SCHEME OF COURSE WORK
(2015-16)

Course Details:

Course Title	**Basic Computation Lab**		
Course Code	: **13ES11BC**	**L T P C**	**0 0 3 2**
Program:	: **B. Tech.**		
Branch: :	: **Mechanical Engineering**		
Semester	: **V**		
Prerequisites	:**Computer Programming Lab**		

Course Outcomes (COs):

At the end of the course the student will be able to

CO	. Course Outcomes	Cognitive Level
CO 1	Perform matrix operations.	Remember , Understand, Apply
CO 2	Plot two dimensional, three dimensional graphs and draw inferences	Remember, Understand, Apply
CO 3	Perform linear and non-linear regression analysis for the given data.	Remember , Understand, Apply
CO 4	Determine steady state, unsteady state solutions of Ordinary differential equations.	Remember , Understand, Apply
CO 5	Compute two and three dimensional integrals and solve unconstrained optimization problems.	Remember, Understand, Apply

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ProgramOutcomes (POs):

A graduate of mechanical engineering will be able to

PO 1	Apply the knowledge of mathematics, science, engineering fundamentals to solve complex mechanical engineering problems
PO 2	the capability to identify, formulate and analyse problems related to mechanical engineering
PO 3	Design solutions for mechanical system components and processes that meet the specified needs with appropriate consideration for public health and safety
PO 4	Perform analysis, conduct experiments and interpret data by using research methods such as design of experiments to synthesize the information and to provide valid conclusions
PO 5	Select and apply appropriate techniques from the available resources and current mechanical engineering and software tools
PO 6	Carry out their professional practice in mechanical engineering by appropriately considering and weighing the issues related to society
PO 7	Understand the impact of the professional engineering solutions on environmental safety and legal issues
PO 8	Transform into responsible citizens by resorting to professional ethics and norms of the engineering practice
PO 9	Function effectively in individual capacity as well as a member in diverse teams and in multidisciplinary straems
PO10	Communicate fluently with the engineering community and society, and will be able to prepare reports and make presentations effectively
PO11	Apply knowledge of the engineering and management principles to managing projects and finance in multidisciplinary environments
PO12	Engage themselves in independent and life-long learning to continuing professional practice in their specialized areas of mechanical engineering

Course Outcome versus **ProgramOutcomes:**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	S	S		M	M							
CO-2	S	S		M	M							
CO-3	S	S		M	M							
CO-4	S	S		M	M							
CO-5	S	S		M	M							

S - Strongly correlated, *M - Moderately* correlated, *Blank - No correlation*

Teaching-Learning and Evaluation

Week	TOPIC / CONTENTS	Course Outcomes	Sample questions	TEACHING-LEARNING STRATEGY	Assessment Method & Schedule
1	Basic MATLAB commands like representing arrays, matrices, reading elements of a matrix, row and columns of matrices,	CO 1	Adition, subtraction, multiplication, deteriminent of a matrix	Programming	Observation and record
2	random numbers, Floor, ceil, and fix command, Eigen values and Eigen vectors of a matrix	CO 1	Eigen values and eigen vectors of a matrix	Programming	Observation and record
	Plotting tools for 2 dimensional and 3 dimensional plots, putting legends, texts, using subplot		How to make 2D plots, 3D plots and subplots	Programming	Observation and record

				Programming	
3	tool for multiple plots.	CO 2			
4	Linear Regression, interpolation and polynomial regression.	CO3	Write a program for regression of order 3 of given data and execute it.		Observation and record
5	Non linear regression.	CO 3	Write a program for nonlinear regression of given data and execute it.	Programming	Observation and record
6	**Backlogs**				
7	**Internal Exam-I**				
8	Solving non linear algebraic equations.	CO 4	Solve give simultaneous algebraic equations	Programming	Observation and record
9	ODE IVP problems using Runge - Kutta method.	CO 4	Solve given intial Value problems	Programming	Observation and record
10	ODE BVP problems using shooting method.	CO 4	Solve give boundary value problem	Programming	Observation and record
11	Using quadrature to evaluate integrals (1, 2 and 3 dimensional cases).	CO 5	Perform numerical integration	Programming	Observation and record

12	Finding the minimum of an unconstrained function	CO 5	Find the minimum of given unconstrained function	Programming	Observation and record
13					
	Backlogs				
14	**Internal Exam – II**				
15	**END EXAM**				