MULTIVARIABLE CALCULUS

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INTENDED AUDIENCE : UG students technical Universities/Colleges,It is a core course for UG.

COURSE OUTLINE : This course is a basic course offered to UG and PG students of Engineering/ Science background. It contains various topics related to the calculus of the functions of two or more variables. In particular, this course includes topics like differentiation and integration of the functions of two or more variables together with their various applications. This course also includes the calculus of vector functions with different applications.

ABOUT INSTRUCTOR :

Prof. S. K. Gupta is an Associate Professor in the Department of Mathematics, IIT Roorkee. His area of expertise includes nonlinear, non-convex and Fuzzy optimization. He has guided three PhD thesis and have published more than 40 papers in various international journals of repute.

Prof. Sanjeev Kumar is working as an associate professor with Department of Mathematics, IIT Roorkee. Earlier, he worked as a postdoctoral fellow with Department of Mathematics and Computer Science, University of Udine, Italy and assistant professor with IIT Roorkee. He is actively involved in teaching and research in the area of computational algorithms, inverse problems and image processing. He has published more than 55 papers in various international journals conferences of repute. He has completed a couple of sponsored research projects and written several chapters in reputed books published with Springer and CRC press.

COURSE PLAN :

 Week 1: Limits, continuity and partial derivatives of multivariable functions

 Week 2: Differentiability and chain rule

 Week 3: Change of variables, Euler's theorem, tangent planes, normal lines and extreme values

 Week 4: Taylor's theorem, error approximation, polar curves and multiple integrals

 Week 5: Change of order and change of variables in multiple integral

 Week 6: Beta and gamma functions

 Week 7: Normal vector and potential field

 Week 8: Vector identities and line integral