FR. Conceicao Rodrigues College Of Engineering

Father Agnel Ashram, Bandstand, Bandra-west, Mumbai-50

Department of Humanities & Sciences

F.E. (Electronics) (semester II) (2018-2019)

Lesson Plan

Subject: Applied Mathematics II (FEC201)

Credits-5

Syllabus:

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							
		Internal Assessment			End Sem Exam	Term Work	Pract	Oral	Total
		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	**Differential Equations of First Order and First Degree** 1.1 Exact differential Equations, Equations reducible to exact form by using integrating factors. 1.2 Linear differential equations (Review), equation reducible to linear form, Bernoulli's equation. 1.3: Simple application of differential equation of first order and first degree to electrical and Mechanical Engineering problem (no formulation of differential equation)	4 3 2
02	**Linear Differential Equations With Constant Coefficients and Variable Coefficients Of 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(ax+b), cos (ax+b), x^n, e^{ax}V, xV. 2.2. Cauchy's homogeneous linear differential equation and Legendre's differential equation, Method of variation of parameters.	6 3
03	**Numerical solution of ordinary differential equations of first order and first degree, Beta and Gamma Function** 3.1. (a)Taylor's series method (b)Euler's method (c) Modified Euler method (d) Runga-Kutta fourth order formula (SciLab programming is to be taught during lecture hours) 3.2 .Beta and Gamma functions and its properties.	4 4
04	**Differentiation under Integral sign, Numerical Integration and Rectification** 4.1. Differentiation under integral sign with constant limits of integration. 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) 4.3. Rectification of plane curves.	2 3 3

05	**Double Integration** 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.	2 7
06	**Triple Integration and Applications of Multiple Integrals.** 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.	3 6

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, RungaKutta 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

Course Outcomes:

Upon completion of this course students will be able to:

1. Solve first order and higher order differential equations.
2. Apply numerical methods to solve Differential Equations
3. Apply Beta-Gamma functions to solve integration problems.
4. Rectify the given curve(using Cartesian, polar and parametric form)
5. Apply the concept of multiple integrals to find area of the given region and mass of given lamina.

Mapping of CO and PO/PSO

Relationship of course outcomes with program outcomes: Indicate 1 (low importance), 2 (Moderate Importance) or 3 (High Importance) in respective mapping cell.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
FEC201.1	3											
FEC201.2	3											
FEC201.3	2											
FEC201.4	1											
FEC201.5	3											
TOTAL												
CO-PO MATRIX												

Justification

PO1: COs are mapped to this PO1 because the students gain basic knowledge on mathematical concepts required for higher semesters (mathematics and technical application)

CO Assessment Tools:

FEC201.**1:** **Direct Methods(80%):** Test1+ Tut1+Tut2+End Exam

CO1dm = 0.3test1+0.2 tut1+0.2tut2+.3 end exam

InDirect Methods(20%): Course exit survey

CO1idm

FEC101.1 = 0.8*CO1dm + 0.2* CO1idm

FEC201.**2:** **Direct Methods(80%):** Tut3+prelim exam+ end exam

CO2dm = 0.2 tut3 + 0.5prelim+ .3 end exam

InDirect Methods(20%): Course exit survey

CO2idm

FEC101.2 = 0.8*CO2dm + 0.2* CO2idm

FEC201.**3:** **Direct Methods(80%):** Tut4+prelim exam+End Exam

CO3dm = 0.2 tut4+0.5prelim exam+.3 end exam

InDirect Methods(20%): Course exit survey

CO3idm

FEC101.3 = 0.8*CO3dm + 0.2* CO3idm

FEC201.**4:** **Direct Methods(80%):**Tut 5+Scilab+ prelim exam+End Exam

CO3dm = 0.2tut5+ 0.2*scilab +0.3prelim exam+.3 end exam

InDirect Methods(20%): Course exit survey

CO4idm

FEC101.4 = 0.8*CO4dm + 0.2* CO4idm

FEC201.**5:** **Direct Methods(80%):**Tut 6+ prelim exam+End Exam

CO5dm = 0.4 tut6 +0.3 prelim exam+.3 end exam

InDirect Methods(20%): Course exit survey

CO4idm

FEC101.5 = 0.8*CO5dm + 0.2* CO5idm

Course Outcomes Target:

Upon completion of this course students will be able to:

FEC201.1 Solve first order and higher order differential equations.

TARGET RANGE : 2.5

FEC201.2 Apply numerical methods to solve Differential Equations

TARGET RANGE : 2.5

FEC201.3 Apply Beta-Gamma functions to solve integration problems.

TARGET RANGE : 2.5

4 .FEC201.4 Rectify the given curve(using Cartesian, polar and parametric form)

TARGET RANGE : 2.5

FEC201.5 Apply the concept of multiple integrals to find area of the given region and mass of the given lamina.

TARGET RANGE : 2.5

Applied Mathematics 2 ELECTRONICS			Academic Year: 2018-19 Semester: II	
Sr. No.	***Name of the Topic***	***Planned Date***	***Executed Date***	***Remark***
	CO1:1. Solve first order and higher order differential equations.			C01 : 16 Lect
1	Introuduction to Differential Equation	7/1/2019	7/1/2019	
2	Exact differential equation,Integrating factor	8/1/2019	8/1/2019	
3	Integrating factor and problems on that	9/1/2019	9/1/2019	
4	Linear Differential Equation	11/1/2019	11/1/2019	
5	Bernoulli's Differential Equation	14/1/2019	14/1/2019	
6	Reducible to Linear Differential Equation	15/1/2019	15/1/2019	
7	Extra problems on first order	16/1/2019	16/1/2019	
8	Higher order Differential Equation	17/1/2019	17/1/2019	
9	Homogeneous ,Non Homogeneous DE	21/1/2019	21/1/2019	
10	Particular Integral	22/1/2019	22/1/2019	
11	Particular Integral	23/1/2019	23/1/2019	
12	Problems on Particular Integral	24/1/2019	24/1/2019	
13	Cauchy's Differential Equation	28/1/2019	28/1/2019	
14	Legendre's Differential Equation	29/1/2019	29/1/2019	
15	Variation of Parameters	30/1/2019	30/1/2019	
16	Practice Problems on above	01/2/2019	01/2/2019	
	CO2: 2. Apply numerical methods to solve Differential Equations and integration			CO2: 3
17	Numerical Method (Euler's Method)	11/2/2019	7/2/2019	
18	R-K Method of order 2 and 4	12/2/2019	18/2/2019	
19	Taylor's series method	18/2/2019	20/2/2019	
20	Numerical integration	20/2/2019	21/2/2019	
	CO3: 3. Apply Beta-Gamma functions to solve integration problems.			
21	Introuduction to Gamma Function	21/2/2019	25/2/2019	CO3: 6 4,5,6 Feb UT2
22	Examples on Gamma Function	25/2/2019	26/2/2019	
23	Introuduction to Beta Function	26/2/2019	28/2/2019	
24	Problems on Beta Function	27/2/2019	1/3/2019	
25	DUIS	28/2/2019	5/3/2019	
	CO4: 4. Rectify the given curve(using Cartesian, polar and parametric form)			CO4: 4
26	Rectification (cartesian form)	5/3/2019	6/3/2019	
27	Polar form	6/3/2019	6/3/2019	
28	Rectification (parametric form)	7/3/2019	7/3/2019	
29	Rectification (cartesian form)	11/3/2019	11/3/2019	

	CO5: 5. Apply the concept of multiple integrals to find area of the given region and mass of given lamina.			
30	Introuduction to Double Integration	11/3/2019	12/3/2019	
31	Evaluation of Double Integration	13/3/2019	13/3/2019	
32	Find the limits of the region of integration	14/3/2019	14/3/2019	
33	Change the order of integration	18/3/2019	18/3/2019	
34	Change to polar	19/3/2019	19/3/2019	
35	Area of the region	20/3/2019	20/3/2019	
36	Mass of the Lamina	25/3/2019	25/3/2019	
37	Evaluation of Triple Integration	26/3/2019	26/3/2019	
38	Find limits (Triple Integration)	27/3/2019	27/3/2019	
39	Volume of the solid	28/3/2019	28/3/2019	CO5: 12
40	Revision and difficulties	01/04/2019	01/04/2019	