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| I | Course Code | **MA 227004** |
| II | Course Title | **Real and Functional Analysis** |
| III | Credit Structure | L T P C<br>3 1 0 4 |
| IV | Prerequisites (If any) | **Advanced Calculus /Analysis** |
| VI | Course Content | Metric spaces: Open sets, Closed sets, Continuous functions, Completeness, Cantor intersection theorem, Baire category theorem, Compactness, Totally boundedness, finite intersection property. Definition and existence of Riemann-Stieitjes integral, Properties of the integral, Differentiation and integration. Uniform convergence, Uniform convergence and continuity, Uniform convergence and integration, Uniform convergence and differentiation.<br><br>Normed linear spaces: Normed linear spaces, Riesz lemma, characterization of finite dimensional spaces, Banach spaces. Bounded linear maps on normed linear spaces: Examples, linear map on finite dimensional spaces, finite dimensional spaces are isomorphic, operator norm. Hahn-Banach theorems. Uniform boundedness principle, closed graph theorem, open mapping theorem, inner product spaces, orthonormal set, Gram-Schmidt orthonormalization, orthonormal basis, orthogonal complements. |
| VIII | Text/References | Text Books:<br>N. L. Carothers, "Real Analysis", Cambridge University Press (2000)<br>J. Conway, "A Course in Functional Analysis", 2nd Ed., Springer.<br>W. Rudin, "Principles of Mathematical Analysis", McGraw-Hill (1986).<br>B.V.Limaye " Functional Analysis" New Age International Publishers. |