MATH 429 **History of Mathematics** **Spring 2021**

Pre-Requisite: **Math 307**
Time: MWF 12.00 – 12:50
Place: Theta Ro Room [Mansfield Library 410]
Instructor: Dr. Sriraman
Office: Math 310
E-mail: sriramanb@mso.umt.edu
Texts:

1. Stillwell, J. (2010). *Mathematics and Its History* (Third Edition). Springer Science.
2. Joseph, G. G. (2011). *The Crest of the Peacock: Non-European Roots of Mathematics*. Princeton University Press.

Webpage: UM-Online Moodle will be used extensively -please check Moodle every week.

Learning Goals

1. To imbue a sense of the development of mathematical ideas over time.
2. To develop a knowledge of the times and places where ideas developed, and the ways in which such ideas were transmitted across cultures and time.
3. To learn about the people behind mathematics that is taught today, and to understand the contributions of other cultures to mathematics.
4. To improve the students ability to write in the context of mathematics; i.e., expository and scientific writing skills.

To further the learning outcomes over the course of the semester, lectures and readings will cover

- Historical techniques/methods for arithmetical computing
- Historical methods in Analysis (approximating roots and irrational numbers such as π and logarithms), Calculus (geometric techniques developed by Archimedes, Fermat, Newton and Leibniz) and Algebra (theory of equations).
- Greek and Non-Greek Mathematical History

In addition, students will develop a critical stance in

- assessing popular myths about mathematics (science) or competing histories of the origins and/or models of the development of mathematics (science)
- assessing whether mathematics (science) is value-free; [consider gender, class, race, nonwestern approaches and contributions, etc.]

Note: The course satisfies the upper-division writing requirement for Math majors.
Important Dates: (*For detailed Add/Drop dates and Spring deadlines go to the Registrars webpage: https://www.umt.edu/registrar/calendar/spring-2021.php*

Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. Academic misconduct is defined as all forms of academic dishonesty and the Student Conduct Code. In particular, Student Conduct Code Section IV.a.5 identifies the following violations: Submitting false information: Knowingly submitting false, altered, or invented information, data, quotations, citations, or documentation in connection with an academic exercise

Students with disabilities may request reasonable modifications by contacting me. The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students (DSS). "Reasonable" means the University permits no fundamental alterations of academic standards or retroactive modifications. For more information, please consult http://www.umt.edu/disability

Grading Distribution:

In class Contributions (Group Assignment (40), Research Paper Talk (40))	80
2 Formative Writing Assignments:	80
Take Home Midterm	80
Research Paper	160
Total:	**400**

Grading Scale: 90-100 A ; 80-89.9 B ; 70-79.9 C ; 60-69.9 D ; Below 60 F
All assignments are to be handed as hard copy in class on the due dates (see below)

In class contributions (Group Assignment; Research Paper Talk)

Group Assignment
In order to succeed in this course, it is important to complete the reading assignments and come to class prepared. There will be a set of targeted readings assigned to groups of 2-3 students. For the reading, you will do the following:

A. Reading: Prepare a summary for the class with several "specific" questions for discussion. The summary will be typed and include the relevant history [and time period], the relevant individual(s) and the relevant mathematics (with attention to specific techniques). The summary will be approximately 2-3pages [single spaced], Font size 12 Times New Roman, 1 inch margins.
B. Class Presentation- Each group will present their summary, lead a discussion of the reading and then present/solve some problems using the relevant mathematical technique learned from the reading. Each pair will get one class period (and two if needed).

Formative Writing Assignments
The only way to become proficient at expository scientific writing is to write, and rewrite and rewrite until your ideas become coherent and accessible to the reader. Writing in the mathematics community is a necessary activity, one in which ideas are subjected to scrutiny in the form of peer-review. This may seem intimidating at first but with time, you will become comfortable and proficient. The two formative writing assignments are as follows:

1. An obituary of a 20th century non-Western mathematician. Please refer to the Washington Post or the New York Times or The Economist for guidance in writing. Use one as your model and turn it in with your own work. (1000 words). Due February 1st

2. A short biography of a living 20th century female mathematician describing her background, research and notable accomplishments (1000 words). Due Feb 24th.

Research Paper:

The research paper is a major component of this course. The paper should be written in APA style [6th edition or higher]. Please refer to the appropriate manual for guidelines. All papers must be typed and submitted hard copy. You will have the opportunity <u>to develop your paper</u> provided you adhere to the deadlines. The point of submitting an earlier draft is for you to receive feedback in improving your writing. Final papers that are submitted on the due date, <u>without any prior feedback from me will receive a 20% deduction.</u>

The research topic should be chosen either from a list that I will provide to you (the list <u>will exclude</u> histories of zero, infinity, π, e and phi (the golden ratio), the Newton/Leibniz controversy) or after consulting me. The paper will focus on (a) tracing the evolution of a topic across time, or (b) it can be a period piece that focuses on the development of a mathematical topic or area, and puts it in the context of

the period of its development. The final paper should include appropriate events in the world of mathematics during that time, some of the cultural history of the time period, and specific mathematical content/techniques developed. The final paper should be around 6000 words.

Due dates are as follows: first draft- March 10 (approx. 2500 words), and final draft April 14 (approx. 6000 words). Grading Criteria will be posted on Moodle.

COVID-19 University Policies

- Mask use is required within the classroom
- Each student is provided with a cleaning kit. The expectation is that students will clean their personal work space when they arrive for class, and before they leave the classroom
- Classrooms may have one-way entrances / exits to minimize crowding
- Students are discouraged from congregating outside the classroom before and after class
- Specific seating arrangements will be used to ensure social distancing and support contact tracing efforts
- Class attendance will be recorded to support contact tracing efforts
- Drinking liquids and eating food is discouraged within the classroom (which requires mask removal)
- Stay home if you feel sick and/or if exhibiting COVID-19 symptoms
- If the student is sick or displaying symptoms, please contact the Curry Health Center at (406) 243-4330
- Up-to-Date COVID-19 Information from the University of Montana
    - UM Coronavirus Website: https://www.umt.edu/coronavirus
    - UM COVID-19 Fall 2020 website: https://www.umt.edu/coronavirus/fall2020.php
- Strongly encourage students to remain vigilant outside the classroom in mitigating the spread of COVID-19