Government College of Engineering Karad
Second Year B. Tech (All Programs)
BC 101 Mathematics (Bridge Course)
For Directly Admitted Diploma Students

Teaching Scheme		**Examination Scheme**	
Lectures	3 Hrs/week	**CT1**	15
Tutorial	1 Hr/week	**CT2**	15
		TA	10
		ESE	60

Audit Course

Course Objectives:

1. The basic necessity for the foundation of Engineering and Technology being mathematics, the main aim is to teach Mathematical methodologies and models.
2. To develop mathematical skills and enhance logical thinking power of students.
3. To provide students with skills in algebra which would enable students to obtain engineering solutions for given situations they may encounter in their profession.
4. To increase interest towards the use of Mathematics in engineering module.
5. To learn differential calculus which would enable students to find engineering solutions for given situations they may encounter in their profession.
6. To understand integral differential calculus for engineering and Technology for which student able to find solutions for problems.

Course Contents

		Hours
Unit I	**Matrix Algebra:** Basics of Matrix, Rank of matrix, Echelon form, Normal form, Inverse of matrix by partition method, Consistency and solution of simultaneous linear homogenous and Non-homogenous equations.	**7**
Unit II	**Applications of Matrix Algebra** Linear dependence and independence of vectors, Eigen values and Eigen vectors and their properties, Cayley -Hamilton theorem (without proof).	**7**
Unit III	**Complex Numbers** Expansion of $\sin n\theta$ and $\cos n\theta$ in power of $\sin\theta$, $\cos\theta$ and expansion of $\sin^n\theta$, $\cos^n\theta$ and $\sin^m\theta$, $\cos^n\theta$ in series of sines or cosines of multiples of θ, Circular functions, Hyperbolic functions, Relation between circular and hyperbolic functions, inverse hyperbolic functions, Separation of real and imaginary parts.	**7**

Unit IV	**Partial Differentiation:** Partial derivatives, Euler's theorem on homogeneous functions, Total derivative, Change of variables, Partial derivatives of Composite, Parametric and implicit functions.	**7**
Unit V	**Applications of Partial Differentiation:** Jacobian of implicit functions, Partial derivatives implicit function using Jacobian, Errors and approximations, Maxima and Minima of a function of two variables, differentiation under the integral sign.	**7**
Unit VI	**Double Integration** Evaluation of double integration, Change of order of integration, Change into polar, Transformation of variables using Jacobian, Evaluation of triple integrations.	**7**

Course Outcome (CO):

1 Student able to think logically & understand the basic concepts.
2 Students formulate problem solving techniques for different mathematical models.
3 Exhibit various Engineering applications for topics included in the course.
4 Students able to solve problems in algebra
5 Students able to solve problems in differential calculus.
6 Students understand solving problems on integral calculus.

Text Books:

1 A Text Book of Applied Mathematics (Vol. I & II) by P.N. Wartikar and J.N.Wartikar,Pune Vidyarthi Griha Prakashan,Pune.
2 Advanced Engineering Mathematics (8^{th} Edition) by Erwin Kreyszing, Wiley Eastern Ltd. Mumbai.
3 Advanced Engineering Mathematics by Peter O Neil Cengage Publications

References:

1 Higher Engineering Mathematics by B.S.Grewal, Khanna Publication, New Delhi.
2 Higher Engineering Mathematics by H.K. Dass & Er. Rajnish Verma (2^{nd} revised edition 2012) S. Chand Publication, New Delhi.
3 Higher Engineering Mathematics by B.V. Ramana, Tata McGraw-Hill
4 A Text Book of Engineering Mathematics, By Bali & Goyal (8^{th} Edition), Laxmi Publication.
5 Mathematical Methods of Science and Engineering (Aided with MATLAB) by Kanti B. Datta, by Cengage Learning

Useful Links:

1 http://www.nptel.iitm.ac.in
2 www.ocw.mit.edu

Mapping of CO and PO

	a	b	c	d	e	f	f	h	i	j	k
CO1	√			√		√		√			√
CO2	√		√						√		√
CO3	√	√				√	√				√
CO4	√				√				√	√	
CO5	√		√					√			√
CO6					√		√			√	

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	1	1	-	10
Understand	2	2	2	10
Apply	3	3	3	10
Analyze	3	3	2	10
Evaluate	3	3	3	10
Create	3	3	-	10
Total	15	15	10	60