



MATH 537, Theory of Numbers

COURSE SYLLABUS: SPRING- 2022

INSTRUCTOR INFORMATION

Instructor:	Padmapani (Pani) Seneviratne
Office Location:	BIN 316
Office Hours:	TR:12:00 – 2:00 pm, W – 2:00 – 3:00 pm or virtual by appointment
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. Class notes will be available on D2L.

Recommended Reading:

- (1). Number Theory, Andrej Dujella, ISBN- 978-9530308978
- (2). Elementary Number Theory, William Stein, <http://wstein.org/ent/>
- (3). Elementary number theory 6th edition, Kenneth H. Rosen, Pearson, ISBN-9780134310053
- (4). A Friendly Introduction to Number Theory, Joseph H. Silverman, 4th edition, ISBN 978-0321816191.

Software : Magma computer Algebra system will be provided.

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 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 of Magma computer algebra system.

Instructional Methods

In this class we will use Magma computer algebra system to illustrate concepts interactively. Online lectures will be uploaded to MyLeo online for each chapter.

Student Responsibilities or Tips for Success in the Course

Attendance:

Online attendance is required. Online attendance is determined by homework submission, video lecture views and proctored exam attendance.

Exams

There will be two midterm exams and a comprehensive final exam. All exams will be proctored remotely using zoom.

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Home Work:

Please submit the homework in pdf format as a single file. 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.

Magma projects:

There will be several magma projects assigned during the course. Students are allowed to work in groups. A group can consists of 1- 4 members. Names of each group must be sent to the instructor during the first week of the semester.

GRADING

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

Midterm Exams:	40%
Home Work:	30%
Magma projects	10%
Final Exam:	20%

Total:	100%

A = 90%-100%

B = 80%-89%

C = 70%-79%

D = 60%-69%

F = 59% or Below

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

Exam 1: Thursday 17th February 2022, 5- 7 pm online.

Exam 2: Thursday 7th April 2022, 5- 7 pm online.

Final Exam: Thursday, 5th May 2022, 5-7 pm online.

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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:

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

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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>

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>

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:

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[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. 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.

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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.

The Counseling Center at A&M-Commerce, located in the Halladay Building, Room 203, offers counseling services, educational programming, and connection to community resources for students. Students have 24/7 access to the Counseling Center's crisis assessment services by calling 903-886-5145. For more information regarding Counseling Center events and confidential services, please visit www.tamuc.edu/counsel

COURSE OUTLINE / CALENDAR

Weekly Schedule

Week	Topic
1	Introduction to Magma
2	Divisibility
3	Congruences
4	Congruences
5	Congruences
6	Quadratic Residues
7	Quadratic Residues
8	Quadratic forms
9	Arithmetical functions
10	Arithmetical functions
11	Applications to Cryptography
12	Diophantine equations
13	Diophantine equations
14	Algebraic Numbers
15	Algebraic Numbers

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