MATH 251: STUDY GUIDE AND ASSIGNMENT SHEET

Textbooks: "Essential Calculus – Early Transcendentals" by Stewart, published by Thomson Brooks/Cole, 2007 Abbreviation. EC. "Linear Algebra for Calculus" (a supplement to the above text) by Heuvers, etc. Abbreviation LAC. "Linear Algebra Notes" Chapter 3 and 5 by James L. Moseley Abbreviation. LAN. Assignments are from these texts except that (A) indicates additional problems which are to be solved in the same assignment. These should be considered as minimal. Students who have difficulty as well as students who wish to acquire better than an average proficiency should work additional problems. The objective of this course is to provide an introduction to Linear Algebra, a reasonably complete coverage of fundamentals of multivariate calculus and an introduction to Vector Calculus. Additional coverage is contained in other courses. A change from the previous syllabus is that a better job of teaching the Linear Theory is attempted. Thus we now cover Vector Space Theory in slightly more detail. This will help students who also take Math 261 to understand how Linear Theory is used to solve Linear Differential Equations. Although a deep understanding of Vector Space Theory is not expected, coverage of the Algebraic Definition of the Dimension of a Subspace is expected. There are 39 assignments. At least 30 should be covered. Those with an asterisk(*) can be omitted without seriously impairing the objective of the course. Four hour (50 min.) exams and a comprehensive final should be given.

Text, Ch, §	Material to be studied.	Problems to be worked in what text
	INTRO. TO LIN. ALG.	LAC, LAN, and EC as specified
1. LAN Ch. 2	Matrix Oper. and Prop.	LAN Ch.2 p.11 #1-4, p.15 #1-5, p. 24 #1-4, p.28 #1, p.32#1-10
2. LAN Ch.3	Vector Space and Subspace	LAN Ch.3 p.4#1-8, p.8 #1-4, p.12 #1-5 (A)Is W ={(x,y,0):x,y $\in$**R**}a subspace of $\mathbf{R}^3$
3.LAC Ch.2	How to Solve $A\vec{x} = \vec{b}$	LAC p.22 1abc, 2abc, 3, 5, 6
4. LAC Ch.3	How to Solve $A\vec{x} = \vec{b}$	LAC p.42 1def, 2befh, 3abcde, 4abcd, 5, 7
5. LAN Ch.5	Operators, Spans	LAN Chap.5 p.3 #1-5, p.6 #1-12
6. LAN Ch.5	Lin. Ind., Basis, Dim.	LAN Chap.5 p.11 #`1-11,p.14 #1-8, (A)Are the following sets linearly independent? 1.{e^{3x},$e^{3(x-1)}$} 2.{3t−5, 9t−15} 3. {x^3,$\|x\|^3$}
7. LAC Ch. 4	Deter., Cramer's Rule	LAC p. 59 1-4, 9ab, 10
8. LAC Ch. 5	Inverse of a Matrix	LAC p. 73 1-5, 6cde, 9, 15bc, 16ab
	VECTORS AND THE, GEOM. OF SPACE	Chapter 10 of "Essential Calculus – Early Transcendentals" by Stewart. p.517
9.EC§10.1	3-D Coordinate Systems	EC p521 #1-27 odd
10.EC§10.2	Vectors	EC.p.529 #1-21 odd,27,29
11.EC§10.3	Dot Product	EC p.535 #1-25 odd, 31.
12.EC§10.4	Cross Product	EC p.543 #1-17 odd, 23-35 odd
13. EC§10.5	Eqs. of Lines and Planes	EC p.551 #1-43 odd
14 EC§10.6	Cylinders	EC p. 558 #1-8 odd
15. EC§10.7	Vec. Func.&Space Cur.	EC p.568 #1-27 odd, 33-51 odd, 57-65 odd
16.EC §10.8	Arc Length.& Curvature	EC p.576 #1,3, 7-27 odd,35, 37,41
17 EC §10.9	Motion in Space	EC p.586 #1-11 odd, 15-21 odd, 29-33 odd.
18.EC §10.6	Quadric Surfaces	EC p.558 #9-15 odd . (Sketching)

19.EC §10.6	Quadric Surfaces	EC p.558 # 17-23 odd (Sketching)
	PARTIAL DERIVATIVES	Chapter 11 of "Essential Calculus – Early Transcendentals" by Stewart. p.591
20. EC §11.1	Func. of Several Var.	EC p.599#1-35 odd, 41-47 odd, 51
21. EC§11.2	Limits and Continuity	EC p.608 #1-15 odd, 19-27 odd, 29,30
22 EC §11.3	Partial Derivatives	EC p.614 #1-33 odd, 37-53 odd, 65,71.
22 EC §11.4	Tang.Pl.&Linear Appr.	EC p.624 #1-5, odd, 11-27 odd, 31
23 EC §11.5	Chain Rule	EC p.631 #1-25 odd, 29,33,39
24.EC §11.6	Dir. Der.&Grad Vec.	EC p.642 #1- 25 odd, 31,33,37
25. EC §11.7	Max & Min	EC p.650 #1-13 odd, 23-27 odd, 31-45 odd
26. EC§12.6, §12.6	Cylind.&Spher. Coord. Coordinate Surfaces.	EC p.706 #1-13 p.711 # 1-14
	MULTIPLE INTEGRALS	Chapter 12 of "Essential Calculus – Early Transcendentals" by Stewart. p.663
27.EC §12.1	Double Integ. over Rec.	EC p.672 #1-33 odd, 37,39
29. EC§12.2	Double Int .Over Regs.	EC p.680 #1-27 odd, 31-41 odd, 48, 51.
30.EC §12.3	Double Int. In Polar Cor	EC p.686 #1-17 odd, 23-29 odd
31.EC §12.4	Applications	EC p.693 #1-13 odd
32.EC §12.5	Triple Integrals	EC p.700 #1-19 odd, 25,31,37
33.EC §12.6	Trip. Int. in Cyl. Coor.	EC p.706 #1-13 odd, 17,21
34.EC §12.7	Trip Int. in Sph. Coor.	EC p.711 #1-15 odd, 21,23
*35.EC §12.8	Change of Variables	EC p.721 #1-15 odd, 19-23 odd
	VECTOR CALCULUS	Chapter 13 of "Essential Calculus – Early Transcendentals" by Stewart. p.725
36.EC §13.1	Vector Fields	EC p.730 #1-17 odd, 21-25 odd, 29,31
37.EC §13.2	Line Integrals	EC p.740 #1-19 odd, 27,33,35
38.EC §13.3	Fund. Thm. Line Int.	EC p.749 #1-21 odd
37.EC §13.4	Green's Theorem	EC p.756 #1,3,7-19 odd
38.EC §13.5	Curl & Divergence	EC p.763#1-7 odd
*39.EC§13.6	Para. Surfaces.	Ecp. 773#1,3
*40.EC§13.7	Surface Integrals	No problems
*41.EC§13.8	Stokes' Theorem	No Problems
*42.EC§13.9	Divergence Theorem	No Problems