Carthage Mathematics Department Course Summary for Math 3140 Abstract Algebra II

- 1. Credits: 4 credits
- 2. Semesters Offered: Spring
- 3. Text(s): Contemporary Abstract Algebra by Joseph Gallian, eighth edition
- 4. Topics Covered:
 - a. Review of Rings
 - b. Properties of Rings and Subrings
 - c. Integral Domains
 - d. Fields
 - e. Ideals and Factor Rings
 - f. Ring Homomorphisms
 - g. Polynomial Rings
 - h. Factorization of Polynomials
 - i. Divisibility in Integral Domains
 - j. Vector Spaces
 - k. Extension Fields
 - I. Algebraic Extensions
 - m. Galois Theory
- 5. Skills Enhanced:
 - a. Technical writing: Students bring both their expository and proof writing to a publishable level, and demonstrate this with a written version of their final project that includes valid proofs within a clear narrative context.
 - b. Computer skills:
 - 1. MS Word/Latex: basic document preparation skills are required, including equation editor and the importing of images when necessary. If there is sufficient student interest, students will be introduced to the mathematical language of Latex for use on their final projects.
 - c. Oral presentations: Students will present homework problems in class often. Special emphasis will be placed upon the differences between written and oral work.
 - d. Research Skills: Students will learn how to independently research a mathematical topic and properly present their findings.
- 6. Sample Syllabus:
 - Chapters 12-21 and Chapters 23 and 32 of Gallian
- 7. Miscellanea

None.

- 8. Course Goals: By the end of the course, students should be able to do the following:
 - a. Write a valid proof, using correct modern notation and clear exposition. Assessment: Weekly homework sets all include proof assignments
 - Write a short article (4-6 pages) in publishable form that includes both narrative and also valid proof, using correct modern notation and clear exposition.
 Assessment: A final project is required, to be written in this format for a letter grade.

- c. Work independently on a significant project. Assessment: The final paper will address this goal.
- d. Present a technical talk with appropriate level of detail for an audience of peers. Assessment: Each student will present problems at the board throughout thesemester.
- e. Describe and apply the definitions and properties of rings, integral domains, fields, and vector spaces.

Assessment: The homework assignments cover this material.