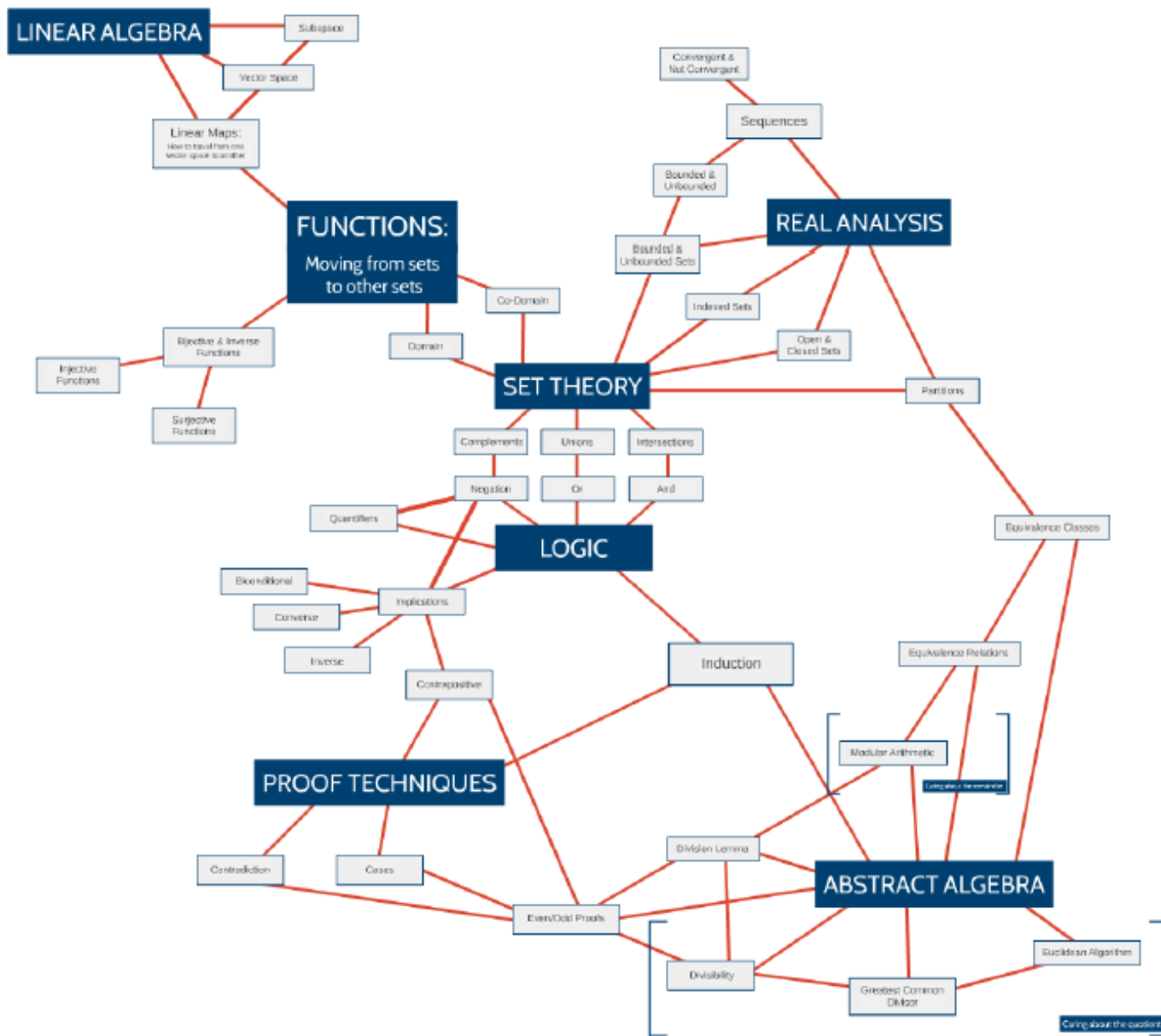

MTH 299 Course Syllabus

Spring 2017 Section 005 (Klanderma)

Last updated on: January 4, 2017



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Who/What/Where/When

People to Know

ITEM	INSTRUCTOR	TEACHING ASSISTANT
Name	Sarah Klanderman	Rani Satyam
Office Location	C542 Wells Hall	N/A
Email	klander2@math.msu.edu	satyamvi@msu.edu
Office Hours	TBD	N/A

Places to Be

WEEKDAYS	LOCATION	TIME	ITEM
M Tu Th	A332 Wells Hall	5:00PM-6:20PM	Class

Expectations

I expect you to be an active, hardworking, diligent, and competent learner. I expect you to attend lectures regularly. I expect you to spend approximately 12 hours per week outside of lecture combined between the tasks of reading, completing reading checks– 1-1.5 hours– and working on homework problems– 10.5-11 hours. (Bases on standard expectations of 3 hours outside of class, per credit hour of enrollment.) I expect you to ask lots of questions. I expect you to frequently visit office hours or the MLC.

Course Objectives

This course acts as a bridge from your training in calculus which typically focuses on formulas and calculations to that of higher mathematics which focuses on abstraction, problem solving, and proof. You will be taught to think independently, to digest abstract concepts and tools from higher mathematics, and to express yourself clearly in a mathematical proof. You will be exposed to and learn some basic concepts from real analysis (rigorous calculus), linear algebra (things similar to vectors and matrices from vector calculus), and number theory. You will be expected to become proficient with the structure of mathematical logic, including truth tables, and you will be expected to become proficient in some basic styles of proof, such as: direct proof, proof by contradiction, proof by induction, proof by contrapositive, equivalences, and more.

Grades

Overall

Your course grade will be based on:

PARTICIPATION	HOMEWORK	MINI EXAM	EXAM 1	EXAM 2	FINAL	TOTAL
6%	24%	3%	16%	16%	35%	100%

In addition, you must take the final examination in order to pass the course.

All assessment items (e.g. exams, semester-long cumulative homework score, etc...) will be scaled at the discretion of the instructor, and they will be recorded and communicated as a rational (decimal) number between 0 and 5– to keep stylistically as close to the MSU points scale. That way, the student can know on each particular assessment, how their performance was rated overall. The course grade will simply be calculated according to the weighted average indicated by the table above, given by the formula

$$CG_1 = 0.06 * P + 0.24 * HW + 0.03 * Mini + 0.16 * E1 + 0.16 * E2 + 0.35 * FE,$$

where P , HW , $Mini$, $E1$, $E2$, and FE are respectively your point values for the items of participation, homework, mini exam, exam 1, exam 2, and the final exam.

IF you finish the semester with a homework average of 43/60 or greater, **AND** your participation average is greater than 80%, then you will have the advantage of improving your grade by a strong performance on the final exam. If you satisfy these requirements, your course grade will instead be determined by

$$CG = \max\{CG_1, CG_2\},$$

where CG_2 is computed by

$$CG_2 = 0.80 * FE + 0.20 * HW.$$

That is to say, your course grade will be the *better* of the two grades: CG_1 and CG_2 . The reason for doing this is to encourage hard work all the way until the end, and to properly reflect the fact that this material is challenging for many students, and it may take the whole semester for some to truly master it. This way, you can prove to me on the final exam that you are deserving of the excellent grade that you most likely want.

Final grades will be determined by:

4.0 GRADE	0.0	1.0	1.5	2.0	2.5	3.0	3.5	4.0
CG	[0,1)	[1,1.5)	[1.5,2)	[2,2.5)	[2.5,3)	[3,3.5)	[3.5,4)	[4,5]

Assessment - Participation

In our class there will be 2 different participation grades aimed to help you master the material.

Attendance (3%) - Come to class, do the work, get some points. Easy as that.

Online Reading Checks (3%) - In order to encourage you to read the book before coming to class there are reading checks online (in the form of D2L quizzes). Reading the book to gain multiple exposures to the material is key to retaining it for quizzes, exams, and life. Due dates are posted on D2L and line up with when we need the material in class.

Assessment - Mini Exam

The Mini Exam is another way for you to get practice performing problems under pressure. This is like a long quiz (and is worth more points). The Mini Exam is tentatively scheduled for **February 2, 2017, in class**, and will cover material presented in class up until that point. Note, the last day to drop with a refund is February 3, and 8pm. The mini-exam is scheduled so that you can get some information about possibly dropping the class before the deadline.

Assessment - (during semester) Exams

Two exams that are 80 minutes long and are tentatively scheduled for **February 23, 2017** and **April 20, 2017**, both in class.

Assessment - Homework

Homework is easily the most important activity for learning in this course (and any mathematics course, really). As an adviser said to us at the beginning of graduate school, mathematics is not a spectator sport!, so stop watching people solve math problems, and go do it yourself. **A paper print out of the Homework will be due at the beginning of class** (typically each Thursday), and will involve both short answer and proof type questions. **Your solutions must be typed in L^AT_EX and printed out to be counted.** Each homework will be worth 60 points and it is very important that claims and statements in your answers are justified. In the words of my favorite undergraduate teacher, a proof is your attempt to convince someone that a certain statement is true, and therefore I need to be convinced that you know what you are talking about and that your assertions are indeed true. In addition, a copy of your homework .TEX document and .PDF must be submitted to D2L (due date/time for each assignment is on D2L). Forgetting to do this on an assignment will lose you 10 points.

A special note on homework grading: There are many of you, and only one of me! So I will be unable to grade every homework problem which you hand in. I will make a selection of homework problems to grade each week at my discretion. With your help I will do my best to provide solutions to the homework so that all of your hard work can be put to good use in learning/practicing the material in this course.

Assessment - Final Exam

By registering for this class, you understand that the final exam is a mandatory part of the course. The final exam is scheduled for **Monday, May 1 2017 5:45pm - 7:45pm** in a location to be announced in class at a later date. The final is cumulative.

Calculating your Final Grade

To calculate your final grade you will take your MSU point grade from each Assessment Topic and multiply it by the Assessment weight. Sum the results to get your current course grade.

EXAMPLE:

Assessment	PARTIC.	HW	MINI EXAM	EXAM 1	EXAM 2	FINAL	SUM
Weight	6%	24%	3%	16%	16%	35%	
Student Scores	3.1	2.6	1.25	4.1	3.71	3.68	
Mult. Result	.186	.624	.0375	.656	.5936	1.288	3.3851

*Since this is less than 3.5 but greater than a 3.0 this student would receive **get a 3.0 in the course.***

Supplies

Course Materials:

CATEGORY	ITEM	DESCRIPTION
Textbook	How to Think Like a Mathematician by Kevin Houston	For reading and learning
Textbook	Class Notes PDF	For reading and learning
Packet	Class Examples PDF	Contains the Examples we will cover.
Electronics	Printer	To print anything you need and homework submissions.
Electronics	Computer	To check email and write LaTeX HW

In Class Materials:

It is mandatory that you bring the textbook(s) and examples packet to all class and recitation meetings.

Late/Missing...

Late/Missing Homework Policy

Late homework will not be accepted without a serious and valid excuse, verified by a note from an appropriate professional. To justify this strict policy, I will DROP the 3 lowest homework scores from each student during the semester. Therefore, you get 3 free occasions to turn in your homework late by exercising your free drop on that particular homework.

Late/Missing Exam Policies

Typically a missed exam is given a 0. There are no make up exams. Please make sure to arrive on time and prepared. You know all the (tentative) exam dates! Please minimize your risk around exam dates and email your instructor and collect crazy amounts of documentation (ideally from professionals) if anything unforeseen occurs on the exam day.

Administrative Drop for Non-Attendance

Students will be dropped from this course for non-attendance by a departmental administrative drop after the fourth class period, or the fifth class day of the term of instruction, whichever occurs first.

Additional Help

In addition to class, recitation, and instructor office hours there are also times in which the MTH 299 TAs tutor in the Math Learning Center (MLC). These hours are available at:

<https://math.msu.edu/mlc/>

and furthermore, the MLC has dedicated a 299 “study room” for 299 students on Wednesdays during 2:30 to 4:30 pm in Wells Hall C117.

There is also a class forum: piazza.com/msu/spring2017/mth299/home in which you can ask questions to your fellow classmates, the TA, and the instructor. It is recommended that when you have a homework question that you use this forum so that way everyone can see the response!

Hints for Success

Often when the instructor or TA presents problems in class they are the polished solutions but in this class we need to realize that it takes a good amount of work to get to that point. It is a process! Here is a typical study cycle that can help you master the material.

The 299 Study Cycle

1. read text, attempt examples in text, but don't waste too much time.
2. ask questions
3. do examples in class/recitation.
4. ask questions
5. look at solutions of examples in class
6. ask questions
7. work on HW (start but maybe not complete each question)
8. ask questions
9. finish the HW
10. look at HW solutions
11. ask questions
12. read and digest the graded HW, try to figure out what went wrong
13. ask questions
14. revisit examples and HW to make sure you can successfully complete them now.
15. ask questions
16. REPEAT!

A Suggestion From Dan: (Dan is our most seasoned assistant for 299, and he has seen a lot of you guys struggle and succeed. Here are some suggestions from him.)

Welcome to math 299. This course is going to be different than most math courses that you have previously taken and for this reason we are giving you a suggested weekly schedule for staying on top of work and concepts. The week "begins" on Thursday when homework is assigned and new topics are introduced. It would be useful to go back through the material that is introduced on Thursday while looking over the homework problems that have been assigned. This gives you the whole weekend to get through homework as well as you can on your own with help from the book and possibly office hours. Another useful thing to do on the weekend is look over solutions to previous examples that you did not fully understand. It is expected that you understand the examples and stay on top of your reading assignments. Without doing this you risk falling behind in the course. Monday and Tuesday will be work

days in which you will be working through the example sheet and doing mathematics together and gaining understanding from each other and the process. After these two days you should be fully able to do any homework problem assigned and due Thursday. After looking through and understanding the weekly examples, you should finish your homework assignment and have it in latex and ready for Thursday. Finally you will be expected to have read and have some exposure to the new material before the new material lecture on Thursday. Be sure to ask lots of questions of your instructors and classmates so that you can more fully understand the proof techniques and concepts in this course!

Schedules and Dates

Tentative Topics List

We will cover at least some of the material from each of the chapters in the textbook. We will have many supplementary examples provided in class.

Tentative Weekly Schedule

(updates can be found on D2L)

Date	Wkday	Wk#	t	Topics	Assessment
1/9/2017	M	1	1	Hello. What is this class about? Syllabus. Some basic defs about sets and \mathbb{N} , \mathbb{Z} (note the typo in the def on p.5), \mathbb{R} . Time permitting, discuss some operations on sets.	HW 1 Assigned
1/10/2017	T	1	2	Sets. Set operations. Defining sets via "all x such that". Finish operations on sets. Demonstrate what careful solutions look like to familiar calculus questions.	
1/11/2017	W	1			
1/12/2017	R	1	3	Misc. topics for HW 1.	RC 1.1 Due
1/13/2017	F	1			
1/16/2017	M	2		No Class	
1/17/2017	T	2	4	Functions and misc. topics on sets.	RC 2.1 Due
1/18/2017	W	2			
1/19/2017	R	2	5	Injective, surjective, bijective, inverses + HW 1 student solutions.	RC 2.2, HW 1 Due 2 Assigned
1/20/2017	F	2			
1/23/2017	M	3	6	Continue with functions, venn diagrams, HW 2 topics.	RC 3.1 Due
1/24/2017	T	3	7	Introduce statements (negation, and, or), function problems	RC 3.2 Due
1/25/2017	W	3			
1/26/2017	R	3	8	HW 2 student solutions, induction, statements (negation, and, or)	RC 3.3 Due, HW 2 Due HW 3 Assigned
1/27/2017	F	3			
1/30/2017	M	4	9	Induction, statements (negation, and, or)	
1/31/2017	T	4	10	Implications, contradiction	RC 4.1 Due
2/1/2017	W	4			
2/2/2017	R	4	11	Mini Exam, HW 3 student solutions	RC 4.2 Due, HW 3 Due 4 Assigned
2/3/2017	F	4			
2/6/2017	M	5	12	Implications, contradiction continued	
2/7/2017	T	5	13	Implications (equivalent, converse, contrapositive, negation)	RC 5.1 Due
2/8/2017	W	5			
2/9/2017	R	5	14	Quantifiers	RC 5.2 Due, HW 4 Due 5 Assigned
2/10/2017	F	5			
2/13/2017	M	6	15	More quantifiers and examples.	RC 6.1 Due
2/14/2017	T	6	16	HW 5 student solutions and quantifiers	RC 6.2 Due
2/15/2017	W	6			
2/16/2017	R	6	17	Wrap up quantifiers and other topics	HW 5 Due HW 6 Assigned
2/17/2017	F	6			
2/20/2017	M	7	18	Student solution, discuss HW 5	
2/21/2017	T	7	19	Review for exam, discuss HW 6	HW 6 Due (no latex)
2/22/2017	W	7			
2/23/2017	R	7	20	Exam 1	HW 7 Assigned
2/24/2017	F	7			
2/27/2017	M	8	21	First day of real analysis sequences	RC 8.1 Due
2/28/2017	T	8	22	Bounded sets	RC 8.2 Due
3/1/2017	W	8			
3/2/2017	R	8	23	Second day of real analysis: open/closed, indexed unions	RC 8.3 Due, HW 7 Due 8 Assigned

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3/3/2017	F	8			
3/6/2017	M				
3/7/2017	T				
3/8/2017	W				
3/9/2017	R				
3/10/2017	F				
3/13/2017	M	9	24	Practice sequences, bounded, open/closed	
3/14/2017	T	9	25	Practice sequences, bounded, open/closed	RC 9.1 Due
3/15/2017	W	9			
3/16/2017	R	9	26	First day of linear algebra, vector spaces	RC 9.2 Due, HW 8 Due HW 9 Assigned
3/17/2017	F	9			
3/20/2017	M	10	27	Vector space examples and practice	
3/21/2017	T	10	28	Vector space examples and practice	RC 10.1 Due
3/22/2017	W	10			
3/23/2017	R	10	29	Linear functions and partitions	RC 10.2 Due, HW 9 Due HW 10 Assigned
3/24/2017	F	10			
3/27/2017	M	11	30	Examples of linear functions and partitions	
3/28/2017	T	11	31	Further examples of linear algebra.	RC 11.1 Due
3/29/2017	W	11			
3/30/2017	R	11	32	Number theory, division lemma, Euclidean algorithm (possibly mod)	RC 11.2 Due, HW 10 Due HW 11 Assigned
3/31/2017	F	11			
4/3/2017	M	12	33	mod, divisibility, gcd	
4/4/2017	T	12	34	divisibility, gcd, mod	RC 12.1 Due
4/5/2017	W	12			
4/6/2017	R	12	35	More number theory, equivalence relation	RC 12.2 Due, HW 11 Due HW 12 Assigned
4/7/2017	F	12			
4/10/2017	M	13	36	equivalence relations examples and practice	
4/11/2017	T	13	37	Final number theory examples and practice	
4/12/2017	W	13			
4/13/2017	R	13	38	Review for exam 2	HW 12 Due HW 13 Assigned
4/14/2017	F	13			
4/17/2017	M	14	39	Review for exam 2	
4/18/2017	T	14	40	Review for exam 2	HW 13 Due
4/19/2017	W	14			
4/20/2017	R	14	41	Exam 2	
4/21/2017	F	14			
4/24/2017	M	15	42	Review for final	
4/25/2017	T	15	43	Review for final	
4/26/2017	W	15			
4/27/2017	R	15	44	Review for final	
4/28/2017	F	15			

Important Dates

WEEKDAY	DATE	EVENT
Wednesday	1/09/17	Classes Begin.
Monday	1/16/17	Holiday – University closed.
Friday	2/03/17	End of 100% Tuition Refund
Wednesday	3/01/17	Middle of Semester. Last day to drop a course without a grade being reported.
Friday	4/28/17	Last day of classes.

Other Policies

The Spartan Code of Honor Academic Pledge:

<http://splife.studentlife.msu.edu/spartan-code-of-honor-academic-pledge>

“As a Spartan, I will strive to uphold values of the highest ethical standard. I will practice honesty in my work, foster honesty in my peers, and take pride in knowing that honor in ownership is worth more than grades. I will carry these values beyond my time as a student at Michigan State University, continuing the endeavor to build personal integrity in all that I do.”

Academic Honesty

Article 2.3.3 of the Academic Freedom Report states that “The student shares with the faculty the responsibility for maintaining the integrity of scholarship, grades, and professional standards.” In addition, the Mathematics Department adheres to the policies on academic honesty as specified in General Student Regulations 1.0, Protection of Scholarship and Grades; the all University Policy on Integrity of Scholarship and Grades; and Ordinance 17.00, Examinations. (See Spartan Life: Student Handbook and Resource Guide and/or the MSU Web site: www.msu.edu.) Therefore, unless authorized by your instructor, you are expected to complete all course assignments, including homework, lab work, quizzes, tests and exams, without assistance from any source. You are expected to develop original work for this course; therefore, you may not submit course work you completed for another course to satisfy the requirements for this course. Also, you are not authorized to use the www.allmsu.com Web site to complete any course work in this course. Students who violate MSU academic integrity rules may receive a penalty grade, including a failing grade on the assignment or in the course. Contact your instructor if you are unsure about the appropriateness of your course work. (See also the Academic Integrity webpage.)

Limits to confidentiality

Essays, journals, and other materials submitted for this class are generally considered confidential pursuant to the University's student record policies. However, students should be aware that University employees, including instructors, may not be able to maintain confidentiality when it conflicts with their responsibility to report certain issues to protect the health and safety of MSU community members and others. As the instructor, I must report the following information to the Department of Police and Public Safety if you share it with me: Suspected child abuse/neglect, even if this maltreatment happened when you were a child, Allegations of sexual assault or sexual harassment when they involve MSU students, faculty, or staff, and Credible threats of harm to oneself or to others. These reports will trigger contact from the Department of Police and Public Safety who will want to talk with you about the incident that you have shared. In almost all cases, it will be your decision whether you wish to speak with that individual. If you would like to talk about these events in a more confidential setting you are encouraged to make an appointment with the MSU Counseling Center.

Accommodations for Students with Disabilities (from RCPD)

Michigan State University is committed to providing equal opportunity for participation in all programs, services and activities. Requests for accommodations by persons with disabilities may be made by contacting the Resource Center for Persons with Disabilities at 517-884-RCPD or on the web at rcpd.msu.edu. Once your eligibility for an accommodation has been determined, you will be issued a Verified Individual Services Accommodation (VISA) form. Please present this form to me at the start of the term and/or two weeks prior to the accommodation date (test, project, etc.). Requests received after this date may not be honored.

Disruptive Behavior

Article 2.III.B.4 of the Academic Freedom Report (AFR) for students at Michigan State University states: The students behavior in the classroom shall be conducive to the teaching and learning process for all concerned.

Article 2.III.B.10 of the AFR states that The student has a right to scholarly relationships with faculty based on mutual trust and civility. General Student Regulation 5.02 states: No student shall . . . interfere with the functions and services of the University (for example, but not limited to, classes . . .) such that the function or service is obstructed or disrupted. Students whose conduct adversely affects the learning environment in this classroom may be subject to disciplinary action through the Student Judicial Affairs office.