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MATH 465-01, Orbifold Euler Characteristics, Fall 2008

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Math 465–01 Fall, 2008
Topics: Orbifold Euler Characteristics
CRN: 19652
Time and Location to be determined

Instructor: Dr. Christopher Seaton
Office: 318 Ohlendorf Hall
Office Hours: MW: 1:45 to 3:30pm
 F: 1:45 to 3:00pm *or by appointment*
Phone: x3721
E-mail: seatonc@rhodes.edu
Web: <http://www.faculty.rhodes.edu/seaton/> and Moodle

Course Description:

This topics course will introduce you to the notion of orbifolds and orbifold Euler characteristics focusing on the case of dimension 2 orbifolds. We will compute many examples of these characteristics and attempt to answer questions about the degree to which these characteristics classify certain classes of 2-dimensional orbifolds.

Text:

There is no required textbook for this class. You will receive a packet of background material, including references to papers and texts that we may find useful. Other reference materials will be announced as the need arises.

Content:

The material we will cover is tentatively as follows: manifolds, the Euler characteristic and classification of compact 2-manifolds, group actions, finite group actions on manifolds, topology of 2-dimensional orbifolds, the classification of compact 2-orbifolds, orbifold Euler characteristics, the inertia orbifold, and generalized orbifold Euler characteristics.

Course Prerequisites:

This course requires a solid background in abstract algebra, especially the theory of finite groups. You are also expected to be familiar with the basic topology of \mathbf{R}^n and linear algebra. Knowledge of general point-set topology will be helpful but not necessary.

Office Hours:

Students are **strongly** encouraged to take advantage of my office **hours and to make appointments when my office hours are not convenient**. My schedule is posted online at <http://faculty.rhodes.edu/seaton/schedule.htm> and on the door of my office. Please consult this schedule before suggesting an appointment time (particularly via e-mail).

Attendance Policy:

All students will be required to attend all weekly meetings. Absences will be excused in advance of the meeting only except under circumstances that would make this impossible.

Meetings:

For the first 4-6 weeks of the semester, our meetings will be informal lectures. By informal, I mean that we will discuss the material openly, and students will be encouraged to present exercises or their own interpretation of the material. As the semester progresses, we will spend less time on background material and more time on our own exploration. Students will present to one another the discoveries they have made, the obstacles they have encountered, and their predictions about the work; we will discuss connections between our discoveries and obstacles and make modifications to our plan.

Grading:

At each meeting, you will be given two grades out of 5 points each. The first will be your homework grade, and the second will be your participation grade. The homework grade will reflect the degree to which you have made progress on the work that was assigned at the previous meeting. Early in the semester, this will be based on your presentation of an exercise problem (or two); later, it will be based on progress you have made on the project. Your participation grade will reflect the degree to which you participate in the meeting.

Your letter grade for the course will be based on the following scale:

A	[93, 100]	B-	[80, 83)	D+	[67, 70)
A-	[90, 93)	C+	[77, 80)	D	[63, 67)
B+	[87, 90)	C	[73, 77)	D-	[60, 63)
B	[83, 87)	C-	[70, 73)	F	[0, 60)

The total percentage will be computed as follows:

Attendance:	20%
Homework:	50%
Participation:	30%

Assignments:

At each meeting, each student will be assigned one to three tasks to work on for the next meeting. These tasks may be assigned individually, to all students, or to groups of students separately. They will include reading, exercises, specific computations, or exploring specific questions.

Outcome:

The goal of this course is to advance our understanding of generalized orbifold Euler characteristics and make progress on questions about the degree to which these characteristics classify 2-dimensional orbifolds. If sufficient progress is made, the class

and instructor will co-author a paper on this subject to be submitted to the journal *Involve* or a journal with similar standards of quality and an appropriate scope.

Honor Code:

All students are expected to conduct themselves within the guidelines of the College's Honor Code. Please ask me if you have any questions about what is allowed. I reserve the right to reduce a student's grade in the event of plagiarism whose intent cannot be verified.

Students With Disabilities:

If you have or think you may have a documented disability, please contact me and the Office of Student Disability Services as early in the semester as possible.