

## FBE 441: Investments

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Instructor	<b>Professor Juhani Linnainmaa</b>
Office	HOH 713
E-mail	jlinnain@usc.edu
Class hours	Section 15360: Monday, Wednesday: 12:00–1:50 pm at HOH 1 Section 15362: Monday, Wednesday: 2:00–3:50 pm at HOH 1
Office hours	Wednesdays, 10:30–11:30 AM, or by appointment
Teaching assistant	TBD

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### Course description

*About the course:* This course is designed to provide a sound foundation for the fundamental concepts in investments. Students who master the course material will acquire the analytical tools and financial theory necessary for making investment decisions and understanding the paradigms by which financial securities are valued. The course is highly quantitative and relies heavily on analytical tools and economic theory developed throughout.

*Key Concepts:* Risk and return in financial markets; Term structure of interest rates; Portfolio choice; Capital Asset Pricing Model; Market efficiency and anomalies; Money management industry; Futures, options, and option pricing

*Who should take this course:* This course is designed for students who want to learn the quantitative side of finance. Students should be comfortable with probability, statistics, and regression analysis. Use of a spreadsheet package such as Excel will be vital for the homework assignments, saving time and aiding in understanding the material. Some use of calculus and matrix algebra will also be required.

*Course Description:* This course offers the financial theory and quantitative tools necessary for understanding how stock, bond, and option prices are determined, and how financial assets are used for investment decisions. Topics covered include modeling the relation between risk and return, optimal portfolio selection based on mean-variance analysis, asset pricing models, money management, practical asset allocation, and more. The focus is mainly on common stocks, but fixed income securities (bonds) and derivative securities (options and futures) are also analyzed.

### Course requirements and grading

The course requirements are two Midterm exams, a Final exam, and six graded group homework assignments. Grades will be assigned based on the following weights according to two schemes.

Component	Scheme 1	Scheme 2
Participation	5%	5%
Homework	20%	20%
Midterm I	20%	20%
Midterm II	20%	20%
Final exam	35%	55%

In scheme 1, missing midterm scores are replaced with zeros. In scheme 2, if you take just one midterm, the 20% weight is placed on its score. If you take both midterms, the 20% weight is placed on the average score. Your overall course score will automatically be based on the more favorable scheme:

$$\text{your score} = \max\{\text{scheme 1, scheme 2}\}.$$

## Group homework assignments

Six homework assignments will be given, which primarily consist of numerical problems and several applications to real data. The latter are designed to apply techniques learned in the course to real data in a similar manner to what might be applied in practice. Keep in mind that exam questions will be similar to the assigned homework problems.

You can use whatever statistics program you wish (Excel, Matlab, R, Stata,...) to minimize the time spent on calculations. We will use Excel in class due to its benefits in terms of visualizing data. You can complete the assignments on your own or in groups of up to four people. Please turn in just one write-up per group.

**Important.** Your write-up must provide enough details so that it is possible to understand how you arrived at the solution. If you just state the solution, you may lose points. This note also applies to midterm and final exams.

## Final exam schedule

Exam dates are in line with the university schedule. You need to reconfirm these dates closer to examinations (<http://classes.usc.edu/term-20183/finals/>). Rooms are the same as the standard classrooms.

Section	Date	Time
15360	Friday, December 7, 2018	11:00–1:00 pm
15362	Friday, December 7, 2018	2:00–4:00 pm

You must take your exam at the scheduled time.

Note: If you are permitted additional time for exams, please let me know at least two weeks before the first exam so that we can make appropriate arrangements.

## Readings for the course

The textbook for the class is

**Bodie, Zvi, Alex Kane, and Alan Marcus, Investments, McGraw-Hill Irwin, 10th or 11th Edition (BKM)**

I use BKM to supplement the lecture slides. It is probably a good idea to start from the lecture and the slides, and then use the book to fill in any gaps. The book often approaches the same topics from a different angle; if my slides are unclear on something, or you want to find additional examples, you will benefit from the book. Please note that both the midterm and final exams will contain questions from the chapters that are listed in the syllabus.<sup>1</sup>

Lecture Notes, articles and problem sets will not be handed out in class. They will be available on Blackboard as PDF documents (<http://blackboard.usc.edu>). You are responsible for timely downloads of the materials.

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<sup>1</sup>If you are interested in a career in finance or prefer an approach that is more quantitative/analytical than BKM, you might enjoy **Grinblatt, Mark and Sheridan Titman, Financial Markets and Corporate Strategy, McGraw-Hill Irwin, 2nd Edition, 2001**. This book is completely optional and will not be used in class.

## Outline of topics

*(Bodie, Kane, and Marcus, 10th edition, chapter numbers are indicated in parentheses.)*

1. Risk and return (BKM 1, 2, and 5)
  - Real assets and financial assets
  - Historical rates of returns
  - “Asset pricing formula”
2. Fixed income (BKM 14–16)
  - Bond markets and interest rates
  - Bond portfolio management
3. Asset allocation (BKM 6–7)
  - Introduction to asset allocation
  - Portfolio mathematics and diversification
  - Portfolio theory and mean-variance analysis
4. Capital asset pricing model (BKM 9)
  - Derivation
  - Empirical performance
5. Practical asset allocation
6. Multifactor models and arbitrage pricing theory (BKM 10)
7. Behavioral finance (BKM 11–13)
  - Market efficiency and anomalies
  - Individual investors and behavioral biases
8. Money management industry and performance evaluation (BKM 4, 24)
9. Derivatives (BKM 20–23)
  - Forwards and futures
  - Options
  - Binomial option pricing

## Schedule (preliminary)

Week	Topics	Monday	Wednesday	Notes
1	Risk and return; present value formula	8/20	8/22	
2	Fixed income	8/27	8/29	
3	Introduction to asset allocation	<b>Labor Day</b>	9/5	PS #1 due
4	Portfolio mathematics	9/10	9/12	
5	Portfolio theory and mean-variance analysis	9/17	9/19	PS #2 due
6	Review; <b>MIDTERM I</b>	9/24	<b>9/26</b>	
7	Capital asset pricing model	10/1	10/3	
8	Asset allocation in practice	10/8	10/10	
9	Multifactor models and arbitrage pricing theory	10/15	10/17	PS #3 due
10	Behavioral finance and market efficiency	10/22	10/24	
11	Anomalies and performance evaluation	10/29	10/31	PS #4 due
12	Review; <b>MIDTERM II</b>	11/5	<b>11/7</b>	
13	Forwards and futures	11/12	11/14	
14	Options	11/19	<b>Thanksgiving</b>	PS #5 due
15	Options; review for final exam	11/26	11/28	PS #6 due

# USC Statements on Academic Conduct and Support Systems

## Academic Conduct

Plagiarism—presenting someone else’s ideas as your own, either verbatim or recast in your own words—is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” (<https://policy.usc.edu/scampus-part-b/>). Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at: <http://www.usc.edu/student-affairs/SJACS/>. Failure to adhere to the academic conduct standards set forth by these guidelines and our programs will not be tolerated by the USC Marshall community and can lead to dismissal.

## Support Systems

**Student Counseling Services** (SCS; (213) 740-7711 are on call 24/7). Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention. <https://engemannshc.usc.edu/counseling/>

**National Suicide Prevention Lifeline** (1-800-273-8255). Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week (<http://www.suicidepreventionlifeline.org>).

**Relationship & Sexual Violence Prevention Services** (RSVP; (213) 740-4900 are on call 24/7). Free and confidential therapy services, workshops, and training for situations related to gender-based harm (<https://engemannshc.usc.edu/rsvp/>).

**Sexual Assault Resource Center.** For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: <http://sarc.usc.edu/>.

**Office of Equity and Diversity** (OED)/Title IX compliance—(213) 740-5086. Works with faculty, staff, visitors, applicants, and students around issues of protected class (<https://equity.usc.edu/>).

**Bias Assessment Response and Support.** Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response (<https://studentaffairs.usc.edu/bias-assessment-response-support/>).

**Student Support & Advocacy**—(213) 821-4710. Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic (<https://studentaffairs.usc.edu/ssa/>).

**Diversity at USC** at <https://diversity.usc.edu/>. Tabs for Events, Programs and Training, Task Force (including representatives for each school), Chronology, Participate, Resources for Students

## **Students with Disabilities**

Students must register with Disability Services and Programs (DSP) for each academic term that accommodations are desired. Guidelines for the DSP accommodation process can be found at [www.usc.edu/disability](http://www.usc.edu/disability) The following paragraph is recommended by DSP.

USC is committed to making reasonable accommodations to assist individuals with disabilities in reaching their academic potential. If you have a disability which may impact your performance, attendance, or grades in this course and require accommodations, you must first register with the Office of Disability Services and Programs ([www.usc.edu/disability](http://www.usc.edu/disability)). DSP provides certification for students with disabilities and helps arrange the relevant accommodations. Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (or to your TA) as early in the semester as possible. DSP is located in GFS (Grace Ford Salvatori Hall) 120 and is open 8:30 a.m.?5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776. Email: [ability@usc.edu](mailto:ability@usc.edu).

## **Emergency Preparedness/Course Continuity**

In case of a declared emergency if travel to campus is not feasible, the USC Emergency Information web site (<http://emergency.usc.edu/>) will provide safety and other information, including electronic means by which instructors will conduct class using a combination of Blackboard, teleconferencing, and other technologies.

Please make sure you can access this course in Blackboard and retrieve the course syllabus and other course materials electronically. You should check Blackboard regularly for announcements and new materials. In the event of an emergency, the ability to access Blackboard will be crucial. USC's Blackboard learning management system and support information is available at [blackboard.usc.edu](http://blackboard.usc.edu).

## **Incomplete grades**

A mark of IN (incomplete) may be assigned when work is not completed because of a documented illness or other "emergency" that occurs after the 12th week of the semester (or the twelfth week equivalent for any course that is scheduled for less than 15 weeks).

An "emergency" is defined as a serious documented illness, or an unforeseen situation that is beyond the student's control, that prevents a student from completing the semester. Prior to the 12th week, the student still has the option of dropping the class. Arrangements for completing an IN must be initiated by the student and agreed to by the instructor prior to the final examination. If an Incomplete is assigned as the student's grade, the instructor is required to fill out an "Assignment of an Incomplete (IN) and Requirements for Completion" form which specifies to the student and to the department the work remaining to be done, the procedures for its completion, the grade in

the course to date, and the weight to be assigned to work remaining to be done when the final grade is computed. Both the instructor and student must sign the form with a copy of the form filed in the department. Class work to complete the course must be completed within one calendar year from the date the IN was assigned. The IN mark will be converted to an F grade should the course not be completed within the time allowed.

### **Grade disputes**

All grades assigned by faculty members are final. Students have the right to seek explanation, guidance, counsel and reasons for the assignment of a grade. Faculty may initiate a change in grade if there is an error in the calculation of a grade. Students may appeal a grade according to university policy as set forth in SCampus. A faculty member may not change a disputed grade outside the formal appeals process. In response to a disputed academic evaluation by an instructor, a student is entitled to two levels of appeal after review by the instructor: first to the chairperson of the department and then to the appropriate dean of the school. The full university policy can be found in SCampus under University Governance / Academic Policies at <http://scampus.usc.edu/academic-policies/>.