**Adv. M. N. Deshmukh Art’s Commerce and Science College , Rajur**

**Annual planning for the year 2015-2016**

S . Y . Bsc . Mathematics Paper I

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| Sr. No. | Month | Total Lectures | Name of the topic |
|  | Sem- I |  | Paper I - Multivariable Calculus |
| 1 | June 2015 | 6 | Ch – 1 Limits and Continuity of Multivariable functions   * 1. Functions of several variables , graphs and level curves of function of two variables.   2. Limits and Continuity in higher dimensions. |
| 2 | July 2015 | 12 | Ch – 2 Partial Derivatives  2.1 Definition and examples.  2.2 Second order partial derivative , the mixed derivative theorem.  2.3 Partial derivative of higher order.  Ch – 3 Differentiability  3.1 Differentiability , the increment theorem for functions of two variables (without proof).  3.2 Chain rule for composite function. |
| 3 | Aug 2015 | 14 | 3.3 Directional derivative , gradient vectors.  3.4 Tangent planes , normal lines and differentials.  Ch – 4 Extreme Values  4.1 Extreme values , First derivative test and Second derivative test for local extreme values.  4.2 Lagrange’s multipliers method for finding extreme values of constraint function (One constraint)  4.3 Taylor’s Formula for two variables. |
| 4 | Sep 2015 | 12 | Ch -5 Multiple integrals  5.1 Double integral over rectangles , Fubini’s Theorem for calculating double integrals (without proof).  5.2 Double integral in polar form.  5.3 Triple integrals in rectangular coordinates. |
| 5 | Oct 2015 | 4 | 5.4 Triple integrals in cylindrical and spherical coordinates  5.5 Substitution in multiple integrals, Application to area and volumes. |
|  | Sem II |  | Paper I – Linear Algebra |
| 1 | Dec 2015 | 8 | Ch -1 Vector Spaces  Vector , examples, linear dependence , basis and dimension , vector subspace |
| 2 | Jan 2016 | 12 | Necessary and sufficient condition for subspace , vector space as a direct sum of subspaces.  Ch -2 Inner Product Spaces  Inner product , norm as length of a vector , distance between two vectors. |
| 3 | Feb 2016 | 12 | Orthonormal basis , orthonormal projection , Gram Schmidt processes of ortogonalization , null space , range space , rank , nullity, Sylvester Inequality. |
| 4 | Mar 2016 | 10 | Ch -3 Linear Transformations  Definition , examples properties of linear transformations , kernel and rank of linear transformation , composite transformation , Inverse of a linear transformation. |
| 5 | April 2018 | 6 | Matrix of a linear transformation , change of basis , similar matrices. |