

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract.	Tut.	Theory	TW/Pract	Tut.	Total
FEC201	Applied Mathematics-II	04	--	01	04	--	01	05

Course Code	Course Name	Examination Scheme							
		Theory				Term Work	Pract	Oral	Total
		Internal Assessment			End Sem Exam				
		Test1	Test2	Av of Test 1 & 2					
FEC201	Applied Mathematics-II	20	20	20	80	25	--	--	125

### Objectives

1. To provide students with sound foundation in applied mathematics to solve real life problems in industry.
2. To provide hands on experience in using Scilab software to handle real life problems.

### Outcomes: Learner will be able to...

1. Apply the concepts of First Order and first degree Differential equation to the engineering problems.
2. Apply the concepts of Higher Order Linear Differential equation to the engineering problems.
3. Apply concepts of Beta and Gamma function to the engineering Problems.
4. Apply SCILAB programming techniques to solve differential equation to model complex engineering activities.
5. Apply concepts of Double integral of different coordinate systems to the engineering problems.
6. Apply concepts of triple integral of different coordinate systems to the engineering problems.

Module	Detailed Contents	Hrs.
01	<b>Differential Equations of First Order and First Degree</b>	
	1.1 Exact differential Equations, Equations reducible to exact form by using integrating factors.	4
	1.2 Linear differential equations (Review), equation reducible to linear form, Bernoulli's equation.	3
	1.3: Simple application of differential equation of first order and first degree to electrical and Mechanical Engineering problem (no formulation of differential equation)	2
02	<b>Linear Differential Equations With Constant Coefficients and Variable Coefficients Of Higher Order</b>	
	2.1. Linear Differential Equation with constant coefficient- complementary function, particular integrals of differential equation of the type $f(D)y = X$ where $X$ is $e^{ax}$ , $\sin(ax+b)$ , $\cos(ax+b)$ , $x^n$ , $e^{ax}V$ , $xV$ .	6
	2.2. Cauchy's homogeneous linear differential equation and Legendre's differential equation, Method of variation of parameters.	3
03	<b>Numerical solution of ordinary differential equations of first order and first degree, Beta and Gamma Function</b>	
	3.1. (a) Taylor's series method (b) Euler's method (c) Modified Euler method (d) Runge-Kutta fourth order formula (SciLab programming is to be taught during lecture hours)	4
	3.2 .Beta and Gamma functions and its properties.	4
04	<b>Differentiation under Integral sign, Numerical Integration and Rectification</b>	
	4.1. Differentiation under integral sign with constant limits of integration.	2
	4.2. Numerical integration- by (a) Trapezoidal (b) Simpson's 1/3rd (c) Simpson's 3/8th rule (all with proof). (Scilab programming on (a) (b) (c) (d) is to be taught during lecture hours)	3
	4.3. Rectification of plane curves.	3

<b>05</b>	<b>Double Integration</b> 5.1. Double integration-definition, Evaluation of Double Integrals. 5.2. Change the order of integration, Evaluation of double integrals by changing the order of integration and changing to polar form.	<b>2</b> <b>7</b>
<b>06</b>	<b>Triple Integration and Applications of Multiple Integrals.</b> 6.1. Triple integration definition and evaluation (Cartesian, cylindrical and spherical polar coordinates). 6.2. Application of double integrals to compute Area, Mass, Volume. Application of triple integral to compute volume.	<b>3</b> <b>6</b>

### Term Work:

General Instructions:

1. Batch wise tutorials are to be conducted. The number of students per batch should be as per University pattern for practical.
2. Students must be encouraged to write Scilab Programs in tutorial class only. Each Student to write atleast 4 Scilab tutorials (including print out) and at least 6 class tutorials on entire syllabus.
3. SciLab Tutorials will be based on (i) Curve Tracing (ii) Taylor's series method, Euler's method Modified Euler method, RungeKutta fourth order formula (iii) Ordinary Differential Equation and (iv) Trapezoidal Simpson's 1/3rd and Simpson's 3/8th rule.

**The distribution of Term Work marks will be as follows -**

Attendance (Theory and  
Tutorial): 05 marks Class  
Tutorials on entire Syllabus: 10  
marks SciLab Tutorials : 10 marks

## Assessment:

### Internal Assessment Test:

Assessment consists of two class tests of 20 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and second class test when additional 35% syllabus is completed. Duration of each test shall be one hour.

### End Semester Theory Examination:

1. Question paper will comprise of total 06 questions, each carrying 20 marks.
2. Total 04 questions need to be solved.
3. Question No: 01 will be compulsory and based on entire syllabus wherein sub-questions of 3 to 4 marks will be asked.
4. Remaining questions will be mixed in nature.( e.g. Suppose Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3 )

5. In question paper weightage of each module will be proportional to number of respective lecture hrs as mentioned in the syllabus.

**References:**

1. A text book of Applied Mathematics, P.N.Wartikar and J.N.Wartikar, Vol – I and –II by Pune VidyarthiGraha.
2. Higher Engineering Mathematics, Dr.B.S.Grewal, Khanna Publication
3. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley EasternLimited, 9thEd.
4. Numerical methods by Dr. P. Kandasamy ,S.Chand Publications