**Philosophy of Mathematics Prof. Joseph McPeak**

**Phil 218-900 Spring 2022** [**mcpeakje@drexel.edu**](mailto:mcpeakje@drexel.edu)

**215-800-4173**

**Office Hours via Skype Tues: 7PM-8PM, or Skype by Appointment (Skype Name Joe McPeak)**

**Course Description:** This course introduces the student to a critical analysis of the fundamental concepts, principles and assumptions of mathematics. Included in this course will be a consideration of the ontological status of mathematical “objects” (numbers, sets, functions); the nature of mathematical knowledge, the relationship between logic and mathematics, and a philosophical analysis of the mathematical concepts of infinity and continuity.

**Course Requirements and Grading**

* **Two discussion board posts - each worth 5% of grade.**
* **One Group PowerPoint Presentation posted 4/22 due 5/9 (25% of Grade)**
* **Offer brief comment on 5 lectures (use question slides- 10% of grade)- Comments are ungraded but assignment is worth 10 points if completed)**
* **Final Paper (5 pages minimum) (55% of Grade).**

**Grade scale: A+ (≥ 95); A (90-94); A- (88-89); B+ (85-87); B (80-84); B- (78-79); C+ (75-77); C (70-74);**

**C- (68-69); D+ (65-67); D (60-64); D- (58-59); F (≤57).**

**Required Texts:**

*Historical Introduction to the Philosophy of Mathematics* (ed). (London: Bloomsbury**,** 2016) 815 pp. **(HIPM)**

Tobias Dantzig. *Number: the language of science.* (New York: Penguin Group, 2005) 416pp. **(NLS)**

**Recommended Text**

Stewart Shapiro. *Thinking about Mathematics: the philosophy of mathematics.* (Oxford: Oxford Univ. Press, 2000) 308 pp. (**TM)**.

**3/29** Lecture 1 **Introduction**  (Shapiro, *Thinking About Mathematics*, pp. 3-20; Oystein Linnebo,

“Mathematics as a Philosophical Challenge,” pp. 4-20 **On Learn under** **Course**

**Readings**)

**4/5** Lecture 2 **History of the Philosophy of Mathematics** (**NLS,** ch 1; **HIPM,** pp.6-15; 31-37; 68-

78; 211-221; 248-255)

**Video-Dangerous Ideas available under Lecture 2 content area**

**4/12-19** Lecture 3/4 **Nature of Mathematical Truth and Knowledge** (**HIPM**, pp.487-504; 683-700 ;

Benacerraf and Maddy, recommended Parsons and Tait, (all available in **Course Readings)**

**---Group Presentation posted 4/22 ---due 5/9---------------------------------------------------------------------------**

**4/26-5/3** Lecture 5/6 **Philosophical Problems with Mathematical Concepts – Continuity and Infinity**

**NLS,** ch, 7, 9 &11; Hilbert , ”On the Infinite” **HIPM,** pp. 363-375, also available on Learn in **Course Readings**);

**Video “52” located on Learn under the Lecture 6 content area**

**5/10** Lecture 7 **Foundation of Mathematics-The “Isms”** -- Logicism, Formalism,

Intutionism,.

` Fictionalism and Naturalism (**HIPM,**  pp. 315-319; 352-362; 394-404; 633-646; 701-714; recommended **TM,** pp. 107-171)

**Group Presentation due 5/9**

**5/17** Lecture 8 **Mathematics, Science and Reality**

Maddy, “Indispensability and Practice.” Sober, “Mathematics and Indispensability.”

Wigner, “Unreasonable Effectiveness of Mathematics in the Natural Sciences,”

Livio, “Is Mathematics Invented or Discovered” (**all available on Learn in *Course Readings***) **Video – Great Math Mystery**

**5/24** Lecture 9 **Is Reality a Mathematical Structure**?

**HIPM,** 601-611; Tegmark, “Physical Reality and Mathematical Reality” (Tegmark available in ***Course Readings***)

**5/31** Lecture 10 **Mathematics, Morality and Literature – another look at infinity**

(Borges “Library of Babel;” “Mathematics, Morality and Machines,” available in ***Course Readings***)

**6/8 Final Paper Due**

**Course Objectives**

* Develop the ability to understand, from a critical perspective, issues and problems pertaining to the philosophy of mathematics.
* Develop a critical understanding of the philosophy of mathematics from an historical perspective.
* Recognize the intersection and distinction between philosophical and mathematical problems as they pertain to the philosophy of mathematics.
* Recognize the importance of critical reasoning as a transferrable skill that can be applied across disciplines

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**Assignments –** The student is expected to submit completed assignments when they are due. Late or missing assignments can result in a reduction in the final course grade.

**Withdrawals and Incompletes –** If the student intends to withdraw from the class, it is the student’s responsibility to know and follow University procedures and deadlines, and secure the appropriate forms and required approvals.

If the student wants an “Incomplete” grade for the course, the student must make arrangements with me prior to the end of the term by completing a “Contract for the Grade of Incomplete,” and must only need to complete the final paper to complete the course requirements. If the student stops participating in the course without withdrawing, or if the student has other requirements outstanding besides the final exam, the student will receive an F for the course.

**Financial/Academic Record Impact for Drop/Withdrawal**-Dropping or withdrawing from courses can have serious financial and academic implications, possibly affecting billing, financial aid, VA benefits, the ability to participate in NCAA athletic events, and for foreign students, immigration status. Students are strongly encouraged to consult with their Academic Advisor and financial aid counselor before withdrawing. Students are considered the responsible parties for any/all transactions processed against their academic record.

**Financial Obligations-**Students who do not satisfy financial obligations to Drexel University are not entitled to a grade by the instructor of the University.

**Academic Honesty Policy-**Drexel University is committed to a learning environment that embraces academic honesty. In order to protect members of our community from the results of dishonest conduct, the University has adopted policies to deal with cases of academic dishonesty. Please read, understand and follow the Academic Honesty Policy as written in the Official Student Handbook

**Americans with Disabilities Act-** Students with documented disabilities who need course accommodations, have emergency medical information or require special arrangements for building evacuation should contact their instructor within the first two weeks of class. Verification of any special arrangements needs to be made through the Office of Disability Services, 3141 Chestnut St., Suite 2228. For more information visit [disability@drexel.edu](mailto:disability@drexel.edu)

**Changes in the Syllabus-** The instructor reserves the right to make changes to the syllabus if circumstances warrant such change. All changes will be provided to the student in writing.