Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract.	Tut.	Theory	Tut.	Pract.	Total
FEC201	Engineering Mathematics-II	3	--	1*	3	1	--	4

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract. /oral	Total
		Internal Assessment			End Sem. Exam.	Exam. Duration (in Hrs)			
		Test1	Test 2	Avg.					
FEC201	Engineering Mathematics-II	20	20	20	80	3	25	--	125

Objectives

1. The course is aimed to develop the basic Mathematical skills of engineering students that are imperative for effective understanding of engineering subjects. The topics introduced will serve as basic tools for specialized studies in many fields of engineering and technology.
2. To provide hands on experience in using SCILAB software to handle real life problems

Outcomes: Learners will be able to…

1. Solve various types of First Order differential equation.
2. Solve various types of Higher Order Differential equation.
3. Illustrate the concepts of Beta and Gamma function,DUIS and rectification.
4. Apply the concepts of Double integral
5. Apply the concept of Triple integral.
6. Apply the principles of Numerical Method for solving differential equation and numerical integration analytically and using Scilab also.

Module	Detailed Contents	Hrs.
01	**Differential Equations of First Order and First Degree** 1.1 Exact differential Equations, Equations reducible to exact form by using integratingfactors. 1.2 Linear differential equations (Review), equation reducible to linear form, Bernoulli'sequation. **# Self learning topics:**Simple application of differential equation of first order and first degree to electrical and Mechanical Engineering problem	4 2
02	**Linear Differential Equations With Constant Coefficients and Variable CoefficientsOf Higher Order** 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},$sin\ sin\ (ax+b)$, $(ax+b)$, $e^{ax}V, x\,V$. 2.2. Method of variation of parameters. **# Self learning topics:** Cauchy's homogeneous linear differential equation and Legendre's differential equation, Applications of Higher order differential equation.	4 2
03	**Beta and Gamma Function, Differentiation under Integral sign and Rectification** Pre-requisite: Tracing of curves 1.1 Beta and Gamma functions and its properties. 1.2 Differentiation under integral sign with constant limits of integration.	2

	1.3 Rectification of plane curves.(Cartesian and polar) # **Self learning topics:** Rectification of curve in parametric co-ordinates.	2 2
04	**Multiple Integration-1** 4.1. Double integration-definition, Evaluation of Double Integrals.(Cartesian & Polar) 4.2. Evaluation of double integrals by changing the order of integration. 4.3. Evaluation of integrals over the given region. (Cartesian & Polar) # **Self learning topics:** Application of double integrals to compute Area, Mass.	2 2 2
05	**Multiple Integration-2** 5.1. Evaluation of double integrals by changing to polar coordinates. 5.2. Application of double integrals to compute Area 5.3.Triple integration definition and evaluation (Cartesian, cylindrical and spherical polarcoordinates). # **Self learning topics:**Application of triple integral to compute volume.	2 2 2
06	**Numerical solution of ordinary differential equations of first order and first degree, and , Numerical Integration** 6.1. Numerical solution of ordinary differential equation using (a) Euler's method (b) Modified Euler method, (c) Runge-Kutta fourth order method 6.2. Numerical integration- by (a) Trapezoidal (b) Simpson's 1/3rd (c) Simpson's 3/8th rule(all with proof). # **Self learning topics:** Numerical solution of ordinary differential equation using Taylorseries method.	3 3

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 practicals.
2. Students must be encouraged to write SCILAB Programs in tutorial class only. Each Student has to write at least 4 SCILAB tutorials (including print out) and at least 6 class tutorials on entire syllabus.
3. SCILAB Tutorials will be based on (i) Euler Method, (ii) Modified Euler Method, (iii) Runge-Kutta Method of fourth order , (iv) Trapezoidal Rule , (v) Simpson's 1/3rd Rule (vi) Simpson's 3/8th rule

The distribution of marks for term work shall be as follows:

- Class Tutorials on entire syllabus **: 10 marks**
- SCILAB Tutorials **: 10 marks**
- Attendance (Theory and Tutorial) **: 05 marks**

The final certification and acceptance of TW ensures the satisfactory performance of laboratory work and minimum passing in the TW.

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 Examination

In question paper weightage of each module will be proportional to number of respective lecture hours as mention in the syllabus.

1. Question paper will comprise of 6 questions, each carrying 20 marks.

2. Question number 1 will be compulsory and based on maximum contents of the syllabus
3. Remaining questions will be mixed in nature (for example, if Q.2 has part (a) from module 3 then part (b) will be from other than module 3)
4. Total four questions need to be solved.

References

1. Higher Engineering Mathematics, Dr. B. S. Grewal, Khanna Publication
2. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley Eastern Limited, 9th Ed.
3. Engineering Mathematics by Srimanta Pal and Subodh,C. Bhunia, Oxford University Press
4. Applied Numerical Methods with MATLAB for Engineers and Scientists by Steven Chapra, McGraw Hill
5. Elementary Linear Algebra with Application by Howard Anton and Christ Rorres. 6th edition. John Wiley & Sons, INC.