

### COURSE INFORMATION

Course title:	Financing Engineering	Course code:	BAFI 516
Course code:	BAFI 516	Session, term, period:	2020 W1, Period 7
Session, term, period:	2019 W1, Period 7	Section(s):	001
Section(s):	001	Course duration:	Nov. 3 to Dec. 3, 2019
Course duration:	Oct. 29 to Nov. 29, 2019	Division:	Finance
Division:	Finance	Course title:	Financing Engineering
Course title:	Financing Engineering		

### INSTRUCTOR INFORMATION

Instructor:	Professor Lorenzo Garlappi	Office location:	HA 870
Phone:	604-822-8848	Office hours:	T/H 4:00 PM -5:00 PM or by appointment
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Teaching assistant:	Keling Zheng
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### COURSE DESCRIPTION

The goal of this course is to provide a rigorous foundation to the principles of financial engineering and risk management. The course focuses on the theory underlying financial derivatives (forwards, futures, options, swaps) and their applications to real world business problems.

### COURSE FORMAT

We will use Zoom to have our classes during the scheduled class times.

For this course, you are required to use a Zoom account during synchronous classes and office hours. If you do not have a Zoom account, you can create one here: <https://zoom.us/signup>. Note: creating a Zoom account requires that you provide a first name, last name, and email address to Zoom. For privacy purposes, you may consent to using your existing email address and your real name. Alternatively, if you prefer, you may sign up using an alternative email address and an anonymized name that does not identify you (i.e. Jane Doe, [jane.doe@email.com](mailto:jane.doe@email.com)). If you have trouble creating an account, or accessing a Zoom session, please contact [CLCHelp@sauder.ubc.ca](mailto:CLCHelp@sauder.ubc.ca).

You will be required to provide the email address associated with your Zoom account in a Canvas quiz for identification purposes.

To help replicate the classroom experience, make sessions more dynamic and hold each person accountable, both students and instructors are asked to have their cameras on during Zoom sessions. This is the desired norm for the Sauder undergraduate program as it will provide you the best learning experience. Students who require an accommodation with regard to the "camera on" requirement must contact their instructors in advance of the first class to discuss options. Students are expected to conduct themselves professionally by joining sessions on time, muting mics when not speaking,

refraining from using any other technology when in-session, attending in attire you would normally wear to school, and participating from a quiet environment. Content from synchronous sessions will be selectively recorded per instructor discretion and made available to students on Canvas for a maximum duration of the course length. This is done to allow students the opportunity to return to lecture content to solidify learnings.

The typical use of class time will be as follows:

1. Brief review of assigned material for the day
2. Practice problems/tutorials in break-out groups
3. Class case discussion
4. Individual quizzes

### LEARNING OBJECTIVES

At the end of this course, you should be able to

1. design financial products for simple hedging purpose and to value the products
2. construct reasonable hedging strategies for a portfolio of derivatives
3. discuss intelligently the key properties of popular derivative contracts, strategies and valuation models
4. assess the uses and abuses of derivatives in practice.

### ASSESSMENTS

#### Summary

<u>Component</u>	<u>Weight</u>
Case analysis and discussion	40%
Group project	20%
Midterm exam	25%
Class participation	<u>15%</u>
Total	<u>100%</u>

#### Details of Assessments

##### Cases

We will discuss two business cases in the course. The case studies provide opportunities to see how some of the financial concepts and tools help understand and solve real world problems. Case study lectures take the form of class discussion. Careful reading of the cases before class will be important for better understanding of the lectures. Students will be asked to form study groups. Groups will be randomly selected to present different aspects of the case in class. The cases can be purchased from Harvard Case website: <https://hbsp.harvard.edu/import/764082>

You need to register in order to access the cases.

##### Midterm Exam

The midterm will be a online quiz available from **Friday, November 20, 2020, 12:PM to Saturday, November 21, 12:00PM**. Logistics details will be provided in due time.

##### Group Project

You will be assigned to a **team of max 3 students (no exceptions)**. Your goal will be to apply the tools we develop in this course to analyze a real-world derivative product offering. Your work on this project will give you a taste for what derivative analysts at various investment houses do. You will be provided with a more complete handout regarding the group project goal and requirements. Your final written report is due on **TBA**.

### Participation

Please make every effort to attend the lectures and review the material beforehand. Come well prepared and ready to contribute to the lecture discussion.

### LEARNING MATERIALS

#### Required:

Lecture notes posted on Canvas

#### Additional materials recommended but not required:

1. Robert McDonald: *“Derivatives Markets”* Third Edition, 2013. A customized copy with the chapters covered in this course is available at the Bookstore. An e-book version is also available from VitalSource ([www.vitalsource.com](http://www.vitalsource.com)). To purchase the e-book version, you need to search the book by author, title, or ISBN 9780321543080.
2. **Software.** Financial engineering is necessarily an analytical subject. To get the most out of this class it is important to be familiar with some common programming languages. I recommend two programming languages widely used in industry:
  - a. **R:** Open source statistical software. You should install R from <https://cran.r-project.org> and the R Studio IDE from <https://rstudio.com/products/rstudio/> This will allow you to replicate *all* the examples in my lecture notes.
  - b. **Python 3:** You can install Python through the Anaconda distribution <https://www.anaconda.com/products/individual> And then install and launch the Python IDE Spyder. Occasionally I might be using Jupyter notebooks which you can access through the Anaconda Navigator.

### COURSE-SPECIFIC POLICIES AND RESOURCES

#### *Missed or late assignments, and regrading of assessments*

Late submissions will not be accepted and will receive a grade of zero.

#### *Academic Concessions*

If extenuating circumstances arise, please contact the RHL Graduate School program office as early as reasonably possible, and submit an [Academic Concession Request & Declaration Form](https://webforms.sauder.ubc.ca/academic-concession-rhlee) <https://webforms.sauder.ubc.ca/academic-concession-rhlee>. If an academic concession is granted during the course, the student will be provided options by RHL, or by the instructor in consultation with RHL, per [UBC’s policy on Academic Concession](#).

#### *Other Course Policies and Resources*

## POLICIES APPLICABLE TO COURSES IN THE ROBERT H. LEE GRADUATE SCHOOL

### *Attendance*

Excepting extenuating circumstances, students are expected to attend 100% of their scheduled class hours. Absent students limit their own academic potential, and that of their classmates, and cause unnecessary disruption to the learning environment. Students missing more than 20% of the total scheduled class hours for a course (including classes held during the add/drop period) without having received an academic concession will be withdrawn from that course. Withdrawals, depending on timing, could result in a “W” or an “F” standing on the transcript.

### *Punctuality*

Students are expected to arrive for classes and activities on time and fully prepared to engage. Late arrivals may be refused entry at the discretion of the instructor or activity lead. Students arriving later than halfway through a scheduled class will be treated as absent for that class.

### *Electronic Devices*

During online lectures, students are not permitted to use any electronic devices other than the primary one used for attending the online lecture (e.g. laptop or desktop). Only Zoom should be open during the online lecture unless an instructor advises the use of another program/website for an in-class activity. Feedback from students indicates that personal devices are the number one distraction from effective learning and participation in the online learning environment.

### *Citation Style*

Please use the American Psychological Association (APA) reference style to cite your sources.

Details of the above policies and other RHL Policies are available at:

<http://www.calendar.ubc.ca/vancouver/index.cfm?tree=12,199,506,1625>

## UNIVERSITY POLICIES AND RESOURCES [DO NOT MODIFY THIS PARAGRAPH]

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of sexual violence. UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom. UBC provides appropriate accommodation for students with disabilities and for religious observances. UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions. Details of the policies and how to access support are available on the UBC Senate website at <https://senate.ubc.ca/policies-resources-support-student-success>.

### *Respect for Equity, Diversity, and Inclusion*

The UBC Sauder School of Business strives to promote an intellectual community that is enhanced by diversity along various dimensions including status as a First Nation, Metis, Inuit, or Indigenous person, race, ethnicity, gender identity, sexual orientation, religion, political beliefs, social class, and/or disability. It is critical that students from diverse backgrounds and perspectives be valued in and well-served by their courses. Furthermore, the diversity that students bring to the classroom should be viewed as a resource, benefit, and source of strength for your learning experience. It is expected that all students and members of our community conduct themselves with empathy and respect for others.

### *Academic Integrity*

The academic enterprise is founded on honesty, civility, and integrity. As members of this enterprise, all students are expected to know, understand, and follow the codes of conduct regarding academic integrity. At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas and attributing them to others as required. This also means you should not cheat, copy, or mislead others about what is your work. Violations of academic integrity (i.e., misconduct) lead to the breakdown of the academic enterprise, and therefore serious consequences arise and harsh sanctions are imposed. For example, incidences of plagiarism or cheating may result in a mark of zero on the assignment or exam and more serious consequences may apply if the matter is referred to the President's Advisory Committee on Student Discipline. Careful records are kept in order to monitor and prevent recurrences.

### *Academic Freedom and Students Studying from Outside Canada*

During this pandemic, the shift to online learning has greatly altered teaching and studying at UBC, including changes to health and safety considerations. Keep in mind that some UBC courses might cover topics that are censored or considered illegal by non-Canadian governments. This may include, but is not limited to, human rights, representative government, defamation, obscenity, gender or sexuality, and historical or current geopolitical controversies. If you are a student living abroad, you will be subject to the laws of your local jurisdiction, and your local authorities might limit your access to course material or take punitive action against you. UBC is strongly committed to academic freedom, but has no control over foreign authorities (please visit <http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,33,86,0> for an articulation of the values of the University conveyed in the Senate Statement on Academic Freedom). Thus, we recognize that students will have legitimate reason to exercise caution in studying certain subjects. If you have concerns regarding your personal situation, consider postponing taking a course with manifest risks, until you are back on campus or reach out to your academic advisor to find substitute courses. For further information and support, please visit: <http://academic.ubc.ca/support-resources/freedom-expression>

### **COPYRIGHT**

All materials of this course (course handouts, lecture slides, assessments, course readings, etc.) are the intellectual property of the instructor or licensed to be used in this course by the copyright owner. Redistribution of these materials by any means without permission of the copyright holder(s) constitutes a breach of copyright and may lead to academic discipline and could be subject to legal action. Any lecture recordings are for the sole use of the instructor and students enrolled in the class. In no case may the lecture recording or part of the recording be used by students for any other purpose, either personal or commercial. Further, audio or video recording of classes are not permitted without the prior consent of the instructor. Students may not share class Zoom links or invite others who are not registered to view sessions.

### **ACKNOWLEDGEMENT**

UBC's Point Grey Campus is located on the traditional, ancestral, and unceded territory of the xwməθkwəyəm (Musqueam) people, who for millennia have passed on their culture, history, and traditions from one generation to the next on this site.

### **ONLINE TEACHING TOOL & REQUIREMENTS**

This course will be taught using Zoom for synchronous classes and office hours.

For this course, you are required to use a Zoom account during synchronous classes and office hours. If you do not have a Zoom account, you can create one here: <https://zoom.us/signup>. Note: creating a Zoom account requires that you provide a first name, last name, and email address to Zoom. For privacy purposes, you may consent to using your existing email address and your real name. Alternatively, if you prefer, you may sign up using an alternative email address and an anonymized name that does not identify you (i.e. Jane Doe, [jane.doe@email.com](mailto:jane.doe@email.com)). If you have trouble creating an account, or accessing a Zoom session, please contact [CLCHelp@sauder.ubc.ca](mailto:CLCHelp@sauder.ubc.ca). You will be required to provide the email address associated with your Zoom account in a Canvas quiz for identification purposes.

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### COURSE SCHEDULE

(Subject to change with class consultation)

Class	Synchronous Or Asynchronous	Date	Topic	Readings or Activities	Assessments due
1	Synchronous	Tue, Nov. 3	Introduction to Derivatives	Watch/read LN01&LN02	Practice Problems/quizzes (non-graded)
2	Synchronous	Thu, Nov. 5	Insurance, Collars, and Other Strategies	Watch/read LN03	Practice Problems/quizzes (non-graded)
3	Synchronous	Tue, Nov.10	Financial Forwards and Futures	Watch/read LN05	Practice Problems/quizzes (non-graded)
4	Synchronous	Thu, Nov. 12	Binomial option pricing - I	Wach/read LN10	Practice Problems/quizzes (non-graded)
5	Synchronous	Tue, Nov. 17	Binomial option pricing - II	Wach/read LN10	Practice Problems/quizzes (non-graded)
6	Synchronous	Thu, Nov. 19	The Black-Scholes Model	Wach/read LN12	
		<b>Fri/Sat Nov 20/21</b>	<b>Midterm Quiz</b>		<b>Online Midterm Quiz</b>
7	Synchronous	Tue, Nov. 24	Case: “Sally Jameson”		Written Case report due

8	Synchronous	Thu, Nov. 26	Case: "Big Game" - Part I		Written Case report due
9	Synchronous	Tue, Dec. 1	Case: "Big Game" - Part II		Written Case report due
10	Synchronous	Thu, Dec. 3	Review		