## COURSE SYLLABUS MATH 3380, Section 01 HISTORICAL PERSPECTIVE OF MATHEMATICS CREDIT HOURS: 3 Spring 2018

### CLASSROOM AND SCHEDULE: Lee Drain Building, Room 424 Monday & Wednesday, 9:30-10:50 a.m.

# **INSTRUCTOR INFORMATION:**

Dr. Dustin L. Jones Office: Room 421C Lee Drain Building Phone: 936-294-4776 Fax: 936-294-1882 Email: DLJones@shsu.edu Office hours: Mon. & Wed. 1 – 2 p.m. Tue. & Thu. 8:30 – 9:30 a.m. Other times available by appointment

**CATALOG DESCRIPTION:** This course is designed to present mathematical topics from a historical perspective. The number systems and computational methods of past cultures and civilizations are discussed, along with the development of number theory and trigonometry. Credit in this course is applicable only toward elementary/middle school teacher certification. Prerequisite: C or better in MATH 2384.

COURSE OBJECTIVES: Upon completion of this course, students will be able to:

- Describe the major mathematical contributions of individuals and societies related to numeration, computation, number theory, and trigonometry.
- Represent numbers (including whole numbers and fractions) in various numeration systems, including Babylonian, Egyptian, Roman, Greek, Chinese, and Mayan.
- Understand and use computational methods of other cultures.
- Classify numbers according to specific definitions (e.g., abundant, amicable, prime, triangular) and use these definitions to make, test, and prove conjectures.
- Understand, use, and create number-theoretic functions.
- Describe how the history of mathematics relates to U.S. middle-grades classrooms.

**REQUIRED TEXTBOOK:** *Number Stories of Long Ago* by David Eugene Smith. The book was originally written in 1919, and it is available for free online through Google Books. A link will be posted on Blackboard. Many other course materials, such as readings, handouts, and assignments, will also be available through Blackboard.

## **COURSE FORMAT**

- This class will be a hybrid of face-to-face (traditional) and online formats.
- In general, students will complete class readings and watch videos on new content before class.
- We will meet in LDB 424 each Monday and Wednesday to discuss articles and present solutions to problem sets related to the readings and videos.
- Reading Quizzes will be submitted electronically, and are due on Fridays. See the Tentative Schedule for specific dates.
- All course material will be posted on Blackboard for students to complete between class meetings. Please check Blackboard regularly.

## **COURSE OUTLINE:**

- Unit 1: History of Numbers, Numerals, and Computation
- Unit 2: Number Theory
- Unit 3: Trigonometry

**ATTENDANCE POLICY:** Regular and punctual attendance is expected of every student. As a prospective teacher, you must demonstrate your reliability and conscientious attitude by your faithful attendance. Any student who is more than 30 minutes late to class will be counted absent. Students who are absent or tardy are still responsible for all material covered in class. Serious health or family problems that are well documented will be handled individually.

In addition to attending class faithfully, students are expected to put forth their best effort in this class. This includes, but is not limited to, actively participating in class discussions and activities. By way of contrast, *unprofessional behaviors will not be tolerated*. Unprofessional behaviors include sleeping, texting, laying your head on the desk, checking social media, or studying for other classes.

## **READING ASSIGNMENTS, VIDEO LECTURES, AND PROBLEM SETS:**

New material will be communicated primarily through reading assignments and video lectures. In order to succeed in this course, it is imperative that students complete the assigned reading and video lectures prior to class meetings. We will use class time to discuss articles and present solutions to problem sets.

For many class periods, there will be an opportunity to earn points in the following ways:

- *Answering questions about articles.* There are fifteen articles to be read. A student may earn up to 30 points (2 points per article) by answering these questions.
- *Presenting solutions to problems from the Problem Sets.* Each student will have the opportunity to earn up to 40 points (up to 3 points per solution) by presenting their solutions. At times, students may be selected randomly; at other times, volunteers may be solicited.

If a student is absent, no points may be earned for that class period.

QUIZZES, TESTS, PRESENTATION, AND FINAL EXAM: Throughout the course of the semester, students will have a number of ways to demonstrate proficiency in learning the material. For all categories, NO LATE WORK WILL BE ACCEPTED. If a student knows that he or she will be absent, he or she may turn in your assignment early, drop it by the instructor's office, or send it by email by class time of the due date.

- *Quizzes:* There will be nine quizzes over the course of the semester. One will be administered in class, and the rest will be online. The Greek alphabet is the subject of the in-class quiz. The online quizzes are related to the chapters of our textbook. Questions for the online quizzes will be selected from the "Question Box" at the end of each chapter. Your top eight quiz scores will count towards your course grade.
- *Tests:* There will be a total of four tests. These will be administered during class time, and some will have take-home portions.
- Final Exam: The final exam is comprehensive.

#### **COURSE EVALUATION:**

Category	Points Possible
In-class Questions about Articles	30
In-class Presentation of Solutions	40
Quizzes (top 8 scores, 10 points each)	80
Tests (6 tests, point totals vary)	205
Final Exam (comprehensive)	70
Total	425

#### **Grading Scale**

Points earned	383-425	340-382	297-339	255-296	less than 255
Course grade	А	В	С	D	F

**ACADEMIC DISHONESTY:** All students are expected to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain complete honesty and integrity in the academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. The University and its official representatives may initiate disciplinary proceedings against a student accused of any form of academic dishonesty including, but not limited to, cheating on an examination or other academic work which is to be submitted, plagiarism, collusion and the abuse of resource materials.

**CLASSROOM RULES OF CONDUCT:** Students will refrain from behavior in the classroom that intentionally or unintentionally disrupts the learning process and, thus, impedes the mission of the university. Cellular telephones and pagers must be turned off and stored out of sight before class begins. Students are prohibited from eating in class, using tobacco products, making offensive remarks, reading newspapers and magazines, sleeping, talking at inappropriate times, wearing inappropriate clothing, or engaging in any other form of distraction. Inappropriate behavior in the classroom shall result in a directive to leave class. Students who are especially disruptive also may be reported to the Dean of Students for disciplinary action in accordance with university policy.

**TELEPHONES AND MESSAGING DEVICES:** The use by students of electronic devices that perform the function of a telephone or text messager during class-time is **prohibited**. Arrangements for handling potential emergency situations may be granted at the discretion of the instructor. *Failure to comply with this policy could result in expulsion from the classroom or with multiple offenses, failure of the course.* Any use of a telephone or text messager or any device that performs these functions during a test period is prohibited. These devices should not be present during a test or should be stored securely in such a way that they cannot be seen or used by the student. Even the visible presence of such a device during the test period will result in a zero for that test. Use of these devices during a test is considered de facto evidence of cheating and could result in a charge of academic dishonesty.

**STUDENTS WITH DISABILITIES POLICY:** It is the policy of Sam Houston State University that individuals otherwise qualified shall not be excluded, solely by reason of their disability, from participation in any academic program of the university. Further, they shall not be denied the benefits of these programs nor shall they be subjected to discrimination. Students with disabilities that might affect their academic performance should register with the Office of Services for Students with Disabilities located in the Lee Drain Annex (telephone 936-294-3512, TDD 936-294-3786, and e-mail disability@shsu.edu). They should then make arrangements with their individual instructors so that appropriate strategies can be considered and helpful procedures can be developed to ensure that participation and achievement opportunities are not impaired.

SHSU adheres to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations for students with disabilities. If you have a disability that may affect adversely your work in this class, then I encourage you to register with the SHSU Services for Students with Disabilities and to talk with me about how I can best help you. All disclosures of disabilities will be kept strictly confidential. NOTE: No accommodation can be made until you register with the Services for Students with Disabilities. For a complete listing of the university policy, see http://www.shsu.edu/dept/academic-affairs/aps/aps-students.html

**STUDENT ABSENCES ON RELIGIOUS HOLY DAYS:** University policy states that a student who is absent from class for the observance of a religious holy day must be allowed to take the examination or complete an assignment scheduled for that day within a reasonable time after the absence. Students will be excused to travel for observance of a religious holy day. A student who wishes to be excused for a religious holy day must present the instructor with a written statement describing the holy day(s) and the travel involved. The instructor will then provide the student with a written description of the deadline for the completion of missed exams or assignments.

**VISITORS IN THE CLASSROOM:** Unannounced visitors to class must present a current, official SHSU identification card to be permitted in the classroom. They must not present a disruption to the class by their attendance. If the visitor is not a registered student, it is at the instructor's discretion whether or not the visitor will be allowed to remain in the classroom. This policy is not intended to discourage the occasional visiting of classes by responsible persons. Obviously, however, the visiting of a particular class should be occasional and not regular, and it should in no way constitute interference with registered members of the class or the educational process.

**COPYRIGHT POLICY:** All printed materials disseminated in class or on the web are protected by Copyright laws. One photocopy (or download from the web) is allowed for personal use. Multiple copies or sale of any of these materials is strictly prohibited.

**SYLLABUS REVISIONS:** All information on this syllabus is subject to change. Any changes will be announced in class and posted on Blackboard.

# **TENTATIVE SCHEDULE**

Mondays		Wednesda	lys	Fridays
		Jan. 17	Numeration Systems	RQ I & II online
				Due at noon on 1/19/18
Jan. 22	Babylonian Numerals	Jan. 24	Egyptian & Roman Numerals	RO III & IV online
	Article 1		Article 2	Due at noon on 1/26/18
	Present 1.1		Present 1.2	
Jan. 29	Chinese & Greek Numerals	Jan. 31	Greek Alphabet Ouiz	RO VIII online
• • • • • • • • • •	Article 3		Mavan Numerals	Due at noon on 2/2/18
	Present 1.3 & 1.4		Articles 4 & 5	
			Present 1.5	
Feb. 5	Egyptian Fractions	Feb. 7	Babylonian Fractions	
	Article 6		Article 7	
	Present 1.6		Present 1.7	
Feb. 12	Greek & Decimal Fractions	Feb. 14	Numeration Systems &	
	Present 1.8		Fractions Test	
Feb. 19	Calculation Methods	Feb. 21	Multiplication Methods	RQ V, VI, & VII online
	Articles 8 & 9		Article 10	Due at noon on 2/23/18
	Present 1.9		Present 1.10	
Feb. 26	Using Logarithms	Feb. 28	Calculation Methods Test,	Calculation Methods
	Present 1.11		In-class Portion &	Test, Individual
			Individual Demonstrations	<b>Demonstrations 3/2/18</b>
				(if needed)
Mar. 5	Calculation Methods Test,	Mar. 7	Figurate Numbers	
	Take Home Portion Due		Articles 11 & 12	
	Even & Odd Numbers		Present 2.1	
Mar. 12	No Class Meeting – Spring	Mar. 14	No Class Meeting – Spring	
	Break		Break	
Mar. 19	Prime Numbers	Mar. 21	Tau and Sigma Functions	
	Article 13		Article 14	
	Present 2.2		Present 2.3	
Mar. 26	Divisibility	Mar. 28	Least Common Multiple	
	Present 2.4		Relatively Prime Numbers	
			Present 2.5 & 2.7	
Apr. 2	Linear Equations	Apr. 4	Euler's $\phi$ Function	Take-home portion of
	Present 2.6		Present 2.8	Number Theory Test
				available by 4/6/18
Apr. 9	Number Theory Test,	Apr. 11	Origins of Trigonometry	
	In-class Portion &		Article 15	
	Take-Home Portion Due		Present 3.1	
Apr. 16	Angular Measure	Apr. 18	Secant, Tangent, &	
	Chords, Sines, & Cosines		Cotangent	
	Present 3.2 & 3.3		Present 3.4 & 3.5	
Apr. 23	Trigonometry	Apr. 25	The Great $\pi/e$ Debate	
	Present 3.6			
Apr. 30	Trigonometry Test	May 2	Review for Final Exam	
May 7	No Class Meeting	May 9	FINAL EXAM	
		1	9:30 – 11:30 A.M.	

### ARTICLE LIST All articles are available online; access is free when using a computer at SHSU.

- Court, N. A. (2006). Mathematics in the history of civilization. Mathematics Teaching in the Middle School, 12(3), 142-148. http://www.jstor.org/stable/41182899
- Zaslavsky, C. (2003). The influence of ancient Egypt on Greek and other numeration systems. *Mathematics Teaching in the Middle School*, 9(3), 174-178. http://www.jstor.org/stable/41181884
- Uy, F. L. (2003). The Chinese numeration system and place value. *Teaching Children Mathematics*, 9(5), 243-246. http://www.jstor.org/stable/41198145
- Walmsley, A. L. E. (2006). Understanding Aztec and Mayan numeration systems. *Mathematics Teaching in the Middle School*, 12(1), 55-61. http://www.jstor.org/stable/41164027
- 5. Krusen, K. (1991). A historical reconstruction of our number system. *Arithmetic Teacher*, 38(7), 46-48. http://www.jstor.org/stable/41194817
- Edwards, T. G. (2004). Using ancient Egyptian fractions to review fraction concepts. *Mathematics Teaching in the Middle School*, 10(5), 226-229. http://www.jstor.org/stable/41182070
- 7. Knott, R. P. (1978). The history of fractional notation. *Mathematics in School*, 7(1), 20-21. http://www.jstor.org/stable/30211688
- 8. The Mathematical Association. (1975). The abacus today. *Mathematics in School*, 4(5), 18-19. http://www.jstor.org/stable/30211432
- 9. Maxwell, R. P. (1981). The Chinese abacus. *Mathematics in School*, 10(1), 2-5. http://www.jstor.org/stable/30213599
- Lin, C.-Y. (2007/2008). Teaching multiplication algorithms from other cultures. *Mathematics Teaching in the Middle School*, 13(5), 298-304. http://www.jstor.org/stable/41182557
- 11. Norman, F. A. (1991). Figurate numbers in the classroom. Arithmetic Teacher, 38(7), 42-45. http://www.jstor.org/stable/41194815
- 12. Richards, A. (1975). Figurate numbers, supermarkets, and Pascal triangles. *Mathematics in School, 4*(5), 2-4. http://www.jstor.org/stable/30211424
- Robbins, C., & Adams, T. L. (2007). Get "primed" to the basic building blocks of numbers. *Mathematics Teaching in the Middle School*, 13(2), 122-124, 126-127. http://www.jstor.org/stable/41182508
- 14. Adams, T. L., & Murphy, K. (2005). A look at some numbers of old: Perfect, deficient, and abundant. Mathematics Teaching in the Middle School, 10(6), 309-310, 312-313. http://www.jstor.org/stable/41182090
- 15. Bressoud, D. M. (2010). Historical reflections on teaching trigonometry. *Mathematics Teacher*, 104(2), 106-112. http://www.jstor.org/stable/20876798