**College of Engineering, Pune-5**

**Department of Mathematics**

**( PGEM2 ) Applied Mathematics**

PG Diploma in Electric Mobility (PG-DEM) Semester I

Teaching Scheme Examination Scheme

Lectures : 2 hrs / week Internal Test 1: 20 marks

Tutorial: 1 hr / week Internal Test 2: 20 marks

 End Sem. Exam: 60 marks

**Objectives :** The basic necessity for the foundation of Engineering & Technology being mathematics, the main aim is, to teach mathematical methodologies & models, develop mathematical skills & enhance thinking power of students. To give a very strong base of Mathematics to do quality research in Engineering is the main objective.

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Matrices and linear equations, Applications to systems of linear equations, vector spaces, subspaces, linear independence and dependence of vectors, bases, dimensions. Row and Column spaces, rank. Linear mappings, representation by matrices, rank-nullity theorem, Eigen values, Eigen vectors, Inner product spaces, orthogonality, Gram-Schmidt process, Diagonalization of special matrices.

Laplace and Fourier Transforms and their applications.

Runge-Kutta methods, stiffness and multistep methods, boundary value and eigen value problems, Finite difference methods for elliptic and parabolic equations. **[26 Total Hrs]**

 **Text Book** **:**

* Advanced Engineering Mathematics by Erwin Kreyszig, John Wiley & Sons, Inc., 10th edition.

**Reference Books** **:**

* Introduction to Linear Algebra (2nd edition) by Serge Lang, Springer
* Elementary Linear Algebra (10th edition) by Howard Anton and Chris Rorres, John Wiley and sons.
* Schaum’s outlines of Linear Algebra (5th edition) by Seymour Lipschutz, Marc Lipson, McGraw-Hill Education (India) Private Limited, New Delhi.
* Linear Algebra and its applications (4th edition) by Gilbert Strang, Cengage Learning (RS).
* Advanced Engineering Mathematics by Chandrika Prasad and Reena Garg, Khanna Publishing Company Private Limited, New Delhi.
* Numerical Methods for Engineers by Steven C. Chapra, Raymond P. Canale, McGraw-Hill (special Indian edition), 5th edition 2010.
* Higher Engineering Mathematics by Dr B S Grewal, Khanna Publication, 40th edition 2007.
* Introductory methods in Numerical Analysis by S S Sastry,PHI,Latest Edition.
* Computed Oriented Numerical Methods, (5th edition) by R.S. Salaria, Khanna Publishing Company Private Limited, New Delhi.

-----------------------------------------------------------------------------------------------------------------**Outcomes :** Students will be able to

1. know and recall core knowledge of the syllabus. ( To measure this outcome, questions may be of the type- define, identify, state, match, list, name etc.)
2. understand basic concepts. ( To measure this outcome, questions may be of the type- explain, describe, illustrate, evaluate, give examples, compute etc.)
3. analyze the problem and apply the appropriate concept. ( To measure this outcome, questions will be based on applications of core concepts)
4. give reasoning. ( To measure this outcome, questions may be of the type- true/false with justification, theoretical fill in the blanks, theoretical problems, prove implications or corollaries of theorems, etc.)
5. apply core concepts to new situations. ( To measure this outcome, some questions will be based on self-study topics and also comprehension of unseen passages.)

Note:

 All the Course outcomes 1 to 3 will be judged by 75% of the questions and outcomes 4 and 5

 will be judged by 25 % of questions.