

<b>Common Syllabus for M.Tech., in EES stream ChoiceBasedCreditSystem(CBCS)and OutcomeBasedEducation(OBE) SEMESTER-I</b>			
<b>ADVANCED ENGINEERING MATHEMATICS</b>			
Course Code	22MATEE11	CIEMarks	50
TeachingHours/Week (L:T:P)	3:0:0	SEEMarks	50
Credits	03	ExamHours	03
<b>Course Learning objectives:</b>			
<ul style="list-style-type: none"> <li>• To have an insight into solving Linear Algebraic Equations and the importance of Eigen values and Eigen vectors in singular value decompositions.</li> <li>• To develop proficiency in vector spaces and linear transformations</li> <li>• To enable learning concepts of probability theory and their implication in Electrical and Electrical Engineering.</li> </ul>			
<b>Module-1: Linear Algebra</b>			
Solution of Systems of Linear Equations: Direct methods-Partition method,Croute's Triangularisation method.Iterative method- relaxation method.Eigen values and Eigen vectors. Bounds on Eigen Values. Jacobi method & Givens method for symmetric matrices.			
<b>RBT Level: L1, L2, L3</b>			<b>8 Hours</b>
<b>Module-2: Vector Space 1</b>			
Introductiontovectorspacesandsub-spaces,definitions, Null spaces, column spacesillustrativeexample.Linearlyindependentanddependentvectors-Basis-definitionandproblems.Lineartransformations-definitions.MatrixformoflinearTransformations-Illustrativeexamples.			
<b>RBT Level: L1, L2, L3</b>			<b>8 Hours</b>
<b>Module-3:Vector Space 2</b>			
Orthogonal vectorsand orthogonal bases. Gram-SchmidtOrthogonalizationprocess.QR decomposition, Least square problems, Singular value decomposition. Applications.			
<b>Module-4:Probability distribution functions</b>			
Reviewofbasicprobabilitytheory. Random variables, Probability distributions: Binomial, Poisson, uniform, and Normal (Gaussian) and Erlangdistributions. Joint probability distribution (discrete and continuous)-Illustrative examples. Independent random variables, covariance and correlation.			
<b>RBT Level: L1, L2, L3</b>			<b>8 Hours</b>
<b>Module-5:Moments &amp;Transformation of random variables</b>			
Moments,Central moments, Transformation of random variables Characteristic functions, probability generating and moment generating functions-illustrations. Engineering applications: Entropy and Source coding.			
<b>RBT Level: L1, L2, L3</b>			<b>8 Hours</b>

<b>Course outcomes:</b>	
At the end of the course the student will be able to:	
<ol style="list-style-type: none"> <li>1. Solve system of linear equations using direct and iterative methods.</li> <li>2. Understand the fundamentals of vector space and bases in reference to transformations.</li> <li>3. Use the idea of Eigen values and Eigen vectors for the application of Singular value decomposition.</li> <li>4. Describe the basic notions of discrete and continuous probability distributions.</li> <li>5. Find out responses of linear systems using statistical and probability tools.</li> </ol>	
<b>Question paper pattern:</b>	
The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.	
<ul style="list-style-type: none"> <li>• The question paper will have ten full questions carrying equal marks.</li> <li>• Each full question is for 20 marks.</li> <li>• There will be two full questions (with a maximum of three subquestions) from each module.</li> <li>• Each full question will have a subquestion covering all the topics under a module.</li> <li>• The students will have to answer five full questions, selecting one full question from each module.</li> </ul>	
<b>Textbooks</b>	
1	Linear Algebra and its Applications, David C. Lay et al, Pearson, 5th Edition, 2015.
2	Numerical Methods for Scientific and Engineering Computation, M. K. Jain et al, New Age International, 9th Edition, 2014.
3	Probability and Random Processes, Scott L. Miller, Donald G. Childers. Elsevier 2004
<b>Reference Books</b>	
1	Numerical methods for Engineers, Steven C Chapra and Raymond P Canale, McGraw-Hill, 7th Edition, 2015.
2	Higher Engineering Mathematics, B.S. Grewal, Khanna Publishers, 44th Edition, 2017.
3	Advanced Engineering Mathematics, E. Kreyszig, Wiley, 10th edition, 2015

Web links and Video Contacts:

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