



## Series and Vector Calculus

| Number | Course and Code | Course Title               | Number of Units |     |        | Pre-requisites |
|--------|-----------------|----------------------------|-----------------|-----|--------|----------------|
|        |                 |                            | Th.             | Pr. | Credit |                |
| 8      | MATH 304        | Series and Vector Calculus | 3               | 2   | 4      | MATH 203       |

### Objectives of the course

To show the importance of calculus in science and engineering and the correlation between them. To provide the basic principles of calculus and its applications.

To improve the students logical thinking and mathematical skills to solve mathematical problems.

### Course description

Infinite sequences and series: Sequences, definition, monotone, and bounded. Series, definition, geometric, and telescoping. The integral test, p-series. The comparison tests. Alternating series. Absolute convergence and the ratio and root tests. Power series. Representations of functions as power series. Taylor and Maclaurin series. The Binomials series. Applications of Taylor polynomials.

Vector functions: Vector functions and space curves. Derivatives and integrals of vector functions. Arc length and curvature. Motion in space, velocity and acceleration. Kepler's Laws of Planetary Motion.

Vector calculus: Vector fields. Line integrals. The fundamental theorem for line integrals. Green's theorem. Curl and divergence. Parametric surfaces and their areas. Surface integrals. Stokes' theorem. The divergence theorem.

### Main text book

[1] H. Anton, I. Bivens, and S. Davis. Calculus, 8th Edition. John Wiley and Sons, 2005.

### Subsidiary Books

[1] James Stewart. Calculus Early Transcendentals, 5th edition. Thomson, 2003.

[2] R. Larson, R. Hostetler, and B. Edwards. Calculus, 7th edition . Houghton Mifflin Company, 2002. [3] H. Anton. Calculus, 7th Edition. John Wiley and Sons, 2002.

[4] E. Swokowski, M. Olinic, and D. Pence Calculus, 6th Edition. PWS Publishing Company, 1994.