MATH 326   **Introduction to Number Theory**   **Spring 2016**

Time:	MWF 1.10 – 2:00
Place:	Math 306
Instructor:	Dr. Sriraman
Office:	Math 301
Office Hours:	MWF: 11.10-12.00
Phone & E-mail:	243-6714; sriramanb@mso.umt.edu

Description: The goal of the course was to familiarize students with basic number theory. Topics that are normally covered in this course are: Congruences, Diophantine equations, properties of primes, quadratic residues, continued fractions, and algebraic numbers

Texts: There are several texts available that cover the basic topics of this course. However the recommended textbook is: *Elementary Number Theory* by David M. Burton (McGraw Hill), from which homework problems will be routinely assigned.

Course Learning Goals:
1. To construct mathematical proofs in number theory.
2. To explore the multiplicative structure of the integers.
3. To define congruence modulo n; and find solutions of linear congruences, quadratic congruences, and quadratic reciprocity.
4. To calculate values and properties of multiplicative functions
5. To find primitive roots of integers modulo n.

Course Agenda: Number theory is often referred to as the "queen of mathematics" because it is an area of mathematics where questions are very easily stated and understandable, but answers are difficult to find and require new areas of mathematics being invented (e.g., homological algebra).

In this course, we will adopt a very basic and classical approach, and among other things will cover properties of integers, the division algorithm and divisibility, Diophantine equations and continued fractions, Prime and Perfect numbers, The fundamental theorem of arithmetic, theory of congruences, special theorems (Fermat and Wilson), and number theoretic functions. We will derive results through basic computation [followed by proof]. Among different things we will investigate prime numbers and perfect numbers in depth, learn about the ubiquity and usefulness of continued fractions for dealing with irrational numbers and improve your proof writing skills

Important Dates: (*For detailed Add/Drop dates, Spring deadlines, refer to the last page of this syllabus*)

January 25, 2016	Spring classes begin
February 15, 2016	President's Day Holiday – no classes, offices closed
April 4 – 8, 2016	Spring Break – no classes
May 6, 2016	Last instructional day of Spring
May 9 – 13, 2016	Spring Final Examinations
3.20-5.20 Tuesday May 10	Final Exam

Other Information: *Academic misconduct* is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. Academic misconduct is defined as all forms of

academic dishonesty and the Student Conduct Code. In particular, Student Conduct Code Section IV.a.5 identifies the following violations: Submitting false information: Knowingly submitting false, altered, or invented information, data, quotations, citations, or documentation in connection with an academic exercise

Students with disabilities may request reasonable modifications by contacting me. The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students (DSS). "Reasonable" means the University permits no fundamental alterations of academic standards or retroactive modifications. For more information, please consult http://www.umt.edu/disability

Grading Distribution:

Homework/Recitation:	75
1 Mid-term:	100
1 Project	75
Final Exam	150
Total:	**400**

Grading Scale: 90-100 A ; 80-89.9 B ; 70-79.9 C ; 60-69.9 D ; Below 60 F

Homework/Recitation
In order to succeed in this course, it is important to attend lectures, take lecture notes and complete the homework assignments. Homework will be assigned regularly and will be compiled by you in a homework notebook. I will collect your homework notebook before your mid-term and before the Final exam. It is important you maintain this book in an orderly manner.
On Fridays there will be recitation, at which time you will be asked to work in groups and present your homework solutions to each other. After this you will be asked to come to the board and present selected problems. This is the only way to become proficient at writing proofs- by subjecting them to scrutiny from your peers. Everyone is expected to participate. This may seem intimidating at first but with time, you will become comfortable and proficient.

Mid-term: A mid-term will be given in March. It will cover the content from the lectures/homework.
Project: Each of you will be assigned a project in February that will be due on April 11. At this point each of you will also be given 25 minutes each to present your project to the class. A schedule will be drawn via lottery.
Final Exam: The final exam is compulsory and no exceptions can be made about the date/time at which it is held- this is decided a priori by the University Administration.

SOME "FREE" ADVICE
Factors that affect your grade
- Readings/Lecture notes: It is your prerogative to keep up with the material.
- Attendance: Students are expected to attend class, and although class attendance is NOT a component of the course grade, absences will impact your performance since you will miss the material covered in the lectures. Late assignments will NOT be accepted.
- Make-ups: THERE ARE NO MAKE-UPS regardless of the reason. Exam make-ups will ONLY be given under special and extenuating circumstances, such as a death in the family or illness, provided that a note from the Health Service or doctor is furnished by the student AND permission is given by me prior to the exam.
- Come to class, work hard, participate in the planned activities, and you will do well in this course. Good luck and welcome to 326.

UNIVERSITY OF MONTANA

Official Dates and Deadlines for Spring Semester & Wintersession 2016

Registration, Adding, & Dropping Classes

Dates	Description
Early October, 2015	Spring Semester/Wintersession advising numbers and class schedule available.
October 19 – October 30, 2015	Spring Semester/Wintersession registration begins for continuing students according to class standing within alphabetical schedule.
October 31, 2015 – February 2, 2016	Open registration for Spring continues on CyberBear. Wintersession open registration ceases January 4th @5pm. Limited outages will be announced on the CyberBear home page.
January 4, 2016 (5:00pm)	**Wintersession classes begin.** Last day to add Wintersession classes via CyberBear without consent.
January 6, 2016 (5:00pm)	✓ **Last day to drop individual Wintersession classes on CyberBear with refund** (only partial refund if *not* taking Spring classes per Semester Withdrawal policy – see Business Services). ✓ Last day to add Wintersession classes with Registration Override slip. ✓ Last day to change Wintersession credits in variable credit courses & switch grade mode in CyberBear. ✓ Last day to change Wintersession grading option to or from audit.
January 7 - 13, 2016 (5:00pm)	**Through Wintersession Day 8:** ✓ Wintersession course adds & drops require a Course Add/Change or Course Drop form with instructor's signature. $10 fee applies. ✓ A 'W' will appear on the transcript for dropped classes. No refunds. ✓ Students can change variable credit amounts and grading options (**except audit**) using a Course Add/Change form with instructor's signature.
January 14 - 21, 2016 (5:00pm)	**After Wintersession Day 8:** ✓ Wintersession adds require a Course Add/Change form with instructor's signature. $10 fee applies. ✓ Wintersession drops require a Course Drop form with instructor's and Dean's signatures. $10 fee applies. ✓ A 'WP' or 'WF' will appear on the transcript for dropped classes. No refunds. ✓ Students can change variable credit amounts, or change grading options, (**except audit**) using a Course Add/Change form with instructor's signature.
January 21, 2016	**Last day of Wintersession instruction.** Last chance to make changes or withdraw from Wintersession by 5pm.
January 22, 2016	Wintersession finals.
January 22, 2016 (5:00pm)	**Friday prior to start of Spring classes:** Last day to withdraw from all classes for Spring Semester without "W"s on transcript. See refund policy below. Withdrawal forms available at Griz Central Registration Counter in the Lommasson Center or online.
January 25, 2016	**Spring classes begin.**
January 29, 2016	Residency reclassification questionnaires for Spring 2016 must be received in time to have review completed prior to 15th Class Day. Residency reclassifications may affect tuition and fee assessment.
February 2, 2016 (5:00pm)	**Spring Class Day 7:** Last day for students to add Spring classes via CyberBear without consent.
February 3, 2016	Instructors must approve all Spring class **adds** via paper or electronic Registration Override on CyberBear.
February 12, 2016 (5:00pm)	**Spring Class Day 15:** ✓ **Last day to drop individual Spring classes on CyberBear with refund** ✓ Last day to withdraw from Spring (drop all classes) with a partial refund – see Withdrawal Policy below. ✓ Last day to add Spring courses with Registration Override slip or Electronic Override on CyberBear. ✓ Last day to change Spring credits in variable credit courses & switch grade mode in CyberBear. ✓ Last day to change Spring grading option to or from audit. ✓ Last day to buy or refuse student health insurance or add clinical health fee.
February 13 – March 28, 2016 (5:00pm)	**Through Spring Class Day 45:** ✓ Spring course adds & drops require a Course Add/Change or Course Drop form with instructor's & advisor's signatures. $10 fee applies. ✓ A 'W' will appear on the transcript for dropped courses. No refunds. ✓ Students can change variable credit amounts and grading options (**except audit**) using a Course Add/Change form with instructor's & advisor's signatures.
March 29 – May 6, 2016 (by 5:00pm)	**After Spring Class Day 45:** ✓ Spring adds require a Course Add/Change form with instructor's & advisor's signatures. $10 fee applies. ✓ Spring drops require a Course Drop form with instructor's, advisor's, & Dean's signatures. $10 fee applies. ✓ A 'WP' or 'WF' will appear on the transcript for dropped classes. No refunds. ✓ Students can change variable credit amounts, or change grading options, (**except audit**) using a Course Add/Change form with instructor's & advisor's signatures.
May 6, 2016	**Last day of Spring instruction** and last day to withdraw from Spring semester (drop all classes) by 5:00pm
May 9 – May 13, 2016	Spring finals week.

Bill Payment & Cancellation Deadlines

Dates	Description
December 7, 2015	**Registration Bills** available to view and pay on CyberBear at 1:00pm
January 4 – January 18, 2016	**"Save My Classes" button available in CyberBear**. If you can't pay by January 18th, the "Save My Classes" function lets us know you still plan to attend, but need some extra time to pay. NOTE: Registration Bills that are SAVED AND NOT PAID by midnight February 2, 2016 will be subject to the first $80.00 Late Registration Fee assessed at 12:01am on February 3, 2016.
January 18, 2016 By midnight	**SPRING/WINTERSESSION PAYMENT DEADLINE** - Students must pay by this date or have clicked the "Save My Classes" button in CyberBear to avoid class cancellation. Print or save the confirmation screen for your records! **IMPORTANT!** - If financial aid, VA Benefits, or other outside funds cover all costs, you must still click the "**Pay Registration Bill**" button in CyberBear to be considered "Paid". **Failure to do this by the deadline will result in cancellation of classes.** Print or save the confirmation screen for your records!
January 18, 2016	Financial aid begins to disburse nightly to student accounts. Students must have met all financial aid requirements and completed the registration payment process before aid will disburse.
January 18 – February 12, 2016	Students with financial aid who drop, add, change classes or withdraw from all classes may see an adjustment of their financial aid and may be required to repay a portion of it. Call (406) 243-2223 for info.
January 20, 2016	**SPRING SEMESTER CANCELLATION FOR NON PAYMENT OF REGISTRATION BILL** Any student who has not paid their registration bill or used the "Save My Classes" function will have their classes cancelled. **This includes financial aid, VA benefit, and other outside funding recipients.**
January 20, 2016	First refund file processed for Spring Semester 2016. Refunds are processed on Tuesdays and Fridays throughout the term. Exceptions may occur due to holidays. Must have completed registration payment process and met all financial aid requirements for financial aid to disburse.
February 2, 2016 @ 11:59pm	**Registration Bill payment due to avoid $80 late registration fee assessment at 12:01am on February 3rd.**
February 3, 2016 @ 12:01am	$80 Late Registration Fee assessed to students who have not paid their Registration Bill.
February 3 – February 12, 2016	**$80 Late Registration Fee in effect for all newly registering students!** Newly registering students between February 3 & February 12, 2016 (Class Day 15) will automatically be assessed the $80 Late Registration Fee.
February 15, 2016 By midnight	**PAYMENT DEADLINE** for Spring Semester 2016. **IMPORTANT!** - If financial aid, VA Benefits, or any other funding is covering all costs, you must still click the "**Pay Registration Bill**" button in CyberBear to be considered "Paid". Failure to do this by the deadline will result in class cancellation. Print or save the confirmation screen for your records!
February 17, 2016	**Any student who has not completed the Registration Bill payment process will be cancelled from classes.**
February 17 , 2016	ADDITIONAL $80 LATE REGISTRATION FEE (for a total of $160) assessed to any student approved to re-register or newly register via the Petition to Register & Pay After the Deadline.

Spring Withdrawal Procedures & Refund Information

- ✓ **Withdrawal definition:** Dropping all courses in a semester after payment process is complete.
- ✓ Withdrawals cannot be done by dropping all classes on CyberBear. Students must turn in a Semester Withdrawal form.
- ✓ Withdrawal forms must be **RECEIVED** at Griz Central Registration Counter by **5:00 pm** on the deadlines listed below to receive appropriate refund of tuition & fees. More information at umt.edu/withdrawal.

Withdrawal Deadlines	Refund Percentage on Tuition & Fees (less $30 Registration Fee)	Period of Withdrawal	Comments
January 22, 2016 by 5:00pm	**100%**	On or before 1/22/16	Withdrawing from all courses for Spring Semester 2016 is a 100% refund of tuition and fees.
January 29, 2016 by 5:00pm	**90%**	1/23 – 1/29/16	Withdrawing from all courses for Spring Semester 2016 is a 90% refund of tuition and fees.
February 5, 2016 by 5:00pm	**75%**	1/30 – 2/5/16	Withdrawing from all courses for Spring Semester 2016 is a 75% refund of tuition and fees.
February 12, 2016 by 5:00pm	**50%**	2/6 – 2/12/16	Withdrawing from all courses for Spring Semester 2016 is a 50% refund of tuition and fees.
On or after February 13, 2016	**0%**	2/13/16 and after	Withdrawing from all courses for Spring Semester 2016 on or after February 13, 2016 is a 0% refund of tuition and fees.

Deferred Payment Plan Deadlines

Dates	Description
October 19, 2015 – February 10, 2016	Deferred Payment Plan application available in CyberBear (Payment and Account menu). A $30 administrative fee will be charged. Deferred Payment Plan application will be unavailable after 5:00pm February 10.
December 7, 2015 – February 15, 2016	1st Deferred Payment Due upon initial payment of Registration Bill.
March 1, 2016	2nd Deferred Payment Due
March 2, 2016	$15 late fee charged if 2nd DPP installment not paid in full
April 1, 2016	3rd Deferred Payment Due
April 2, 2016	$15 late fee charged if 3rd DPP installment not paid in full
May 1, 2016	4th Deferred Payment Due
May 3, 2016	$15 late fee charged if 4th DPP installment not paid in full

Graduation Application Deadlines & Commencement Information

Dates	Description
October 31, 2015 – March 7, 2016	**Spring 2016** Late Graduation Applications accepted with $40 fee and additional $15 late fee. Applications received after March 7 will be reviewed for the next term.
February 26, 2016	**Summer 2016** Graduation Applications Due – Department approved undergraduate degree applications for graduation are due with a $40 application fee paid in treasury (Lommasson 237). *Applications should be submitted to departments 14 days in advance of this deadline.*
February 27 – June 6, 2016	**Summer 2016** Late graduation applications accepted with $40 fee and additional $15 late fee. Applications received after June 6 will be reviewed for the next term.
April 29, 2016	**Autumn 2016** Graduation Applications Due – Department approved undergraduate degree applications for graduation are due with a $40 application fee paid in treasury (Lommasson 237). *Applications should be submitted to departments 14 days in advance of this deadline.*
April 30 – October 3, 2016	**Autumn 2016** Late Graduation Applications accepted with $40 fee and additional $15 late fee. Applications received after October 5 will be reviewed for the next term.
May 14, 2016	**Commencement Ceremonies 2016**
October 28, 2016	**Spring 2017** Graduation Applications Due – Department approved undergraduate degree applications for graduation are due with a $40 application fee paid at treasury (Lommasson 237). *Applications should be submitted to departments 14 days in advance of this deadline.*

Instructional Days & Holidays

Dates	Description
January 4, 2016	Wintersession classes begin
January 18, 2016	Martin Luther King, Jr. Day Holiday – no classes, offices closed
January 22, 2016	Wintersession Final Examinations
January 25, 2016	Spring classes begin
February 15, 2016	President's Day Holiday – no classes, offices closed
April 4 – 8, 2016	Spring Break – no classes
May 6, 2016	Last instructional day of Spring
May 9 – 13, 2016	Spring Final Examinations

For assistance or questions about dates and deadlines, please call the Registrar's Office at (406)243-2995 or email registration@umontana.edu.