



MATH 537, Theory of Numbers

COURSE SYLLABUS: SPRING- 2020

INSTRUCTOR INFORMATION

Instructor:	Padmapani (Pani) Seneviratne
Office Location:	BIN 316
Office Hours:	M 3:00 – 5:00, T 12:00 – 2:00 pm, W 4:00 – 5:00
Office Phone:	903-886-5952
Office Fax:	903-886-5945
University email:	padmapani.seneviratne@tamuc.edu
Preferred Communication:	email
Response time:	within 24 hours during weekdays
Class Location:	MyLeo online(D2L)
Class Time:	

COURSE INFORMATION

Textbook: There is no specific text book for this class.

Recommended Reading:

- (1). Elementary Number Theory, William Stein, <http://wstein.org/ent/>
- (2). Elementary number theory 6th edition, Kenneth H. Rosen, Pearson, ISBN-9780134310053
- (3). A Friendly Introduction to Number Theory, Joseph H. Silverman, 4th edition, ISBN 978-0321816191.

Software : Sagemath computer algebra system will be used. It is available freely at <http://www.sagemath.org/>

Calculator: optional.

The syllabus/schedule are subject to change.

Course Description

Factorization and divisibility, Diophantine equations, congruences, quadratic reciprocity, arithmetic functions, asymptotic density, Riemann's zeta function, prime number theory, Fermat's Last Theorem.

Prerequisites: C or higher in Math 331 or Math 437.

Student Learning Outcomes Upon successful completion of this course a students will:

- Demonstrate knowledge and understanding of topics including, but not limited to divisibility, prime numbers, congruences, quadratic reciprocity, Diophantine approximations, arithmetic functions, elliptic curves.
- Learn methods and techniques used in number theory.
- Apply abstract results in number theory to solve applications in cryptography and coding theory.
- Learn and use sagemath computer algebra system to solve number theory problems.

COURSE REQUIREMENTS

Minimal Technical Skills Needed

Access MyLeo online. Learn and use sagemath computer algebra system.

Instructional Methods

In this class we will use sagemath computer algebra system to illustrate concepts interactively.

Student Responsibilities or Tips for Success in the Course

Attendance:

Online attendance is required. Your log in, homework and participation in our course in MyLeo online determine online attendance in this course.

Midterm and final exams are proctored and you need to attend in person for the final exam. If you cannot take a test on the Commerce campus, you need to let your instructor know the location where you want to take the test. A location usually is a testing center at a college or university near you. Some college and universities may charge you a fee for using the testing

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center. Once an agreement with the testing center is made, you will be notified. If you have questions, discuss it with your instructor immediately.

Home Work:

Please submit the home work in pdf format. Write clearly on white A4 paper and keep space between lines. Save the file as `firstname_lastname_HW#.pdf`. Keep the original copy with you.

At end of each chapter, homework problems will be assigned and will be graded. Submit the homework to the Assignments section on MyLeo online. Plagiarism is prohibited.

SageMath projects:

With each home work, you will be assigned sagemath projects to enhance your understanding of abstract and computational techniques of number theory.

GRADING

Final grades in this course will be based on the following scale:

Midterm Exam:	30%
Home Work:	30%
Sagemath projects	10%
Final Exam:	30%

Total:	100%

A = 90%-100%

B = 80%-89%

C = 70%-79%

D = 60%-69%

F = 59% or Below

Exams: There will be a midterm exams and a comprehensive final exam for this course.

Midterm Exam : Thursday 5th March 2020 (8th week).

Final Exam: Thursday, 30th April 2020, 3-5 pm.

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Home work/Quizzes: You are required to submit all homework problems and sagemath projects on the due date.

TECHNOLOGY REQUIREMENTS

LMS

All course sections offered by Texas A&M University-Commerce have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are technical requirements

LMS Requirements:

<https://community.brightspace.com/s/article/Brightspace-Platform-Requirements>

LMS Browser Support:

https://documentation.brightspace.com/EN/brightspace/requirements/all/browser_support.htm

YouSeeU Virtual Classroom Requirements:

<https://support.youseeu.com/hc/en-us/articles/115007031107-Basic-System-Requirements>

ACCESS AND NAVIGATION

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@tamuc.edu.

Note: Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a TAMUC campus open computer lab, etc.

COMMUNICATION AND SUPPORT

If you have any questions or are having difficulties with the course material, please contact your Instructor.

Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found here:

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<https://community.brightspace.com/support/s/contactsupport>

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Course Specific Procedures/Policies

You are expected to attend all classes.

Syllabus Change Policy

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

University Specific Procedures

Student Conduct

Appropriate classroom behavior is required to attend this class.

All cell phones must be put on silent during class.

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The Code of Student Conduct is described in detail in the [Student Guidebook](http://www.tamuc.edu/Admissions/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx).
<http://www.tamuc.edu/Admissions/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx>

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum:
<https://www.britannica.com/topic/netiquette>

TAMUC Attendance

For more information about the attendance policy please visit the [Attendance](#) webpage and [Procedure 13.99.99.R0.01](#).
<http://www.tamuc.edu/admissions/registrar/generalInformation/attendance.aspx>

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/academic/13.99.99.R0.01.pdf>

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Academic Integrity

Students at Texas A&M University-Commerce are expected to maintain high standards of integrity and honesty in all of their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

[Undergraduate Academic Dishonesty 13.99.99.R0.03](#)

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf>

[Graduate Student Academic Dishonesty 13.99.99.R0.10](#)

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/graduate/13.99.99.R0.10GraduateStudentAcademicDishonesty.pdf>

Students with Disabilities-- ADA Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services

Texas A&M University-Commerce

Gee Library- Room 162

Phone (903) 886-5150 or (903) 886-5835

Fax (903) 468-8148

Email: studentdisabilityservices@tamuc.edu

Website: [Office of Student Disability Resources and Services](#)

<http://www.tamuc.edu/campusLife/campusServices/studentDisabilityResourcesAndServices/>

Nondiscrimination Notice

Texas A&M University-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

Campus Concealed Carry Statement

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University-Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun.

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Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations.

For a list of locations, please refer to the [Carrying Concealed Handguns On Campus](#) document and/or consult your event organizer.

Web url:

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf>

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all A&M-Commerce campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

COURSE OUTLINE / CALENDAR

<h3>Weekly Schedule</h3>

Tentative course outline: Chapters

1. Divisibility and basic properties of integers.
2. Congruences.
3. Prime Numbers.
4. Ring of integers modulo m .
5. Sums of squares.
6. Quadratic reciprocity.
7. Discrete Logarithms
8. Gaussian integers and unique factorization.
9. Elliptic curves.
10. Other topics.

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