Subject: Mathematics

Teacher name: Rashminder Semester 2nd

Name of the Paper: Paper 2

Class: MSc (Mathematics)

April 2021

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| Lebesgue outer measure, elementary properties of outer measure, Measurable sets and their properties, 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 and G sets, existence of a non-measurable set. Lebesgue measurable functions and their properties, characteristic functions, simple functions, approximation of measurable functions by sequences of simple functions, measurable functions as nearly continuous functions. Borel measurability of a function. |

May 2021

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| Almost uniform convergence, Egoroff’s theorem, Lusin’s theorem, 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 its properties, Lebsegue integral as a generalization of the Riemann integral, Bounded convergence theorem, Lebesgue theorem regarding points of discontinuities of Riemann integrable functions. |

June 2021

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| Integral of a non negative function, Fatou’s lemma, Monotone convergence theorem, integration of series, the general Lebesgue integral, Lebesgue convergence theorem. Differentiation and Integration : Differentiation of monotone functions, Vitali’s covering lemma, the four Dini derivatives, Lebesgue differentiation theorem, functions of bounded variation and their representation as difference of monotone functions. |

July 2021

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| Differentiation of an integral, absolutely continuous functions, convex functions, Jensen’s inequality. The Lp spaces The Lp spaces, Minkowski and Holder inequalities, completeness of Lp spaces, Bounded linear functionals on the Lp spaces, Riesz representation theorem |