Ma223C - Vector Calculus - Fall 2021 Syllabus

Description Double and triple integrals and their applications. Vector fields. Gradient, divergence and curl. Line integrals. Path independence of line integrals. Integration theorem of Green. 2 credits. Prerequisites: Ma110 and Ma113. Thomas, Weir, and Hass, "Thomas' Calculus", 12th edition, Pearson (2009), ISBN-13: Textbook 978-0321587992 Robert Smyth, Professor, Mathematics. Instructor See faculty.cooper.edu/smyth for office hours and contact information. Course Upon completion of the course, the student will be able to demonstrate high profi-**Objectives** ciency in setting up and computing double and triple integrals. Demonstrate sound understanding of the concept of vector field. Demonstrate a rigorous understanding of the integration theorem of Green. Demonstrate high proficiency in executing technical calculations by application of Green's Theorem. Course Double and iterated integrals over rectangles (15.1, H.A.: 4, 9, 11, 14, 20, 21, 23, 26, **Topics** 27). Double integrals over general regions (15.2, H.A.: 2, 4, 5, 7, 9, 12, 14, 18, 19, 22, and 24, 25, 27, 30, 31, 34, 38, 41, 46, 47, 53, 55, 58, 61, 66-71, 73, 75, 78, 80, 81, 86, 90. Homework Area by double integration (15.3, H.A.: 3, 6, 15, 17–21, 23, 26). Double integrals in polar form (15.4, H.A.: 1–8, 10, 13, 17, 22, 24, 26, 27, 29, 32, 34, 35, 38, 40, 42, 44, 46, 50). Triple integrals in rectangular coordinates (15.5, H.A.: 4, 8, 11, 14, 18, 22, 25, 29, 35, 39, 41–43, 46, 48, 51). Moments and centers of mass (15.6, H.A.: 11–13, 22, 29, 30, 32, 35, 36). Triple integrals in cylindrical and spherical coordinates (15.7, H.A.: 8, 11. 12, 14, 15, 19, 28, 31–33, 38, 42, 47, 49–52, 56, 62, 68, 73, 76, 85, 86). Substitutions in multiple integrals (15.8, H.A.: 2, 3, 7, 10, 11, 13, 16–19, 23, 26). Line integrals (16.1, H.A.: 1–8, 10, 12, 15, 18, 20, 23, 25, 28, 31, 33–38, 45). Vector fields and line integrals: work, circulation, and flux (16.2, H.A.: 2, 5, 6, 9, 14, 16, 17, 20, 23, 26, 28, 29, 33, 37, 45, 48, 51, 57). Path independence, conservative fields, and potential functions (16.3, H.A.: 4–6, 10, 11, 16, 20, 23, 26, 29, 31, 35, 38). Green's theorem in the plane (16.4, H.A.: 4, 7, 12–14, 19, 22-24, 26, 28, 29, 32, 33, 36, 37, 40, 45). Your term grade will be determined by two midterms (26% each) and a cumulative final Assessment exam (48%). The schedule is available at faculty.cooper.edu/smyth/ma223/ma223.htm. Exam All exams are closed book / closed notebook exams. You may use a basic scientific **Policies** calculator, but no graphing or programmable calculators, computers, cellphones, books, notebooks, or other resources may be used. Bring a pencil or pen on the day of the exam. Paper will be provided. Exams are timed. Your score may be reduced if you do not stop working on your exam after time has been called. If you choose to leave the exam room during the exam period you will not be permitted to resume working on the exam after returning. Registered students must sit for the course examinations on the scheduled day and time. Failure to do so will generally result in forfeiture of the percentage credit allotted to the missed exam. Students who have medical excuses for missing an exam should contact the Dean of Students promptly. Failure to register a request for a medically excused absence in a timely manner with

the Dean of Students may complicate and potentially invalidate the request. Any

student requesting a medically excused absence must provide the Dean of Students with documentation from a medical provider justifying the absence. The Dean of Students will inform me when an absence is due to a valid medical issue/condition so that the absence can be considered excused. In the event of an excused absence, the student must, ordinarily, schedule an oral makeup exam with me as soon as is possible. However, if a sufficiently large number of students document excused absences for an exam, it may be necessary to schedule a written makeup exam.

ADA If you believe you are entitled to an accommodation through the Americans with Disabilities Act you must self-identify to the Office of the Dean of Students, and meet with me during the first week of the term to discuss arrangements for meeting your accommodation. Cooper Union has limited resources and extra time may be required for accommodation arrangement to be feasible. If you are entitled to an accommodation on exams, you must confirm exam accommodation arrangements with me during the week prior to *each* exam.