

Mathematics 3810H – Ancient and Classical Mathematics

TRENT UNIVERSITY, Winter 2016

[In Peterborough!]

MATH 3810H traces the development of mathematics in the Middle East and the Mediterranean from prehistory to the end of the classical period.

Instructor

Stefan Bilaniuk (pronounced Стефан Біланюк)

office: GCS 337

Office hours: Tuesday–Friday 11:00–11:50,

or by appointment, or just drop by!

phone: 705 748-1011 x7474

home: 705 742-7862 [Do not call between 9 p.m. and 8 a.m. unless it's an emergency.]

e-mail: sbilaniuk@trentu.ca [E-mail sent to my Trent address sometimes just vanishes. If it's important, call!]

web: euclid.trentu.ca/math/sb/

Department of Mathematics

office: GCS 346

hours: 08:30–12:30 & 13:30–16:30

phone: 705 748-1011 x7531

e-mail: math@trentu.ca

Prerequisite

MATH 1120H or MATH 1100Y/1101Y. *Recommended:* MATH 2200H or MATH 2350H.

Text

The Historical Roots of Elementary Mathematics, by Lucas N.H. Bunt, Phillip S. Jones, & Jack D. Bedient, Dover Publications, New York, 1988, ISBN 0-486-25563-8.

We will also make some use of the following book:

A Short Account of the History of Mathematics (4th Edition), by W. W. Rouse Ball, 1908. Available for free from Project Gutenberg at: www.gutenberg.org/etext/31246

Additional readings will be assigned from other sources available online.

Meetings

Lectures: Tuesday 13:00–13:50 in GCS 105, Wednesday 12:00–12:50 in SC 208, and Thursday 13:00–13:50 in GCS 103.

Seminars: Thursday 14:00–14:50 in GCS 103.

Marking Scheme

There will be at least six fortnightly assignments, a project (including a proposal), and a take-home final examination. The assignments will be handed out and collected every other week, the project proposal will be due on 8 February, and the project itself will be due in the examination period on 18 April. The final examination will be distributed on 22 March, two weeks before the last day of classes, and will also be due on 18 April. The final mark will be calculated as follows:

Best 5 assignments (7% each)	35%	Project	30%
Project proposal	3%	Final Examination	32%

At least 25% of the course marks will be obtained by the final date (Thursday, 3 March) to withdraw from Winter half-courses without academic penalty. Students who are unable to hand in assignments on time for reasons beyond their control should contact the instructor as soon as possible.

This scheme may be modified for students in exceptional circumstances. Any such modification will require the agreement of both the student and the instructor.

Content & Learning Outcomes

MATH 3810H is a survey of the development of mathematics in the Mediterranean and the Middle East to the end of the classical period, with particular attention to the development of number systems, arithmetic, and algebra in ancient Egypt and Mesopotamia, and the development of rigour and geometry in ancient Greece and in the Hellenistic and Roman periods. Students will be exposed to the problem of interpreting the available data (*e.g.* the various interpretations of the cuneiform tablet Plimpton 322), and will read portions of several original sources in translation.

Web page

This course will make at most minimal use of Blackboard, and perhaps none at all. A web page at euclid.trentu.ca/math/sb/3810H/ will have hopefully-up-to-date information and all handouts.

Readings & Schedule

The following schedule is *tentative* – no lesson plan survives contact with students! – and our actual pace will be adjusted as necessary. Most of our readings will be from the textbook, *The Historical Roots of Elementary Mathematics*, by Lucas N.H. Bunt, Phillip S. Jones, & Jack D. Bedient, hereinafter referred to as *BJB*. Some readings are given from *A Short Account of the History of Mathematics* (4th Edition), by W. W. Rouse Ball, hereinafter referred to as *Ball*. Some additional readings will also be given from time to time, from sources available online. (See the course web page for links when the time comes.)

Week 0. (6–8 January, 2016.) Classes begin on Wednesday, 6 January. *BJB* §1-1-1-3; *Ball* Chapter I. Mathematics in prehistory; historical evidence and its limitations; Egyptian number system.

Week 1. (11–15 January, 2016.) *BJB* §1-4-1-8. Arithmetic operations and algorithms, fractions.

Week 2. (18–22 January, 2016.) *BJB* §1-9-1-11 & §2-1-2-3. Algebra and geometry in ancient Egypt; Mesopotamian number system and arithmetic. Assignment #1 due on Thursday, 21 January.

Week 3. (25–29 January, 2016.) *BJB* §2-4-2-9; *Words and Pictures: New Light on Plimpton 322*. Mesopotamian algebra and geometry.

Week 4. (1–5 February, 2016.) *BJB* 3-1-3-5; *Ball* Chapters II & VII. Early Greek mathematics, Greek number systems. Assignment #2 and project proposal due on Thursday, 4 February.

Week 5. (8–12 February, 2016.) *BJB* §3-6-3-10; *Ball* Chapter II. Pythagorean number theory and geometry, incommensurables.

Winter Reading Week. (15–19 February, 2016.) Enjoy!

Week 6. (22–26 February, 2016.) *BJB* 4-1-4-5; *Ball* Chapter III. Development of Greek geometry, quadrature, proportion, geometric algebra, systematization. Assignment #3 due on Thursday, 25 February.

Week 7. (29 February – 4 March, 2016.) *BJB* §5-1-5-5 & 6-1-6-5; *Ball* Chapter V. Logic, rigour, Euclid's *Elements*. The last date to withdraw from Winter half-courses without academic penalty is Thursday, 3 March.

Week 8. (7–11 March, 2016.) *BJB* §6-6-6-14 More on Euclid's *Elements*. Assignment #4 due on Thursday, 10 March.

Week 9. (14–18 March, 2016.) *BJB* §7-1-7-3; *Ball* Chapter IV; *The Sand-Reckoner*. Hellenistic mathematical physics, computation of areas and volumes, number systems.

Week 10. (21–25 March, 2016.) *BJB* §7-4-7-7; *Ball* Chapter V. Hellenistic astronomy, trigonometry, algebra. Take-home final examination distributed on Tuesday, 22 March; Assignment #5 due on Thursday, 24 March.

Week 11. (28 March – 1 April, 2016.) *BJB* §7-8-7-11. Influence of ancient and classical mathematics.

Week 12. (4–5 March, 2016.) Tuesday, 7 April, is the last day of classes. Clean-up. Assignment #6 due on Tuesday, 5 March.

Winter final examination period. (8–22 April, 2016.) Project and take-home final examination due on Monday, 18 April.

Academic Integrity

Academic dishonesty, which includes plagiarism and cheating, is an extremely serious academic offence and carries penalties varying from a 0 grade on an assignment to expulsion from the University. Definitions, penalties, and procedures for dealing with plagiarism and cheating are set out in Trent University's Academic Integrity Policy. You have a responsibility to educate yourself – unfamiliarity with the policy is not an excuse. You are strongly encouraged to visit Trent's Academic Integrity website to learn more – www.trentu.ca/academicintegrity

For clarity, the following guidelines will apply in MATH 3810H:

You are permitted and encouraged to work together and ask anyone willing (especially the instructor!) for explanations, hints, and suggestions on the assignments and projects, and to consult whatever sources you wish, with the exception that **you may not consult anyone who has taken a similar course recently or their work**. However, **all work submitted for credit must be written up entirely by you** (with the exception of group projects), **giving due credit to all relevant sources of help and information**. The take-home final exam will have more restrictive conditions that will be spelled out on the exam.

Access to Instruction

It is Trent University's intent to create an inclusive learning environment. If a student has a disability and/or health consideration and feels that he/she may need accommodations to succeed in this course, the student should contact the Student Accessibility Services Office (SAS), Blackburn Hall Suite 132, 705 748-1281, sas@trentu.ca. For Trent University in Oshawa Student Accessibility Services Office contact 905 435-5102, ext. 5024. Complete text can be found under Access to Instruction in the Academic Calendar.