UNDERGRADUATE MATH SEMINAR

The next math seminar on the term will be

DATE: THURSDAY, May 16

Time &   **12:30 –** Refreshments in **Bailey 204**

Location: **12:50 – 1:45** Seminar in **Bailey 207**

In this seminar, **Professor Greg Malen** from Mathematics and Statistics Department at **Skidmore College** will present the following talk.

Professor Greg Malen

Title: Graph Homomorphisms and Topological Bounds on Chromatic Number

Abstract: A common theme in mathematics is to try to learn about an object by mapping it, or encoding it, into another object. In graph theory, we do this using *graph homomorphisms*, which are maps from a graph G to a graph H that preserve adjacencies. For two fixed graphs G and H, you can then consider *all* of the different possible ways to map G into H. This set of all such maps, called Hom(G,H), can be viewed as a topological object, and it turns out that we can then use some basic tools in topology to study important properties of the graphs we started with. In this talk, I will give an introduction to graph homomorphisms and the space Hom(G,H) (with lots of images and diagrams!), and explore its connection to the chromatic number of a graph.

Pieces from Thesis – by Katelynne Righi

***Katelynne** wrote her senior thesis this past fall and winter terms, supervised by **Professors Jue Wang** (Math) and **Tomas Dvorak** (Economics).*

As a double major, I chose to write a joint thesis during the fall and winter terms, under the advisement of Professor Jue Wang in the Math department and Professor Tomas Dvorak in the Economics department.

My thesis explored the determinants of electrified vehicle (EV) adoption in New York State, for which I created a linear regression model using EV shares (# of EVs / total cars in a zip code) as a dependent variable. My data included 9 million cars in NYS, obtained through DMV vehicle registration data. The original dataset contained over 12 million vehicles, including boats and snowmobiles, so I did a lot of filtering in R to get it down to just passenger cars. The dataset contained general characteristics about the cars, however, I also had to run an API VIN decoder loop in R on all nine million cars, which took a lot of time and computer power. Running this loop allowed me to gather more specific information on each car, including the specific electrification level - battery-only, hybrid, and gas.

Because I had the zip code of each registration, I was able to assign demographic data to each car from the Census - income, education, age, and race. Additionally, I was able to include political and

ReUnion Weekend, Friday, May 17, 4:00 – 5:00pm
Math Department Reception: Bailey 204 (Math Common Room)
Enjoy a casual reception and light refreshments with alumni who majored in math.

infrastructural variables, using 2020 election results and the number of public EV charging stations within each zip code. My results found that all of my variables had positive, significant effects on EV shares in NYS, with income being the major driving force of EV adoption.

My advice for future seniors would be to pick a topic that genuinely interests you and enjoy the process. Thesis is challenging, but the end results are so rewarding. My research, writing, and coding skills have improved tremendously, and I cannot thank Professors Wang and Dvorak enough for their guidance and support throughout my entire thesis experience.

Scenes from the Steinmetz Symposium, Friday, May 10, 2024

At the Steinmetz Symposium, four students presented wonderful math talks. Pictured, clockwise from top left: **Livi Gwinnett, Emily Vasquez, Uri Tomer, and Mayah Teplitskiy.**
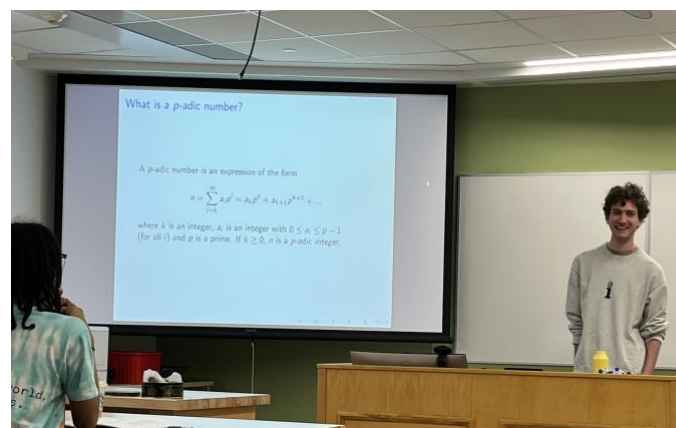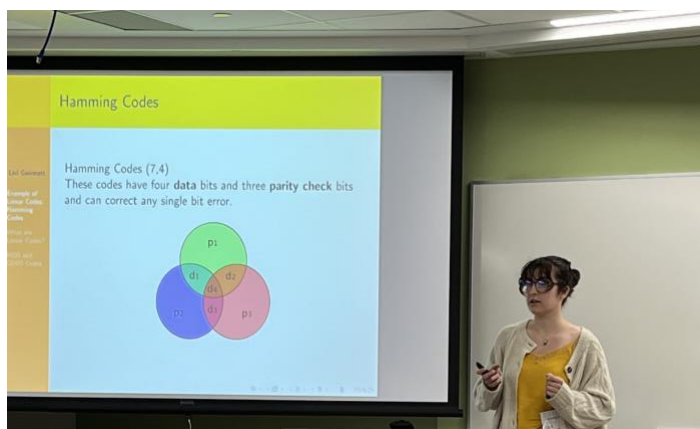
Pre-Approval Deadline: May 15!

For the Fall 2024 term, **six math courses require pre-approval:**

MTH 105, 110, 113, 117, 197, and 199

You must complete this form to seek preapproval for these math courses.

The complete list of courses across the college that require pre-approval can be found at https://www.union.edu/advising-registration/pre-approval-courses.