Evolution of Mathematical Systems MATH 5331
Department of Mathematics and Statistics
Spring 2015

A. COURSE INFORMATION
   Course number/section: CRN 41742, MATH 5331/ Section 001
   Class meeting time: Tuesday 7:00pm-9:30pm
   Class location: CS-107
   Course Website: TAMU-CC Blackboard https://bb9.tamucc.edu

B. INSTRUCTOR INFORMATION
   Instructor: Valentina Postelnicu
   Office location: CI-357
   Office hours: Tuesday 12:00pm-3:00pm, Wednesday 7:00pm-8:00pm (online),
                Thursday 2:00pm-3:00pm, and by appointment
   Telephone: (361) 825-3023 (office)
              (480) 220-4961 (cell, for text and emergency only)
   e-mail: Valentina.Postelnicu@tamucc.edu
   Appointments: Please email me, and include information about your availability during
                 the week you would like to meet with me.

C. COURSE DESCRIPTION
   Covers the evolution of mathematical concepts and thought from ancient to modern times,
   including women and men who played key roles, from original and secondary sources. Provides
   a better understanding of the historical development of larger context for topics studied in other
   courses, and deepens understanding and appreciation of these topics. This course is intended to
   benefit current and future mathematics teachers.

D. PREREQUISITES AND COREQUISITES
   Prerequisites: MATH 5321 or consent of the instructor.

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES
   Required textbook
   Other References
   • The First Six Books of the Elements of Euclid by John Casey and Euclid, and
   • Philosophiae Naturalis Principia Mathematica by Sir Isaac Newton (in Latin) can be
accessed from http://www.gutenberg.org/. Our library has an English translation of
Newton’s Mathematical Principles of Natural Philosophy, in Encyclopaedia
Britannica.
For their activities and assignments, students may use other references, limited to books and
articles from academic journals (Wikipedia is not an acceptable reference). It will be the
students’ responsibility to find and access references for their papers.

Supplies
Regular access to high speed internet and office applications (e.g., MS Word).

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT
By the end of this course, students should be able to:
1. Demonstrate knowledge of the historical development of mathematics, and identify
factors that influenced it.
2. Demonstrate knowledge of the contributions of important mathematicians, analyze and
argue their impact on the development of mathematics.
3. Solve a selection of mathematical problems using ancient techniques, and compare them
with modern techniques.
4. Identify appropriate sources, select and organize appropriate information, and create
original presentations on the historical development of a mathematical discipline or topic.

G. INSTRUCTIONAL METHODS AND ACTIVITIES
The course will be a combination of lectures, whole-class discussions, and individual
investigations of the history of mathematics. Students will be required to give individual or
group presentations. If needed, there will be alternative assignments in lieu of presentations.
All participants are expected to engage in group and whole class activities by contributing
knowledge and thoughtful evaluation of others’ contributions.

H. MAJOR COURSE REQUIREMENTS AND GRADING
Grades will be based on the percentage of total points the student earns. There will be points
given on the following:

<table>
<thead>
<tr>
<th>ACTIVITY/ASSIGNMENT</th>
<th>% of FINAL GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timeline Project</td>
<td>15%</td>
</tr>
<tr>
<td>Calculus Debate</td>
<td>15%</td>
</tr>
<tr>
<td>Paper 1: Problem solving with ancient and modern technique</td>
<td>20%</td>
</tr>
<tr>
<td>Paper 2: Important mathematician’s contribution</td>
<td>20%</td>
</tr>
<tr>
<td>Final Project: The historical development of a mathematical domain or topic (written paper, ppt)</td>
<td>30%</td>
</tr>
</tbody>
</table>
The activities/assignments will be graded using the following **Grading Rubric**:

<table>
<thead>
<tr>
<th>Category</th>
<th>4 Exemplary</th>
<th>3 Good</th>
<th>2 Satisfactory</th>
<th>1 Unsatisfactory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject knowledge 50%</td>
<td>Demonstrates subject knowledge throughout the entire assignment.</td>
<td>Demonstrates subject knowledge most of the time.</td>
<td>Demonstrates some subject knowledge.</td>
<td>Subject knowledge is not demonstrated.</td>
</tr>
<tr>
<td></td>
<td>All information is clear, appropriate, and accurate.</td>
<td>Most of the information is clear, appropriate, and accurate.</td>
<td>Some information is clear, appropriate, and accurate.</td>
<td>Information is confusing, insufficient, inappropriate, and inaccurate.</td>
</tr>
<tr>
<td></td>
<td>The solutions to all problems are correct.</td>
<td>Most of the solutions to problems are correct, some solutions have minor errors.</td>
<td>Some solutions to problems are correct.</td>
<td>Most of the problems have incorrect solutions.</td>
</tr>
<tr>
<td>Organization 30%</td>
<td>The sequence of information/proof is logical and well organized.</td>
<td>The sequence of information/proof is well organized.</td>
<td>Some parts of the sequence of information/proof is organized.</td>
<td>The sequence of information/proof is disorganized.</td>
</tr>
<tr>
<td>Communication (written paper, and/or ppt and oral presentation) 20%</td>
<td>Excellent written communication of ideas/ excellent integration of spoken and visual presentation.</td>
<td>Good written communication of ideas, most of the time/good integration of spoken and visual presentation, most of the time.</td>
<td>Some parts are well written, and ideas are communicated effectively / some parts of the presentation are coordinated orally and visually.</td>
<td>The written paper is hard to follow, ideas are not communicated effectively / the presentation is hard to follow, the spoken and visual presentation are not integrated.</td>
</tr>
</tbody>
</table>

Final grades will be assigned according to the following table:

**Percentage Grade**

- 90.0% A
- 80.0% B
- 70.0% C
- 60.0% D
- Below 60% F
## I. COURSE CONTENT/SCHEDULE

<table>
<thead>
<tr>
<th>DATE</th>
<th>TOPIC</th>
<th>CHAPTER(S)</th>
<th>ASSIGNMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 27</td>
<td>Introduction</td>
<td>Chapter 1 Traces</td>
<td>Read Chapters 2 and 3&lt;br&gt;Start the Timeline Project&lt;br&gt;Identify problems with ancient solutions for Paper 1</td>
</tr>
<tr>
<td>Feb 3</td>
<td>The mathematics of ancient Egypt and Mesopotamia (Online)*</td>
<td>Chapter 2 Ancient Egypt&lt;br&gt;Chapter 3 Mesopotamia</td>
<td>Read Chapters 4&lt;br&gt;Continue the Timeline Project&lt;br&gt;Identify problems with ancient solutions for Paper 1</td>
</tr>
<tr>
<td>Feb 10</td>
<td>Hellenic mathematics (Online)*</td>
<td>Chapter 4 Hellenic Traditions</td>
<td>Read Chapters 5 and 6&lt;br&gt;Continue the Timeline Project&lt;br&gt;Paper 1 is due&lt;br&gt;Identify important mathematicians for Paper 2</td>
</tr>
<tr>
<td>Feb 17</td>
<td>Greek mathematics</td>
<td>Chapter 5 Euclid of Alexandria&lt;br&gt;Chapter 6 Archimedes of Syracuse</td>
<td>Read Chapters 7, and 8&lt;br&gt;Continue Timeline Project&lt;br&gt;Identify important mathematicians for Paper 2</td>
</tr>
<tr>
<td>Feb 24</td>
<td>Greek mathematics and its decline</td>
<td>Chapter 7 Apollonius of Perge&lt;br&gt;Chapter 8 Crosscurrents</td>
<td>Read Chapters 11, and 12&lt;br&gt;Continue Timeline Project&lt;br&gt;Identify important mathematicians for Paper 2</td>
</tr>
<tr>
<td>Mar 3</td>
<td>The Islamic hegemony, Fibonacci and Archimedes revived</td>
<td>Chapter 11 The Islamic Hegemony&lt;br&gt;Chapter 12 The Latin West</td>
<td>Read Chapters 13, and 14&lt;br&gt;Continue Timeline Project&lt;br&gt;Identify important mathematicians for Paper 2</td>
</tr>
<tr>
<td>Mar 10</td>
<td>The European Renaissance and the beginning of modern era</td>
<td>Chapter 13 The European Renaissance&lt;br&gt;Chapter 14 Early Modern Problem Solvers</td>
<td>Read Chapters 15, 16, and 20&lt;br&gt;Prepare the Calculus Debate&lt;br&gt;Paper 2 is due&lt;br&gt;Identify important mathematicians for Paper 2</td>
</tr>
<tr>
<td>Mar 17</td>
<td>Spring break – No classes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mar 24</td>
<td>Modern era (Newton and Leibniz) (Online)*</td>
<td>Chapter 15 Analysis, Synthesis, the Infinite, and Numbers&lt;br&gt;Chapter 16 British Techniques and Continental Methods</td>
<td>Read Chapters 14, and 15&lt;br&gt;Continue Timeline Project&lt;br&gt;Identify important mathematicians for Paper 2&lt;br&gt;Calculus Debate</td>
</tr>
<tr>
<td>Mar 31</td>
<td>Euler</td>
<td>Chapter 17 Euler</td>
<td>Read Chapter 17&lt;br&gt;Continue Timeline Project&lt;br&gt;Identify important mathematicians for Paper 2</td>
</tr>
<tr>
<td>Apr 7</td>
<td>French mathematics (D’Alembert, Lagrange, Cauchy)</td>
<td>Chapter 18 Pre- to Post-revolutionary France</td>
<td>Read Chapter 18&lt;br&gt;Continue Timeline Project&lt;br&gt;Identify important mathematicians for Paper 2</td>
</tr>
<tr>
<td>Apr 14</td>
<td>Mathematics in 19th century</td>
<td>Chapter 19 Gauss</td>
<td>Read Chapter 19&lt;br&gt;Continue Timeline Project&lt;br&gt;Paper 2 is due&lt;br&gt;Identify important mathematicians for Paper 2</td>
</tr>
<tr>
<td>Apr 21</td>
<td>Geometry, Algebra, Analysis</td>
<td>Chapter 20 Geometry&lt;br&gt;Chapter 21 Algebra&lt;br&gt;Chapter 22 Analysis</td>
<td>Read Chapters 20, 21, and 22&lt;br&gt;Continue Timeline Project&lt;br&gt;Identify a domain or topic for Final Project</td>
</tr>
<tr>
<td>Apr 28</td>
<td>Mathematics in 20th century</td>
<td>Chapter 23 Twentieth-Century Legacies</td>
<td>Read Chapter 23&lt;br&gt;Continue Timeline Project&lt;br&gt;Start Final Project</td>
</tr>
<tr>
<td>May 5</td>
<td>Recent and current trends</td>
<td>Chapter 24 Recent Trends</td>
<td>Read Chapter 24&lt;br&gt;Timeline Project due&lt;br&gt;Continue Final Project</td>
</tr>
<tr>
<td>May 12</td>
<td>Final Exam 7:15pm-9:45pm</td>
<td></td>
<td>Final Project due</td>
</tr>
</tbody>
</table>

*Online delivery, no face-to-face meeting.
Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

J. COURSE POLICIES

Attendance/Tardiness
You are expected to attend every class session, and arrive on time. There is no make up for class activities, you need to be present to participate. All the absences will be considered “unexcused” unless you have an exceptional situation (e.g., documented illness, family situation), and you email the instructor about it.

Late Work and Make-up Exams
Late assignments will not be accepted, unless exceptional circumstances prevent you from completing them. Extension of deadlines will be at the instructor’s discretion. Late assignments may result in partial or total loss of credit. There are NO make-ups for exams or in-class activities.

Extra Credit
There will be no extra credit for this course.

Cell Phone Use
Please silence phones before coming to class. If you need to take a call, please go outside the classroom.

Laptop Use
In general, you cannot use your laptops during class activities or exams. For special circumstances (e.g., presentations), or special needs, please talk with the instructor.

Food in Class
Refrain from bringing food to class. For special needs or occasions, please talk with the instructor.

Missed Exam
Exceptional circumstances (e.g., documented illness, family situations) may be considered at the instructor’s discretion.

Participation
You are expected to come to class prepared every time, and participate in class activities.

K. COLLEGE AND UNIVERSITY POLICIES

- Academic Integrity (University)
  It is expected that university students will demonstrate a high level of maturity, self-direction, and ability to manage their own affairs. Students are viewed as individuals who possess the qualities of worth, dignity, and the capacity for self-direction in
personal behavior. See Full University Policy at http://catalog.tamucc.edu/content.php?catoid=10&navoid=313#Academic_Integrity

- **Classroom/Professional Behavior**
  Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

- **Deadline for Dropping a Course with a Grade of W (University)**
  The grade of W will be assigned to any student officially dropping a course by Friday, April 10, 2015. No student is eligible to receive a W without completing the official drop process by this deadline. Visit the Office of the University Registrar for the Course Drop Form that must be submitted. After April 10, 2015 a student will not be allowed to drop a course.

- **Grade Appeals (College of Science and Engineering)**
  As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at http://www.tamucc.edu/provost/university_rules/index.html, and the College of Science and Engineering Grade Appeals webpage at http://sci.tamucc.edu/students/GradeAppeal.html. For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

- **Disability Services**
  Disability Services (DS) is the hub for coordinating services and accommodations to ensure accessibility and utilization of all programs for all Texas A&M University-Corpus Christi students with disabilities. Our services are designed to meet the unique educational needs of enrolled students with documented permanent or
temporary disabilities. DS provides intake and consultation services to students seeking to register with our office. DS reviews an individual’s documentation of disability and assesses eligibility for services and the determination of reasonable accommodations. For more information visit the Disability Services Office at 116 Corpus Christi Hall or go to http://disabilityservices.tamucc.edu/

L. OTHER INFORMATION

This course has an online component (24%), i.e., part of it will be delivered on line. You can access it through TAMUCC-Blackboard at https://bb9.tamucc.edu/.

GENERAL DISCLAIMER

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.