VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

SYLLABUS FOR 2018 -2020

I Semester M.Tech. (EEE)

MATHEMATICAL METHODS IN CONTROL

Course Code : 18XXX11 **CIE Marks: 40**
Contact Hours/Week : 04 **SEE Marks: 60**
Total Hours: 50 **Exam Hours: 03**
Semester: I **Credits: 04 (4:0:0)**

Course Learning Objectives: This course will enable the students:

- To introduce linear algebra in a best suitable approach for solving large number of equations using transformation methods.
- To understand the techniques of numerical methods for estimating high accuracy in finding the roots and, in solving differential equations and their applications.

MODULE	No. of Hrs
MODULE-I Introduction to vector spaces and sub-spaces, definitions, illustrative example. Linearly independent and dependent vectors- Basis-definition and problems. Linear transformations-definitions.Matrix form of linear transformations-Illustrative examples (RBT Levels: **L1 & L2)**	**10 Hrs**
MODULE-II Solution of Systems of Linear Equations:Direct methods-Relaxation method, Partition method, Croute's Triangularisation method . Eigen values and eigen vectors. Bounds on Eigen Values. Jacobi method& Givens method for symmetric matrices. (RBT Levels: **L2 & L3)**	**10 Hrs**
MODULE- III Orthogonal vectors and orthogonal bases. Gram-Schmidt orthogonalization process.SVD and Applications. (RBT Levels: **L2 & L3)**	**10 Hrs**
MODULE- IV Probability: Random variables, Probability distributions: Binomial, Poisson, Normal distributions, Joint probability distribution (discrete and continuous)-Illustrative examples (RBT Levels: **L1 & L2)**	**10 Hrs**
MODULE - V Moments, central moments, characteristic functions, probability generating and moment generating functions-illustrations. Gaussian, Weibull and Erlang distributions-examples. (RBT Levels: **L1 & L2)**	**10 Hrs**

Course Outcomes:

At the end of this course, students will be able to:

1. Understand the fundamentals of vector space and bases in reference to transformations.
2. Solve system of linear equations using direct and iterative methods.
3. Use the idea of eigen values and eigen vectors for the application of SVD.
4. Describe the basic notions of discrete and continuous probability distributions.
5. Find out responses of linear systems using statistical and probability tools.

Question Paper Pattern:

The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 60.

- The question paper will have **ten**full questions carrying equal marks.
- Each full question consisting of **20** marks.
- There will be **two** full questions (with a **maximum** of **four** sub questions) from each module.
- Each full question will have sub question covering all the topics under a module.
- The students will have to answer **five** full questions, selecting **one** full question from each module.

Text Books:-

1. David C.Lay, Steven R.Lay and J.J.McDonald: Linear Algebra and its Applications, 5th Edition, Pearson Education Ltd., 2015.
2. M K Jain, S.R.K Iyengar, R K. Jain, Numerical methods for Scientific and Engg. Computation, New Age International, 6th Ed., 2014.

Reference Books:-

1. Alan V. Oppenheim and George C. Verghese, "Signals, Systems, and Inference", Spring 2010.
2. Steven C Chapra and Raymond P Canale, "Numerical Me thods for Engineers," 7 th Ed., McGraw-Hill Edition, 2015.
3. B.S. Grewal, "Higher Engineering Mathematics", Khan na Publishers, 44th Ed.,2017.

Web links:

1. *http://nptel.ac.in/courses.php?disciplineId=111*
2. *http://www.class-central.com/subject/math(MOOCs)*
3. *http://ocw.mit.edu/courses/mathematics/*