Math 2110 Calculus III University of Memphis

Course Content: (4 credit hours.) This course deals with vector calculus and related differentiation and integration in 3-dimensional spaces. It start with equations of lines, planes, quadratic surfaces and the notions of arc length, curvature and tangent planes; it proceeds with optimization and Lagrange multipliers; double and triple integrals in various coordinate systems, as well as line integrals, and related Green's theorems; and culminates with Stokes theorem and the divergence theorem.

Prerequisite: Math 1920 or Math 2421. A score of at least 4 on the AP Calculus BC series exam can be used to obtain credit for Math 1920, and thus fulfil the prerequisites for Math 2110.

Note: students with a stronger math background may be invited to take Honors Calculus III (Math 2422) in place of Math 2110. See http://www.memphis.edu/msci/ugrad/honors.php for more details. Students may not receive credit for both Math 2422 and Math 2110.

Method of Instruction: Four academic hours/week taught by the instructor, with emphasis on computations.

Course Materials: Textbook*, Calculus Early Transcendentals*, by James Stewart, 8th ed., Chapters 12–16. Webassign student access code.

Tutoring: Free tutoring is available through the University's Education Support Programs. They offer a drop-in tutoring service in the Math Learning Center in DH 341 and online assistance.

Disabilities: Any student who anticipates physical or academic barriers based on the impact of a disability should contact Disability Resources for Students (DRS) at 110 Wilder Tower, 901.678.2880 at the earliest opportunity. DRS coordinates access and accommodations for students with disabilities. You must give your instructor a copy of any accommodation memos provided by the DRS **within the first week of class.**

Attendance: Attendance is important. Every student is required to be in class, on time, and stay for the entire class period for each class session. If you miss class you are responsible for finding out what topics were covered.

Academic Integrity: Plagiarism, cheating, and other forms of academic dishonesty are prohibited. Institutional disciplinary rules will be imposed.

Grading Policy: Grades will be calculated based on homework and tests, and final exam. Grading scale is determined by the instructor.

Homework: Homework will be assigned for each section of the text and must be finished before the due date for you to receive credit.

No Make-ups for Tests: If you must miss a test because of an official school function you must schedule to take the test at a time prior to the original test date. No other rescheduling will be allowed.

Final Schedule: see http://www.memphis.edu/registrar/calendars/

Course schedule: Any changes of this schedule will be announced in class, and in writing.

Chapter 12: Vector and the Geometry of Space

- Three-Dimensional Coordinate Systems
- Vectors
- The Dot Product
- The Cross Product
- Equations of Lines and Planes
- Cylinders and Quadratic Surfaces

Chapter 13: Vector Functions

- Vector Functions and Space Curves
- Derivatives and Integrals of Vector Functions
- Arc Length and Curvature
- Motion in Space: Velocity and Acceleration

Chapter 14: Partial Derivatives

- Functions of Several Variables
- Limits and Continuity
- Partial Derivatives
- Tangent Planes and Linear Approximations
- The Chain Rule
- Directional Derivatives and Gradient Vector
- Maximum and Minimum Values
- Lagrange Multipliers

Chapter 15: Multiple Integrals

- Double Integrals over Rectangles
- Double Integrals over General Regions
- Double Integrals in Polar Coordinates
- Applications of Double Integrals
- Surface Area
- Triple Integrals
- Triple Integrals in Cylindrical Coordinates
- Triple Integrals in Spherical Coordinates
- Change of Variables in Multiple Integrals

Chapter 16: Vector Calculus

- Vector Fields
- Line Integrals
- The Fundamental Theorem of Line Integrals
- Green's Theorem
- Curl and Divergence
- Parametric Surfaces and their Areas
- Surface Integrals
- Stokes Theorem
- The Divergence Theorem