



<b>Math 2006</b>	<b>APPLIED MATHEMATICS</b>	<b>(CR3)</b>
<b>Preq.</b>	<b>Math 1001, 1002</b>	

### Objectives

The main objectives of this course is to introduce students with some applied mathematical methods.

### Syllabus

Vector Analysis, Vectors in 2-space and 3-space, lines and planes in 3-space, vector spaces, Gram-Schmidt orthogonalization process, vector functions, motion on a curve, curvature and components of acceleration, partial derivatives, directional derivatives, tangent planes and normal lines, curl and divergence, line integrals, independence of the path, double integrals, double integrals in polar coordinates, Green's theorem, surface integrals, Stokes' theorem, triple integrals, divergence theorem, change of variables in multiple integrals, vector operators acting on sums and products, combinations of grad, div and Curl, general curvilinear coordinates. Group Theory, Symmetry of a square, the dihedral group, definition and examples of groups, elementary properties of groups, finite groups, subgroups, tests of subgroups, examples of subgroups, cyclic groups, properties of cyclic groups, classifications of subgroups of cyclic groups, permutation groups, properties of permutations, a check-digital scheme based on  $D_5$ .

### Recommended Books

1. *Contemporary Abstract Algebra* by J. A. Gallian (8th Edition), Cengage Learning (2013)
2. *Mathematical Methods for Physicists* by G.B. Arfken, , H. J. Weber and F. E. Harris (7<sup>th</sup> Edition), Academic Press (2012)
3. *Advanced Engineering Mathematics* by D. G. Zill and W. S. Wright (6th Edition), Jones and Bartlett (2018)
4. *Mathematical methods for physics and engineering* by K. F. Riley, M. P. Hobson, and S. J. Bence (3<sup>rd</sup> Edition), Cambridge (1999)
5. *Advanced Engineering Mathematics* by E. Kreyszig (9th Edition), John Wiley & Sons (2006)
6. *Mathematical Methods for Physicists: A Concise Introduction* by T. L. Chow, Cambridge (2000)