproduced or redistributed without prior written consent of the author(s).

Required calculator in BUSI course examinations

If you are purchasing a calculator, we recommend any one of the following options: Texas Instruments BA II Plus (including Pro Model), Hewlett Packard HP 12C (including Platinum model), Staples Financial Calculator, Sharp EL-738C & Hewlett Packard HP 10bII

Group work

The Sprott School of Business encourages group assignments in the school for several reasons. They provide you with opportunities to develop and enhance interpersonal, communication, leadership, follower-ship and other group skills. Group assignments are also good for learning integrative skills for putting together a complex task. Your professor may assign one or more group tasks/assignments/projects in this course. Before embarking on a specific problem as a group, it is your responsibility to ensure that the problem is meant to be a group assignment and not an individual one.

In accordance with the Carleton University Undergraduate Calendar (p 34), the letter grades assigned in this course will have the following percentage equivalents:

A+ = 90-100	B+ = 77-79	C+ = 67-69	D+ = 57-59
A = 85-89	B = 73-76	C = 63-66	D = 53-56
A - = 80-84	B - = 70-72	C - = 60-62	D - = 50-52
F = Below 50			

Grades entered by Registrar:

WDN = Withdrawn from the course

DEF = Deferred

Academic Regulations



University rules regarding registration, withdrawal, appealing marks, and most anything else you might need to know can be found on the university's website, here:

<http://calendar.carleton.ca/undergrad/regulations/academicregulationsoftheuniversity/>

Requests for Academic Accommodation

You may need special arrangements to meet your academic obligations during the term. For an accommodation request, the processes are as follows:

Pregnancy obligation

Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist.

For more details, visit the Equity Services website: carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf

Religious obligation

Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist.

For more details, visit the Equity Services website: carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf

Academic Accommodations for Students with Disabilities

If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. carleton.ca/pmc

Survivors of Sexual Violence

As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and its survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: carleton.ca/sexual-violence-support

Accommodation for Student Activities

Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. <https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf>

For more information on academic accommodation, please contact the departmental administrator or visit: students.carleton.ca/course-outline

Academic Integrity

Violations of academic integrity are a serious academic offence. Violations of academic integrity – presenting another’s ideas, arguments, words or images as your own, using unauthorized material, misrepresentation, fabricating or misrepresenting research data, unauthorized co-operation or collaboration or completing work for another student – weaken the quality of the degree and will not be tolerated. Penalties may include; a grade of Failure on the submitted work and/or course; academic probation; a refusal of permission to continue or to register in a specific degree program; suspension from full-time studies; suspension from all studies at Carleton; expulsion from Carleton, amongst others. Students are expected to familiarize themselves with and follow the Carleton University Student Academic Integrity Policy which is available, along with resources for compliance at: <https://carleton.ca/registrar/academic-integrity/>.

Sprott Student Services

The Sprott student services office, located in 710 Dunton Tower, offers academic advising, study skills advising, and overall academic success support. If you are having a difficult time with this course or others, or just need some guidance on how to successfully complete your Sprott degree, please drop in* any weekday between 8:30am and 4:30pm. Our advisors are happy to discuss grades, course selection, tutoring, concentrations, and will ensure that you get connected with the resources you need to succeed! <http://sprott.carleton.ca/students/undergraduate/learning-support/>

** Note that the office is physically closed. However, e-drop in is available between 8:30-4:30 until social distancing requirements are updated by the Province*

Centre for Student Academic Support

The Centre for Student Academic Support (CSAS) is a centralized collection of learning support services designed to help students achieve their goals and improve their learning both inside and outside the classroom. CSAS offers academic assistance with course content, academic writing and skills development. Visit CSAS on the 4th floor of MacOdrum Library or online at: carleton.ca/csas.

Important Information:

- Students must always retain a hard copy of all work that is submitted.
- All final grades are subject to the Dean’s approval.
- For us to respond to your emails, we need to see your full name, CU ID, and the email must be written from your valid CARLETON address. Therefore, in order to respond to your inquiries, please send all email from your Carleton CMail account. If you do not have or have yet to activate this account, you may wish to do so by visiting <http://carleton.ca/ccs/students/>