



University of Maryland College Park School of Public Health

FMSC644, **WB12**, PERSONAL FINANCIAL PLANNING

Semester: **Winter 2024**
Classroom & Time: **Asynchronous**

Office Hours: Online - By Appointment

Instructor: **DR. M. MOKHTARI**

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Course webpages: ELMS & MindTap

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Teaching Assistant: **TBD**

Office Hours: **By Appointment**

Course Description:

This course provides a solid framework, meaningful context, institutional understanding, and critical skills for solving key personal financial planning problems for the graduating seniors and graduates who will enter the job market or will enter a graduate program. Practical illustrations and substantive examples complement formal and intuitive approach for use by current students and tomorrow's graduates when succeeding in a dynamic job market with minimal support for managing finances are becoming the norm in our society. Students learn how to manage their finances, improve spending habits, ask the right questions, budget effectively, pay taxes, choose the right bank for their needs, determine whether to buy or lease a car, select the best credit card, recognize what's most important in buying a home, investing, plan for retirement, and make sound decisions. The latest cultural and institutional changes, tax information, and use of financial data strengthen this course to dynamically guide students towards their financial well-being and career goals in a changing world.

Course Learning Objectives:

1. Understanding advanced concepts and applicable tools and techniques used in personal financial planning to reach goals during and after graduating from the University.
2. Develop ability to set goals and engage in financial planning, career planning, developing and analyzing financial statements and budgeting to reach financial goals.
3. Understand and develop ability in personal liquidity management through efficient handling of personal income taxes, money, credits and making large purchases including vehicles and housing.
4. Understand risk and developing a risk management plan for protecting income and assets, such as, property, health and potential beneficiaries.
5. Understand concepts and tools for valuing investment, taking risk and managing assets including, stocks, bonds, mutual and exchange traded funds, real estate, and planning for retirement and estate.

Program Competencies Addressed in this Course:

The following competencies are addressed in this course:

1. Improve well-being through setting goals and engage financial planning process to succeed.
2. Understand the role and use of financial institutions to comply with the legal requirements and best practice in financial planning.
3. Manage liquidity, credit, debt and assets to optimize the path during you financial lifecycle.
4. Engage in retirement and estate planning.

Required Texts and Other Readings & Media:

1. **Personal Financial Planning, MindTap**, 15th Edition, by Randy Billingsley, Lawrence Gitman, Michael Joehnk, 2021. Publisher: CENGAGE; ISBN: 9780357438480

Required Technology:

- **Financial calculator:** computations (e.g., time value of money) may require a calculator.
- **Spreadsheet Analysis:** *Excel* helps with organizing and computing your financial information.

Other Materials:

- The Black Swan: The Impact of the Highly Improbable:** With a new section: "On Robustness and Fragility", by Nassim Nicholas Taleb. Publisher: Random House Publishing Group; 2nd edition (May 11, 2010). ISBN: 978-0812973815
- Principles: Life and Work Principles:** Life and Work (2017), by Ray Dalio, Publisher: Simon & Schuster (ISBN-13: 978-1501124020). Available as a free App: "Principles in Action"
- Principles for Success (30 Minutes):** <https://www.youtube.com/watch?v=B9XGUpQZY38>
- Supplemental Readings & Videos:** (A) elms.umd.edu / CANVAS includes lecture notes and additional material. (B) See folder for videos on the ELMS
- Yahoo – Finance:** <https://finance.yahoo.com/> This is a great source of information.
- Wall Street Journal:** <https://r.wsj.com/PROFqgrc> -- 15 weeks membership for \$1.
- Goal Setting and Principles for Success (Videos):**
Goal Setting (6 minutes): A Complete Guide to Goal Setting
<https://www.youtube.com/watch?v=XpKvs-apvOs>
Goal Setting (18 minutes): Goal Setting in Practice
<https://www.youtube.com/watch?v=WZyRbnpGyzQ>

Course Communication:

Professor's email address: mokhtari@umd.edu
Course materials & general communications: elms.umd.edu

Course Requirements and Expectations:

- MindTap Assignments/Participations (80 points)**
All assignment/participations take place on Canvas/ELMS. You will earn the full number of points for an assignment, **if 100% are correctly answered**; otherwise, a lower number of points or zero points are earned.
- Tests (20 points)** The textbook, lectures / slides, play **important** roles as the base/source for the questions on exams. The final letter grade will be determined by the standard 10-point scale out of 100.
- Absence:** For absence Policy, please see (a copy is in the File folder on the ELMS):
<https://president.umd.edu/sites/president.umd.edu/files/files/documents/policies/V-100G.pdf>
- Make-up (test, assignments, or any graded participations) & Late Assignments:** Students must resolve any related questions (make-up date, if eligible) **as soon as possible** and take the make-up (if eligible) **within three calendar days** after returning to the school from a documented excuse day or days. **Late assignments/reports lose 2 points per day.**
- Final Exam Day: The final exam is mandatory.** The University determines the **date**.
- Calculator:** You may use any calculator at any time.

Use of Course Assistance Websites, Online Group Forums, and A:: Course assistance websites, such as CourseHero and others (or AI), are not permitted sources for SPH courses, unless the professor explicitly gives permission for you to use one of these sites. Material pulled from these sites can be deemed unauthorized material and a violation of academic integrity. These sites offer information that might not be accurate and more generally shortcuts the learning process. In addition, it is understandable that students may use one of a variety of online or virtual forums for course-wide discussion (e.g., GroupME or WeChat). Collaboration in this way regarding concepts discussed in this course is permissible. However, collaboration on graded assignments is

strictly prohibited. Examples include: asking classmates for answers on quizzes or exams, asking for access codes to clicker polls, etc. Additional information on academic integrity is found in University Course Related Policies. <http://www.ugst.umd.edu/courserelatedpolicies.html>

Major Graded Assignments:

Grading Procedures:

- | | | |
|----|-------------------------------------------------|-----|
| 1. | Adaptive Assignments (on Canvas)* -Online | 80% |
| 2. | Test : Ch. 1-15 & Lectures (Exam Week)* -Online | 20% |

The final letter grade will be determined by the standard 10 point scale out of 100.

Grading Scale

97-100% = A+	87 – 89.9% = B+	77 – 79.9% = C+	67 – 69.9% = D+
93 – 96.9% = A	83 – 86.9% = B	73 – 76.9% = C	60 – 66.9% = D
90 – 92.9% = A-	80 – 82.9% = B-	70 – 72.9% = C-	0 – 59.9% = F

Course Outline / Course Calendar:

Lecture or Week	Topics	Learning Objective	#
	1. FOUNDATIONS OF FINANCIAL PLANNING		
Lecture/Week 1	1. Understanding the Financial Planning Process	LO	1
	1-2. The Personal Financial Planning Process	LO	1
	1-3. From Goals to Plans: A Lifetime of Planning	LO	1
	1-4. The Planning Environment	LO	1
Lecture/Week 2	2. Using Financial Statements and Budgets	LO	2
	2-1. Mapping Out Your Financial Future	LO	2
	2-2. The Balance Sheet: Your Wealth	LO	2
	2-3. The Income and Expense Statement	LO	2
	2-4. Using Your Personal Financial Statements	LO	2
	2-5. Cash in and Cash Out: Preparing Budgets	LO	2
	2-6. The Time Value of Money: Financial Goals	LO	2
	2-7. Inflation and Interest Rates	LO	2
Lecture/Week 3	3. Preparing Your Taxes	LO	2,3
	3-1. Understanding Federal Income Tax Principles	LO	2,3
	3-2. It's Taxable Income That Matters	LO	2,3
	3-3. Calculating and Filing Your Taxes	LO	2,3
	3-4. Other Filing Considerations	LO	2,3
	3-5. Effective Tax Planning	LO	2,3
	2. MANAGING BASIC ASSETS		
Lecture/Week 4	4. Managing Your Cash and Savings	LO	1,2,3
	4-1. Cash Management in Personal Financial Planning	LO	1,2,3
	4-2. Today's Financial Services Marketplace	LO	1,2,3
	4-3. A Full Menu of Cash Management Products	LO	1,2,3
	4-4. Maintaining a Checking Account	LO	1,2,3

	4-5. Establishing a Savings Program	LO	1,2,3
Lecture/Week 5	5. Making Automobile and Housing Decisions	LO	1,2,3
	5-1. Buying an Automobile	LO	1,2,3
	5-2. Leasing a Car	LO	1,2,3
	5-3. Meeting Housing Needs: Buy or Rent?	LO	1,2,3
	5-4. How Much Housing Can You Afford?	LO	1,2,3
	5-5. The Home-Buying Process	LO	1,2,3
	5-6. Financing the Transaction	LO	1,2,3
	3. MANAGING CREDIT		
Lecture/Week 6	6. Using Credit	LO	1,2,3
	6-1. The Basic Concepts of Credit	LO	1,2,3
	6-2. Credit Cards and Open Account Credit	LO	1,2,3
	6-3. Obtaining and Managing Open Forms of Credit	LO	1,2,3
	6-4. Using Credit Wisely	LO	1,2,3
Lecture/Week 7	7. Using Consumer Loans	LO	1,2,3
	7-1. Basic Features of Consumer Loans	LO	1,2,3
	7-2. Managing Your Credit	LO	1,2,3
	7-3. Single-Payment Loans	LO	1,2,3
	7-4. Installment Loans	LO	1,2,3
	4. MANAGING INSURANCE NEEDS		
Lecture/Week 8	8. Insuring Your Life	LO	1,2,4
	8-1. Basic Insurance Concepts	LO	1,2,4
	8-2. Why Buy Life Insurance?	LO	1,2,4
	8-3. How Much Life Insurance Is Right for You?	LO	1,2,4
	8-4. What Kind of Policy Is Right for You?	LO	1,2,4
	8-5. Buying Life Insurance	LO	1,2,4
	8-6. Key Features of Life Insurance Policies	LO	1,2,4
Lecture/Week 9	9. Insuring Your Health	LO	1,2,4
	9-1. The Importance of Health Insurance Coverage	LO	1,2,4
	9-2. Health Insurance Plans	LO	1,2,4
	9-3. Health Insurance Decisions	LO	1,2,4
	9-4. Medical Expense Coverage and Policy Provisions	LO	1,2,4
	9-5. Long-Term-Care Insurance	LO	1,2,4
	9-6. Disability Income Insurance	LO	1,2,4
Lecture/Week 10	10. Protecting Your Property	LO	1,2,4
	10-1. Basic Principles of Property Insurance	LO	1,2,4
	10-2. Homeowner's Insurance	LO	1,2,4
	10-3. Automobile Insurance	LO	1,2,4
	10-4. Other Property and Liability Insurance	LO	1,2,4
	10-5. Buying Insurance and Settling Claims	LO	1,2,4
	5. MANAGING INVESTMENTS		
Lecture/Week 11	11. Investment Planning	LO	1,4,5
	11-1. The Objectives and Rewards of Investing	LO	1,4,5
	11-2. Securities Markets	LO	1,4,5
	11-3. Making Transactions in the Securities Markets	LO	1,4,5

	11-4. Becoming an Informed Investor	LO	1,4,5
	11-5. Online Investing	LO	1,4,5
	11-6. Managing Your Investment Holdings	LO	1,4,5
Lecture/Week 12	12. Investing in Stocks and Bonds	LO	1,4,5
	12-1. The Risks and Rewards of Investing	LO	1,4,5
	12-2. Investing in Common Stock	LO	1,4,5
	12-3. Investing in Bonds	LO	1,4,5
Lecture/Week 13	13. Investing in Mutual Funds, ETFs, and Real Estate	LO	1,4,5
	13-1. Mutual Funds and Exchange-Traded Funds	LO	1,4,5
	13-2. Types of Funds and Fund Services	LO	1,4,5
	13-3. Making Mutual Fund and ETF Investments	LO	1,4,5
	13-4. Investing in Real Estate	LO	1,4,5
	6. RETIREMENT AND ESTATE PLANNING		
Lecture/Week 14	14. Planning for Retirement	LO	1,4,5
	14-1. An Overview of Retirement Planning	LO	1,4,5
	14-2. Social Security	LO	1,4,5
	14-3. Pension Plans and Retirement Programs	LO	1,4,5
	14-4. Annuities	LO	1,4,5
Lecture/Week 15	15. Preserving Your Estate	LO	1,4,5
	15-1. Principles of Estate Planning	LO	1,4,5
	15-2. Thy Will Be Done ...	LO	1,4,5
	15-3. Trusts	LO	1,4,5
	15-4. Federal Unified Transfer Taxes	LO	1,4,5
	15-5. Calculating Estate Taxes	LO	1,4,5
	15-6. Estate Planning Techniques	LO	1,4,5

TEST (Final Exam)

University Course Related Policies:

All University of Maryland-approved course policies are provided at the following website:

<http://www.ugst.umd.edu/courserelatedpolicies.html>

Policy descriptions, resources, and links to official policy documents are provided for:

Academic Integrity: What is cheating? What is plagiarism? What is the Honor Pledge?

Code of Student Conduct: What behavior is prohibited?

Sexual Misconduct: What to do in case of sexual harassment or sexual assault.

Non-Discrimination: Procedures to prohibit discrimination, complaints about discrimination, harassment, and retaliation.

Accessibility: Information about disability support services (DSS) and accommodations.

Attendance, Absences, or Missed Assignments: The student must notify the instructor in a timely manner (typically first week of class). Read this prior to Schedule Adjustment date.

Student Rights Regarding Undergraduate Courses: What should I find in the course syllabus? Am I allowed to see my exams after they are graded?

Official UMD Communication: Use of email, communication with faculty, communication about cancelled class meetings, and weather-related or other urgent notifications.

Mid-Term Grades: Provided for 100 and 200 level courses, and all student athletes.

Complaints About Course Final Grades: Questions about course grades should first be addressed to the course instructor.

Copyright and Intellectual Property: Who owns the work that I produce in class?

Final Exams: Final exams are scheduled by the University.

Course Evaluations: The School of Public Health is committed to the use of student course evaluations for improving the student experience, course and curriculum delivery, and faculty instruction.

Campus Resources: ELMS, counseling, learning workshops, tutoring, writing help, questions about graduation, adding or dropping classes, withdrawing from the semester, etc.

Email – The Official University Correspondence:

Verify your email address by going to www.my.umd.edu.

All enrolled students are provided access to the University's email system and an email account. *All official University email communication will be sent to this email address* (or an alternate address if provided by the student). Email has been adopted as the primary means for sending official communications to students, so email must be checked on a regular basis. Academic advisors, faculty, and campus administrative offices use email to communicate important and time-sensitive notices.

Students are responsible for keeping their email address up to date or for redirecting or forwarding email to another address. Failure to check email, errors in forwarding email, and returned email (from "full mailbox" or "unknown user" errors for example), will not excuse a student from missing University announcement, messages, deadlines, etc. Email addresses can be quickly and easily updated at www.my.umd.edu or in-person at the Student Service Counter on the first floor of the Mitchell Building.

For technical support for University email: www.helpdesk.umd.edu or call 301-405-1400.

Late work, Missed Participation Points, Missed Exams / Assignments and Other Notes:

- **Make-up policy (exams, graded assignments/participations,):** Students with written, excused absences (those that are sanctioned by the University policy) are entitled to a **makeup exam**. However, relevant documentation is required. Students must resolve any questions (including make-up, if eligible) **as soon as possible** after returning to school from a documented excuse, or earning grade for an assignment or exam. Make-up tests **must be taken within three calendar days after the properly documented excused day**. Students that miss arranging for and taking the make-up test or assignments will lose the opportunity for making-up grades/points. Please note that, in case of a make-up test, the exact date, time, and place must be agreed upon in advance by the professor, student, and teaching assistant for the course.

Please note: "For medically necessitated absences: Students may, one time per course per semester, provide a *self-signed excuse* as documentation of an absence from a single class (e.g., lecture, recitation, or laboratory session) *that does not coincide with a major assessment or assignment due date.*" [added emphasis in red fonts].

- **Missed participation:** In case of **missing participation** points, students with the University sanctioned excuse must **immediately notify the professor via an email after the excused date** (i.e., missed participation date). Otherwise, student will lose the opportunity for making-up grades/points for participation (**see the above make-up policy**).

- **There is no make-up for the late arrival or early departure from the classroom that leads to the loss of in-class-participation points.**

- **Please See:** Attendance and Assessment Policy: <http://www.testudo.umd.edu/soc/atedasse.html>
- **Late assignments** (book report or any homework) leads to **a loss of 2 points per day**, not to exceed the total available points for the any report/assignment or homework.
- **Late Arrival to an exam (test):** Arriving late to an exam may lead to precluding you from taking the exam. Please note that, as soon as a student has left the testing area (classroom), then no late arrival will be allowed to take the same test (or a make-up test, if no University sanctioned excuse is in effect).
- **Inclement weather:** If on any scheduled test dates, the University is closed due to inclement weather (or any other reason determined by the University), the relevant test will be administered in the next scheduled class period. (So, if the University closes on Thursday, then the exam will be administered on Tuesday).
- Please note that, there will be **no extra credit assignments available for individual students.**
- It is essential that you bring a **pencil** to the exam.
- You will not be allowed to share a **calculator** with another student during the exam period, except by the instructor's permission.
- **No laptop** (or smartphone, iPad or similar handheld devices) use will be allowed during the class period, except by the instructor's permission. **No laptop (or smartphone, iPad or similar handheld devices, even in airplane mode) use will be allowed during the exams.**
- **No phones** (and other communication devices) can be used as your calculator during the exams.
- Please **turn off the sound (ringer)** on your cell phones while the class is in session
- If you have a **documented disability** and wish to discuss academic accommodation with me, please contact me as soon as possible.
- Students are responsible for giving the Professor **advance notice** of intended **religious observances.**
- **Participation (questions, discussions, presentation, assignments, etc.) is monitored, rewarded, and highly encouraged.**

Religious Observances:

The University System of Maryland policy provides that students should not be penalized because of observances of their religious beliefs; students shall be given an opportunity, whenever feasible, to make up within a reasonable time any academic assignment that is missed due to individual participation in religious observances. **It is the student's responsibility to inform the instructor in advance of any intended absences for religious observance.**

Special Accommodations / Disability Support Services:

If you have a documented disability and wish to discuss academic accommodations for test taking or other needs, you will need documentation from Disability Support Service, DSS, (301-314-7682). If you are ill or encountering personal difficulties, please let the instructor know as soon as possible. You can also contact Learning Assistance Services (301-314-7693) and/or the Counseling Center (301-314-7651) for assistance.

Academic Integrity:

The University's code of academic integrity is designed to ensure that the principle of academic honesty is upheld. Any of the following acts, when committed by a student, constitutes academic dishonesty:

- **CHEATING:** intentionally using or attempting to use unauthorized materials, information, or study aids in an academic exercise.

- **FABRICATION:** intentional and unauthorized falsification or invention of any information or citation in an academic exercise.
 - **FACILITATING ACADEMIC DISHONESTY:** intentionally or knowingly helping or attempting to help another to violate any provision of this code.
 - **PLAGIARISM:** intentionally or knowingly representing the words or ideas of another as one's own in any academic exercise.
- **NOTE:** [*“Facilitating Academic Dishonesty: Intentionally or knowingly helping or attempting to help another to commit an act of academic dishonesty.”*] See: <http://www.testudo.umd.edu/soc/dishonesty.html>
 - [*“Academic dishonesty is a serious offense which may result in suspension or expulsion from the University. The normal sanction for academic dishonesty is a grade of "XF", denoting "failure due to academic dishonesty." That grade will normally be recorded on the transcripts of students found responsible for acts of academic dishonesty in addition to any other action taken (e.g., suspension or expulsion). A forty member Student Honor Council has the responsibility to investigate allegations of academic dishonesty and to convene Honor Boards to adjudicate charges. In specified circumstances, the Student Honor Council will accept petitions to remove the grade of "XF" from a transcript and replace it with the grade of "F".* “]
 - See: <http://www.testudo.umd.edu/soc/dishonesty.html>

For more information see: <http://www.shc.umd.edu/code.html>.

The Honor Pledge is a statement undergraduate and graduate students should be asked to write by hand and sign on examinations, papers, or other academic assignments. The Pledge reads:

I pledge on my honor that I have not given or received any unauthorized assistance on this assignment/examination.

The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit <http://www.shc.umd.edu>.

University Closings / Inclement Weather:

In the event that the University is closed for an emergency or extended period of time, the instructor will communicate to students regarding schedule adjustments, including rescheduling of examinations and assignments due to inclement weather and campus emergencies (please see IMPORTANT NOTES below). Official closures and delays are announced on the campus website (<http://www.umd.edu>) and snow phone line (301-405-SNOW), as well as local radio and TV stations.

Dates for Course Evaluations

For standard term courses, the course evaluation system will be announced by the University. It is very important for students to participate in the course evaluations.

BASIC NEEDS SECURITY

If you have difficulty affording groceries or accessing sufficient food to eat every day, or lack a safe and stable place to live and believe this may affect your performance in this course, please visit <http://go.umd.edu/basic-needs> for information about resources the campus offers you and let me know if I can help in any way.

Available Support Services:

Disability Support Service (Susquehanna Hall)

<http://www.counseling.umd.edu/DSS/>

Online Economics Textbooks:

<http://www.oswego.edu/~economic/newbooks.htm>

A website with many multiple-choice (MC) tests:

http://www.unc.edu/depts/econ/byrns_web/EC101/TB_Principles/Contemp_Chaps.htm

How do you find facts and ideas that address economic issues?

<http://www.vanderbilt.edu/AEA/students/FindingFacts.htm>

Popular books in Economics:

<http://www.vanderbilt.edu/AEA/students/Books.htm>

Summer Study, Research, and Presentation Opportunities:

<http://www.vanderbilt.edu/AEA/students/Opportunities.htm>

APPENDIX : Examples of Time Value Of Money (TVM) Formulas

NOTE: *n*: number of years; *m*: number of compounding periods pre year; *N*: is number of payments during the life of the loan or investment; *R*: simple interest rate; *i*: interest rate; *i/m*: periodic interest rate; *I*: interest (amount); *PV*: present value; *FV*: future value; *PMT*: payment (monthly, quarterly, etc.); *IF*: interest factor.

Simple Interest method: Computing interest or finance charges *I*, when borrowing \$*D* for *n* years at simple interest rate *R*:

$$I = (D)(R)(n)$$

In the following formulas, please note that:

$$(1 + i)^{-n} = \frac{1}{(1 + i)^n}$$

Future Value of a Lump Sum. (FVIF_{i,n}):

$$FV = PV (1 + i)^n$$

$$(1 + i)^n = \text{Interest Factor} = \text{IF}$$

Present Value of a Lump Sum. (PVIF_{i,n}):

$$PV = FV (1 + i)^{-n}$$

$$(1 + i)^{-n} = \text{IF}$$

Present Value of an Ordinary Annuity. (PVIFA_{i,n}):

$$PVA = PMT \left[\frac{1 - (1 + i)^{-n}}{i} \right]$$

$$\left[\frac{1 - (1 + i)^{-n}}{i} \right] = \text{IF}$$

Future Value of an Ordinary Annuity (FVIFA_{i,n}):

$$FVA = PMT \left[\frac{(1 + i)^n - 1}{i} \right]$$

$$\left[\frac{(1 + i)^n - 1}{i} \right] = \text{IF}$$

Mortgage payment: Borrowing *D* and paying *PMT* dollars per month:

$$PMT = D \frac{i(1 + i)^N}{(1 + i)^N - 1}$$

The Sum-of-the years' digits, Sd: Sd = N(N+1)/2,

Computing Annual Percentage Rate APR: the *n-ratio* method: Loan proceeds D . Finance charges $I = (D)(R)(n)$:

$$APR = \frac{n(95N + 9)I}{12N(N + 1)(4D + I)}$$

Retirement Saving Goal:

$$\frac{PMT}{(i - \pi)} \left[1 - \left(\frac{1 + \pi}{1 + i} \right)^n \right]$$

- PMT = Income Shortfall; n = Years in retirement; i = average return; π = average inflation

Detailed TVM Formulas	Compounding		
	FV: Future Value; PV: Present Value; A: Annuity; PMT: Payment; P: Perpetuity; Ln: Natural Log (\log_e); i : interest rate; APR: Annual Percentage Rate		
	annual (n : number of years) $X^{-n} = 1/X^n$	m times per year $X^{-nm} = 1/X^{nm}$	continuous ($e = 2.718$)
FV of a Lump Sum	$FV = PV(1+i)^n$	$FV = PV \left(1 + \frac{i}{m} \right)^{nm}$	$FV = PV(e)^{in}$
PV of a Lump Sum	$PV = FV(1+i)^{-n}$	$PV = FV \left(1 + \frac{i}{m} \right)^{-nm}$	$PV = FV(e)^{-in}$
FV of an Annuity	$FVA = PMT \left[\frac{(1+i)^n - 1}{i} \right]$	$FVA = PMT \left[\frac{(1 + (i/m))^{nm} - 1}{i/m} \right]$	
PV of an Annuity	$PVA = PMT \left[\frac{1 - (1+i)^{-n}}{i} \right]$	$PVA = PMT \left[\frac{1 - (1 + (i/m))^{-nm}}{i/m} \right]$	
PV of an infinite annuity (Perpetuity)	$PVP = \frac{PMT}{i}$	$PVP = \frac{PMT}{[(1+i)^{1/m} - 1]}$	
Effective Annual Rate	$EAR = APR$	$EAR = \left(1 + \frac{i}{m} \right)^m - 1$	$EAR = e^i - 1$
Years for a PV to become FV	$n = \frac{\ln(FV/PV)}{\ln(1+i)}$	$n = \frac{\ln(FV/PV)}{m \left[\ln \left(1 + \frac{i}{m} \right) \right]}$	$n = \frac{1}{i} [\ln(FV/PV)]$
Required i for a PV to become FV	$i = \left(\frac{FV}{PV} \right)^{1/n} - 1$	$i = m \left[\left(\frac{FV}{PV} \right)^{1/(nm)} - 1 \right]$	$i = \frac{1}{n} [\ln(FV/PV)]$
Years PMTs to become FVA	$n = \frac{\ln \left[\frac{(FVA)(i)}{PMT} + 1 \right]}{\ln(1+i)}$	$n = \frac{\ln \left[\left(\frac{i}{m} \right) \left(\frac{FVA}{PMT} + \frac{m}{i} \right) \right]}{m \left[\ln \left(1 + \frac{i}{m} \right) \right]}$	

Years for PMTs to consume PVA	$n = -\frac{\ln\left[1 - \frac{(PVA)(i)}{PMT}\right]}{\ln(1+i)}$ Assuming that $PVA(i) < PMT$	$n = -\frac{\ln\left[1 - \frac{(PVA)(i/m)}{PMT}\right]}{m \left[\ln\left(1 + \frac{i}{m}\right)\right]}$ Assuming that $PVA(i/m) < PMT$	
FV of Sinking Fund that you make payment to	$FVS = PMT \left[\frac{(1+i)^n - 1}{i} \right]$	$FVS = PMT \left[\frac{\left(1 + \frac{i}{m}\right)^{nm} - 1}{i/m} \right]$	
PMTs to a Sinking Fund to reach a given FV	$PMT = FVS \left[\frac{i}{(1+i)^n - 1} \right]$	$PMT = FVS \left[\frac{i/m}{\left(1 + \frac{i}{m}\right)^{nm} - 1} \right]$	

Risk and Return Analysis

Expected return (R) over different probable states (s) of the financial market: P_s : probability of state "s" to occur:

$$E(R) = \left(\sum_{s=1}^S R_s \right) P_s \quad \text{Note: } \sum_{s=1}^S P_s = 1$$

Risk or standard deviation: $\sigma = \sqrt{\sigma^2}$

Variance: $\sigma^2 = \sum_{s=1}^S [R_s - E(R)]^2 P_s$

Covariance of two assets i and j : $\sigma_{ij} = \left[\sum_{s=1}^S P_s (R_{is} - E(R)_i)(R_{js} - E(R)_j) \right]$

Correlation Coefficient: $\rho_{ij} = \frac{\sigma_{ij}}{\sigma_i \sigma_j}$

Relative systematic risk (beta = β) for an asset:

β = covariance of an asset with market σ_{iM} relative to market risk as measure by market variance σ_M^2

β is correlation coefficient of an asset i with market M as a whole: $\beta_i = \rho_{iM} = \frac{\sigma_{iM}}{\sigma_M \sigma_M}$

R_f : return on a safe asset

R_m : Market return

the excess asset returns: $R_i - R_f$

the excess market returns: $R_m - R_f$

$$\beta_i = \frac{\sigma_{iM}}{\sigma_M^2} = \frac{\rho_{iM} \sigma_i}{\sigma_M}$$

β of an asset is the slope of a line that relates **the excess asset returns** (relative to a safe asset) to **the excess market returns** (relative to a safe asset). Graphically, this can be depicted by measuring $(R_i - R_f)$ on Y-axis and $(R_m - R_f)$ on X-axis.

The beta of a portfolio $\beta_{Portfolio}$:

w_i : Weight of a stock in the portfolio--- weight shows proportion of total investment in a particular stock.

$$\beta_{Portfolio} = \sum w_i \beta_i . \quad \text{Note: } \sum w_i = 1$$