DEPARTMENT OF MATHEMATICS

MATH 2720 MULTIVARIABLE CALCULUS

September – December 2016

A01: **Instructor**: G.I. Moghaddam, 426 Machray Hall, 474-8345, e-mail: moghadm@cc.umanitoba.ca

Office hours: Monday, Wednesday and Friday 12:00-1:00 PM ; and or by appointment

Lecture: 111 Armes, Slot 3, Monday, Wednesday, and Friday 10:30–11:20 AM

Pre-Requisites: A grade of C or better in one of MATH 1220, MATH 1300 (136.130), MATH 1301, or MATH 1310 (136.131) (C); and a grade of C or better in one of MATH 1232, MATH 1690 (136.169), MATH 1700 (136.170), MATH 1701, MATH 1710 (136.171), or the former 136.173.

Textbook: Calculus Early Transcendentals by James Stewart, Seventh Edition, **or** Multivariable Calculus by James Stewart, Seventh Edition.

Course Outline:

1. **Vectors and the Geometry of Space**(mostly review): Vectors, Dot and Cross product, Equations of Lines and Planes, Cylinders and Quadric Surfaces. (CET, Stewart, Chapter 12 sections 1 to 6)

2. **Vector Functions**: Vector Functions and Space Curves, Derivatives and Integrals of Vector Functions, Arc Length and Curvature. (CET, Stewart, Chapter 13 sections 1 to 3)

3. **Partial Derivatives**: Functions of Several Variables, Limits and Continuity, Partial Derivatives, Tangent Planes, Chain Rule, Directional Derivatives and the Gradient Vector, Maximum and Minimum Values, Lagrange Multipliers. (CET, Stewart, Chapter 14 sections 1 to 8)

4. **Multiple Integrals**: Double Integrals over Rectangles, Iterated Integrals, Double Integrals over General Regions, Double Integrals in Polar Coordinates, Applications of Double Integrals, Triple Integrals. (CET, Stewart, Chapter 15 sections 1 to 9)

5. **Vector Calculus**: Vector Fields, Line Integrals, The Fundamental Theorem for Line Integrals, Green's Theorem. (CET, Stewart, Chapter 16 sections 1 to 4)

Course webpage : http://home.cc.umanitoba.ca/∼moghadm/Math2720

Midterm exam: A 75 minutes midterm examination, worth 30% of the final grade, will be conducted from 5:30 p.m. to 6:45 p.m. on

Friday October 28

Calculators and/or reference material will NOT be allowed on tests or final examination.

Evaluation:

The midterm exam counts as 30% of the final grade.

A three hour final examination, to be scheduled by the Registrar's Office, will count for the remaining 70% of the final grade.

Grading Table:

Letter Grade	Minimum percentage to guarantee	Final Grade Point
A+	92	4.5
A	83	4.0
B+	77	3.5
B	71	3.0
C+	65	2.5
C	60	2.0
D	50	1.0

Notes:

(1) If you miss the midterm exam, you will be assigned a mark of "zero" unless reasons and acceptable supporting evidence are provided. In that case you will be given the opportunity to write a make-up exam. A student missing a midterm must contact the instructor within 2 days of the scheduled midterm (email contact is sufficient).

(2) **Notes, books, calculators or other computing devices are not allowed for the midterm or the final exam.**

(3) Students are expected to attend all classes and are responsible for all material presented in class even if they are not present.

(4) Student should not participate in personal direct electronic messaging / posting activities (e-mail, texting, video or voice chat, wikis, blogs, social networking (e.g. Facebook) online and offline "gaming" during scheduled class time. If student is on call (emergency) the student should switch his/her cell phone on vibrate mode and leave the classroom before using it.

(5) G.I. Moghaddam and the University of Manitoba hold copyright over the course materials, presentations and lectures which form part of this course. No audio or video recording of lectures or presentations is allowed in any format, openly or surreptitiously, in whole or in part without permission. Course materials (both paper and digital) are for the participant's private study and research.

(6) If you are a student with a disability, please contact SAS for academic accommodation supports and services such as note-taking, interpreting, assistive technology and exam accommodations. Students who have, or think they may have, a disability (e.g. mental illness, learning, medical, hearing, injury-related, visual) are invited to contact SAS to arrange a confidential consultation.

> Student Accessibility Services http://umanitoba.ca/student/saa/accessibility
> 520 University Centre
> 204 474 7423
> `Student_accessibility@umanitoba.ca`

(7) Students are advised to familiarize themselves with the General Academic Regulations of the University contained in the Undergraduate calendar. All forms of academic dishonesty are treated very seriously by the Department of Mathematics, and the Faculty of Science. Submitting another person's work as your own, copying from another person at an exam, or bringing unauthorized information into a test or examination is a serious offense. For further information, please see reverse.

(8) Voluntary Withdrawal Deadline is Friday **November 18**, 2016.

Academic Integrity

The Department of Mathematics, The Faculty of Science and The University of Manitoba regard acts of academic dishonesty in quizzes, tests, examinations, laboratory reports or assignments as serious offences and may assess a variety of penalties depending on the nature of the offence.

Acts of academic dishonesty include, but are not limited to bringing unauthorized materials into a test or exam, copying from another individual, using answers provided by tutors, plagiarism, and examination personation.

Note: cell phones, pagers, PDAs, MP3 units or electronic translators are explicitly listed as unauthorized materials, and must not be present during tests or examinations.

Penalties that may apply, as provided for under the University of Manitoba's Student Discipline By-Law, range from a grade of zero for the assignment or examination, failure in the course, to expulsion from the University. The Student Discipline By-Law may be accessed at:

http://umanitoba.ca/admin/governance/governing _ documents/students/868.htm

Suggested minimum penalties assessed by the Faculty of Science for acts of academic dishonesty are available on the Faculty of Science web page:
http://umanitoba.ca/faculties/science/resources/Discipline_Penalties_Table_Jul09.pdf
All Faculty members (and their teaching assistants) have been instructed to be vigilant and report all incidents of academic dishonesty to the Head of the Department.