20XC11 CALCULUS AND ITS APPLICATIONS **3 2 0 4**

LIMITS AND CONTINUITY: Standard functions – Graphs - Limit- continuity- piecewise continuity- periodic- differentiable functions - Riemann sum- integrable functions- fundamental theorem of calculus. **(6+2)**

SEQUENCES & SERIES: Sequences – increasing- decreasing- bounded- function - limit properties - Series – convergence and divergence – alternating series test- absolute convergence – ratio test- power series- Taylor series (single variable) **(8+6)**

FUNCTIONS OF TWO VARIABLES: Models- partial derivative and its geometrical interpretation- Stationary points – maxima and minima- saddle points- Taylor series- Constrained maxima and minima – Lagrange multiplier method. **(6+4)**

MULTIPLE INTEGRALS: Evaluation of multiple integrals – Cartesian and polar forms- Change of order of integration - Applications of multiple integrals to find area and volume. **(9+6)**

ORDINARY DIFFERENTIAL EQUATIONS: Linear Differential Equations of first order - Exact differential equations- Integrating factors- Bernoulli equations -Linear Differential Equations of higher order with constant coefficients -Euler's equation with variable coefficients - Simultaneous equations - Method of variation of parameters. Modeling simple systems. **(12+8)**

VECTOR CALCULUS: Vector differentiation-gradient- divergent- curl- vector integration- Greens theorem- Stokes theorem- Gauss divergence theorem (concepts only). **(6+2)**

Total L: 45+T: 30=75

TEXT BOOKS:

1. Thomas G B Jr., Maurice D Wier, Joel Hass, Frank R. Giordano, "Thomas' Calculus", Pearson Education, 2018.
2. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley, 2014.

REFERENCES:

1. Ben Orlin, "Change Is the Only Constant: The Wisdom of Calculus in a Madcap World", Black Dog & Leventhal, New York, 2019.
2. Ray Wyile C and Raymond Wyile C, "Advanced Engineering Mathematics", McGraw Hill, 2013.
3. Ken F. Riley, Mike P. Hobson, Stephen J. Bence, "Mathematical Methods for Physics and Engineering", Cambridge University Press, 2018
4. Deborah Hughes-Hallett , Patti Frazer Lock , Andrew M. Gleason," Applied Calculus", Wiley, 2017
5. Judith A. Beecher, Judith A. Penna, Marvin L. Bittinger, "College Algebra", 5th Edition, Pearson, 2016**.**