Youngstown STATE UNIVERSITY

Department of Mathematics and Statistics
Course Outline for Mathematics 5828

Table of Contents

Course Title: Number Theory

Course Number: MATH 5828

Semester: Fall 2020

Course Credit: 3 s.h.

Text: *An Illustrated Theory of Numbers,* Weissman, Martin H.; Publisher: American Mathematical Society

Course Prerequisite: MATH 3721

Course Objectives: A study of congruences, Diophantine equations, quadratic residues, special number theory functions, and selected applications.

Learning Outcomes:

UNDERGRADUATE LEARNING OUTCOMES: Undergraduate students who are successful in Math 5828 can

- define divisibility, congruences, and greatest common divisor and prove basic results concerning these concepts
- define and solve problems involving the Legendre symbols and quadratic reciprocity
- solve systems of linear congruences

GRADUATE LEARNING OUTCOMES: Graduate students who are successful in Math 5828 can:

- define divisibility, congruences, and greatest common divisor and prove basic results concerning these concepts
- define and solve problems involving the Legendre symbols and quadratic reciprocity
- solve systems of linear congruences
- prove the fundamental results concerning expressing integers as a sum of squares

Blackboard: This class will be using the Learning Management System Blackboard. Blackboard can be accessed: https://ysu.blackboard.com/. Here you will find a copy of this syllabus, assignments, notes, solutions, etc. You are required to regularly check Blackboard for documents.

Faculty Evaluations: At the end of the semester you will be asked to evaluate the instructor and the course in general. We ask that you take these evaluations seriously and provide honest feedback as these are reviewed by the Chair of the Department of Mathematics and Statistics.

Honors Contracts: Honors students may contract this course for honors credit. Notify your instructor of your interest to discuss options, complete required paperwork, and submit to instructor by the semester deadline.

YSU Policies:

Coronavirus Policy: As a consequence of the current coronavirus pandemic, students are expected to abide by all safety and health policies implemented by the University's Office of Environmental Occupational Health and Safety as well as all applicable local, state, and federal mandates. Currently, the City of Youngstown and the State of Ohio mandates a face covering/mask in public spaces. Consistent with federal, state and local guidelines, University Health Guidelines require that all individuals within campus buildings, including students, properly wear face coverings except when working alone within an enclosed area. Face coverings are in addition to maintaining appropriate

social distancing when possible. Exceptions to wearing a face covering in a classroom or laboratory must be for justifiable reasons as approved by the Office of Disability Services (https://ysu.edu/center-for-student-progress/disability-services). Repeated violations of any coronavirus safety and health policy shall be handled in accord with The Student Code of Conduct (https://ysu.edu/student-conduct/code-conduct).

Students with Disabilities: In accordance with University procedures, if you have a documented disability and require accommodations to obtain equal access in this course; please contact me privately to discuss your specific needs. To coordinate reasonable accommodations, you must be registered with the Center for Student Progress Disability Services, located in Kilcawley Center Room 2082. You can reach CSP Disability Services at 330-941-1372.

Non-Discrimination from the University: Youngstown State University does not discriminate on the basis of race, color, national origin, sex, sexual orientation, gender identity and/or expression, disability, age, religion or veteran/military status in its programs or activities. Please visit www.ysu.edu/ada-accessibility for contact information for persons designated to handle questions about this policy.

Academic Integrity: As outlined in The Student Code of Conduct, all forms of academic dishonesty are prohibited at Youngstown State. This includes plagiarism, the unauthorized use of tools or notes in taking tests or completing assignments, fabrication of data or information used for an assignment, working with others without permission from the instructor, and more. A student who is believed to have violated the academic integrity policy will meet with the instructor to discuss the allegations. The student may accept responsibility for the violation and any sanctions selected by the instructor, or they have the right to ask for a hearing before a hearing panel. The full Academic Integrity policy can be found in Article III. 1. of The Student Code of Conduct, while further information on University procedures for alleged academic integrity violations can be found in Article V.

Cancelled Class Policy: If this class is being cancelled for any one day because of instructor illness, or other reasons, a notice will be sent to your YSU email address as soon as possible. University-wide class cancellation is a decision made by the President's Office, and officially announced via the YSU homepage and on WYSU (88.5 FM) radio. Students may also register at the YSU Portal to receive a text message about University-wide closures via the Emergency Alert Notification System. Please familiarize yourself with the University's Cancellation and Closing Procedures: https://ysu.edu/cancellation-and-closing-procedures.

Important Dates

- *Monday, August 17, 2020 – Term Begins*
- *Monday, August 24, 2020 – The last day to add a class or change the grade option*
- *Sunday, August 30, 2020 – The last day to withdraw with a full refund*
- *Monday, September 7, 2020 – Labor Day (University closed)*
- *Monday, October 12 – Tuesday, October 13, 2020 – Fall Break Period*
- *Thursday, October 22, 2020 – The last day to drop the course with a grade of "W"*
- *Wednesday, November 11, 2020 – Veterans Day (University closed)*
- *Wednesday, November 25, 2020 – No classes scheduled; University office are open*
- *Thursday, November 26 – Friday, November 27, 2020 – Thanksgiving Break (University closed)*
- *Monday, December 7 – Saturday, December 12, 2020 – Final exams*
- *Saturday, December 12, 2020 – Term Ends*

Mathematics Assistance Center (MAC):

For all your mathematics needs:

- Tutoring
- Computers
- Limited Course Materials

Location: Lincoln Building Room 408 and Online
MAC Webpage: (https://cms.ysu.edu/mathematics-assistance-center/math-assistance-center)
Email:mac@ysu.edu
Phone:330-941-3274

Visit our website to schedule an appointment.

Check for services available for your course.

Additional Information:

The Penguin Service Center - A One Stop for Campus is an enrollment resource established to help students access and manage their academic record and student accounts. Please visit the Penguin Service Center or call (330) 941-6000 for assistance with financial aid, records access, registration processes, and tuition charges/billing. The office is located on the second floor of Meshel Hall.

College/University Career Advisement

University Counseling Services

The following information is provided by your instructor:

Faculty Information:

Instructor:	Eric J. Wingler
Office Location:	536 Lincoln Building
Email:	ejwingler@ysu.edu
Phone:	330-941-1817
Office Hours:	1300—1450 MWF (online and in office) or by appointment
Section Information	CRN: 45638, 46102 Days/Times: MWF, 900—950 Location: 206 Lincoln Building

Grading Policy:

Class participation and homework will determine 100% of your grade. This will be discussed further in class.

The following grading scale will be used.

90 –100%	A
80 –89%	B (at least)
70 –79%	C (at least)
55 –69%	D (at least)
Below 55%	F (at least)

Course Topics:

Chapter 0	Seeing Arithmetic
Chapter 1	Euclidean Algorithm
Chapter 2	Prime Factorization
Chapter 3	Rational and Constructible Numbers
Chapter 4	Gaussian and Eisenstein Integers
Chapter 5	The Modular World
Chapter 6	Modular Dynamics
Chapter 7	Assembling the Modular Worlds
Chapter 8	Quadratic Residues
Chapter 9	The Typograph
Chapter 10	Definite Forms
Chapter 11	Indefinite Forms

Other Course Policies: