Information Sheet for Math 225 Winter 2015

Class meets: MTRF 11:00 - 11:50 am in BH 317

Instructor: Branko Ćurgus **Office:** BH 178 **Hours:** MTRF 12 noon **Email:** curgus@gmail.com

Course website: http://faculty.wwu.edu/curgus/Courses/225_201510/225.html

Text: Multivariable CALCULUS, 5th edition, McCallum, Hughes-Hallet, et al.

Material Covered We will review Chapter 16 and cover Chapters 17, 18, 19 and 20. In Math 124 and 125 you studied differential and integral calculus of functions of a single variable. In Math 224 you studied differential and some integral calculus of functions of two and more variables. In Math 225 we study more of the integral calculus in the setting of functions of multiple variables. In particular, we investigate the analogies of the Fundamental Theorem of Calculus from single variable calculus to functions of two and more variables. This is the relationship between integration and differentiation when the integral may now be taken over a curve, a surface, a region, or the boundary of a region; the most important results being "Green's Theorem", the "Divergence Theorem", and "Stokes' Theorem".

Exams: There will be two in class exams and a comprehensive final exam. The dates for the in-class exams are Monday, February 2 and Tuesday, March 3. The final exam is scheduled for *three hours* on Tuesday, March 17 from 8am to 11am. There will be no make-up exams. If you are unable to take an exam for a very serious reason verified in writing, please see me beforehand. This does not apply to the final exam which cannot be taken neither early nor late.

Homework: Suggested homework problems will be assigned on the class web-site. Homework will not be collected. Questions about homework problems, or any other calculus problems are welcome. I strongly encourage you to put your questions in writing with a description of your difficulty. You can hand in your questions at the beginning of each class period. I will give extra credit for well posed interesting questions.

Grading: Each exam will be graded by an integer between 0 and 100. Your final grade will be determined using the following formula

$$\texttt{FG} = \lceil 0.25*\texttt{E1} + 0.25*\texttt{E2} + 0.5*\texttt{FE} \rceil,$$

where E1 and E2 are the grades for two in-class exams and FE is the grade for the final exam. Your letter grade will be assigned according to the following table.

F : 0 - 49	D : 50 - 54	C− : 55 - 59	C : 60 - 64	C+ : 65 - 69
B− : 70 - 74	B : 75 - 79	B+ : 80 - 84	A− : 85 - 89	A : 90 - 100

How to succeed: Attend class regularly and do all the suggested homework problems. Do and redo more problems. Read the book before class and before doing the problems. Keep organized notes of all your work. Make sure that you *fully understand* how to do each assigned problem correctly. Do not hesitate to ask a question whenever something is unclear. You can talk to other students from this class or other calculus classes, visit Math Center in BH 211A, stop by my office during the office hours or make an appointment. There are plenty of resources. Use them!

Student learning outcomes: By the end of this class, a successful student will demonstrate: (1) an ability to set up and compute integrals of functions of two or three variables over regions in the plane or in space, and to do so in a variety of coordinate systems; (2) an understanding of parameterized curves, tangent vectors to such curves as velocity vectors, acceleration vectors, and an ability to find parameterizations of simple geometric curves in space; (3) an understanding of parameterization of surfaces and the ability to find parameterizations of simple examples; (4) an understanding of vector fields, their flows, and the differential equations defining the flows; (5) an understanding of the definition of a line integral and the ability to compute line integrals along parameterized curves; (6) an understanding of the fundamental theorem for line integrals and the notion of path independent fields; an understanding of path dependent fields and Green's theorem (in the plane); the ability to determine when a vector field is the gradient of a function and to find such a function in this case; (7) a geometric and physical understanding of flux and flux integrals, and an ability to compute flux integrals for simple parameterized surfaces; (8) a geometric and physical understanding of divergence of a vector field; an understanding of the notion of a divergence-free field and of the divergence theorem, and the ability to apply the divergence theorem to compute flux integrals; (9) a geometric and physical understanding of the curl of a vector field; an understanding of the notion of a curl-free field, and the ability to compute the curl in Cartesian coordinates; (10) an understanding of Stokes' theorem and the ability to apply Stokes' theorem to compute flux integrals (and line integrals).