# GOVT. POST GRADUATE NEHRU COLLEGE, JHAJJAR

## *Department of Mathematics (2025-26)*

## *Lesson Plan 2025-2026(EVEN SEM)*

***Class MSc. Mathematics*** ***Semester -IV***

Name of Teacher…Samsher

Subject/Paper- Inner Product Space & Measure Theory

| Sr. No. | Week Days | Subject Matter/ Syllabus |
|---|---|---|
| Unit-1 | January | Hilbert Spaces: Inner product spaces, Hilbert spaces, Schwarz inequality, Hilbert space as normed linear space,Convex sets in Hilbert spaces, Projection theorem, Orthonormal sets, Separability, Total Orthonormal sets, Bessel inequality, Parseval identity. |
| Unit-2 | February | Conjugate of a Hilbert space, Riesz representation theorem in Hilbert spaces, Adjoint of an operator on a Hilbert space, Reflexivity of Hilbert space, Self-adjoint operators, Positive operators, Product of Positive Operators. |
| Unit-3 | March | Projection operators, Product of Projections, Sum and Difference of Projections, Normal and unitary operators, Projections on Hilbert space, Spectral theorem on finite dimensional space. Convex functions, Jensen inequalities, Measure space, Generalized Fatou lemma, Measure and outer measure, Extension of a measure, Caratheodory extension theorem. |
| Unit-4 | 1st April to to 6th May | Signed measure, Hahn decomposition theorem, Jordan decomposition theorem, Mutually signed measure, Radon – Nikodyn theorem,Lebesgue decomposition, Lebesgue - Stieltjes integral, Product measures, Fubini theorem, Baire sets, Baire measure, Continuous functions with compact support. |

Signature

# GOVT. POST GRADUATE NEHRU COLLEGE, JHAJJAR
## *Department of Mathematics (2025-26)*

***Class MSc. Mathematics*** ***Semester - 2nd***

**Name of Teacher…Samsher**

**Subject/Paper- Theory of Field Extension**

| Sr. No. | Week Days | Subject Matter/ Syllabus |
|---|---|---|
| Unit-1 | January | Extension of fields: Elementary properties, Simple Extensions, Algebraic and transcendental Extensions. Factorization of polynomials. |
| Unit-2 | February | Splitting fields, Algebraically closed fields, Separable extensions, Galios fields, Perfect fields. Section-. |
| Unit-3 | March | Galios theory: Automorphism of fields, Monomorphisms and their linear independence, Fixed fields. |
| Unit-4 | 1st April to to 6th May | Normal extensions, Normal closure of an extension, The fundamental theorem of Galois theory. |

Signature