LESSON PLAN		
Discipline / All Branches	**Semester-2nd**	**Name of the teaching faculty:- Sri Sarada Ku. Nayak Lect. in Mathematics, Math. & Sc. Deptt., GP, Bolangir**
Subject:- Engg. Math-I	**No. of days/per week- 05**	**Semester from date : 02.01.2020 to 30.04.2020 No. of weeks :- 15**
Week	**Class day**	**Theory**
1st	1st	Introduction, scalars & vectors, different types of vectors.
	2nd	Operations on vectors (addition, subtraction, multiplication of a vector by a scalar) with properties.
	3rd	Position vector, section formula, illustrative examples.
	4th	Components of vector in two dimensions, three dimensions, magnitude of a vector, illustrative examples.
	5th	Distance between two points by vector method, problem discussion.
2nd	1st	Product of vectors, scalars (dot) product, geometrical meaning of scalar product, properties of scalar product.
	2nd	Illustrative examples, components of a vector along and perpendicular to a vector.
	3rd	Illustrative examples, exercise problem discussion.
	4th	Cos & angle between two vectors, scalar & vector projection of two vectors.
	5th	Illustrative examples, problem discussion
3rd	1st	Vector product (cross product) of vectors, geometrical meaning & properties.
	2nd	Vector product of orthonormal triad of unit vectors, illustrative examples
	3rd	Area of a triangle and parallelogram, illustrative examples
	4th	Problem discussion, doubt clearing
	5th	Exercise problem discussion

4th	1st	Definition of function, domain and range of a function types of functions.
	2nd	Constant function, identify function, absolute value function.
	3rd	Greatest integer function, trigonometry function.
	4th	Exponential function, logarithm function, introduction to limit.
	5th	Limit of a function, left hand and right hand limit, existence of limit.
5th	1st	Illustrative examples, methods of evaluation of limit
	2nd	Direct substitution method, factorization method, rationalization method, illustrative examples.
	3rd	Dividing highest power of x by both numerator and denominator, illustrative examples problem discussion.
	4th	Standard identities:- i) limit of $\frac{x^n-a^n}{x-a}\ as\ x \to a$ ii) limit of $\frac{a^x-1}{x}\ as\ x \to 0$, illustrative examples.
	5th	Limit of $\frac{e^x-1}{x}\ as\ x \to 0$, iv) limit of ln (1+x) as $x \to 0$, illustrative examples.
6th	1st	v) $\lim_{n\to\infty}\left(1+\frac{1}{n}\right)^n$ = e, vi) $\lim_{n\to\infty}(1+n)^{\frac{1}{n}}$=e, illustrative examples.
	2nd	vii) Limit of $\frac{sinx}{x}$, limit of $\frac{tanx}{x}$ as $x \to 0$, illustrative examples.
	3rd	Definition of continuity of a function at a point and problem based on it.
	4th	Illustrative examples based on continuity.
	5th	Problem discussion, doubt clearing.
7th	1st	Introduction to differential calculus derivative of a function at a point.
	2nd	Algebra of differentiation.
	3rd	Derivative of standard functions, x^n, a^x bnx, e^x, sinx, cosx, tanx, cotx, secx, cosecx, $\sin^{-1}x$, $\cos^{-1}x$, $\tan^{-1}x$, $\cot^{-1}x$, $\sec^{-1}x$, $\text{cosec}^{-1}x$
	4th	Continue

	5th	Continue
8th	1st	Continue
	2nd	Continue
	3rd	Derivative of composite function, illustrative examples.
	4th	Continue, problem discussion.
	5th	Derivative of inverse trigonometric function.
9th	1st	Continue
	2nd	Differentiation by trigonometric transformations.
	3rd	Continue
	4th	Differentiability
	5th	Relation between differentiability & continuity.
10th	1st	Differentiation of parametric function, illustrative examples.
	2nd	Derivative of implicity function illustrative examples
	3rd	Derivative of a function w.r.f. another function, illustrative examples.
	4th	Logarithmic differentiation, illustrative examples.
	5th	Continue
11th	1st	Problem discussion.
	2nd	Successive differentiation illustrative examples.
	3rd	Partial differentiation.
	4th	Continue.

	5th	Problem discussion.
12th	1st	Definition of integration as inverse of differentiation.
	2nd	Some standard formulae of integration with examples.
	3rd	General properties of integration, illustrative examples.
	4th	Methods of integration, i) Substitution illustrative examples.
	5th	Continue
13th	1st	Integration by using trigonometric identities, trigonometric, substitution, illustrative examples.
	2nd	Integration of parts, illustrative examples.
	3rd	Integration of the forms:- i) $\int \frac{dx}{x^2+a^2}$, ii) $\int \frac{dx}{x^2-a^2}$ iii) $\int \frac{dx}{a^2-x^2}$ Illustrative examples.
	4th	iv) $\int \frac{dx}{\sqrt{x^2+a^2}}$, v) $\int \frac{dx}{\sqrt{x^2-a^2}}$ vi) $\int \frac{dx}{\sqrt{a^2-x^2}}$ vii) $\int \frac{dx}{x\sqrt{x^2-a^2}}$ viii) $\int \sqrt{a^2-x^2}\, dx$ ix) $\int \sqrt{a^2+x^2}\, dx$ x) $\int \sqrt{a^2-x^2}\, dx$, llustrative examples.
	5th	Definite integral, illustrative examples.
14th	1st	Properties of definite integrals, illustrative examples.
	2nd	Application of integration i) Area enclosed by a curve and x-axix ii) Area of a circle with centre of origin.
	3rd	Problem discussion.
	4th	Introduction to differential equation, order & degree of differential equation.
	5th	Solution of 1^{st} order and 1^{st} degree differential equation.
15^{th}	1st	Problem discussion.
	2nd	Linear differential equation, illustrative examples.

	3rd	Continue.
	4th	Problem discussion.
	5th	Problem discussion, end of syllabus.