

**Course Name** : Civil Engineering Group **Course code:** CE/CS/CR/CV

**Semester** : Third

**Subject Title** : Applied Mathematics

**Subject Code:** 9018

**Teaching and examination scheme:**

Teaching Scheme			Examination Scheme						
TH	TU	PR	Paper	TH	TEST	PR	OR	TW	TOTAL
03	--	-	03	80	20	---	---	-	100

**Rationale:**

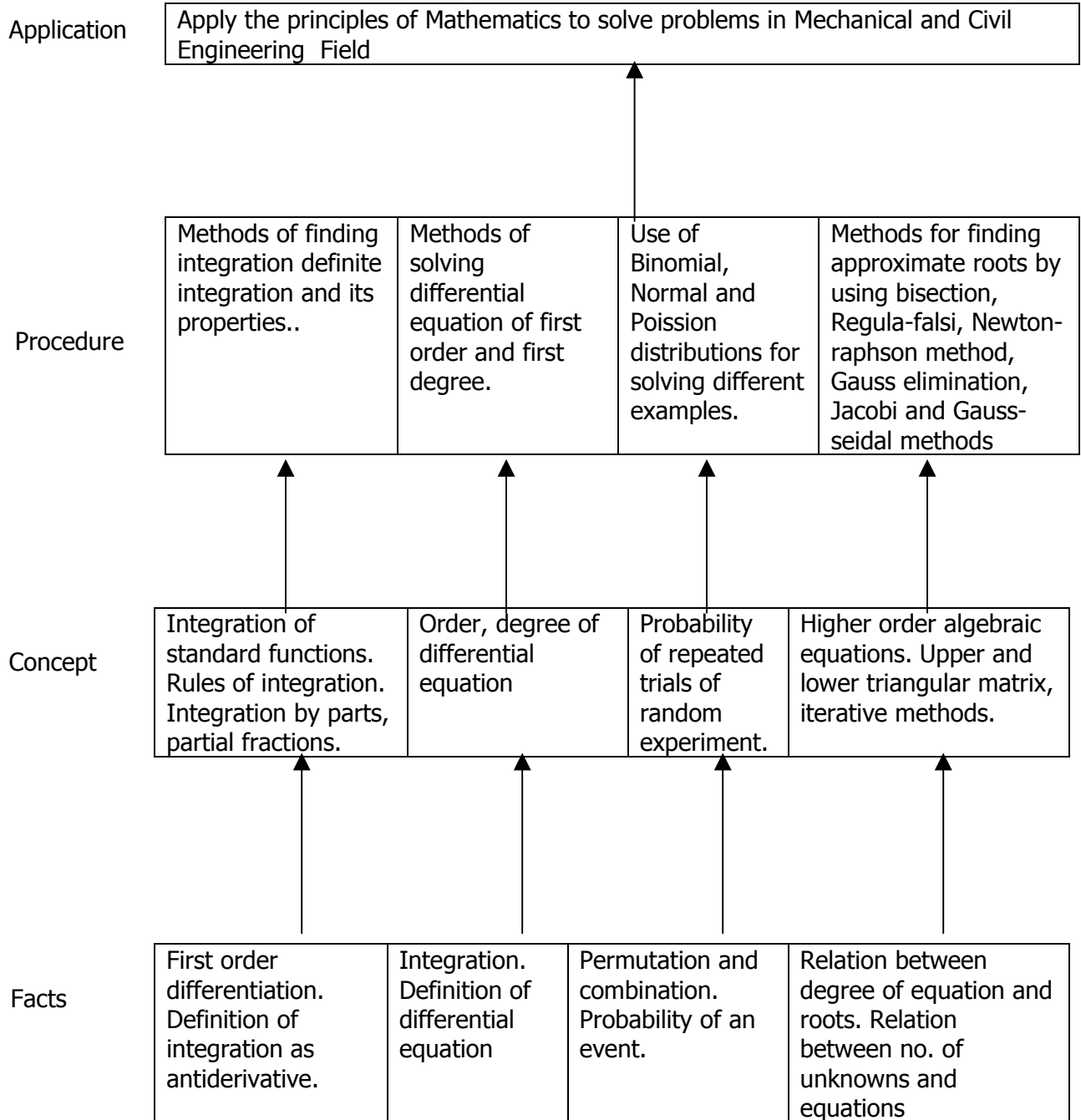
The study of mathematics is necessary to develop in the student the skills essential for studying new technological development. This subject introduces some applications of engineering, through which the student can understand the link of Mathematics with engineering principles.

**Objectives:**

Students will be able to:

1. Apply Mathematical term, concept, principals, and different methods for studying engineering subjects
2. Apply Mathematical methods to solve technical problems,
3. Execute management plans with precision.
4. Use Mathematical techniques necessary for daily and practical problems.

LEARNING STRUCTURE:



## Contents: Theory

Chapter	NAME OF TOPIC	Hours	Marks
01.	<p><b>INTEGRATION:</b></p> <p>1.1 Definition of integration as anti-derivative. Integration of standard function.</p> <p>1.2 Rules of integration (Integrals of sum, difference, scalar multiplication).</p> <p>1.3 Methods of Integration.</p> <p>1.3.1 Integration by substitution</p> <p>1.3.2 Integration of rational functions.</p> <p>1.3.3 Integration by partial fractions.</p> <p>1.3.4 Integration by trigonometric transformation.</p> <p>1.3.5 Integration by parts.</p> <p>1.4 Definite Integration.</p> <p>1.4.1 Definition of definite integral.</p> <p>1.4.2 Properties of definite integral with simple problems.</p>	10	20
	<p>1.5 <b>Applications of definite integrals.</b></p> <p>1.5.1 Area under the curve. Area bounded by two curves,</p> <p>1.5.2 Volume of revolution.</p> <p>1.5.3 Centre of gravity of a rod, plane lamina.</p> <p>1.5.4 Moment of Inertia of uniform rod, rectangular lamina</p> <p>1.5.5 Theorems of parallel and perpendicular axes.</p>	08	12
02.	<p><b>DIFFERENTIAL EQUATION</b></p> <p>2.1 Definition of differential equation, order and degree of differential equation. Formation of differential equation for function containing single constant.</p> <p>2.2 Solution of differential equations of first order and first degree such as variable separable type, reducible to Variable separable, Homogeneous, Nonhomogeneous, Exact, Linear and Bernoulli equations.</p> <p><b>2.3 Applications of Differential equations.</b></p> <p>2.3.1 Rectilinear motion (motion under constant and variable acceleration)</p> <p>2.3.2 Simple Harmonic Motion.</p>	10	12
			08

03	<b>PROBABILITY DISTRIBUTION</b> 3.1 Binomial distribution. 3.2 Poisson's distribution. 3.3 Normal distribution 3.4 Simple examples corresponding to production process.	08	12
04	<b>NUMERICAL METHODS</b>  <b>4.1 Solution of algebraic equations</b> Bisection method. Regulafalsi method. Newton – Raphson method.  <b>4.2 Solution of simultaneous equations containing 2 and 3 unknowns</b> Gauss elimination method. Iterative methods- Gauss seidal and Jacobi's methods.	06  06	08  08
	Total	48	80

### LEARNING RESOURCES:

#### 1: BOOKS

Sr. No.	Title	Authors	Publications
1	Mathematics for polytechnic	S. P. Deshpande	Pune Vidyarthi Griha Prakashan, Pune
2	Calculus: single variable	Robert T. Smith	Tata McGraw Hill
3	Advanced Mathematics for Engineers and Scientist	Murray R Spiegel	Schaum outline series McGraw Hill
4	Higher Engineering Mathematics	B. S. Grewal	Khanna Publication, New Dehli
6	Introductory Methods of Numerical analysis	S. S. Sastry	Prentice Hall Of India New Dehli
7	Numerical methods for Engg. 4 <sup>th</sup> ed.	Chapra	Tata McGraw Hill
8	Numerical methods for scientific & engineering computations	M. K. Jain & others	Wiley Eastern Publication.