Textbook, Notes and Lecture Videos

For most of our coursework in this class we will be using two free textbooks. The first is one that is based on notes that I and another mathematician friend of mine are currently developing. The second one is called “Book of Proof.”

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Week 1 and Week 2: Casey’s Notes / Book

* [Introduction](https://uofh-my.sharepoint.com/:b:/g/personal/cdouglas_cougarnet_uh_edu/ESy77rX23LlGnLIdXvBrC2EBENRqPVqFzPaYP0e9cLc4wQ?e=Clcigh)
* [Chapter 1 (Sections 1 – 8)](https://uofh-my.sharepoint.com/:f:/g/personal/cdouglas_cougarnet_uh_edu/EpJ5L0dpqg5Hq1kjx6SJb_0BwHB0ILPpMKFHf3NPGAkrJQ?e=dS3znh)
  + [Lecture Video 1](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/EWI3x20lg2tHnLDwzUpWrjgBgFqFcPZNPavcwxSvIQZxsQ?e=wbK1V1) (Statements – Section 1)
  + [Lecture Video 2](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/EbvuNUv-jJJGsK_CHlZaEIIBOiQmpjApX_G67jG7p8BbZA?e=Ux9pMW) (Negation, And, Or, Xor – Section 2)
  + [Lecture Video 3](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/Edu2-DVfRpRGnuEbXvkctVQBQppuwFt6FIvQsciXejtyFw?e=hmpKVU) (Conditional Statements – Section 3)
  + [Lecture Video 4](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/EVnnvkwIih9BvDo8YOlDYbcBm4J7ILx5lbs-MGQ6O7dLCg?e=GhZtHf) (Biconditional Statements – Section 4)
  + [Video Notes](https://uofh-my.sharepoint.com/:f:/g/personal/cdouglas_cougarnet_uh_edu/Eg0_WDSdxOZAqylTb_ZE0T4BGQbeUnX3NgA_qyq1QJLlLg?e=o4qdd5)
  + [Lecture Video 5 (Truth Tables and Logical Equivalence -- Section 5)](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/ESYnKJup4epMjzD0mmdScBABjGDARrluudvylgzqbEpJIA?e=qbjzT7)
  + [Lecture Video 6 (Quantifiers -- Section 6)](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/ESyyMkXllGVGs-o5qEevSo8BZzmET2GHkQ2aWdFYrQ6H5g?e=adESTO)
  + [Lecture Video 7](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/EbNdd2Nwpm5BuE4W9KxPPbkBEmcx5ZqZ2LnTCpwahuCyJA?e=sN939c) (Translating – Section 7)
  + [Lecture Video 8](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/ET4dDJNciChAoVid3BTCykUB7gRXTsKytVV2CPNld0-4Ow?e=INyjkE) (Negating – Section 8)
  + [Video Notes](https://uofh-my.sharepoint.com/:f:/g/personal/cdouglas_cougarnet_uh_edu/Eg0_WDSdxOZAqylTb_ZE0T4BGQbeUnX3NgA_qyq1QJLlLg?e=o4qdd5)

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Week 3: [Book of Proof](https://www.people.vcu.edu/~rhammack/BookOfProof/Main.pdf)

Note: This book makes the decision that the natural numbers do *not* contain 0 – please keep in mind that *for our course 0* ***is*** *a natural number!* Also, these video lectures were recorded in Spring of 22; if something mentioned in the video does not match our course or schedule and you’re confused, please ask!

* [Lecture Video 9](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/EZkk1hlpmTNJnaDnnAWrzo4BAReEopDUZBzW-H_KtGPD8A?e=NMZKX4) (Introduction to Sets) -- Section 1.1 in Book of Proof
* [Lecture Video 10](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/EYDJIG1b1UxDjhKrbE2jQXABSbeCGxZeSXBXJS8L6YjHjA?e=AB53Rv) (Cartesian Products) -- Section 1.2 in Book of Proof
* [Lecture Video 11](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/Efcxvu0uRftOpMWf6dQw4rcBMR9uUlOLqMEjx_AEOsjIWA?e=HGcoYa) (Subsets, Power Sets) -- Sections 1.3, 1.4 in Book of Proof
* [Lecture Video 12](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/EdySaZnofitKq4TmTRq7XUcB5Cq5iKIBZ2g3gVUN8jbOVA?e=rqhCJf) (Union, Intersection, Difference) -- Section 1.5 in Book of Proof
* [Lecture Video 13](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/EUMxTdDCZTtAqAoUmsqWHPYBovWlED_3XZGB-QYGynXDNw?e=trifZk) (Complement) -- Section 1.6 in Book of Proof
* Quiz 3 covers this material, so get started as soon as possible and ask lots of questions!
* [Lecture Video 14](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/EQUxDUxLgqpFu7QxbTjtK0QBbUaKfTNZPyCS7rtSE74HsQ?e=kBwpSk) (Extra, Supplementary Video About Sets -- not necessary for HW or Quizzes – useful if you want to take more math or CS courses)

[Video Notes](https://uofh.sharepoint.com/:f:/r/sites/Section_H_20223_MATH_3336_16884/Class%20Materials/Video%20Notes%20for%20Sets?csf=1&web=1&e=Se8Lz3)

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Week 4: Casey’s Notes / Book

* [Chapter 2 (Sections 4 and 5)](https://uofh-my.sharepoint.com/:f:/g/personal/cdouglas_cougarnet_uh_edu/Ek0fWCBDjftFnj54Fx3GvUQByYjyh4yJfiOodhhIhN8saw?e=oaSLNm)
  + [Lecture Video 15](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/EXX2t_n1s05Bg0AmPQuE4WEBsXSZYMykigWzj_JCygg7UA?e=dtvi51) (functions – section 4)
  + [Lecture Video 16](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/ETEDg71EfFtLpqaOmHOleR8B8GNCirBJJM054ny7GwA44g?e=CpbM3r) (sequences – section 5)
  + [Video Notes](https://uofh-my.sharepoint.com/:f:/g/personal/cdouglas_cougarnet_uh_edu/Eg0_WDSdxOZAqylTb_ZE0T4BGQbeUnX3NgA_qyq1QJLlLg?e=o4qdd5)

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Week 5: Casey’s Notes / Book + Book of Proof (as needed – pages + examples mentioned in Casey’s Notes)

* [Chapter 3 (Section 1, Section 2](https://uofh-my.sharepoint.com/:f:/g/personal/cdouglas_cougarnet_uh_edu/ErDLQDnbHedKmgPa1PDbegABMD8ROJ5zSWx3J-garmyCUQ?e=k5FVIX), and [Section 3](https://uofh-my.sharepoint.com/:b:/g/personal/cdouglas_cougarnet_uh_edu/EevhvWaYQJ9HhAY4FUmNGDgBcgbQZgCv5IPJgPu3SityhA?e=4WnRaK))
  + [Lecture Video 17](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/Eak1IAog5n5ArSZ-IV8I35YBoi9CkkGqd-gQZbdJxZCM6Q?e=95lYyi) (What is a proof? -- Section 1)
  + [Lecture Video 18](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/ESATRgc8-dlNpWqcVNO5bzEBigI1duML74CapTxu1PVeVA?e=9DsA56) (Direct and Contrapositive Proofs – Section 2)
  + [Lecture Video 19](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/Edy71aT6ymFKr44eMVPANPkBYr5deNOKZSWC6puiM_qg0A?e=fMyrjM) (Proofs by Contradiction – Section 3)
  + [Video Notes](https://uofh-my.sharepoint.com/:f:/g/personal/cdouglas_cougarnet_uh_edu/Eg0_WDSdxOZAqylTb_ZE0T4Bf8pc6uWoESRXHmzbrJX61w?e=Fulwnk)

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Week 6: Casey’s Notes / Book + Book of Proof (as needed – pages + examples mentioned in Casey’s Notes)

* [Chapter 4](https://uofh-my.sharepoint.com/:f:/g/personal/cdouglas_cougarnet_uh_edu/EgAUlRstPLZAuL8CnMKNpPwB7reFf0eiJMrHBmSPE4PR5Q?e=NRjgcz) (Section 1, Section 2 – read only)
  + [Lecture Video 20 (Examples of Recursive Structure – Section 1)](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/EYghQZGgvfBMnviN6w_1hSUBC1GPfRBeNl6HQ1VDQgexAA?e=DBZS6k)
  + [Lecture Video 21 (Proofs by Induction – Section 2)](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/EeXVFbx6FaVPmOhM-U0K8jYBVwZn-x6b-hwmlSZYFnU7cg?e=DWKvyj)
  + [Video Notes](https://uofh-my.sharepoint.com/:f:/g/personal/cdouglas_cougarnet_uh_edu/Eg0_WDSdxOZAqylTb_ZE0T4Bf8pc6uWoESRXHmzbrJX61w?e=Fulwnk)
* Schedule to take Test 1 & Study for Test 1

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Week 7: Casey’s Notes / Book + Book of Proof (as needed – pages + examples mentioned in Casey’s Notes)

* Chapter 4 (Section 2 and [Section 3](https://uofh-my.sharepoint.com/:b:/g/personal/cdouglas_cougarnet_uh_edu/EebeatOSnktNpnfW03kZyLEBs8brcuHhh2EGl3G6qbbWGg?e=SQ7gtQ))
  + [Lecture Video 21 (Proofs by Induction – Section 2)](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/EeXVFbx6FaVPmOhM-U0K8jYBVwZn-x6b-hwmlSZYFnU7cg?e=DWKvyj)
  + [Lecture Video 22 (Proofs by “Strong” Induction – Section 3)](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/EVYSmtWzF35Oh4BvA-e1B7ABtWAYQ3FIuKFgkG5WEEkAiA?e=UkhAUV)
  + [Video Notes](https://uofh-my.sharepoint.com/:f:/g/personal/cdouglas_cougarnet_uh_edu/Eg0_WDSdxOZAqylTb_ZE0T4Bf8pc6uWoESRXHmzbrJX61w?e=Fulwnk)
    - [More Examples of Induction Proofs (from Spring 22)](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/ETBHHZpwcYNPtWyqF4VLCg8BIjMY2KrC-RvQ_rRJXRTG1g?e=dX4RR8)

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Week 8: Casey’s Notes / Book + Book of Proof (as needed – pages + examples mentioned in Casey’s Notes)

* Chapter 4 ([Section 3](https://uofh-my.sharepoint.com/:b:/g/personal/cdouglas_cougarnet_uh_edu/EebeatOSnktNpnfW03kZyLEBs8brcuHhh2EGl3G6qbbWGg?e=SQ7gtQ) and [Section 4](https://uofh-my.sharepoint.com/:b:/g/personal/cdouglas_cougarnet_uh_edu/EXH1kP9HFbpHuA4yDYQMpXwBwTkMCO42KcgkQAZ6kem9GQ?e=QBa9vf))
  + [Lecture Video 22 (Proofs by “Strong” Induction – Section 3)](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/EVYSmtWzF35Oh4BvA-e1B7ABtWAYQ3FIuKFgkG5WEEkAiA?e=UkhAUV)
  + [Lecture Video 23 (Structural Induction – Section 4 – Coming Soon)](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/EVPmW0bDz7RIkhg-8nPGOYUBow_JbKzLAQninAD4i5Fh1w?e=nnQoq9)
    - [More Examples of Induction Proofs (from Spring 22)](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/ETBHHZpwcYNPtWyqF4VLCg8BIjMY2KrC-RvQ_rRJXRTG1g?e=dX4RR8)

Week 9: [Book of Proof](https://www.people.vcu.edu/~rhammack/BookOfProof/Main.pdf)

* Chapter 3, sections 3.1, 3.2, 3.3, 3.4, 3.5 (this is for the first half of this week)
  + There are videos on each of these sections that go into depth; these were recorded from Spring 2022; [link to these long-ish videos](https://uofh-my.sharepoint.com/:f:/g/personal/cdouglas_cougarnet_uh_edu/EiG3IlJrmhROkMciX_eghesBFxS4yaz-ZlcT7sit6uwNoA?e=iZanAa) + [links to their video notes](https://uofh-my.sharepoint.com/:f:/g/personal/cdouglas_cougarnet_uh_edu/EuWlWBq-y2RAgZi3OmefEn4BPqTcGtCR8AKyi8G_A5nIUg?e=IrEmdB)
    - If this material is new to you, then you probably will need to use these videos and the reading from Book of Proof
  + [Here is a comprehensive video that summarizes ALL of these sections](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/EeNQ2UZi-XVIh9s1Yp5qKF8Be0tEjLAC3LvqkJKqUJn7DQ?e=R30Fha)
    - This video is about one hour and goes through defining examples and defines key concepts
* Chapter 3, sections 3.7, 3.9
  + There are videos on each of these two sections that go into depth; these were recorded from Spring 2022. [Link to these long-ish videos](https://uofh-my.sharepoint.com/:f:/g/personal/cdouglas_cougarnet_uh_edu/EiG3IlJrmhROkMciX_eghesBFxS4yaz-ZlcT7sit6uwNoA?e=iZanAa) + [links to their video](https://uofh-my.sharepoint.com/:f:/g/personal/cdouglas_cougarnet_uh_edu/EuWlWBq-y2RAgZi3OmefEn4BPqTcGtCR8AKyi8G_A5nIUg?e=IrEmdB) notes
    - If this material is new to you, then you probably will need to use these videos and the reading from Book of Proof
  + [Here is a comprehensive video that summarizes these sections](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/EcYIELMJlO5EiiExK_mCb48Bovh-H1OFV8y3WvA21pk5Rg?e=flLRjA)
  + There will be another video discussing the topic of **solving recurrence equations +** here are some written notes on this [topic of recurrence equations](https://uofh-my.sharepoint.com/:b:/g/personal/cdouglas_cougarnet_uh_edu/EXtvB3071DtHrGg69lHk3y4Bt3QmxcduoWl_JIzNjWPx3g?e=J12S9Q)
* Note: WE HAVE TWO QUIZZES THIS WEEK
  + Quiz 8 covers the following;
    - Counting lists
    - Counting Subsets
    - Factorials and Permutations
  + Quiz 9 covers the following:
    - The Exclusion-Inclusion Principle
    - The Pigeonhole Principle
    - Solving Recurrence Equations ([Chapter 5 Section 4](https://uofh-my.sharepoint.com/:b:/g/personal/cdouglas_cougarnet_uh_edu/EXtvB3071DtHrGg69lHk3y4Bt3QmxcduoWl_JIzNjWPx3g?e=J12S9Q) of Casey’s Notes)
      * Using iteration
      * Using a fancy theorem

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Week 10: Casey’s Notes (+ Book of Proof as desired)

* [Chapter 6, sections 1, 2, 3 and 4](https://uofh-my.sharepoint.com/:f:/g/personal/cdouglas_cougarnet_uh_edu/EtuFnTi6YIlFvF2wNh3JA4IBhmNPBHBTY4yj2IL1gomaBQ?e=64HtNE)
  + Quiz 10 covers these sections, but with a lot of emphasize on understanding and simply using The Division “Algorithm”
  + Video Lectures
    - Section 1 – [Video 30](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/ERuNXPBc9KtOt5VrNZ4lqqsBeTkMCLXP3e2HWdvoUt1BIQ?e=QOn3kV)
    - Sections 2 and 3 – [Video 31](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/EXx9heTL-nlDkLcIOL01AE0Bw_3Vv_lk8TDHJf7VfDyWgg?e=j7aMcj)
    - Sections 4 – [Video 32](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/EeQECGjrda9Au6Yf6HHpHu0BZ6S2Om5rFjCcOmkIiotHrw?e=0q5Vrf)
  + [Video Notes](https://uofh-my.sharepoint.com/:f:/g/personal/cdouglas_cougarnet_uh_edu/Eg0_WDSdxOZAqylTb_ZE0T4Bf8pc6uWoESRXHmzbrJX61w?e=Fulwnk)

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Week 11: Casey’s Notes (+ Book of Proof, as desired)

* Chapter 6, Section 5 (Modular Arithmetic)
  + Quiz 11 covers this section
  + Video Lectures
    - Section 5 – [Video 33](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/EZZ7Ly6j-5RPnDdCVQsy4SUBG20r6uwVZtUslsqoBqQc5w?e=zOjQeM) + [Video 34](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/EZzj6gX3vcVLsBEfI6ZB_3EBjk6l3Z9ef8tl_QZdogQGMw?e=VOe6ew)
* Book of Proof: Sections 5.2 (pages 131-133) + Example 11.8 on page 208

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Week 12: Test 2 Review

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Week 13: Algorithm Complexity

* [Video 35 (Algorithms and Pseudocode)](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/ETmDy-fXtrlNm7d9zp1n6KsBN83XaqbXoU0hY9ya1M4HLQ?e=vkc3iw)
* [Video 36 (Big-O, Big-Omega and Big-Theta)](https://uofh-my.sharepoint.com/:v:/g/personal/cdouglas_cougarnet_uh_edu/EZPHj-NBewZJi8TZKIYcXHsB_aN4iU7qjz2FsOq9OB27fA?e=RZgdlP)