

---

## COMPUTATIONAL FINANCE in Spring 2021 (BA4020)

|                       |                                                          |                         |                |
|-----------------------|----------------------------------------------------------|-------------------------|----------------|
| <b>Course Code</b>    | BA4020                                                   | <b>Professor(s)</b>     | James Ward     |
| <b>Prerequisites</b>  | None                                                     | <b>Office Number</b>    | G-3A04         |
| <b>Class Schedule</b> | M: 18:30-19:50 in<br>G-113<br>W: 18:30-19:50 in<br>G-113 | <b>Office Hours</b>     | Mondays P1 & 2 |
| <b>Credits</b>        | 4                                                        | <b>Email</b>            | jward@aup.edu  |
| <b>Semester</b>       | Spring 2021                                              | <b>Office Tel. Ext.</b> | 803            |

## Course Description

---

**Description:** an introduction to computational methods for finance and the valuation of financial firms and elements of capital structure: equity, bonds, and options and additional methods for portfolio optimization and hedging risk. We emphasize implementation and use selected models. Aimed at providing the necessary technical and analytical skills useful for graduate school assignments, or roles in financial firms or investment banks.

## Course Learning Outcomes

---

Build Pro-forma financial statement models, and value firms.  
Price options. Price greeks.  
Manage delta, gamma and theta of an options book.  
Optimize portfolios of securities.  
Price bonds  
Build convex portfolios of bonds.

## General Education

---

[PLEASE REMOVE THIS SECTION IF THE COURSE DOES NOT FULFILL ANY GLACC REQUIREMENT]

### GLACC

The Global Liberal Arts Core Curriculum (GLACC) degree requirements include the following

---

categories of courses:

- Integrative Inquiry (coded CCI)
- Experiential learning (coded CCX)
- Research, Interpretation, and Writing (coded CCE)
- Digital Literacy and Communication (coded CCD)
- Disciplinary Research Methods and Writing (coded CCR)
- Quantitative Reasoning (coded CCM)
- Experimental Reasoning Course with Lab (coded CCS)
- Expression Française (coded FR)
- AUP Capstone (coded CCC)

This course can be used to fulfill the [INDICATE THE REQUIREMENT(S) FULFILLED BY THE COURSE] requirement and as such has the following learning outcomes:

[INDICATE THE GENERAL EDUCATION LEARNING OUTCOMES]

## Course Outline

---

| week | starting<br>Tuesday<br>the | topic                           | Tuesday                    | Friday                                                  |
|------|----------------------------|---------------------------------|----------------------------|---------------------------------------------------------|
| 1    |                            | Intro to<br>Finance in<br>Excel | Chapter 0, & 1 Data Tables | Chapter 1, 2, & 3                                       |
| 2    |                            |                                 | Chapter 4 & 5              | Homework Due: C.V.<br>quiz 1 HW Chapter 6<br>Chap 1 2 3 |
| 3    |                            | Bonds &<br>Duration             | Chapter 20                 | Quiz 2 Chapter 21                                       |
| 4    |                            | Term<br>Structure,<br>etc.      | Chap 23                    | HW Chap 6<br>HW Chap 20, Test 1<br>21                   |
| 5    |                            | Benford                         | Benford Material           | HW Chap 23 Chap 15                                      |
|      |                            | aup break                       |                            |                                                         |
| 6    |                            | Options                         | Chap 16 Binomial           | HW Chap 15 Chap 17                                      |

|    |              |                                                                   |                      |                |
|----|--------------|-------------------------------------------------------------------|----------------------|----------------|
| 7  |              | Chap 17 (cont.)                                                   | HW 16 & 17           | Chap 18        |
| 8  | Portfolios   | Chap 8                                                            | HW 18                | Chap 9         |
| 9  |              | Chap 10: MMVP                                                     | HW 9                 | Chap 11        |
| 10 | Restrictions | Chap 12 : no shorts                                               | HW 10, 11            | Chap 13: Black |
| 11 |              | Chap 14: Event studies                                            | HW 13 14             | Alternative    |
| 12 | Unusual      | Valuation of Banks                                                | HW Project           | Hedge Funds    |
| 13 | Topics       | High Frequency                                                    | May Day - AUP closed |                |
| 14 | Review       | Exam Review                                                       | classes over         |                |
| 15 | exam week    | final examination: cumulative and comprehensive; on the computer. |                      |                |

**\*Content Modification:** In the Anglo-American academic tradition a professor has full control of the content and organization of a course, materials, classroom, and grading practices and may modify it at any time based on assessment and progress of the students. It is more likely I will have to do that than not.

**Professor Biography:** James Noel Ward began his academic career as a night janitor working for Building and Grounds at Boston University while earning a Bachelor of Arts in Philosophy and Religion (1985). He attended lectures at the Universities of Munich and Tübingen on a fellowship before returning to serve as a Financial Aid Officer at B.U. for one year. He served as a Youth Minister at Christ Church, Greenwich, Connecticut, while attending Berkeley Divinity School before testing a vocation as a Benedictine monk. Upon leaving religious life without profession he worked as an analyst and futures trader at the Chicago Board of Trade, before devoting himself to applied economic and statistical research and consulting in Washington, D.C. He was a partner at Alternative and Derivative Investments, then France's largest hedge fund, from 1999 to 2003, and

---

was Head of High Yield Investments for AXA Investment Management until 2009, when he joined AUP full time after teaching Computational Finance at AUP since 2001. He earned a Master of Science in Finance from The George Washington University (2000) and is completing a Ph.D. in Finance and Applied Mathematics.

**Professor Ward's research interests are in sub-optimal price formation in markets under differing efficiency regimes, corporate capital structure, price psychology, and asset pricing under asymmetric**

**Instructor Biography:** James Noel Ward, M.Sc.F., FRM, PRM, D.E.A. is an Instructor in Finance at AUP and a PhD candidate in Finance. He is Former Head of High Yield Investments for AXA Investment Managers-Paris. Previously he was Vice President and Head of Research for Alternative & Derivative Investments (ADI), a Paris-based international hedge fund. He holds a B.A. in Philosophy from Boston University; a Master of Science in Finance (with distinction) from The George Washington University; the Certified Financial Risk Manager (FRM) professional Charter of the Global Association of Risk Professionals (GARP); and the Chartered Professional Risk Manager (PRM) professional Charter of the Professional Risk Manager International Association (PRMIA). Prof. Ward has lectured at INSEAD, The George Washington University, Temple University, EDHEC-Nice, and L'École Nationale Supérieure d'Informatique pour l'Industrie et l'Entreprise and Deep Springs College. Prior to joining ADI he worked as an analyst for The Union Planters National Bank, REFCO International, Bear Stearns, Lehman Brothers, BNA, and as an economist at The Sparks Companies. He regularly consults with various portions of the government of the Kingdom of Cambodia (Khmer: ??????????????????????, Preah Réachéanachâk Kâmpuchéa), as well as the National Bank of Cambodia. In 2014 he was visiting Professor of Economics at Deep Springs College.

## Textbooks

---

This course doesn't have any textbook.

## Attendance Policy

---

You will know more about finance and practical solutions to financial problems than most MBAs. In previous finance courses you learned financial concepts and theories and techniques. This course teaches you to implement computational models. This is not an Excel course. This is a finance class where we use a tool (Excel, VBA) to make decisions about money. "Learning by model building" gains insight into decisions about money.

---

**Teaching Method:** There are three main vectors of learning in this course:

1. the **Textbook**;
2. the **Homework**;
3. the **Lectures**.

If you read the book, work the examples along with the author, do the homework, and attend class, you will master this material and acquire these skills.

**Academic Habits:** Besides attending classes, each student is expected to read the appropriate chapters before each session, participate in class, and hand in homework at deadline. Expect to work or do readings for three to four hours (3 – 4) for each hour of class (i.e. total class time = 26 hours, therefore total reading and homework time ~ 78 to 124 hours over the course of the semester....yes, I am serious).

**Attendance & Absence Policy:** Students studying at AUP are expected to attend ALL scheduled classes. A maximum of four (4) absences per semester may be requested for this course. Students are responsible for compliance.

**Attendance at all exams is mandatory.**

People who have these skills work with interesting and intelligent people at well-paid jobs. They have exciting careers. They get to travel the globe, and they have bright futures. This is your chance to be one of them.

Student Affairs will recommend that a professor excuse an absence only for involuntary absences due to illness or personal emergencies, upon presentation of documentary proof of illness or emergency. Due to the large number of nationalities and faiths represented at the University, religious and national holidays will not be excused by Student Affairs. Academic Affairs will excuse an absence for students' participation in study trips related to their courses. If a student arrives at course meetings more than 10 minutes late without documentation for one of the above scenarios, it will be considered an unexcused absence.

**NOTE:** I will not be pleased, encouraged, or favorably disposed towards students who exhibit tardiness, absences, leave early, or vegetate. Being rude to me in the above-described manners exponentially increases my scrutiny for errors in your work. **Do not risk it.** Prof. WARD very strictly enforces the Attendance Policy and the Policy on Academic Integrity of the American University of Paris.

**Policy on Academic Integrity:** Please read the University policy on Academic Integrity.

**I HAVE A MORE RESTRICTIVE POLICY ON CHEATING.**

No one who cheats ever passes my course. **I AM UNFORGIVING AND IMMOVABLE ON THIS**

---

**ISSUE.** If you cheat you earn an “F” for the course and I will petition the Academic Integrity Board to have you removed from the University. **I AM VERY SERIOUS.** This is your senior year and **YOU KNOW CHEATING IS NOT ALLOWED. Do.Not.Risk.It.**

**The Professor Emeritus James Clayson Prize for Computational Finance:** About Professor Emeritus James CLAYSON: Professor Emeritus James Clayson is one of my heroes and my beloved colleague who guided and formed my teaching style and improved my delivery of my subject. He taught business courses and applied statistics at AUP in the International Business Administration Department and Department of Computer Science, Mathematics, and Science for over twenty-seven years. He won the AUP Board of Trustees Excellence in Teaching Award three times. Jim holds a BS from the Massachusetts Institute of Technology and an MBA from the University of Chicago.

**About the James Clayson Prize for Computational Finance:** The James Clayson Prize for Computational Finance was established in 2011 and is given to the student who has demonstrated mastery of the topics covered in IBA 4020: Computational Finance, holds the highest GPA, and has submitted work superior to his or her peers. Recipients will be acknowledged by a gift consisting of a selected volume on finance inscribed to the award winner, a cash prize, and extensive career support and professional introductions. Winners may use the Award title on their resumes, and employment and graduate school applications.

The Professor Emeritus James Clayson Prize for Computational Finance

| <b>Year</b> | <b>Winner</b>                 | <b>Prize Cash Award</b> | <b>Prize Volume</b>              |
|-------------|-------------------------------|-------------------------|----------------------------------|
| 2011        | Nayda MASSOUD                 | Euro 100                | The Poker Face of Wall Street    |
| 2012        | Lorena GABI                   | Euro 150                | William Poundstone’s “Priceless” |
|             | Mark SZE                      | Euro 150                |                                  |
| 2013        | Penelope SHAW                 | Euro 200                | William Poundstone’s “Priceless” |
| 2014        | Katharine COUNTRYMAN          | Euro 200                | Selected volume.                 |
| 2015        | Paul Armand                   | Euro 200                | Options by Sinclair              |
| 2016        | Nicholas DEFRENOIS            | Euro 200                | Options by Sinclair              |
| 2017        | Fabrice Korinienko            | Euro 200                | Options by Sinclair              |
| 2018        | Wes Smith & Nebi Dzhabrailova | Euro 200 (2x)           | Option Trading by Sinclair       |
| 2019        | Miriam Gegenava               | Euro 200                | Volatility Trading by Sinclair   |
| 2020        | Charles Beach                 | U.S. D. 200             | Collected works, Sinclair        |

Please NOTE: The top prize for Computational Finance formerly was The Professor Kate Carpenter Memorial Prize in Computational Finance, the title of which was retired in 2014.

**ABOUT Professor KATE CARPENTER (Died: April 2007):** Professor Kate CARPENTER was my colleague and inspiration to teach from the perspective of a practicing professional. She taught Accounting at AUP in the International Business Administration Department for twenty years while also maintaining a private practice. She exemplified high values and duties in teaching: treat students as adults and fairly, but demand his or her best; never compromise with mediocrity or dishonesty; and inspire a love of the discipline of your field. She was the co-founder of AUP’s Applied Finance major with Professor Michel RAKOTOMAVO, and

---

demanding and ensured that IBA 420 Computational Finance be a required course for the distinction, and also found me to teach it.

**About the Kate Carpenter Memorial Prize for Computational Finance :** The Kate Carpenter Memorial Prize was established in 2007 and was given to the student who has demonstrated mastery of the topics covered in IBA 420: Computational Finance, held the highest GPA, and has submitted work that is superior to his or her peers.

| Year | Winner                   | Prize Cash Award | Prize Volume                          |
|------|--------------------------|------------------|---------------------------------------|
| 2007 | Christine GUNSENHEIMER   | Euro 200         | Paul Wilmott on Quantitative Finance  |
| 2008 | Laura Jane PETERSON      | Euro 200         | Paul Wilmott on Quantitative Finance  |
| 2009 | Boris PAVLOV             | Euro 150         | Paul Wilmott on Quantitative Finance  |
|      | Henrik ALMSKOU           | Euro 150         |                                       |
| 2010 | Ivan IVANOV              | Euro 150         | Paul Wilmott on Quantitative Finance  |
| 2011 | Radoslav RATCHEV         | Euro 200         | Options Futures and Other Derivatives |
| 2012 | Lorena GABI and Mark SZE | Euro 200         | Priceless by William Poundstone       |
| 2013 | Mohammad Bourji          | Euro 200         | Option Pricing by Euan Sinclair       |
| 2014 | Mahmoud EL SAID          | Euro 200         | Option Pricing by Euan Sinclair       |

## Grading Policy

---

**How you earn your grades:** There are weekly homework assignments (25%), a comprehensive assessment exam (5%), a mid-term exam (30%), and a final exam (40%).

I am an easy grader to those who respect this subject. 'A's are earned by students who are not perfect all the time. You do not spring full-grown from Zeus's forehead being a Spreadsheet Samurai and I do not expect you to, but each assignment/exam should be better than the last.

If you work you will have no worries about getting an 'A.' If you slack off you should not be in this class. You will not survive in a financial institution without these skills.

**Homework** must be your individual effort. All Homework **MUST** be submitted **by class time** in my e-mail, or on disk submitted to me in class (floppy or storage key). **No late homework will**

---

**be accepted (grade = 0).** This is a firm deadline. You bear all risk. I accept no excuses of: “my e-mail was down.” “my disk didn’t work” etc. **Repeat: you bear all risk.**

Homework is extremely easy but it does take time: all you have to do is reproduce the exercises, the answers to which are contained in the compressed download file that comes with your textbook. No, don’t just cut-and-paste the exercises (I can tell, and this constitutes cheating). Set up your own spreadsheet, values, etc. and plug away. Try to do it on your own and then look at the solutions ONLY when you get stuck.

**Assessment:** EM 4020 Computational Finance is the “Capstone course” for the Applied International Finance major. As such, the comprehensive assessment is part of this course.

## Other

---