UNIVERSITY OF PETROLEUM & ENERGY STUDIES, DEHRADUN

Program	B.Tech (All SoCS Branches)	Semester	II
Course	Mathematics II	Course Code	MATH 1005

Unit I: Differential Equations (10L)		References
Session 1-2:	Exact differential equations	T1: 1.4, T3:2.16
Session 3-5:	Linear differential equations with constant coefficients	T1: 2.2, 2.3, 2.7, 3.2, 3.3 and T2: 13.1, 13.2, 13.3, 13.4, 13.5, 13.6, 13.7, 13.8
Session 6:	Cauchy-Euler differential equation, Legendre linear differential equation	T1: 2.5 and T2: 13.9
Session 7:	Solution of second order differential equations when a part of complementary function is known	T1: 2.1 and T2: 15.6
Session 8:	Solution of second order differential equations by reduction to normal form	T3: 4.6
Session 9:	Solution of second order differential equations by changing the independent variable	T2: 15.7
Session 10:	Solution of second order differential equation by variation of parameters	T1: 2.10 and T2: 13.8
Unit II: Probability & Statistics (6L)		
Session 11-12:	Discrete and continuous random variables, Probability mass and probability density functions	T4: 2.1-2.5
Session 13:	Moment generating functions and Moments, Skewness and Kurtosis	T4: 3.7, 3.8, 3.9, 3.19
Session 14:	Binomial distribution	T4: 4.1, 4.2
Session 15:	Poisson distribution	T4: 4.7, 4.8
Session 16:	Normal distribution	T4: 4.4, 4.5
Unit III: Numerical Methods (12L)		
Session 17-18:	Bisection method, Regula-falsi method, Fixed point iteration and Newton-Raphson method	T1: 19.2 and T2: 28.2, 28.3
Session 19	Gauss-Jacobi and Gauss-Seidel methods	T1: 20.3 and T2: 28.7
Session 20-21:	Finite difference operators and their relationships, difference tables	T1: 19.3 and T2: 29.1, T2: 29.4
Session 22:	Newton forward interpolation formula	T1: 19.3 and T2: 29.6
Session 23:	Newton backward interpolation formula	T1: 19.3 and T2: 29.6
Session 24:	Newton divided difference method	T1: 19.3 and T2: 29.12
Session 25:	Numerical differentiation	T1: 19.5 and T2: 30.1
Session 26:	Newton-Cotes integral formula, Trapezoidal rule	T1: 19.5 and T2: 30.5-30.6

Session 27:	Simpson's1/3 and Simpson's 3/8 rules	T1: 19.5 and T2: 30.7-30.8
Session 28:	Picard's method, Taylor series method	T2: 32.2, 32.3
Session 29:	Euler's method and modified Euler's method	T1: 21.1 and T2: 32.5
Session 30:	Runge-Kutta fourth order method	T1: 21.1 and T2: 32.7
Unit IV: Posets and Lattices (6L)		
Session 31-32:	Partial order relations, Hasse diagram	T5: 13.2, 13.3
Session 33:	Posets, lattices, maximal and minimal element	T5: 13.2, 13.3, 13.5
Session 34:	Well-ordered set, properties of lattices	T5: 13.7, 13.8
Session 35-36:	Some special lattices-bounded lattice and complemented lattices, distributive lattice, modular lattice and complete lattice	T5: 13.9, 13.10, 13.11 and T6: 9.6

Text Books:

T1. E. Kreyszig, Advanced Engineering Mathematics, Wiley Publications. ISBN: 978-81-265-5423-2.

T2. B. S. Grewal, Higher Engineering Mathematics, Khanna publications. ISBN: 978-81-7409-195-5..

T3. M. D. Raisinghania, "Advanced Differential Equations", S. Chand & Company Ltd., ISBN: 81-219-0893-0.

T4. M. R. Spiegel, J. J. Schiller, R. A. Srinivasan "Probability and Statistics", Tata McGraw Hill Education Private Ltd., ISBN-13: 978-0-07-015154-3.

T5. S. Lipschutz and M. Lipson, Discrete Mathematics, Tata Mcgraw Hill Professional, ISBN: 978-1-25-906253-7.

T6. Swapan Kumar Sarkar, A Textbook of Discrete Mathematics, S. Chand & Company Pvt. Ltd. ISBN: 81-219-2232-1.