A/P Sushma
Mathematics

Lesson plan
B.Sc VIth sem
Real and complex analysis

February:- Jacobians, Beta and Gamma functions, Double and Triple integrals.

March:- Dirichlet's integrals, Change of order of integration in double integrals, Fourier's series. Fourier expansion of piecewise monotonic functions. Properties of Fourier coefficients, Dirichlet's conditions, Parseval's identity for Fourier series, Fourier series for even and odd functions, Half range series, Change of intervals

April:- Extended Complex plane, stereographic projection of complex numbers, continuity and differentiability of complex functions, Analytic functions, Cauchy-Riemann equations. Harmonic functions., Mappings by elementary functions; Translation, Rotation, Magnification and Inversion, Conformal Mappings,

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May: Mobius transformations, Fixed points, Cross ratio, Inverse points and Critical mappings.

Lesson Plan (GMIT)

A/P Sushma
Mathematics

M.Sc IVth sem

January/February : Measures, some properties of measures, extension of measures, uniqueness of extension, completion of a measure, the LUB of an increasingly directed family of measures. Measurable functions, combination of measurable functions, limit of measurable functions.

March : localization of measurability, simple functions, Measure spaces, almost everywhere convergence, fundamental almost everywhere, convergence in measure, fundamental in measure, almost uniform convergence, Egoroff's theorem, Riesz-Weyl theorem. Integration w.r.t measure, Integrable simple function.

April : non -ve integrable functions, integrable functions, indefinite integrals, the monotone convergence theorem, mean convergence theorem. Rectangles, cartesian product of two measurable space, measurable rectangle, the product of two finite measurable space, product of any two measure space. Product of two σ - finite measure spaces, signed measures, Absolute continuity, finite signed measure, contractions of a finite signed measure,

May :- purely +ve and purely -ve sets, comparison of finite measures, Lebesgue ~~ae~~ decomposition theorem, Radon-Nikodym theorem, Hahn decomposition, Jordan decomposition, upper and lower variation, the Radon - Nikodym theorem for finite measure and for a σ -finite measure. Integration over locally compact spaces.

A/P Sushma
Mathematics

Lesson-plan
M.Sc Ist year
Topology

January :- Definition and examples of topological spaces, neighbourhoods, nbd system of a point and its properties, interior point and interior of set, interior as an operator and its properties.

February :- definition of a closed set as complement of an open set, limit point of set, derived set of a set, adherent point of a set, closure of a set, Closure as an operator and its properties, dense set and separable space. Base for a topology and its characterization,

March :- base for neighbourhood system, sub-base for a topology, Relative topology and subspace of a topologyies spaces, Alternate methods of defining a topology using properties of neighbourhood system, interior operator, closed sets, Kuratowski closure operator. comparison of topologies on a set, about intersection and union of topologies, the collection of all topologies on a set as complete lattice. First countable, second countable, their relationships and hereditary property, countability of a collection of disjoint open sets in a separable and second countable space

April:- Lindelof theorem, Definition, examples and characterizations of continuous functions, homeomorphism, Tychonoff product topology, projection maps, their continuity and openness, Characterization of product topology as the smallest topology such that the projections are continuous, continuity of a function from a space into a product of spaces.

Connectedness and its characterization, Connected subsets and their properties, Continuity and connectedness, Components, Locally connected spaces., mid term

May:- T_0, T_1, T_2 spaces, productive property of T_1 and T_2 spaces. Regular and T_3 separation axioms, their characterization and basic properties. Completely regular and Tychonoff ($T_{3\frac{1}{2}}$) spaces, their hereditary and productive properties. Embedding Lemma, Embedding theorem, normal and T_4 spaces, Urysohn's Lemma, complete regularity of a regular normal space. Tietze's extension theorem (only statement).

A/P Sushma
Mathematics

Lesson plan (Measure and integration)
M.Sc Ist year

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January:- Lebesgue outer measure, elementary Properties of outer measure, measurable sets and their properties.

February:- Lebesgue measure of sets of real numbers, algebra of measurable sets, Borel sets and their measurability characterization of measurable sets in terms of open, closed, F_σ and G_δ set, existence of a non-measurable set, Lebesgue measurable functions and their properties, the almost everywhere concept, characteristic functions, simple functions, approximation of measurable function by sequences of simple functions, Borel measurability of function. Littlewood's three principles, measurable functions as nearly continuous functions. Lusin's theorem, almost uniform convergence. Egoroff's theorem, Test, Ist Assignment.

March:- Convergence in measure, F. Riesz theorem that every sequence which is convergent in measure has an almost everywhere convergent subsequence. The Lebesgue Integral. Shortcomings of Riemann integral, Lebesgue integral of a bounded function over a set of finite measure and integration its properties, Lebesgue theorem regarding points of discontinuities of Riemann integrable functions.

April:- Integral of a non-negative function, Fatou's lemma, Monotone convergence theorem, integration of series, the general Lebesgue integreal, Lebesgue convergence thorem. mid-term exam.

May:- Differentition of monotone functions, Vitali's covering Lemma, the four Dini derivaties, Lebesgue differentiation theorem, functions of bounded variation and their representation as difference of monotone functions. Differentiation of an integral, absolutely continuous functions and their properties, Convex functions, Jensen's inequality, L^p space.