Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Structured Work Plan for Teaching

First Term

(June 2019 to Oct 2019)

I. Details of Classes to be taught

Sr. No.	Class	Name of Faculty	Subject	Paper
1.	B.Sc. II	Pimple N.S.	Mathematics	Real Analysis(T) Problems in Real Analysis (P)
2.	M.Sc. I			Ordinary Differential Equations (T)
3.	M.Sc. II			Functional Analysis (T)

2. **Summary of Lesson Plan**

Name of Teacher: Pimple N.S.

Class: - B.Sc. II

Sr. No.	Subject	Unit and Chapter to be covered	Date	No. of Lectures	Academic activities to be organized	No. of Test / Assignment with topic and date
1.	Mathematics (Real Analysis)	**Unit I :** **Sequences:** Sequences and their limits, limit theorems, Monotone Sequences, Subsequences and Bolzano Weierstrass theorem, The Cauchy's criterion, Properly divergent sequences **Unit II :** Sequence of functions Pointwise and uniform convergence, Interchange of limits, The exponential and Logarithmic functions, The trigonometric functions **Unit III :** Infinite Series Introduction to series, Cauchy's criterion for series. Comparison tests, Absolute convergence Test for Absolute convergence, Test for Non-absolute convergence, series of functions.	21 June 2019 To 31 Jul 2019 1 Aug 2019 to 14 Sept 2019 19 Sept 2019 to 19 Oct 2019	15 15 15	Assignments NPTEL Course registration Madhava Quiz Competition Ramanujan Quiz Competition IIT-JAM Entrance preparation Seminars Poster Presentation	Unit Test-1 Unit Test-2

Summary of Lesson Plan

Name of Teacher: Pimple N.S. **Class: M.Sc. I**

Sr. No.	Subject	Unit and Chapter to be covered	Date	No. of Lectures	Academic activities to be organized	No. of Test / Assignment with topic and date
1.	Mathematics (Ordinary Differential Equations)	**Unit I Linear equations of first order, Initial Value Problem for second order equations:** Initial value problems, Solutions of the homogeneous equation. **Unit II Linear Equations with constant coefficients:** Linear dependence and independence, A formula for the Wronskian, The non-homogeneous equations of order two, The homogeneous equations of order n, Initial Value Problem for nth order equations, Equations with real constants, The non-homogeneous equations of order-n, A special method for solving the non-homogeneous equation, Algebra of constant coefficient operators. **Unit III Linear equations with variable coefficients:** Wronskian and linear independence, Reduction of order, Non-homogeneous	04 July 2019 to 23 July 2019 24 July 2019 to 20 Aug 2019 21 Aug 2019 to 14 Sept 2019	15 20 15	Assignments NPTEL Course registration Seminars Poster Presentation	Unit Test -1

		equations, Legendre equation, Linear Equations with regular singular points: Euler equation, Second order equation with regular singular points, exceptional cases, The Bessel equation, The Bessel equation (Continued). **Unit IV Existence and uniqueness of solutions to first order equations:** Separation of variables, Exact equations, Method of successive approximations, Lipchitz condition, Convergence of the successive approximations, Non local existence of solutions, Approximations to, and uniqueness of solutions, Equations with complex valued functions.	**16 Sept 2019** **to** **05 Oct 2019**	**10**	**Guest lecture**	**Unit Test -2**

Summary of Lesson Plan

Name of Teacher: Pimple N.S. Class: M.Sc. II

Sr. No.	Subject	Unit and Chapter to be covered	Date	No. of Lectures	Academic activities to be organized	No. of Test / Assignment with topic and date
1.	Mathematics (Functional Analysis)	**Unit-I:** Definition and some Examples of Banach Spaces, continuous linear transformations, The Hahn-Banach Theorem, The Natural embedding of N in N**.	24 June 2019 to 22 July 2019	20	Assignments NPTEL Course registration	
		Unit-II: The open Mapping Theorem, The conjugate of an operator. The definition and some simple properties of Hilbert Spaces, orthogonal complements, orthonormal sets.	23 July 2019 to 20 Aug 2019	15	Seminars	Unit Test -1
		Unit-III: The conjugate space H*, The adjoint of an operator, self-adjoint operators, Normal and Unitary Operators, projections.	21 Aug 2019 to 14 Sept 2019	15	Poster Presentation	
		Unit-IV:	16 Sept 2019	10	Guest lecture	Unit Test -2

		Finite Dimensional Spectral Theory: Introduction, Matrices, Determinants and spectrum of an operator, The spectral Theorem.	to 04 Oct 2019			
4.	M.Sc. I , II	Seminar & project	July 2019 to Oct 2019	40	2 students per week for seminar and six students for project	2- project Presentations for each group

Signature of Staff

Pimple N.S.

HoD

M. S. Wavare

Head,
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Rajarshi Shahu Mahavidyalaya, Latur (Autonomous)

Principal

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Structured Work Plan for Teaching

Second Term

(December 2019 to March 2020)

1. **Details of Classes to be taught**

Sr. No.	Class	Name of Faculty	Subject	Paper
1.	B.Sc. I	Pimple N.S.	Mathematics	Geometry-Paper-III (T)
2.	B.Sc. II			Ordinary Differential Equations (T) Problems in ODE (P)
3.	B.Sc. III			Complex Analysis (X) (T) Problems in Complex Analysis (P)
4.	M.Sc. I			Seminar
5.	M.Sc. II			Seminar and Project

2. **Summary of Lesson Plan**

Name of Teacher: Pimple N.S. Class: - B.Sc. I

Sr. No.	Subject	Unit and Chapter to be covered	Date		Academic activities to be organized	No. of Test / Assignment with topic and date
1.	**Mathematics** **(U-MAT-139** **Geometry-III)**	**Unit-I** Analytical Geometry of two dimensions Change of axes: translation and rotation. Conic Sections: General equation of second degree in two variables. Reduction to standard form. Centre of conic. Nature of conic. **Unit-II** **The Plane and Right Line** The plane: First degree equation, converse, transformation to normal form, plane under given condition,	**9 Dec 2019** **To** **31 Dec 2019** **01 Jan 2020** **to** **18 Feb 2020**	**10** **20**	**Assignments** **NPTEL Course registration** **Madhava Quiz Competition** **Ramanujan Quiz Competition** **IIT-JAM Entrance preparation**	

		system of planes, length of perpendicular from a point Right line: equation of line, line through a point and given direction, line through two points, Angle between line and plane, conditions to lie in plane, coplanar lines, number of constants in equation of line, Shortest distance. **Unit-III** **Sphere, Cones and Cylinder** The sphere: Equation of a sphere, general equation, plane section of sphere, intersection of two sphere, sphere with given diameter, equations of a circle, sphere through given circle,	**24 Feb 2020** **to** **31 Mar 2020**	**15**	**Seminars** **Poster Presentation**	

		intersection of a sphere and a line, equation of tangent plane, Angle between two spheres, conditions of orthogonality **Cones and Cylinders:** Cone, equation of cone, right circular cone and equation, Cylinder and its equation.				

Summary of Lesson Plan
Name of Teacher: Pimple N.S. Class: B.Sc. II

Sr. No.	Subject	Unit and Chapter to be covered	Date	No. of Lectures	Academic activities to be organized	No. of Test / Assignment with topic and date
1.	**Mathematics** **(Ordinary Differential Equations)**	**Unit-I** **Definitions and Formation of Differential Equation** Preliminaries: Ordinary and partial differential equations order and degree, Solutions and constants of integration,	**9 Dec 2019** **To** **31 Dec 2019**	**10**		

		The derivation of differential equation. Solutions, general, particular, singular, Equations of the First order and of the First Degree. **Unit-II** **Linear Differential equations with constant coefficient** Linear equations, The complementary function, the particular Integral, the complete integral. The linear equation with constant coefficient and second member zero. Case of the auxiliary equation having equal roots, imaginary roots, The symbol D, Theorem concerning D. The linear equation with constant coefficient and second member is a function of x, The symbolic function	**1 Jan 2020** **to** **12 Feb 2020**	**18**	**Seminars** **Poster Presentation**	

		Unit-III **Linear Differential equations with variable coefficients** The Homogeneous linear equation. First method of solution, Second method of Solution to find the Complementary function, particular integral. Method for finding particular integral. Integral corresponding to a term of form x in the second member, Equations reducible to the homogeneous linear form, Orthogonal Trajectories Equation of the second order Complete solution in terms of a known integral, by inspection, by means of first two integrals, variation of parameters. Ordinary differential equation with more than two variables.	**17 Feb 2020** **to** **31 March 2020**	**17**		

		Simultaneous linear differential equation and their solutions. Geometrical meaning, method of finding the solution of the single integrals.				

Summary of Lesson Plan
Name of Teacher: Pimple N.S. Class: B.Sc. III

Sr. No.	Subject	Unit and Chapter to be covered	Date	No. of Lectures	Academic activities to be organized	No. of Test / Assignment with topic and date
1.	**Mathematics** **(Complex Analysis (X))**	**Unit-I** **Functions of Complex Variables** Definitions and examples, Limit, Theorems on limit, Continuity, Derivative, Differentiable functions, Algebra of differentiable functions. Chain rule, Cauchy Riemann equations, Sufficient conditions, C-R	**09 Dec 2019** **To** **13 Jan 2020**	**15**	**Assignments** **NPTEL Course registration** **Madhava Quiz Competition** **Ramanujan Quiz Competition** **IIT-JAM Entrance preparation**	

		equations in polar form, formula for f'(z0). Analytic functions, Harmonic functions and harmonic conjugate. Elementary functions, Bilinear transformation. **Unit-II** **Integrals** Contour, Simple arc, line integral, Proof of the result ML inequality, Cauchy-Goursat's theorem, Simply and multiply connected domains, Cauchy integral formula. Derivatives of analytic functions, Taylors's series and Laurent series, examples, Liouville's theorem. Fundamental theorem of Algebra.	**14 Jan 2020** **to** **18 Feb 2020**	**15**	**Seminars** **Poster Presentation**	**Test-1**

		Unit-III **Singularities and the Calculus of Residues** Zero of function, singular point, Different types of singularities, Limiting point of zero and poles, some theorems, Definition of Residue, Cauchy residue theorem, Principal part of a function, poles and residues at poles, Applications of residues Evaluation of improper integrals, examples.	**24 Feb 2020** **to** **31 March 2020**	**15**		**Test-2**
4.	**M.Sc. I , II**	Seminar & project	Dec 2019 - March 2020	40	2 students per week for seminar and six students for project	2- project Presentations for each group

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