Math 522 Number Theory

Spring 2024 Calendar

January 2024

◄ Dec 2023   Feb 2024 ►

Sun	Mon	Tue	Wed	Thu	Fri	Sat
21	22 Start of the semester	23 First Day of Class Introductions and Expectations	24	25 Review of Rings, Ideals, and Fields	26	27
28	29	30 Chapter 1.1: Unique Factorization in **Z**	31 Homework 0 Due			

February 2024

◀ Jan 2024

Mar 2024 ►

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1 Section 1.2: Unique Factorization in k[x]	**2**	**3**
4	**5**	**6** Sections 1.3 and 1.4: Unique Factorization in a PID and The Rings **Z[i]** and **Z[ω]**	**7** Homework 1 Due	**8** Finishing up Chapter 1 (Purple text indicates on opportunity for student presentations.)	**9**	**10**
11	**12**	**13** Sections 2.1 and 2.2: The Infinitude of the Primes and Some Arithmetic Functions (Euler's φ function)	**14**	**15** Section 2.3: $\sum \frac{1}{p}$ Diverges Congruences in **Z** SMIMIC Talk	**16**	**17**
18	**19**	**20** Congruences in **Z** ax congruent to b modulo m Section 3.4: Sunzi's Remainder Theorem	**21** Homework 2 Due	**22** Section 3.4: The Chinese Remainder Theorem Finish up Chapter 3, Start Chapter 4 SMIMIC Talk	**23**	**24**
25	**26**	**27** Midterm 1	**28**	**29** Section 4.1 Primitive Roots in U(**Z**/n**Z**) Section 4.2: n^{th} Power Residues SMIMIC Talk		

March 2024

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	**2**
3	**4**	**5** Section 4.2: n^{th} Power Residues Quadratic Reciprocity	**6** Homework 3 Due	**7** Intro to Galois Theory: Field Extensions and Authomorphisms	**8**	**9**
10	**11**	**12** Galois Theory, Quadratics as Example	**13**	**14** Galois Theory, Cyclotomics as Example SMIMIC Talk	**15**	**16**
17 Spring Break!	**18** Spring Break!	**19** Spring Break!	**20** Spring Break!	**21** Spring Break!	**22** Spring Break!	**23** Spring Break!
24 Homework 4 Due	**25**	**26** Section 12.1: Algebraic Preliminaries, Section 12.2	**27**	**28** Section 12.2: Finiteness of the Class Number, Unique Factorization SMIMIC Talk	**29**	**30**

April 2024

Sun	Mon	Tue	Wed	Thu	Fri	Sat
Mar. 31	1 Cesar Chavez Day	2 Midterm 2	3 Homework 5 Due	4 Section 12.3: Ramification and Degree SMIMIC Talk	5	6
7	8	9 Section 13.1: Quadratic Number Fields	10	11 Section 13.2: Cyclotomic Number Fields	12	13
14	15	16 Section 13.3: Quadratic Reciprocity Revisited	17 Homework 6 Due	18 Section 13.3: Quadratic Reciprocity Revisited	19	20
21	22	23 Reid Lecture	24	25 Kummer's Attack on Fermat's Last Theorem	26	27
28	29	30 Kummer's Attack on Fermat's Last Theorem				

May 2024

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1 Homework 7 Due	**2 Buffer and Student Presentations** **SMIMIC Talk**	**3**	**4**
5	**6**	**7 Buffer and Student Presentations** **Vistas into Modern Number Theory and Arithmetic Geometry**	**8**	**9 Last Day of Class** **Vistas into Modern Number Theory and Arithmetic Geometry**	**10**	**11**
12	**13 Final Exam Week (Exam date and time TBD)**	**14 Final Exam Week (Exam date and time TBD)**	**15 Final Exam Week (Exam date and time TBD)**	**16 Final Exam Week (Exam date and time TBD)**	**17 Final Exam Week (Exam date and time TBD)**	**18**

Assignment	Percentage of Grade
Homework	40%
Midterm 1	17.5%
Midterm 2	17.5%
Final	25%
Presentation	Optional, can replace one midterm

The presentation is optional. Student are allowed to give one 10-15 minute presentation during the course. A student will correspond with me to choose a topic and prepare a concise and coherent exposition of this topic. I and other students can ask questions during the presentation, and I reserve five minutes at the end of a presentation to add my commentary. Depending on the quality of the presentation, the student's lowest midterm grade is multiplied by a factor between 1.1 and 1.6. A very high quality presentation yields a factor of 1.6, while a lower quality presentation yields a factor closer to 1.1. For example, a student gives a decent presentation and receives a factor of 1.4. If their lowest midterm grade is a 50, then this grade becomes 50x1.4=70.