The City College of New York **Department of Mathematics**
MATH 392 Course Syllabus **Spring 2014**

Course Supervisor: Prof. Joseph Bak (jbak@ccny.cuny.edu)

Required Texts:

1) **Essential Calculus, 2nd edition** (Stewart) Thomson Brooks-Cole

For this course, you need ONLY chapters 12 and 13, which can be downloaded for $12 each from

http://www.cengagebrain.com/shop/isbn/9781133112297

2) **Linear Algebra for Calculus, 2nd edition** (Heuvers et. al.), Brooks-Cole

The syllabus leaves a total of 4 hours for exams and review.

Section and Topic	Hours
Part 1: Vector Calculus: 24 hours. (Stewart Essential Calculus)	**24 hours**
10.7,10.8 Parametrized curves; arc length Omit curvature	1.5
13.1 Vector Fields	1
13.2 Line Integrals	2
13.3 Fundamental theorem for line integrals	2
13.4 Green's Theorem	3
13.5 Curl and Divergence	2
12.5-12.7 Triple integrals; cylindrical and spherical coordinates	2
13.6 Parametric Surfaces and their areas	2
13.7 Surface Integrals	2.5
13.8 Stokes' Theorem	3
13.9 Divergence Theorem	3
Part 2: Linear Algebra: 14 hours. (Heuvers' Linear Algebra for Calculus)	**14 hours**
1 Matrices and Matrix Algebra	1
2 Linear Systems, Elementary Row Operations	2
3 Varieties of Systems of Linear Equations	2.5
4 The Determinant of a Matrix	2
5 The Inverse of a Matrix	1.5
6 Orthogonal Matrices and Changes of Coordinates (6.1 & 6.2 only; optional)	1.5
7 The Eigenvalue Problem (7.1 & 7.2 only) (with applications to systems of ODE's in notes distributed by course supervisor)	3.5

COURSE LEARNING OUTCOMES

DEPARTMENT: Mathematics

COURSE #: 39200 ***COURSE TITLE: Linear Algebra and Vector Analysis for Engineers*** CATEGORY: TERM OFFERED: Spring 2014 PRE-REQUISITES: Math 20300 PRE/CO-REQUISITES: Math 39100 HOURS/CREDITS: 3 hrs./ week; 3 credits. DATE EFFECTIVE: 1/28/10 COURSE COORDINATOR: Joseph Bak	***CATALOG DESCRIPTION*** *Matrix theory, linear equations, Gauss elimination, determinants, eigenvalues problems and first order systems of ordinary differential equations, vector field theory, theorems of Green, Stokes, and Gauss.* ***Required Texts*** *Essential Calculus (2nd Edition) ISBN 1133112293* *Linear Algebra for Calculus (2nd Edition) ISBN 0534252486* *Both published by Thomson Brooks-Cole*

COURSE LEARNING OUTCOMES

Please describe below all learning outcomes of the course, and indicate the letter(s) of the corresponding Departmental Learning Outcome(s) (see list at bottom) in the column at right.

After taking this course, the student should be able to:	Contributes to Departmental Learning Outcome(s):
1. solve linear systems and find matrix inverses ,determinants, eigenvalues and eigenvectors;	a, b
2. relate characteristics of solutions of a linear system to determinant and rank of its associated matrices;	a, e2
3. use eigenvector methods to solve a system of first-order ordinary differential equations	a, b, c
4. construct precise descriptions of curves, surfaces, and solids using parametrizations or equations/inequalities;	a, b
5. compute work, flux, and mass integrals on curves, surfaces, and solids, respectively;	a, b
6. find lengths, areas, and volumes of curves, surfaces, and solids, respectively;	a, b, c
7. choose co-ordinate systems (polar, spherical, cylindrical, rectangular) appropriate to a given problem;	a, b, c
8. state and apply the theorems of Green, Stokes, and Gauss;	a, b, e1, e2
9. find and use potential functions, when appropriate, to find work integrals along curves; and	a, b, c
10. solve other problems appropriate for a course in linear algebra and vector analysis;	a, b, c, e1,e2

COURSE ASSESSMENT TOOLS

Please describe below all assessment tools that are used in the course.
You may also indicate the percentage that each assessment contributes to the final grade.

1. Final exam: 40%
2. In-class exams, quizzes, homework, attendance: 60%

DEPARTMENTAL LEARNING OUTCOMES *(to be filled out by departmental mentor)*

The mathematics department, in its varied courses, aims to teach students to

a. perform numeric and symbolic computations
b. construct and apply symbolic and graphical representations of functions
c. model real-life problems mathematically
d use technology appropriately to analyze mathematical problems
e. state (e1) and apply (e2) mathematical definitions and theorems
f. prove fundamental theorems
g. construct and present (generally in writing, but, occasionally, orally) a rigorous mathematical argument.