

**Lesson Plan (Odd semester)**  
**(July 2018 to Nov 2018)**  
**B. Sc. (Hons) Mathematics (Semester III).**  
**Subject: C-7 Multivariate Calculus**

**Teacher: Mr. Basant Kumar Mishra**

<b>References:</b>	1. M. J. Strauss, G. L. Bradley and K. J. Smith, Calculus (3rd Edition), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education), Delhi, 2007.
	2. E. Marsden, A. J. Tromba and A. Weinstein, Basic multivariable calculus, Springer (SIE), Indian reprint, 2005.

<b>Unit</b>	<b>Week</b>	<b>Topics Covered</b>
<b>1</b>	<b>Week-1</b> July 23-27, 2018	Definition of functions of several variables, Graphs of functions of two variables – Level curves and surfaces
	<b>Week-2</b> July 30 - August 3, 2018	Limits and continuity of functions of two variables. Partial differentiation, and partial derivative as slope and rate.
	<b>Week-3</b> August 6-10, 2018	Higher order partial derivatives. Tangent planes, incremental approximation, Total differential. Differentiability, Chain rule for one parameter, Two and three independent parameters.
	<b>Week-4</b> August 13-17, 2018	Directional derivatives, The gradient, Maximal and normal property of the gradient, Tangent and normal lines
<b>2</b>	<b>Week-5</b> August 20-24, 2018	First and second partial derivative tests for relative extrema of functions of two variables, and absolute extrema of continuous functions.
	<b>Week-6</b> August 27-31, 2018	Lagrange multipliers method for optimization problems with one constraint.
	<b>Week-7</b> September 3-7, 2018	Definition of vector field, Divergence and curl.
<b>3</b>	<b>Week-8</b> September 10-14, 2018	Double integration over rectangular and nonrectangular regions
	<b>Week-9</b> September 17-21, 2018	Double integrals in polar co-ordinates, and triple integral over a parallelepiped
	<b>Week-10</b> September 24-28, 2018	Triple integral over solid regions, Volume by triple integrals, and triple integration in cylindrical coordinates.
	<b>Week-11</b> October 1-5, 2018	Triple integration in spherical coordinates, Change of variables in double and triple integrals.
<b>4</b>	<b>Week-12</b> October 8-12, 2018	Line integrals and its properties, applications of line integrals: mass and work
	<b>Week-13</b> October 22-26, 2018	Fundamental theorem for line integrals, Conservative vector fields and path independence.
	<b>Week-14</b> Oct 29 - Nov 2, 2018	Green's theorem for simply connected region, Area as a line integral, Definition of surface integrals.
	<b>Week-15</b> November 5-9, 2018	Stokes' theorem and the divergence theorem.
	<b>Week-16</b> November 12-16, 2018	Revision, Doubt Class, Test(if required) and Assignments submission.