Math 498 - 502 **SENIOR SEMINAR** Spring 2024

4:00- 4:55 Tuesday 3 hours COHH 3119

Course Description: Math 498 is a required course for seniors completing a bachelor's degree in mathematics. The course is used to assess the student's independent thinking skills and ability to write and present formal mathematics. The course has a director who oversees the course, but each student will work individually with a faculty member on a project.

Director: Dr. Tom Richmond COHH 3106
Tom.Richmond@wku.edu (513) 666-1159
http://people.wku.edu/tom.richmond/

Office Hours: 9:05-9:45 MF, 2:10-2:45 TR
"Drop-ins" and appointments are welcomed.

Learning Outcomes: Students will communicate mathematics orally and in writing and will conduct a capstone research project synthesizing or extending material from earlier coursework.

Requirements:

1. Maintain regular contact with your supervising faculty member and make regular progress on your project according to a timetable set by your supervising faculty member.

2. Select two additional faculty members to serve, along with your supervising faculty member, as your grading committee. Maintain contact with your grading committee regarding your progress and their expectations.

3. Give 3 colloquium talks. The first is to be approximately 10 minutes in length and given within the first 6 weeks of the semester. The second is to be 15 to 20 minutes in length and given during the 7^{th} to 12^{th} weeks of the semester. The final presentation is to be approximately 25 minutes long and must be given by the end of the semester.

Note 1: If the presentation requirement is not completely fulfilled then the student must withdraw from the course or receive an incomplete.

Note 2: The final presentation may be given at a conference instead of in the departmental colloquium, as long as there are an adequate number of faculty members present to grade the presentation, as outlined below.

4. Attend at least ten other 498 talks and talks of external speakers as prescribed. Other talks may be substituted with the permission of the director.

5. Submit, on schedule, a 12-20 page paper (single spaced) on your project. The paper will be read by the supervising faculty member and two other faculty members. Subject to approval of the grading committee, the student may be allowed to make revisions suggested by the graders before the final version is graded according to the departmental rubric.

6. A copy of the final version of your paper must be submitted to the course director. This copy must include the name of the supervising faculty member and the names of the other graders.

7. You must complete the exit-interview Senior Survey to assist the department in assessment and evaluation of our program. Submissions are anonymous.

Method of Evaluation and Grading:
Each student will receive a "multiplier" score between 0% and 100% from the instructor of record representing what percentage of the requirements 1-6 above have been completed. The final grade is the product of this multiplier and the grades determined by the grading committee.

The student's written paper and final oral presentation will be evaluated by a committee of three mathematics faculty members, including the student's supervisor. The committee shall use the departmental rubrics for grading the presentation and paper, available online.

http://people.wku.edu/tom.richmond/Math498_Rubrics.pdf

The grades are determined by the averages of the committee's scores, multiplied by the "requirement score" described in item 3 above. Grading for the paper and presentation will adhere to the guidelines:

0 – unacceptable 0.5 – very poor 1 – poor 1.5 – below average
2 – fair 2.5 – above average 3 – good 3.5 – very good 4 – excellent

The course grade will be determined by the average of the paper and presentation scores according to the following scale:

F – [0, 1) D – [1, 2) C – [2, 3) B – [3.0, 3.5) A – [3.5, 4.0]

Last Date to Withdraw/Audit: October 30, 2023

Academic Dishonesty: Student who commit any act of academic dishonesty may receive from the instructor a failing grade in that portion of the course work in which the act is detected or a failing grade in a course without possibility of withdrawal. Academic dishonesty includes copying the work of someone else, sharing your work with someone else, or using web tools to solve problems on graded assignments. As with all WKU classes, student work may be checked using plagiarism detection software.

ADA Accommodation Statement: In compliance with University policy, students with disabilities who require academic and/or auxiliary accommodations for this course must contact the Student Accessibility Resource Center located in Downing Student Union, 1074. SARC can be reached by phone number at 270-745-5004 [270-745-3030 TTY] or via email at sarc.connect@wku.edu . Please do not request accommodations directly from the professor or
instructor without a faculty notification letter (FNL) from The Student Accessibility Resource Center.

Sexual Misconduct/Assault Policy: Western Kentucky University (WKU) is committed to supporting faculty, staff and students by upholding WKU's Title IX Sexual Misconduct/Assault Policy (#0.2070) at https://wku.edu/eoo/documents/titleix/wkutitleixpolicyandgrievanceprocedure.pdf and Discrimination and Harassment Policy (#0.2040) at https://wku.edu/policies/hr_policies/2040_discrimination_harassment_policy.pdf.

Under these policies, discrimination, harassment and/or sexual misconduct based on sex/gender are prohibited. If you experience an incident of sex/gender-based discrimination, harassment and/or sexual misconduct, you are encouraged to report it to the Title IX Coordinator, Andrea Anderson, 270-745-5398 or Title IX Investigators, Michael Crowe, 270-745-5429 or Joshua Hayes, 270-745-5121.

Please note that while you may report an incident of sex/gender based discrimination, harassment and/or sexual misconduct to a faculty member, WKU faculty are "Responsible Employees" of the University and **MUST** report what you share to WKU's Title IX Coordinator or Title IX Investigator. If you would like to speak with someone who may be able to afford you confidentiality, you may contact WKU's Counseling and Testing Center at 270-745-3159.

Evaluating the Paper:

The paper will be graded on (i) its organization, (ii) presentation of mathematical material, (iii) demonstration of mathematical reasoning and problem solving, (iv) readability, grammar, and style, and (v) level of difficulty. The faculty members will grade each of these parts on a scale of 0 (unacceptable) to 4 (excellent). The final grade on the paper will be the average of all scores on all parts. Evaluation of the paper will be based on the following set of expectations:

Organization

a. The paper includes a title page and a bibliography in the standard scientific format.

b. The main body of the paper is from ten to fifteen (single-spaced) pages and is typeset with an appropriate word processor and equation editor. (Exceptions in length can be made if the supervising faculty member feels that it is necessary.)

c. The paper begins with an introduction that describes the material to be presented, clearly states the objectives of the paper, and explains any special techniques to be used by the author.

d. Following the introduction, the paper has an identifiable body that focuses on the main points with logical and clear transitions between them.

e. Bibliographic and equation number references are cited throughout the paper as appropriate.

f. The paper contains a conclusion that, as appropriate, describes specific applications, related problems, or directions for future development.

Presentation of Mathematical Material

a. The paper includes all necessary definitions as well as a description of all terms or background results that are cited.

b. The paper includes appropriate examples that illustrate the key concepts.

c. Results and exposition flow in a logical order.

d. All results, statements, definitions, theorems, and proofs are accurate.

Mathematical Reasoning and Problem Solving

a. Student demonstrates a clear understanding of the material/problem being presented.

b. Student draws upon his/her accumulated knowledge of a variety of mathematical ideas to explain/solve
their topic/problem.

c. Student demonstrates the ability to work independently.

d. Student is able to relate the topic/problem to other mathematical ideas they have encountered in their
course work.

Readability, Grammar, and Style

a. The paper should be readable by a fellow mathematics major who has completed the foundation core MATH 136, 137, 237, 307, 310, 317, and some other 400-level mathematics course.

b. There should be distinction between concepts and results that should be known to readers versus those that require review or some introduction and development.

c. Spelling, punctuation, and grammar must be correct.

d. Equations, figures, and tables should be properly inset and numbered for reference.

Level of Difficulty

The material should be appropriately challenging given the student's mathematical background and coursework, and normally should apply 300-400 level coursework.

Evaluating the Presentation:

The presentation will be graded on (i) its structure, (ii) engagement of the audience, (iii) demonstration of mathematical comprehension and problem-solving ability, (iv) style, and (v) level of difficulty. The faculty members will grade each of these parts on a scale of 0 (unacceptable) to 4 (excellent). The final grade on the presentation will be the average of all scores on all parts. Evaluation of the oral presentation will be based on the following set of expectations:

Structure

a. The presentation should begin with an introduction that describes the material to be presented, clearly states the objectives of the presentation, and states any special techniques to be used by the speaker.

b. Following the introduction, the presentation should have an identifiable body that focuses on the main points with logical transitions between the key ideas.

c. As appropriate, the speaker identifies specific applications, related questions, or direct ions for future development.

d. The presentation should be from 20 to 25 minutes in length followed by a question and answer period.

Engagement of Audience

a. The presentation should be delivered in such a way as to assure its understanding by the audience.

b. The speaker should assume that the listeners have solid mathematical reasoning skills and have been exposed to the ideas of calculus and the fundamentals of logic, sets, and proofs. The presenter should not assume that members of the audience have any specific detailed background on the subject matter.

c. The speaker should provide appropriate review or development of any specific background necessary for understanding the material in the presentation.

d. The speaker may use note cards, overhead transparencies, and other forms of support as appropriate, but should speak to members of the audience as opposed to reading the paper.

e. The speaker should maintain eye contact during the presentation and should make an effort to include everyone in the audience.

f. The speaker should invite questions and comments, specifically at the conclusion of the presentation, and the speaker should treat all questions and questioners with respect.

Demonstration of Mathematical Comprehension and Problem-Solving Ability

a. If the presentation is to communicate an overview of the entire topic through a selection of definitions and theorems, then the speaker should explain the central concepts and results formally and accurately, and should provide appropriate examples to illustrate them.

b. If the presentation is to communicate an overview of the whole topic, but the mathematical treatment is more informal, then the speaker should introduce central concepts and results through examples and informal statements designed to stimulate intuitive understanding.

c. If a formal proof is part of the presentation, then the speaker should demonstrate a clear understanding of the way that definitions and prior results are applied in the course of the proof.

d. The speaker should respond appropriately and correctly (within the scope of the student's research) to questions during the question and answer period.

e. The speaker should identify, in the course of the presentation, the key issues of their topic/problem and the steps they took to resolve those issues.

Style

a. The speaker should speak clearly and loudly enough for all audience members to hear.

b. The presentation should be delivered with sufficient clarity and professionalism so that the main points can be understood by most audience members.

c. The presenter should use adequate technology in the presentation. PowerPoint presentations with elaborations on the blackboard are encouraged.

Level of Difficulty

The material should be appropriately challenging given the student's mathematical background and coursework, and normally should apply 300-400 level coursework.