



Faculty of Science
DEPARTMENT OF MATHEMATICS AND STATISTICS
Course Information Sheet

1. Course: MATH331 **P05**
Lecture/Time/Session: L20 TR/19:00 **Room:** MS319
Instructor: K.W. CHANG
Office: MS426 **Phone:** 220-6301

2. Prerequisites: MATH 253 or MATH263 or AMAT219 and either MATH221 or MATH 211 + Math013

NOTE: The Faculty of Science policy on pre- and co-requisite checking is outlined in the current University Calendar (see www.ucalgary.ca/pubs/calendar) *Faculty of Science, section 5C*. **It is the students' responsibility to ensure that they have the pre- and co-requisites for the course, and if they do not they will be withdrawn from the course without notice.**

3. Fee policy: After the last day to drop/add courses, there will be no refund of tuition fees if a student withdraws from a course, courses or the session.

4. The University policy on grading and related matters is described in the current University Calendar, *Academic Standings*. In determining the overall grade in the course, the following weights will be used:

Mid-term Test	[1]	25%
Quizzes	[5]	25%
Final Exam		50%

A passing grade on any particular component of the course is essential to passing the course as a whole. There will be a final examination scheduled by the Registrar's Office.

5. Missed Components of Term Work. The regulations of the Faculty of Science pertaining to this matter are outlined in the current University Calendar, *Faculty of Science, section 6A*. It is the student's responsibility to familiarize herself/himself with these regulations.

6. Academic misconduct (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the current University Calendar. See: <http://www.ucalgary.ca/honesty/>

7. Dates and times of class exercises held outside of class hours (evening tests, Saturday laboratory examinations, weekend field trips, etc.): *There will be no out-of-class-time activities.**

8. Textbooks:

(a) Serge Lang: *Calculus of Several Variables*, 3rd edition.

(b) Shepley L. Ross: *Introduction to Ordinary differential Equations (Chapters 1, 2 & 3)*

9. Calculators are allowed in Tests and Final Examination.

Detailed Schedule – MATH 331 (L20)

Week	Date	Topic	Text	Events
1	May 12	Exact Equations Separable & Homogeneous Eq. Linear Eq.; Bernoulli Eq.	2.1 2.2 2.3	Review Integration
2	May 17	Special Transformations Orthogonal Trajectories Mechanics Problems Vectors Vector Differentiation	2.4B 3.1 3.2 – 3.3 Lang: Ch. 1	Assignment 1
3	May 24	Curve Length Several Variables Chain Rule Tangent plane Partial differentiation	Ch. 2 Ch. 3 Ch. 4 Ch. 4	Assignment 2 Mid-Term (May 26)
4	May 31	Maximum/Minimum Curve Integrals	Ch. 5 Ch. 7	Assignment 3
5	June 7	Jacobian matrix Double Integrals	Ch 16 Ch 9	Assignment 4
6	June 14	Green's Theorem Triple Integrals	Ch. 10 Ch. 11	Assignment 5
7	June 21	Divergence Theorem & Review	Ch. 12	

$f(x)$	$\int f(x) dx + c$
$x^n \ (n \neq -1)$	$\frac{x^{n+1}}{n+1} + c$
$\frac{1}{x}$	$\ln x + c$
e^x	$e^x + c$
a^x	$\frac{a^x}{\ln a} + c \ (a > 0)$
$\sin(ax+b)$	$-\frac{1}{a} \cos(ax+b) + c$
$\cos(ax+b)$	$\frac{1}{a} \sin(ax+b) + c$
$\sec^2(ax+b)$	$\frac{1}{a} \tan(ax+b) + c$
$\operatorname{cosec}^2(ax+b)$	$-\frac{1}{a} \cot(ax+b) + c$
$\tan x \ (= \frac{\sin x}{\cos x})$	$-\ln \cos x + c = \ln \sec x + c$
$\cot x$	$\ln \sin x + c$
$\sec x$	$\ln \sec x + \tan x + c$
$\operatorname{cosec} x$	$\ln \operatorname{cosec} x - \cot x + c$
$\sec x \tan x$	$\sec x + c$
$\operatorname{cosec} x \cot x$	$-\operatorname{cosec} x + c$
	$\frac{1}{a} \tan^{-1} \frac{x}{a} + c$
	$\frac{1}{a} \sin^{-1} \frac{x}{a} + c$
	$\ln x + \sqrt{x^2 + a^2} + c$
	$= \sinh^{-1} \frac{x}{a} + c$
	$\ln x + \sqrt{x^2 - a^2} + c$
	$= \cosh^{-1} \frac{x}{a} + c$

Trig. Identities

(A) $\cos^2 \theta = 1 - \sin^2 \theta$

(B) $\sec^2 \theta = 1 + \tan^2 \theta$

(C) $\tan^2 \theta = \sec^2 \theta - 1$

$\frac{d}{dx} \sin^{-1} x = \frac{1}{\sqrt{1-x^2}}$

$\frac{d}{dx} \tan^{-1} x = \frac{1}{1+x^2}$

Integration by parts

$\int f(x)g(x) dx$

$= f(x) \cdot \int g(x) dx - \int f'(x) (\int g(x) dx) dx + c$

or $\int u dv = uv - \int v du$