| Student Learning Outcome | Measurement tool | Method of direct assessment | | Courses | Results | How Results Are Used |
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| | | **Evaluation method** | **Performance criteria** | | | |
| **<u>Outcome A</u>** ***The graduate demonstrates a depth and breadth of knowledge of mathematical concepts, methods, reasoning, and language.*** | Sequence Course | • The student completes at least one upper level two semester sequence course for their major requirements. | Student receives a grade of C or better in both courses of the sequence. | MATH: 345-346, 341-342, 353-354 | | |
| | Course Papers | • The student demonstrates a mastery of the criteria in the "Clarity and Insight" section of the Writing Evaluation document, in at least one paper outside of the senior comprehensive project. | Student receives a grade of C or better. | MATH: 225, 231, 326, 332, 339, 361, 345, 346, 341, 342, 353, 354 | | |
| | Breadth Requirement | • The student completes at least three upper level courses in distinct areas. | Student receives a grade of C or better. | MATH: 332, 339, 341, 345, 353, 361, 362, 372, 438 | | |
| | Proof Construction | • The student is able to write proofs at an acceptable level in Algebra or Analysis. | Student receives a grade of B- or better in at least one of the courses in an Algebra or Analysis sequence. | MATH: 341, 342, 353, 354 | | |
| **<u>Outcome B</u>** ***The graduate is able to engage in independent learning, application, and problem solving.*** | Senior Comprehensive Project - Final Written Paper | • The student uses her textual or other resources to synthesize a written product, rather than show a significant dependence on those resources.<br>• The student moves beyond the resources, such as to apply ideas to problems or examples not directly treated by those resources or to extend the results presented in the resources in some meaningful way.<br>• The student states and presents a solution to a significant problem in the paper. | Unsatisfactory, Satisfactory, or Honors | MATH: 495, 496 | | |
| | Senior Comprehensive Project – Assessment of Independence (Advisor Only) | • The student masters the background material on her own.<br>• The student actively participates in meetings with her advisor. In particular, the student asks or introduces substantive questions in the course of those meetings and demonstrates mastery of the reading material.<br>• The student demonstrates initiative in addressing the senior comprehensive project problem(s). | Unsatisfactory, Satisfactory, or Honors | MATH: 495, 496 | | |

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| | Problem Sets and Projects | • Course instructor creates a problem-solving portfolio for students in core courses by selecting a problem set and/or project that is representative of her current abilities. | Student receives a grade of C or better. | MATH: 225, 326, 341, 342, 353, 354 | | |
| | Senior Seminar | • The student demonstrates accurate and detailed solutions to problems during problem presentations in class.<br>• If the student assigns homework to the class, she chooses problems that adequately allow the other students to explore the presented ideas, and provides an accurate answer key for those problems to the instructor.<br>• The student works independently with her peer team to master the material for her presentation and to generate answer keys, rather than relying on instructor assistance. | Student receives a grade of C or better. | MATH: 495 | | |
| **<u>Outcome C</u>**<br>***The graduate is able to communicate her ideas and the results of her work, both orally and in writing, with clarity and precision.*** | Senior Comprehensive Project – Final Oral Presentation and Response to Questions | • The student orally presents the ideas in her senior comprehensive project to a panel of faculty readers.<br>• The faculty panel assesses the student's performance during her final presentation and her ability to answer questions posed by the audience. | Unsatisfactory, Satisfactory, or Honors | MATH: 495, 496 | | |
| | Senior Comprehensive Project - Final Written Paper | • The student submits a final written paper for work on her senior comprehensive project to the faculty readers.<br>• The faculty readers assess the student's final written paper according to the criteria on the Writing Evaluation document. | Unsatisfactory, Satisfactory, or Honors | MATH: 495, 496 | | |
| | Course Papers | • The student demonstrates a mastery of a majority of the criteria within each area on the Writing Evaluation document. | Student receives a grade of C or better. | MATH: 225, 231, 326, 332, 339, 361, 345, 346, 341, 342, 353, 354 | | |
| | Oral Presentations in Courses | • The student demonstrates a mastery of the criteria on the Oral Presentation Evaluation document for at least one oral presentation outside of the senior comprehensive project. | Student receives a grade of C or better. | MATH: upper level<br>CPSC: all | | |
| | Sophomore and Junior W | • The student demonstrates a mastery of a majority of the criteria within each area on the Writing Evaluation document.<br>• Members of the Sophomore and Junior Writing Committees assess a student's achievement in each area: accuracy, organization, clarity and insight, mechanics. | Pass/Fail | | | |

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| | Senior Seminar | • The student is assessed on her technical writing and presentation skills; the communication skills are assessed also by group work and responsiveness to class questions. | Student receives a grade of C or better. | MATH 495, 496 | | |
| **<u>Outcome D</u>**<br>***The graduate recognizes the importance of social and ethical issues in professional settings.*** | Senior Comprehensive Project - Final Written Paper | • The student gives proper attribution for work that is not her own.<br>• A panel of faculty readers assesses whether the student has expressed her work in her own words or given appropriate attribution otherwise. | Unsatisfactory, Satisfactory, or Honors | MATH: 495, 496 | | |
| | Course Papers | • The student gives proper attribution for work that is not her own.<br>• Course instructor assesses whether the student has expressed her work in her own words or given appropriate attribution otherwise. | Student receives a grade of C or better. | MATH: 225, 231, 326, 332, 339, 361, 345, 346, 341, 342, 353, 354 | | |
| | Formal Group Work | • As a member of a group, the student addresses the social and ethical problems which occur in group work.<br>• Instructors provide both guidance and assessment. | Student receives a grade of C or better. | CPSC: 308, 315, 417, 429 | | |
| | Problems Sets and Projects | • The student follows ethical principles as she completes all assignments and her major projects.<br>• In CPSC 207 (required of all math majors) social and ethical issues are addressed as they relate to technology. The student's understanding is assessed by exam questions on the final exam.<br>• Upper level computer science courses include considerations of social and ethical issues in relation to the particular area of study. The student's mastery is assessed through class projects, which require directly addressing such issues. | Student receives a grade of C or better. | CPSC: 207, 308, 315, 417, 429 | | |
| | Self Assessment, Peer Review, or Reflection Reports | • The student completes a peer review of oral presentations and written work in many of the upper division courses.<br>• In the case of written work, the student gives honest and thorough evaluations. This serves as good preparation for the issues of evaluation of peers in professional settings.<br>• Course instructor assesses the peer reviews. | Student receives a grade of C or better. | CPSC: 207, 308, 315, 417, 429<br>MATH: 495,496 | | |
| **<u>Outcome E</u>**<br>***The graduate is prepared for a career path that requires*** | Senior Comprehensive Project- Final Oral Presentation | • The student gives a professional talk about her senior comprehensive project topic and demonstrates her knowledge to a panel of faculty readers. | Unsatisfactory, Satisfactory, or Honors | MATH 496 | | |

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| ***mathematical understanding.*** | and Response to Questions | | | | | |
| | Senior Comprehensive Project- Final Written Paper | • The student writes a formal expository paper on her senior comprehensive project topic that is understandable to a panel of faculty readers.<br>• The student observes professional style and formatting guidelines and typesets the final paper using the math editing program LaTex . | Unsatisfactory, Satisfactory, or Honors | MATH 496 | | |
| | Senior Comprehensive Project- Assessment of Independence (Advisor Only) | • The student works through advanced material independently, using the faculty advisor as a resource, determines a set of project goals with the advisor, prepares for all meetings with the advisor, and meets all deadlines. | Unsatisfactory, Satisfactory, or Honors | MATH 496 | | |
| | Formal Group Work | • As a member of a group, the student engages in honest self-evaluation of team performance and assesses the role-based contributions of individual team members. | Student receives a grade of C or better. | MATH: 345, 438, 495; CPSC: 308, 315, 417, 429 | | |
| | Breadth Requirement | • The student successfully engages in the study of a variety of mathematical areas to prepare herself for the numerous possibilities that knowledge of mathematics make available.<br>• The student studies a range of courses that provide the opportunity for self-assessment, which highlights her strengths as areas for future career paths.<br>• Academic advisor directs and assesses the student's efforts at self-discovery and planning for life after graduation. | Student receives a grade of C or better. | | | |
| | Senior Seminar | • The student takes ownership of new knowledge.<br>• The student works in teams.<br>• The student guides the work of others. | Student receives a grade of C or better. | MATH 495, 496 | | |
| | Alumnae Interviews | • The student interviews alumnae and writes about it in the department newsletter.<br>• The student interacts with alumnae at contact events, such as AfterMath.<br>• The department communicates with alumnae to understand the trajectory of their professional life and better understand the opportunities available to graduates.<br>• The graduate self-assesses her career preparedness in the Alumnae Survey. | Pass/Fail/Not Applicable<br><br>Institutional Research provides an aggregate survey response. | | | |

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| **Outcome F** ***The graduate is prepared to be a contributing member of a problem solving team.*** | Formal group work | • As a member of a group, the student actively contributes to the problem at hand as an equal to other team members. | Pass/fail or gradation rubric? | CPSC: 308, 315, 417, 429 | | |
| | Senior Seminar | • The student works in a team of two, which is responsible for presenting and teaching assigned material. | Pass/fail or gradation rubric? | MATH: 495, 496 | | |
| | Self Assessment, Peer Review, or Reflection Reports | • As a member of a group, the student engages in honest self-evaluation of team performance.<br>• Senior seminar peer review<br>• **paper peer-review in analysis and algebra - is it a part of 'group work'?...in a sense that the final product is a result of "collaboration" between the author and the peer reviewer – WE MAY WANT THIS SOMEWHERE BUT WHERE?!** | Pass/fail or gradation rubric? | CPSC: 207, 308, 315, 417, 429<br>MATH: 495,496 | | |
| **Outcome G** ***The graduate utilizes technology appropriately for analysis and problem solving.*** | Full Year Sequence | • The student completes at least one upper level two semester sequence course for their major requirements. | Student receives a grade of C or better in both courses of the sequence. | MATH: 345-346, 341-342, 353-354 | | |
| | Breadth Completion | • The student completes at least three upper level courses in distinct areas. | Student receives a grade of C or better in each course. | MATH: 332, 339, 341, 345, 353, 361, 362, 372, 438 | | |
| | Problem Sets and Projects | • The student understands the importance of using technology in order to speed up, improve or solve various problems that are posed during the course.<br>• Course instructor assesses the student's mastery through grading of problem sets and projects that involve the use of mathematical, statistical, or programming software (such as Maple, MINITAB, Java). | Student receives a grade of C or better. | MATH: 231, 341, 342, 345, 346<br>CPSC: all | | |
| **Outcome H** ***The graduate has a developed appreciation for the power and beauty of mathematics.*** | Senior Comprehensive Project- Oral and Written Presentation | • The student exhibits enthusiasm, insight, and good exposition during the senior comprehensive project final talk and in the introduction and conclusion to the final paper. | Level evaluated by panel of faculty readers for the senior comprehensive project and indicated on the senior comprehensive project evaluation form. | MATH 495 | | |