SYLLABUS COVERAGE DETAILS

Class No	Date	Time	Topic(s) Covered
01	5.10.23	10.30 – 12.30	Introduction to Python.
02	12.10.23	10.30-12.30	Programming structures. if condition loops types
03	19.10.23	10.30-12.30	2D-plots of Cartesian curves & Polar curves (i) Scattered plot (ii) Line plot
04	Lab 1		(iii) $y=e^x$ (iv) sine and cosine curves (v) $x^2+y^2=4$ (vi) $y^2(a-x)=x^2(a+x)$, $a>0$
05			(vii) $y^2(a-x)=x^3$, $a>0$, (viii) $y^2(a-x)=x^3$, $a>0$
06			(ix) $a^2y^2=x^2(a^2-x^2)$ (x) $x^3+y^3=3axy$ (xi) circle $r=p$, (xii) $r=5(1+\cos\theta)$
07			(xiii) $r=2\lvert\cos 2\theta\rvert$ (xiv) $r=a+a\cos(\theta)$ and $r=a-a\cos(\theta)$ (xv) $x=a\cos\theta$; $y=a\sin\theta$ (xvi) $x=a(\theta-\cos\theta)$; $y=a(1-\cos\theta)$
08	26.10.23	10.30-12.30	if-else statements, loops. Lab-2. Find if
09			Find the angle between (i) $r=4(1+\cos t)$ & $r=5(1-\cos t)$
10			(ii) $r=4\cos t$ & $r=5\sin t$
11			Find the radius of curvature for (i) $r=a\sin(nt)$ at $t=\pi/2$ and $n=1$
12			(ii) $r=4(1+\cos t)$ at $t=\pi/2$
13	2.11.23	10.30-12.30	Lab-3: (i) Prove that mixed partial derivative, $U_{xy}=U_{yx}$ for $u=e^x(x\cos y-y\sin y)$
14			(ii) If $u=e^x(x\cos y-y\sin y)$ then p.t $U_{xx}+U_{yy}=0$
15			(iii) If $u=\frac{xy}{z}$, $v=\frac{yz}{x}$, $w=\frac{zx}{y}$ p.t $J=4$
16			(iv) If $u=x+3y^2-z^3$, $v=4x^2yz$, $w=2z^2-xy$ then prove that at $(1,-1,0)$, $J=20$.
17			(v) $x=s\cos\phi\sin\theta$, $y=s\cos\phi\cos\theta$, $z=s\sin\phi$ then find $\frac{\partial(x,y,z)}{\partial(s,\phi,\theta)}$.
18			
19	2.11.23.	10.30-12.30	Lab4: (i) Find the Maxima and minima of $f(x,y)=x^2+y^2+3x-3y+4$
20			(ii) Expand $\sin(x)$ as a Taylor's series about $x=\pi/2$ upto 3rd degree term. Also find $\sin(100^\circ)$.

SYLLABUS COVERAGE DETAILS

Class No	Date	Time	Topic(s) Covered
21			[illegible]
22			expression of $\sin(x)$ + $\cos(x)$ upto n^{th} degree term. Calculate $\sin(10^\circ)$ + $\cos(10^\circ)$
23			(iv) Evaluate (i) $\lim_{x \to 2} \frac{x^2 - 4}{x - 2}$
24			(ii) $\lim_{x \to 1} \frac{5x^2 - 4x^2 - 1}{10x - 9x^3}$ (iii) $\lim_{x \to \infty} \left(1 + \frac{1}{x}\right)^x = e$
25	9.11.23	10.30-12.30	Lab 5: Solution of First ODE and plotting the solution curve
26			Write a Python program to
27			(i) Solve $\frac{d}{dt}(x(t)) = 4$
28			(ii) Solve $\frac{dy}{dx} + \tan x - y^2 \sec x = 0$
29			(iii) Solve $x^3 \frac{dy}{dx} - x^2 y + y^2 \cos x = 0$
30			(iv) Solve $\frac{dy}{dt} = -ky$ with parameter $k = 0.3$ and $y(0) = 5$
31			(v) Simulate $T \frac{dy}{dt} = -y + K_p u$; $K_p = 3.0$, $T = 2.0$
32			Application problem
33			(vi) A culture initially has P_0 number of bacteria. At $t=1$ hour the number of bacteria is measured to be $\frac{3}{2} P_0$. If the
34			rate of growth is proportional to the number of bacteria $P(t)$ present at time t, determine
35			the time necessary for the number of bacteria to triple.
36	23.11.23	10.30-12.30	Lab 6: Numerical soln of system of equations, test for consistency and graphical representation
37			of the solution
38	25-11-23		Lab 7: Solution of system of linear equations by Gauss-Seidal method.
39			Lab 8: Compute Eigen values and corresponding Eigen vectors.
40			Find dominant Eigen value and corresponding Eigen vector.

SYLLABUS COVERAGE DETAILS

Class No	Date	Time	Topic(s) Covered
41	21·12·23	10·30 – 12·30	Lab 9: Finding GCD using Euclid's algorithm.
42			Lab 10: Solving linear congruence of the form $ax \equiv b \pmod{m}$.
43	28·12·23	10·30 – 12·30	Lab repetition and Journal corrections. Tutorial.
44			
45			
46			
47			
48			
49			
50			
51			
52			
53			
54			
55			
56			
57			
58			
59			
60			