M339D Topics					
✓	Date	Day	Topic	Assignments Out/Due	In class activities
☐	1/9/2023	M	Orientation.		1. The syllabus 2. Important prerequisite material
			Basics of R.		
☐	1/11/2023	W	Setting up R and RStudio. Basics of R: Arithmetic. Vectors.		
☐	1/13/2023	F	R-scripts and R-notebooks. For loops.	**Due:** HW#0	
☐	1/16/2023	M	**MLK DAY.**		
☐	1/18/2023	W	Functions in R. `If ... else` in R. Background on financial market models.		
			Forwards. Calls. Puts. Put-Call Parity.		
☐	1/20/2023	F	Standing assumptions and conventions. Risky assets. Transaction costs.	**Out:** Reading: p. 17 and Figure 1.0.1 from *Fahim* **Due:** HW#1	
☐	1/23/2023	M	Outright purchase. Short sales.		
☐	1/25/2023	W	Historical returns of stocks.	**Out:** *Project #1:* Portfolios with different investment schemes.	
☐	1/27/2023	F	Payoff and profit curves. Long/short positions.	Due: HW#2	
☐	1/30/2023	M	Basic risk management. Forward contracts.		
☐	2/1/2023	W	Hedging using forward contracts.		
☐	2/3/2023	F	European call options.	Due: HW#3	
☐	2/6/2023	M	European put options. Moneyness.	**Due:** *Project #1*	
☐	2/8/2023	W	Finite probability spaces [revisited]. Arbitrage portfolios.		
☐	2/10/2023	F	Law of the Unique Price. Replicating portfolios. Equity-linked products.		
☐	2/13/2023	M	Put-call parity. Chooser options.	**Out:** *Project #2:* 1. Estimate the interest rate based on provided put/call prices; 2. Discuss the deviations from the theoretical framework	
☐	2/15/2023	W	***In-Term Exam I***		
			Monte Carlo.		
☐	2/17/2023	F	Random number generation.		
☐	2/20/2023	M	Inverse-Transform Method. Acceptance-Rejection Method.		
☐	2/22/2023	W	SLLN. Monte Carlo simulation.	**Out:** Project #3: 1. Noise trading. 2. Various Monte Carlo problems.	
			Binomial Option Pricing.		
☐	2/24/2023	F	The binomial asset-pricing model.	Due: HW#4	
☐	2/27/2023	M	Historical returns of stocks. Forward trees.	**Due:** Project#2	
☐	3/1/2023	W	Binomial option pricing: Pricing by replication.		
☐	3/3/2023	F	Binomial option pricing: Risk-neutral probability.	Due: HW#5	
☐	3/6/2023	M	Binomial option pricing: Two periods.		
☐	3/8/2023	W	Multiple binomial periods.		
☐	3/10/2023	F	Monte Carlo for binomial option pricing.	Out: *Project #4:* 1. Fitting a distribution to historical returns. 2. Binomial Monte Carlo Due: HW#6	
☐	3/20/2023	M	Review of the normal distribution.		
☐	3/22/2023	W	***In-Term Exam II***		
			Black-Scholes Pricing with Delta-Hedging.		
☐	3/24/2023	F	The normal approximation to the binomial.		
☐	3/27/2023	M	The limiting behavior of stock prices. More on realized returns.	**Due: Project#3**	
☐	3/29/2023	W	Moment generating functions. The log-normal distribution. Jensen's inequality.		
☐	3/31/2023	F	Log-normal stock prices: Parameter interpretation.	Due: HW#7	
☐	4/3/2023	M	Log-normal stock prices: Tail probabilities.		
☐	4/5/2023	W	Partial expectation.		
☐	4/7/2023	F	The Black-Scholes pricing formula.	Out: *Project #5:* 1.The normal approximation to the binomial. 2. Lognormal stock prices as a limit in the binomial tree. 3. Monte Carlo with Black-Scholes (due on the date of the final exam) Due: HW#8	
☐	4/10/2023	M	Forward-start options. Rolling insurance strategy.		
☐	4/12/2023	W	Focus on the delta.		
☐	4/14/2023	F	Delta-hedging.	Due: HW#9	
☐	4/17/2023	M	Monte Carlo with Black-Scholes pricing.		
☐	4/19/2023	W	***In-Term Exam III***		
☐	4/21/2023	F	Options embedded in insurance products: Part I.		
☐	4/24/2023	M	Options embedded in insurance products: Part II.	Due: Project#4	