CITY UNIVERSITY OF NEW YORK – NEW YORK CITY COLLEGE OF TECHNOLOGY

MAT 2675 – SPRING 2019
EXPERIMENTAL COURSE OUTLINE

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TEXTBOOKS

The proposed outline uses two Open Educational Resource (OER) textbooks.

1. **Whitman Calculus (Chapters 12-16),**
   a. available to browse at this link https://www.whitman.edu/mathematics/calculus_online/ with interactive images
   b. available to download at https://www.whitman.edu/mathematics/multivariable/multivariable.pdf
2. **OpenStax Calculus 3 (Chapters 1-6)**
   a. available to browse at https://cnx.org/contents/oxzXkyFi@3.7:Zh8bDwa-@16/Preface
   b. available to download at https://cnx.org/exports/a31cd793-2162-4e9e-acb5-6e6bbd76a5fa@3.7.pdf/calculus-volume-3-3.7.pdf

Whitman Calculus will be the required text, and OpenStax Calculus 3 will be used as a supplementary/optional resource.

WEBWORK

In Fall 2015, I had compiled problem sets on WeBWork based on our current MAT2675 outline. I will continue using it for the proposed experimental outline with only minor adjustments. Whitman Calculus provides a compilation of WeBWork questions available at https://www.whitman.edu/mathematics/webwork/Guichard-Calc3-Webwork-20121209.tgz.

PROPOSED EXPERIMENTAL OUTLINE & COMPARISON WITH THE CURRENT OUTLINE

Lec.	Topics in Current Outline	Topics in the Proposed Outline	Reading (Whitman)	Reading (Openstax)
1	**9.1** Vectors in the Plane **9.2** Vectors in Three-dimensional Space	Points in space. Coordinate Systems	12.1 12.6	2.7
2	**9.3** The Dot Product and Applications (P. 741-745) **9.4** The Cross Product (P. 753-759)	Vectors in space Dot Product Cross Product	12.2 12.3 12.4	2.1 2.2 2.3 2.4
3	**9.5** Lines and Planes in Space	Lines and Planes in Space	12.5	2.5

4	**10.1** Vector-Valued Functions -- Limits, Derivatives and Continuity **10.2** Velocity (P. 805-807)	Vector valued functions and space curves Tangent vectors to curves	13.1 13.2 13.3	3.1 3.2 3.3
5	**10.3** Tangent Vectors and Arc Length (P. 813-820)	Multivariable functions Quadric Surfaces	14.1 14.2	4.1 2.6
6	**11.1** Functions of Several Variables	Partial Derivatives Tangent Planes	14.3 14.6	4.3 4.4
7	**11.3** Limits and Continuity	Chain Rule	14.4	4.5
8	**First Examination**	Test 1		
9	**11.4** Partial Derivatives	Directional Derivatives Gradient	14.5	4.6
10	**11.5** Differentiability and the Chain Rule	Max-Min Problems	14.7	4.7
11	**11.6** Gradients and Directional Derivatives	Lagrange Multipliers	14.8	4.8
12	**11.7** Tangent Planes	Volume under graphs	15.1	5.1
13	**11.8** Maximum-Minimum Problems	Double and iterated integrals	15.1	5.2
14	**11.9** Lagrange Multipliers	Double integral in polar coordinates	15.2	5.3
15	**12.1** Double Integrals Over Rectangular Regions	Review		
16	**Second Examination**	Test 2		
17	**12.2** Integration Over More General Regions	Triple integrals	15.5	5.4
18	**12.3** Calculation of Volumes of Solids	Double integrals in spherical and cylindrical coordinates	15.6	5.5
19	**12.4** Polar Coordinates	Change of Variables and jacobians	15.7	5.7
20	**12.5** Integrating in Polar Coordinates	Vector fields Line integrals	16.1 16.2	6.1 6,2
21	**12.6** Triple Integrals	Conservative vector fields	16.3	6.3
22	**13.1** Vector Fields	Green's Theorem	16.4	6.4
23	**13.2** Line Integrals	Divergence and Curl	16.5	6.5
24	**Third Examination**	Test 3		
25	**13.3** Conservative Vector Fields and Path Independence	Vector functions on surfaces Surface integrals Surface area	16.6 16.7 15.4	6.6
26	**13.4** Divergence, Gradient, and Curl	Stokes' Theorem	16.8	6.7

27	**13.5** Green's Theorem	Stokes' Theorem,ctd Gauss' Theorem	16.8 16.9	6.7 6.8
28	**13.6** Surface Integrals	Gauss' Theorem, ctd	16.9	6.8
29	Review	Review		
30	**Final Examination**	Final		

MAIN DIFFERENCES WITH THE CURRENT OUTLINE

The new outline allocates less time on "theoretical" topics such as *limits, continuity, and differentiability of multivariable functions*, with the aim of covering *Gauss Theorem* and *Stokes Theorem* in depth at the end of the semester. The pace of the course will be slightly faster in the beginning, up until Test 1.