

FR. Conceicao Rodrigues College of Engineering

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

Department of Humanities & Sciences

F.E. (Common) (Semester II) (2020-2021)

Lesson Plan

Subject: Engineering Mathematics II (FEC201)

Credits-4

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Syllabus

Module No	Topic	Hours Planned
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.	06
02	Linear Differential Equations with Constant Coefficients and Variable Coefficients of Higher Order	06

	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} , $\sin(ax + b)$, $e^{ax}V$, xV . 2.2. Method of variation of parameters. #	
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. 1.3 Rectification of plane curves.(Cartesian and polar)	06
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)	06
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 polar coordinates).	06
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).	06

Course Outcomes:

CO	Course Outcome At the end of the course student will be able to:	Cognitive Level (Bloom's Taxonomy)	Hours Planned
CO 1	Solve first order and higher order differential Equations	Apply (Level 3)	14
CO 2	Apply Beta-Gamma functions to solve integration problems.	Apply (Level 3)	04
CO 3	Rectify the given curve using Cartesian, polar form)	Apply (Level 3)	06
CO 4	Apply the concept of multiple integrals to find area of the given region	Apply (Level 3)	05
Total Hours Planned			29

CO- PO mapping

Course	PO1
FEC201.1	3
FEC201.2	2
FEC201.3	2
FEC201.4	3
TOTAL	10
Direct Attainment	2.5 (M)

Justification:

Above CO's are mapped to the following PO's as explained below:

PO1 Provides the basic knowledge required for identifying and analyzing problems in Engineering Program.

CO Assessment Tools:

FEC201.1: **Direct Methods (80%):** Test 1+Tutorial 1+ Tutorial 2+ End Exam
 CO1 dm = 0.3xtest1+0.2xtutorial1+0.2xtutorial2+0.3x end exam
Indirect Methods (20%): Course Exit Survey(CES)
 CO1 idm =1xCES
FEC201.1 = (0.8 x CO1 dm) + (0.2 x CO1 idm)

FEC201.2: **Direct Methods (80%):** Tutorial 3+ End Exam
 CO2 dm = 0.5xtutorial3+0.5x end exam
Indirect Methods (20%): Course Exit Survey(CES)
 CO2 idm =1xCES
FEC201.2 = (0.8 x CO2 dm) + (0.2 x CO2 idm)

FEC201.3: **Direct Methods (80%):** Test 2+ Tutorial 4+ End Exam
 CO3 dm =0.3xtest2+0.4xtutorial4+0.3x end exam
Indirect Methods (20%): Course Exit Survey(CES)
 CO3 idm =1xCES
FEC201.3 = (0.8 x CO3 dm) + (0.2 x CO3 idm)

FEC201.4: **Direct Methods (80%):** Test 2+ Tutorial 5+ End Exam
 CO4 dm = 0.3xtest2+0.4xtutorial5+0.3x end exam
Indirect Methods (20%): Course Exit Survey(CES)
 CO4 idm =1xCES
FEC201.4 = (0.8 x CO4 dm) + (0.2 x CO4 idm)

LESSON PLAN

Sr. No	Topic Planned	Planned Date	Actual Date	Mapped with CO	Content Delivery Method	Remarks
1	Introduction to Differential Equations	06/05/2021	06/05/2021	CO 1	Online	
2	Exact Differential Equations – Examples	07/05/2021	07/05/2021	CO 1	Online	
3	Non-exact differential equations	10/05/2021	10/05/2021	CO 1	Online	

4	Linear differential equations	10/05/2021	10/05/2021	CO 1	Online	Tutorial planned to engaged as theory class
5	Linear differential equations - Derivative form	11/05/2021	11/05/2021	CO 1	Online	
6	Bernoulli's differential equations	14/05/2021	14/05/2021	CO 1	Online	13/05 holiday
7	Higher order differential equations – Introduction	17/05/2021	19/05/2020	CO 1	Online	17/05 Technical problem due to heavy rains
8	Homogeneous DE - Higher Order	18/05/2021	20/05/2021	CO 1	Online	18/05 Technical problem due to heavy rains
9	Non-homogeneous DE - Higher Order	20/05/2021	21/05/2021	CO 1	Online	
10	Higher Order Differential Equations – Examples	21/05/2021	24/05/2021	CO 1	Online	
11	Higher Order Differential Equations - Examples (continued ...1)	24/05/2021	25/05/2021	CO 1	Online	
12	Higher Order Differential Equations - Examples on the general formula	25/05/2021	27/05/2021	CO 1	Online	
13	Method of Variation of Parameters	27/05/2021	28/05/2021	CO 1	Online	
14	Module 03: Gamma Function - Introduction	28/05/2021	31/05/2021	CO 2	Online	
15	Gamma Function – Examples	31/05/2021	01/06/2021	CO 2	Online	
16	Beta Function – Introduction	01/06/2021	03/06/2021	CO 2	Online	
17	Beta Function - Theory and Examples	03/06/2021	04/06/2021	CO 2	Online	

18	Differentiation Under Integral Sign (DUIS) – Introduction	04/06/2021	07/06/2021	CO 2	Online	
19	DUIS – Examples	07/06/2021	08/06/2021	CO 2	Online	
20	Rectification – Introduction	08/06/2021	10/06/2021	CO 3	Online	
21	Rectification - Examples	10/06/2021	11/06/2021	CO 3	Online	
22	Examples (continued...1) on Rectification	11/06/2021	16/06/2021	CO 3	Online	12-15/06 UT 1 16/06 Mutual exchange
23	Examples (continued...2) on Rectification	17/06/2021	17/06/2021	CO 3	Online	
24	Examples (continued...3) on Rectification	18/06/2021	19/06/2021	CO 3	Online	18/06 Mutual exchange
25	Examples (continued...4) on Rectification	19/06/2021	21/06/2021	CO 3	Online	21/06 Mutual exchange
26	Examples (continued...5) on Rectification	22/06/2021	22/06/2021	CO 3	Online	
27	Examples (continued...6) on Rectification	24/06/2021	24/06/2021	CO 3	Online	
28	Module 04: Multiple Integration – 1	25/06/2021	25/06/2021	CO 4	Online	
29	Double Integration – Examples	28/06/2021	28/06/2021	CO 4	Online	
30	Double Integration - Partition of a Region	02/07/2021	28/06/2021	CO 4	Online	Tutorial engaged as theory class
31	Double Integration - Change of Order of Integration	05/07/2021	29/06/2021	CO 4	Online	29/06 Mutual exchange
32	Double Integration - Change of Order and Evaluation of Integral	06/07/2021	01/07/2021	CO 4	Online	
33	Module 05: Double Integration - Polar Coordinates and	08/07/2021	02/07/2021	CO 4	Online	

	Change from Cartesian to Polar					
34	Double Integration – Area	09/07/2021	05/07/2021	CO 4	Online	
35	Double Integration - Area (continued...)	12/07/2021	06/07/2021	CO 4	Online	
36	Double Integration - Area (continued...2) and Triple Integration – Introduction	12/07/2021	08/07/2021	CO 4	Online	
37	Triple Integration - Cylindrical Polar Coordinate System	13/07/2021	09/07/2021	CO 4	Online	
38	Triple Integration - Examples on Cylindrical Polar Coordinate System	19/07/2021	12/07/2021	CO 4	Online	
39	Triple Integration - Examples on Spherical Polar Coordinate System	20/07/2021	12/07/2021	CO 4	Online	Tutorial engaged as a theory class
40	Module 06: Numerical solutions to ordinary differential equations	22/07/2021	13/07/2021	CO 4	Online	
41	Module 06: Numerical Integration	23/07/2021	13/07/2021	Module removed from the syllabus for 2020-21	Online	Tutorial engaged as theory class 15-17/07 UT 2
42	Module 06: Numerical Integration (continued...)		19/07/2021		Online	Engaged EG Class

Tutorial Plan

	DIVISION –E (Entire Class)			
	SEMESTER- II			
Tut.No	Topic Planned	Planned Date	Actual Date	Mapped with CO
1	DE: First order	03/02/2020	24/05/2021	CO 1

2	DE: Higher order	03/03/2020	31/05/2021	CO 1
3	Beta, Gamma functions	17/03/2020	07/06/2021	CO 2
4	Rectification	24/03/2020	21/06/2021	CO 3
5	Double integration	31/03/2020	05/07/2021	CO 4

Course Outcomes Target:

FEC201.1

TARGET RANGE: 2.5

FEC201.2

TARGET RANGE: 2.5

FEC201.3.

TARGET RANGE: 2

FEC201.4

TARGET RANGE: 2.2