Name of the Teacher: Gurjeet Singh Class: M.Sc Maths(1st semester) Sub.: Complex Analysis(MM-404)

**Lesson Plan**

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| **S No** | **Period** | **Topics to be Covered** | **Academic Activity to be Organized** |
|  | **17-31 July 2017** | **Power series, its convergence, radius of convergence, examples, sum and product, differentiability of sum function of power series, property of a differentiable function with derivative zero. expz and its properties, logz, power of a complex number (z ), their branches with analyticity.** | **Oral Presentation** |
|  | **01-31 Aug 2017** | **Path in a region, smooth path, p.w. smooth path, contour, simply connected region, multiply connected region, bounded variation, total variation, complex integration, Cauchy-Goursat theorem, Cauchy theorem for simply and multiply connected domains**  **Index or winding number of a closed curve with simple properties. Cauchy integral formula. Extension of Cauchy integral formula for multiple connected domain. Higher order derivative of Cauchy integral formula. Gauss mean value theorem Morera’s theorem** | **Discussion** |
|  | **01-30 Sept 2017** | **Cauchy’s inequality. Zeros of an analytic function, entire function, radius of convergence of an entire function, Liouville’s theorem, Fundamental theorem of algebra, Taylor’s theorem** | **Seminar** |
|  | **01-31 Oct 2017** | **Maximum modulus principle, Minimum modulus principle. Schwarz Lemma. Singularity, their classification, pole of a function and its order. Laurent series, Cassorati – Weiertrass theorem Meromorphic functions, Poles and zeros of Meromorphic functions. The argument principle, Rouche’s theorem, inverse function theorem.** | **Discussion** |
|  | **01-13 Nov 2017** | **Residue : Residue at a singularity, residue at a simple pole, residue at infinity. Cauchy residue theorem and its use to calculate certain integrals, definite integral (∫0 2∏ f(cosθ, sinθ) dθ, ∫-∞∞f(x)dx), integral of the type ∫0∞f(x) sinmx dx or ∫0 ∞ f(x) cosmx dx, poles on the real axis, integral of many valued functions.** | **Seminar** |

**Topics of Assignments/ Class Tests to be given to the Students:**

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| **Assignment 1** | **Numericals of section 1 & 2 of question paper K.U. 2015 &2016** |
| **Assignment 2** | **Numericals of section 3 & 4 of question paper K.U. 2015 &2016** |
| **Class Test** | **Maximum modulus principle, Minimum modulus principle. Schwarz Lemma. Singularity, their classification, pole of a function and its order. Laurent series, Cassorati – Weiertrass theorem Meromorphic functions, Poles and zeros of Meromorphic functions. The argument principle, Rouche’s theorem, inverse function theorem.** |