FYUGP CURRICULAR FRAMEWORK FOR BACHELORS PROGRAMME WITH MATHEMATICS/APPLIED MATHEMATICS AS MAJOR

SEMESTER	COURSE CODE	TYPE OF COURSE	TITLE OF COURSE	CREDITS	
				THEORY	TUTORIAL
I	MMT122J	CT-1	**MATH/APP. MATH:** CALCULUS-I	4	2
II	MMT223J	CT-1	**MATH/APP. MATH:** CALCULUS-II	4	2
III	MMT322J	CT-1	**MATH/APP. MATH:** THEORY OF MATRICES	4	2
IV	MMT422J1	CT-1	**MATH/APP. MATH:** REAL ANALYSIS -1	3	1
	MMT422J2	CT-2	**MATH/APP. MATH:** GEOMETRY	4	2
	MMT422J3	CT-3	**MATH/APP. MATH:** THEORY OF NUMBERS	4	2
V	MMT522J1	CT-1	**MATH/APP. MATH:** ALGEBRA-I	3	1
	MMT522J2	CT-2	**MATH/APP. MATH:** MATH MODELLING AND NUMERICAL METHODS	4	2
	MMT522J3	CT-3	**MATH/APP. MATH:** FOURIER AND LAPLACE TRANSFORM	4	2
VI	MMT622J1	CT-1	**MATH/APP. MATH:** GRAPH THEORY	3	1
	MMT622J2	CT-2	**MATH/APP. MATH:** DIFFERENTIAL EQUATIONS	4	2
	MMT622J3	CT-3	**MATH/APP. MATH:** ADVANCED CALCULUS	4	2
FOR FYUGP HONOURS					
VII	MMT722J1	CT-1	**MATH/APP. MATH:** LINEAR ALGEBRA	3	1
	MMT722J2	CT-2	**MATH/APP. MATH:** ALGEBRA- II	4	2
	MMT722J3	CT-3	**MATH/APP. MATH:** REAL ANALYSIS-II	4	2
VIII	MMT822J1	CT-1	**MATH/APP. MATH:** COMPLEX ANALYSIS	3	1
	MMT822J2	CT-1	**MATH/APP. MATH:** METRIC AND TOPOLOGICAL SPACES	4	2
	MMT822J3	CT-1	**MATH/APP. MATH:** MATHEMATICAL STATISTICS	4	2
FOR FYUGP HONOURS WITH RESEARCH					
VII	MMT722J1	CT-1	**MATH/APP. MATH:** LINEAR ALGEBRA	3	1
	MMT722J4	CT-2	**MATH/APP. MATH:** ALGEBRA- II	4	2
	MMT722J3	CT-3	**MATH/APP. MATH:** REAL ANALYSIS-II	4	2
VIII	MMT822J1	CT-1	**MATH/APP. MATH:** COMPLEX ANALYSIS	3	1
	MMT822JP	PROJECT	**MATH/APP. MATH: PROJECT WITH DISSERTATION**	-	12

HEAD OF THE DEPARTMENT / CONVENOR BOUGS

Bachelors with Mathematics as Major

1st Semester

MMT122J: Mathematics/Applied Mathematics: Calculus - I

Credits: 4 THEORY + 2 TUTORIAL **Theory: 60 Hours & Tutorial: 30 Hours**

Course Objectives: (i) To study and understand the notions of differential calculus and to imbibe the acquaintance for using the techniques in other sciences and engineering. (ii) To prepare the students for taking up advanced courses of mathematics.

Course Outcome: (i) After the successful completion of the course, students shall be able to apply differential operators to understand the dynamics of various real life situations. (ii) The students shall be able to use differential calculus in optimization problems.

Theory: 4 Credits

Unit –I

Limits and infinitesimals, Continuity ($\epsilon - \delta$ definition), types of discontinuities of functions, Differentiability of functions, Successive differentiation and Leibnitz theorem, Partial differentiation, Total differentiation, Homogenous functions and Euler's theorem.

Unit –II

Indeterminate forms, Tangents and normals (polar coordinates only), Angle between radius vector and tangent, Perpendicular from pole to tangent, angle of intersection of two curves, polar tangent, polar normal, polar sub-tangent, polar sub-normal.

Unit –III

Curvature and radius of curvature, Pedal Equations, lengths of arcs, Asymptotes, Singular points, Maxima and minima of functions. Bounded functions, Properties of continuous functions on closed intervals, Intermediate value theorem, Darboux theorem.

Unit –IV

Rolle's theorem and mean value theorems (with proofs) and their geometrical interpretation, Taylor's theorem with Lagranges and Cauchy's form of remainder, Taylor's series, Maclaurin's series of $\sin x,\ \cos x,\ e^x,\ \log x,\ (1+x)^m$.Envelope of a family of curves involving one and two parameters.

Tutorial: 2 Credits

Unit –V

Examples of discontinuous functions, nth derivative of product of two functions, involutes and evolutes, bounds of function (Supremum and infimum).

Unit –VI

Tracing of cartesian equations of the form $y = f(x)$, $y^2 = f(x)$, tracing of the parametric equations.

Recommended Books:

1. Shanti Narayan and P.K. Mittal, Differential Calculus, S. Chand, 2016.
2. S. D. Chopra, M. L. Kochar and A. Aziz, Differential Calculus, Kapoor Sons.
3. Schaums outline of Theory and problems of Differential and Integral Calculus, 1964.
1. H. Anton, I. Birens and S. Davis, Calculus, John Wiley and Sons, Inc. 2002.
2. T.M. Apostal, Calculus Vol. I, John Wiley & Sons Inc, 1975.
3. S. Balachandra Rao and C. K. Shantha, Differential Calculus, New Age Publication, 1992.
4. S. Lang, A First Course in Calculus, Springer-Verlag, 1998.
5. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 2008.
6. G.B. Thomas and R.L. Finney, Calculus, Pearson Education, 2007.
7. Suggestive digital platforms web links: NPTEL/ SWAYAM/ MOOCS.