

## BLHS 034-40 – Math as Philosophy

**Dates**: Thursdays, 5:20-7:20 PM

**Location**: This course takes place online. Georgetown University School of Continuing Studies (SCS) uses Canvas as its Learning Management System. This course will be taught entirely through the Canvas platform. To learn more about Canvas, please go through the [Canvas Guide for Students](http://guides.instructure.com/m/4212).

**Faculty**: JT Paasch

**Contact Information**: jp475@georgetown.edu

**Virtual Office Hours**: Anytime. Email me, and we’ll coordinate a time to talk/zoom.

## COURSE DESCRIPTION

Here is a stunning fact: the world can be understood mathematically. This fact underlies our success in science, computers, and even our private everyday reasoning processes. But why is this so? Why is mathematical thinking so astonishingly useful? In this course, we examine the conceptual foundations of mathematics. **No prior mathematical knowledge is required**. This is not a course about doing calculations. It is about abstract structures, and how we use structure in our thinking. Throughout the course, we will ask the following questions. How do we organize things into collections, and networks? Does “+” (adding) mean what you think it means? Are there numbers that can’t be enumerated (even by God), and if so, how do we even know about such spooky numbers? How do computers work, and how could it possibly all boil down to just ones and zeros? Are there math problems that can't be solved (even with an infinitely powerful computer)? And how do we even know how to figure out the answer to that? Finally, how do computer simulated neural networks “learn,” and how much is it like human learning?

## COURSE LEARNING OBJECTIVES

By the end of the course, students will be able to:

1. Explain deductive reasoning and the mathematical method.
2. Apply deductive reasoning to a variety of situations, including philosophy, law, politics, and regular day-to-day reasoning.
3. Explain some of the fundamental concepts of modern mathematics.
4. Use these fundamental concepts in order to critically and ethically assess various scenarios in our modern world that involve math (e.g., artificial intelligence, cryptocurrency, computability, and the like).
5. Write and present information clearly for diverse audiences in a clear and ethical way through appropriate forms and media

## REQUIRED READINGS

The following are the required reading material for this course (these will be available for free on the course Canvas site):

1. A course reader
2. Other readings may be made available on the Canvas site as needed.

## COURSE REQUIREMENTS

### Technical Requirements

As an online student your "classroom" experience will be very different than a traditional student. As part of your online experience, you can expect to:

1. Communicate via email including sending attachments.
2. Navigate the internet using a Web browser.
3. Use office applications such as Microsoft Office or Google Docs to create documents..
4. Learn how to submit assignments in Canvas.
5. Communicate with peers using discussion boards and other platforms.
6. Upload and download saved files.
7. Have easy access to the Internet.
8. Navigate Canvas, including using the email component within Canvas.
9. Use a microphone to record audio through your computer.
10. Use an internal or external camera to record video through your computer.

In this course we will use VoiceThread, TurnItIn and Zoom.

* VoiceThread is a tool that enables teachers and students to upload and asynchronously present images, video, and/or other media and respond to others presentations with audio, video, and/or text comments. [Instructions for VoiceThread are available here](https://georgetown.instructure.com/courses/221/files/931208/download?verifier=0HKK42XTKw0f9aO2RLRsiULGoUKjpCDPVnOUjjCM&wrap=1)[.](https://voicethread.com/support/)
* TurnItIn is a writing assessment tool that is used to detect plagiarism and allows teachers to provide assignment feedback to students. [Instructions for TurnItIn are available here](https://georgetown.instructure.com/courses/221/files/931207/download?verifier=rMu7Ak5xPZGl4jt6o1XfWH4ApQUbN8vFmeaQlLt0&wrap=1).
* Zoom enables users to conduct synchronous (“real-time”) conferences, presentations, lectures, meetings, office hours and group chats via audio, video, text chat and content sharing. [Instructions for Zoom are available here](https://georgetown.instructure.com/courses/221/files/931205/download?verifier=LOBslq9lcBQer3d7f4LVd2K31x4v49okC9hZsNKn&wrap=1).

### Computer Requirements

Students need to have sufficient technology and Internet access to complete this course. The requirements are listed by [Canvas in the Instructure Guides](https://guides.instructure.com/m/4214/l/82542-what-are-the-basic-computer-specifications-for-canvas).

**Audio and Video Capability**

* You will need an internal or external microphone. Most computers now come with them built in.
* You will need an internal or external camera. Most computers now come with them built in.

## COURSE EXPECTATIONS

This course is conducted entirely online, which means students do not have to be on campus to complete any portion of it. Students will participate in the course using Georgetown University's online learning management system called Canvas.

Student Expectations

This course consists of 13 weeks. You are expected to do the readings, attend any lectures, watch any assigned lecture videos, and to engage with the course material in depth. Your responsibilities include completing all the assignments. Participation is essential to your success in this class. In order to get full credit for participation, you will need to attend all lectures, read all assigned readings and watch any assigned videos, and complete all of your assignments.

### Time Expectations

Our online classes are designed to meet the same academic standards as our place-based (face-to-face) courses. You can think of each module equal to the same level of participation, commitment, and academic rigor as a face-to-face class. Students should plan on spending approximately 12-15 hours per week on the work for each online module.

## ACADEMIC INTEGRITY

All students are expected to maintain the highest standards of academic and personal integrity in pursuit of their education at Georgetown. Academic dishonesty in any form is a serious offense, and students found in violation are subject to academic penalties that include, but are not limited to, failure of the course, termination from the program, and revocation of degrees already conferred. All students are held to the Honor Code.

The Honor Code pledge follows:

In the pursuit of the high ideals and rigorous standards of academic life, I commit myself to respect and uphold the Georgetown University Honor System: To be honest in any academic endeavor, and To conduct myself honorably, as a responsible member of the Georgetown community, as we live and work together.

### **Plagiarism**

Stealing someone else’s work is a terminal offense in the workplace, and it will wreck your career in academia, too. Students are expected to work with integrity and honesty in all their assignments. The Georgetown University Honor System defines plagiarism as "the act of passing off as one's own the ideas or writings of another.” More guidance is available through the [Gervase Programs](http://honorcouncil.georgetown.edu/system). If you have any doubts about plagiarism, paraphrasing, and the need to credit, check out [Plagiarism.org](http://www.plagiarism.org/).

## COURSE ACTIVITIES AND ASSIGNMENTS

Written work is due by the assigned due date on Canvas. **DO NOT SEND YOUR PAPERS TO OTHER PERSONAL OR PROFESSIONAL EMAIL ADDRESSES**. Follow-ups and class participation are contingent on the timely submission of your initial responses.

### **Late Submission Policy:**

As stated in the [Student Handbook](http://static.scs.georgetown.edu/upload/kb_file/mps.studenthandbook.15-16.pdf), you must notify me and obtain my approval if you are unable to complete any assignment by the published submission deadline. I will gladly consider granting extensions for assignments as long as the request is made by e-mail at least 24 hours before the due date/time. The request must include the date and time when you intend to submit the assignment. If you fail to give both a date and a time, however, the request will not be honored. However, no late submissions or extensions are available for the last week of class or for any Discussion Board participation. Late responses with no previous arrangements for all assignments will be penalized by 10% for each day or portion of a day that the assignment is late, unless previous arrangements have been made.

### Discussions and Assignments

There are two groups of assignments you need to complete. First, there are weekly assignments, which you need to complete each week. Second, there are some other assignments that not weekly, but are dispersed throughout the semester (like the Final Exam).

Weekly Assignments

Each week, you will be required to complete the following assignments:

* Attend **lectures**, complete any assigned **readings**, and watch any assigned **supplemental** videos.
* Complete any assigned **exercises** on the Canvas Site.
* Post a **cheat sheet** of your own design on the weekly discussion board. A cheat sheet is a summary of the week’s material that anybody could use as a quick reference or a study guide of that week’s material. There is no word limit or other requirements about what it should look like (that is up to you), but in order to get full credit, your cheat sheet must cover *all* of the topics covered in that week’s materials.
* You must **peer review** *two* cheat sheets from your peers that were posted on the previous week’s discussion board. In order to get full credit for each of review, you must do three things: (1) you must explain 2 things you learned from the cheat sheet, and (2) you must explain 2 things you think the cheat sheet could do better, and (3) assign a hypothetical grade (out of 100), and explain why you chose that grade. Of course, any inappropriate or unkind commentary will be penalized.

Other Assignments

In addition to the weekly assignments described above, you will also need to complete the following further assignments:

* Post a response to **discussion** prompt. These discussion prompts are periodic (they do not happen every week). In order to get full credit for each discussion post, you must write 250 words in your post, and you must actually answer the prompt!
* For each such discussion prompt, you must also **post two replies** to the posts of your peers. In order to get full credit for your replies, each reply must be 100 words, and you must say something relevant about your peer’s post (e.g., you can critique something they wrote, and explain *why* you disagree, or you can approve of something they wrote, and explain *why* you think it is correct).
* There will be a **Final Exam**, on the Canvas site.

### Grade Weighting

The above-mentioned assignments contribute to your following grade with the following weights:

* Participation/Attendance: 20%
* Weekly Cheat Sheet: 20%
* Weekly Peer Review of Cheat Sheet: %15
* Weekly Exercises: 20%
* Periodic Discussion Posts: 10%
* Discussion Post Replies: 10%
* Final Exam: 15%

### Citation Style

In your writing, if you cite the course reader, it is okay to just mention the page number. If you want to cite anything else, you must APA or Chicago style for every writing and research assignment you complete. Resources for this citation style are available through:

[Georgetown Library Citation Guide](http://guides.library.georgetown.edu/c.php?g=425820&p=3799134)

[APA Style Guidebook](http://writing.wisc.edu/Handbook/DocAPA.html)

## GRADING

Grading in this course will be determine by the following grading scale:

## • A: 93% to 100%

## • A-: 90% to 92%

## • B+: 87% to 89%

## • B: 83% to 86%

## • B-: 80% to 82%

## • C+: 77% to 79%

## • C: 73% to 76%

## • C-: 70% to 72%

## • D+: 67% to 69%

## • D: 63% to 66%

## • F: 62% and below

## ACCOMMODATIONS

Under the Americans with Disabilities Act (ADA) and the Rehabilitation Act of 1973, individuals with disabilities are provided reasonable accommodations to ensure equity and access to programs and facilities. Students are responsible for communicating their needs to the Academic Resource Center, the office that oversees [disability support services](http://academicsupport.georgetown.edu/disability), (202-687-8354; arc@georgetown.edu; ) before the start of classes to allow time to review the documentation and make recommendations for appropriate accommodations. The University is not responsible for making special accommodations for students who have not declared their disabilities and have not requested an accommodation in a timely manner. Also, the University need not modify course or degree requirements considered to be an essential requirement of the program of instruction. For the most current and up-to-date policy information, please refer to the [Georgetown University Academic Resource Center website](http://academicsupport.georgetown.edu/disability/). Students are highly encouraged to discuss the documentation and accommodation process with an Academic Resource Center administrator.

## STUDENT SUPPORT SERVICES

### Support Services

SCS offers a variety of support systems for students that can be accessed online, at the School of Continuing Studies downtown location, and on the main Georgetown campus:

* [Academic Resource Center](http://academicsupport.georgetown.edu/)
* 202-687-8354 | arc@georgetown.edu
* [Counseling and Psychiatric Services](http://caps.georgetown.edu/)
* 202-687-6985
* [Institutional Diversity, Equity & Affirmative Action (IDEAA)](https://ideaa.georgetown.edu/)
* (202) 687-4798

### Georgetown Library

Students enrolled in online School of Continuing Studies SCS coursework have access to the University Library System’s eResources, including 500+ research databases, 1.5+ million ebooks, and thousands of periodicals and other multimedia files (films, webinars, music, and images). Students can access these resources through the [Library’s Homepage](http://library.georgetown.edu/scs) by using their University username (NetID) and password (this is the same login information used to access email, BlackBoard, etc.). The Library does not mail physical items to students.

SCS students may make an appointment with a librarian to discuss a research topic, develop a search strategy, or examine resources for projects and papers. Librarians offer an overview of and in-depth assistance with important resources for senior or master's theses, dissertations, papers and other types of research. Appointments are conducted using Google Hangout (video-conferencing function) through the Georgetown Gmail System or by telephone. This service is available to currently enrolled students who need assistance with Georgetown-assigned projects and papers. Please review the [Services & Resources Guide for Online Students](http://guides.library.georgetown.edu/scs/online) for additional information.

### Research Guide

The Project Management program has an extensive online [Library Research Guide](http://guides.library.georgetown.edu/researchcourseguides) designed for the subject and research specifications of our program. This Guide will give you direct access to the library resources central to your course research work.

### Learning Resources

SCS offers a host of [learning resources](http://scs.georgetown.edu/academic-affairs/resources/) to its students. Two that you might find particularly helpful in this course are the [Writing Center](http://writingcenter.georgetown.edu/) and [Refworks](http://guides.library.georgetown.edu/refworks).

* The [Writing Center](http://writingcenter.georgetown.edu/) offers professional writing support through its online peer tutoring service.
* [Refworks](http://guides.library.georgetown.edu/refworks) is an online research management tool that aids in organizing, storing, and presenting citation sources for papers and projects.

### Technical Support

Click on the Help link (on the bottom-left corner in Canvas) to reach Canvas Support, including the [Canvas Student Guide](http://guides.instructure.com/m/4212) and 24 hour Canvas Support Hotline at 855-338-2770.

In this course we will use VoiceThread, TurnItIn and Zoom.

* VoiceThread is a tool that enables teachers and students to upload and asynchronously present images, video, and/or other media and respond to others presentations with audio, video, and/or text comments. [Technical support for VoiceThread is available.](https://voicethread.com/support/)
* TurnItIn is a writing assessment tool that is used to detect plagiarism and allows teachers to provide assignment feedback to students. [Technical support for TurnItIn is available](http://turnitin.com/en_us/support).
* Zoom enables users to conduct synchronous (“real-time”) conferences, presentations, lectures, meetings, office hours and group chats via audio, video, text chat and content sharing. [Technical support for Zoom is available.](https://help.georgetown.edu/sims/helpcenter/common/layout/SelfhelpArticleView.seam?inst_name=georgetown_university&article_id=8580-8283-5647)

## COMMUNICATIONS GUIDELINES

### Netiquette Guidelines

To promote the highest degree of education possible, we ask each student to respect the opinions and thoughts of other students and be courteous in the way that you choose to express yourself. The topics in this course can be controversial and promote debate. Students should be respectful and considerate of all opinions.

In order for us to have meaningful discussions, we must learn to genuinely try to understand what others are saying and be open-minded about others’ opinions. If you want to persuade someone to see things differently, it is much more effective to do so in a polite, non-threatening way rather than to do so antagonistically. Everyone has insights to offer based on his/her experiences, and we can all learn from each other. Civility is essential.

### Statement of Student Conduct, Civility, and Engagement

The School of Continuing Studies offers students the opportunity to engage with faculty, staff, and peers in ways that foster intellectual growth and development in their chosen field of study. It is important to recognize that each member of our community brings his or her own values, thoughts, perspectives, and experiences into each interaction. We expect students to behave in a manner that is civil and respectful of others, and appreciate the learning opportunities that come from engaging pluralistic perspectives in a dynamic educational environment.

Engagement within the SCS Georgetown community takes places in on-campus meeting spaces and classrooms, and extends to online learning platforms and forums. Students should be particularly mindful that participation in class discussions, group assignments, emails, blogs, and social media reflect upon them personally, academically, and professionally. All viewpoints, editorials, and opinions expressed by students represent those students exclusively – and not the students’ instructors, classmates, academic program, School, or University – even in cases when students are using Georgetown-affiliated systems like email, blogs, and online portfolios. The expectations for respect and civility are consistent for on-campus classes and spaces, as well as cyber, virtual, and online environments. Thus, civility and cybercivility are expected of all students, in all campus spaces.

SCS students are expected to adhere to the SCS guidelines for student conduct and the University Code of Student Conduct. In the event that a student's behavior is perceived to fall outside the stated SCS guidelines or may be a violation of the Code of Student Conduct, the matter may be referred to the Office of Student Conduct for further review and possible sanctioning. Such instances can include but are not limited to: disruption of official university functions (including teaching, research, administration), failure to comply with a directive issued by a University official, harassment and bullying, and incivility. For questions regarding the SCS student conduct expectations please review the policy in-full found in the [Graduate Professional Studies Student Handbook](http://scs.georgetown.edu/academic-affairs/student-handbooks/). For questions about the Code of Student Conduct, please review the information provided by the [Office of Student Conduct](https://studentconduct.georgetown.edu/).

## Communication with Peers

### Notifications

In this course we will use Canvas to send email for private messages. You can either check your messages in the Canvas system or set your notifications to your preferred method of contact. Please check your messages at least once per day. When submitting messages, please do the following:

* Put a subject in the subject box that describes the email content with your name and module.
* Do not send messages asking general information about the class, please post those in the General Questions Discussion Board Forum.

### Questions Forum

In online courses, everyone will likely have many questions about things that relate to the course, such as clarification about assignments and course materials. Please post these in the General Question Discussion Board Forum, which you can access by clicking Discussions in the course navigation menu. This is an open forum, and you are encouraged to give answers and help each other.

### Turnaround and Feedback

If you have a concern and send me a message, you can expect a response within one business days. Please allow two business days for assessment submission feedback.

## Copyright

The materials used in Georgetown University courses ("Course Materials") generally represent the intellectual property of course instructors which may not be disseminated or reproduced in any form for public distribution (e.g., sale, exchange, etc.) without the written permission of the course instructor. Course Materials include all written or electronic documents and materials, including syllabi, current and past examination questions/answers, and presentations such as lectures, videos, PowerPoints, etc., provided by a course instructor. Course Materials may only be used by students enrolled in the course for academic (course-related) purposes.

Published course readings (book chapters, articles, reports, etc.) available in Canvas are copyrighted material. These works are made available to students through licensed databases or fair use. They are protected by copyright law, and may not be further disseminated or reproduced in any form for distribution (e.g., uploading to websites, sale, exchange, etc.) without permission of the copyright owner.

More information about intellectual property and copyright can be found here: <https://www.library.georgetown.edu/copyright>

More information about computer acceptable use policy and intellectual property can be found here: <https://security.georgetown.edu/it-policies-procedures/computer-systems-aup>

## SEXUAL MISCONDUCT

Georgetown University and its faculty are committed to supporting survivors and those impacted by sexual misconduct, which includes sexual assault, sexual harassment, relationship violence, and stalking. Georgetown requires faculty members, unless otherwise designated as confidential, to report all disclosures of sexual misconduct to the University Title IX Coordinator or a Deputy Title IX Coordinator. If you disclose an incident of sexual misconduct to a professor in or outside of the classroom (with the exception of disclosures in papers), that faculty member must report the incident to the Title IX Coordinator, or Deputy Title IX Coordinator. The coordinator, will, in turn, reach out to the student to provide support, resources, and the option to meet. [Please note that the student is not required to meet with the Title IX coordinator.]. More information about reporting options and resources can be found on the [Sexual Misconduct Website](https://sexualassault.georgetown.edu/resourcecenter).

If you would prefer to speak to someone confidentially, Georgetown has a number of fully confidential professional resources that can provide support and assistance. These resources include:

1. Health Education Services for Sexual Assault Response and Prevention: confidential email [sarp@georgetown.edu](mailto:sarp@georgetown.edu)
2. Counseling and Psychiatric Services (CAPS): 202. 687.6985 or after hours, call 202. 444.7243 and ask for the on-call CAPS clinician.

Thank you for supporting our students impacted by sexual violence. If interested, other helpful more general resources are included below:

* [Georgetown Self-Care Resource Guide](https://studenthealth.georgetown.edu/self-care)
* [Georgetown Wellness Wheel](https://studenthealth.georgetown.edu/Hoya-Wellness-wheel)
* [Georgetown Guide to Recognizing Students in Distress](https://studenthealth.georgetown.edu/resourceguide)

## PREGNANCY ADJUSTMENTS AND ACCOMMODATION

Georgetown University is committed to creating an accessible and inclusive environment for pregnant and parenting students.  Students may request adjustments based on general pregnancy needs or accommodations based on a pregnancy-related complication.  Specific adjustments will be handled on a case by case basis and will depend on medical need and academic requirements.

Students seeking a pregnancy adjustment or accommodation should follow the process laid out at the [Pregnancy Adjustments and Accommodations for Students webpage](https://titleix.georgetown.edu/student-pregnancy).

## COURSE SCHEDULE

\*Course schedule will be followed but is not a contract.

All readings are posted on Canvas

| **Week** | **Topic** |
| --- | --- |
| 0 | Orientation |
| 1 | The Mathematical Method |
| 2 | Sets |
| 3 | Graphs |
| 4 | Order and Lattices |
| 5 | Numbers and Infinities |
| 6 | Cryptocurrency |
| 7 | Algebras 1 |
| 8 | Algebras 2 |
| 9 | State Machines |
| 10 | Turing Machines |
| 11 | Modern Computers |
| 12 | Artificial Intelligence 1 |
| 13 | Artificial Intelligence 2 |
| Finals | Final Exam |