

INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI
PROFORMA FOR NEW COURSE

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| 1. | Title of the Course | Functional Analysis |
| 2. | Course Number | MA6022 |
| 3. | Status of the Course | Elective |
| 4. | Structure of Credits | 3-0-0-3 |
| 5. | Offered To | PG |
| 6. | New Course/Modification to | New |
| 7. | To be Offered by | Department of Mathematics |
| 8. | To take effect from | July 2019 |
| 9. | Prerequisite | CoT |
| 10. | Whether approved by the Department | Yes |
| 11. | Course Objective: To describe properties of normed linear spaces, Banach Spaces, Inner Product Space and Hilbert Space and construct examples of such spaces. To study fundamental theorems on Banach spaces and Hilbert spaces. To know three important classes of operators (self-adjoint, unitary and normal operator) which have a key role in applications To know Spectral theory and understand spectral properties of bounded self adjoint operators. | |
| 12. | Course Content: Normed linear space; Banach spaces and basic properties, Bounded linear maps on a normed linear spaces and operator norm, Hahn-Banach theorem, Uniform Boundedness Theorem, Open Mapping Theorem, Closed Graph Theorem and Banach Fixed Point Theorem. Dual spaces and adjoint of an operator. Inner product spaces and Hilbert spaces, orthonormal set, Gram Schmidt orthonormalization, Bessels inequality, Orthonormal basis, Separable Hilbert spaces. Projection and Riesz representation theorem, Bounded operators on Hilbert spaces: Adjoint, normal, unitary, self adjoint operators, compact operators. Spectral theorem for compact self adjoint operators. | |
| 13. | Text book(s): 1. B. V. Limaye, <i>Functional Analysis</i> , New Age International Publishers, (1996). | |
| 14. | Reference(s): 1. E. Kreyszig, <i>Introductory Functional Analysis with Applications</i> , Wiley (India), (1989). 2. W. Rudin, <i>Functional Analysis</i> , Mc Graw Hill Education (India) Private Ltd., (2006). 3. R. Larsen, <i>Functional analysis: an introduction</i> , M. Dekker, (1973). | |