

**Subject: Applied Mathematics**

**Class: First year**

**Hours: 2 hrs (Theoretical), 2hrs (Practical)**

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**Objectives :**

This subject will develop the ability of student in using mathematics in engineering applications; also the student will learn different methods in equation expressions, formation multi kinds of curves related to civil engineering applications.

| Week  | Syllabus  |
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| 1&2   | Limits  |
| 3     | Slope of the straight line , Slope of the curve   |
| 4&5   | Derivatives of algebraic functions , Chain rule , Second and higher order derivative , Application in mechanics |
| 6     | Trigonometric functions   |
| 7     | Derivatives of trigonometric functions  |
| 8     | Inverse of trigonometric function , The exact value of trigonometric functions                                  |
| 9     | Derivatives of inverse of trigonometric functions   |
| 10&11 | Logarithmic and exponential functions , Logarithmic method in derivatives                                       |
| 12    | Derivative of logarithmic and exponential functions , Derivative of $a^u$ , $\log_a u$                          |
| 13    | Hyperbolic functions , Relation between the hyperbolic functions and exponential functions                      |
| 14    | Derivative of hyperbolic functions  |
| 15    | Applications of derivatives , Rate of change  |
| 16    | Integration of algebraic functions  |
| 17    | Applications of indefinite integration and finite integration   |
| 18&19 | Integration of trigonometric functions and inverse Trigonometric functions                                      |
| 20    | Integration of $\ln x, u^{-1}, a^u, e^u$  |
| 21&22 | Methods of integration  |
| 23    | Area by calculus (Rectangular method ,Trapezoidal rule, Simpson rule)   |
| 24    | Area under curve , Area between two curves  |
| 25&26 | Volume by revolution (Disk strip ,Washer strip, Shell strip)  |
| 27    | Length of the plane curve , Area of surface of revolution   |
| 28&29 | Matrices (Inverse Matrix)   |
| 30    | Matrices ( Grammar Method)  |

### **References:**

- 1. Calculus “Seven Edition” By H. Anton , I.Bivens , S. Davis**
- 2. Advanced Engineering Mathematics , By C.R. Wylie ,**
- 3. Calculus , By Thomas**