CALCULUS BLUE

SCHEDULE **R. Ghrist** **2020**

MULTIVARIABLE

			CALCULUS BLUE CHAPTERS		
WEEK	TOPICS	VOL	CORE	EXTRA	OPTIONAL
1	lines, planes, surfaces, coordinates; vectors; dot, cross, & scalar triple products	**1**	**1, 2, 3** **4, 5, 6**		
2	intro to vector calculus; motivating matrices matrix algebra, linear systems, & row reduction	**1**	**7, 8, 9** **10, 11, 12**		
3	inverses; linear transformations & bases determinants	**1**	**13, 14, 15** **16, 17, 18**		
4	multivariate functions & partial derivatives derivatives as linear transformations;	**2**	**1, 2,** **3, 4**		
5	chain rule, derivative rules inverse & implicit function theorems	**2**	**5, 6** **7**	 8	
6	gradients, tangents, & linearization multivariate Taylor expansion	**2**	**9, 10, 11**	 12, 13	
7	optimization and applications Lagrange multipliers in optimization	**2**	**14** **17, 18, 19**	16	15
8	multiple integrals & Fubini double & triple integrals; averages	**3**	**1, 2** **3, 4, 5**		
9	centroids, & moments multivariate probability	**3**	**6, 7** **10, 11**		8, 9 12
10	cylindrical & spherical coordinates change of variables, surface integrals	**3**	**13, 14** **15, 16**	 17	 18, 19
11	scalar fields, vector fields, path integrals independence of path; work/circ/flux	**4**	**1, 2, 3** **4, 5**		
12	green's theorem div, curl; differential forms	**4**	**6** **7, 8**		
13	integrating 2-form fields Gauss' Theorem & Stokes' Theorem	**4**	**9** **10, 11**		
14	using Green, Gauss, & Stokes applications	**4**	**12** **REVIEW**	 15	13, 14 16, 17, 18

Assumptions:

14 week semester

weekly meetings / assignments

CORE: These are the essential chapters

EXTRA: Important for the story, but hard

OPT: Optional; best for engineers