BASIC SIMULATION WITH MAT LABORATORY

II Semester: AE							
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**	
		L	**T**	**P**	C	**CIE**	**SEE**
AAEB01	**Foundation**	0	0	3	1.5	30	70
Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes: 24**				**Total Classes: 24**	

COURSE OBJECTIVES:

The course should enable the students to:

I. Understand the procedures, algorithms, and concepts require to solve specific problems
II. Analyze the concepts of algebra, calculus and numerical solutions using MATLAB software.
III. Enrich the knowledge in MATLAB and can apply for project works.
IV. Interpret and visualize simple mathematical functions and operations thereon using plots/display.

COURSE OUTCOMES:

CO 1 Understand the need for simulation/implementation for the verification of mathematical functions
CO 2 Understand the main features of the MATLAB program development environment to enable their usage in the higher learning
CO 3 Implement simple mathematical functions/equations in numerical computing environment such as MATLAB.
CO 4 Interpret and visualize simple mathematical functions and operations thereon using plots/display
CO 5 Analyze the program for correctness and determine/estimate/predict the output and verify it under simulation environment using MATLAB tools.

COURSE LEARNING OUTCOMES (CLOs):

The students should be able to:

CLO 1 Understand the basic of MATLAB
CLO 2 Understand the basic of features of MATLAB
CLO 3 Understand the steps involved in developing MATLAB
CLO 4 Wring code of MATLAB code with .m extension
CLO 5 Execution of .m file and analysis the results
CLO 6 Executing the .m file and syntax analysis
CLO 7 Runtime change the variable to analyze the properties
CLO 8 Algebraic operations with Matrix
CLO 9 Analyze the errors and fixing.
CLO 10 Plotting options with various data structure
CLO 11 Writing application from Aeronautical problems

LIST OF EXPERIMENTS

Week-l	BASIC FEATURES
a. Features anduses. b. Local environmentsetup.	
Week-2	**ALGEBRA**
a. Solving basic algebraicequations. b. Solving system ofequations. c. Two dimensionalplots.	
Week-3	**CONTROL STRUCTURES**

a. For Loop. b. WhileLoop. c. If- elseif- else controlstructure.	
Week-4	**MATRICES**
a. Addition, subtraction and multiplication ofmatrices. b. Transpose of amatrix. c. Inverse of amatrix.	
Week-5	**SYSTEM OF LINEAR EQUATIONS**
a. Rank of amatrix. b. Gauss Jordanmethod. c. LU decompositionmethod.	
Week-6	**LINEAR TRANSFORMATION**
a. Characteristicequation. b. Eigenvalues. c. Eigen vectors.	
Week-7	**DIFFERENTIATION AND INTEGRATION**
a. Higher order differentialequations. b. Doubleintegrals. c. Tripleintegrals.	
Week-8	**NUMERICAL DIFFERENTION AND INTEGRATION**
a. Trapezoidal, Simpson'smethod. b. Eulermethod. c. RungeKutta method	
Week-9	**3D PLOTTING**
a. Lineplotting. b. Surfaceplotting. c. Volumeplotting.	
Week-10	**DEFLECTION OF SIMPLY SUPPORTED BEAM**
a. Calculating vertical displacement with pointload. b. Calculating vertical displacement with uniformly distributedload. c. Calculating vertical displacement with uniformly varyingload.	
Week-11	**DEFLECTION OF CANTILEVER BEAM**
a. Calculating vertical displacement with pointload. b. Calculating vertical displacement with uniformly distributedload. c. Calculating vertical displacement with uniformly varying load	
Week-12	**FORMULATION OF IDEAL AND REAL GAS EQUATIONS**
a. Calculating the pressure, temperature, density for Earth's atmospheric conditions atdifferent altitudes. b. Calculating the pressure, temperature, density for other planets at differentaltitudes.	
Reference Books:	

1. Cleve Moler, “Numerical Computing with MATLAB”, SIAM, Philadelphia, 2nd Edition, 2008.
2. Dean G. Duffy, “Advanced Engineering Mathematics with MATLAB”, CRC Press, Taylor& Francis Group, 6th Edition, 2015.
3. Delores M. Etter, David C. Kuncicky, Holly Moore, “Introduction to MATLAB 7”, Pearson Education Inc, 1st Edition, 2009.
4. Rao. V. Dukkipati , “MATLAB for ME Engineers”, New Age Science, 1st Edition,2008.

Web Reference:

1. http://www.tutorialspoint.com/matlab/
2. http://www.iare.ac.in