

## Semester - IV

# Advanced Functional Analysis—II

*Course No. MM-CP-404*  
*Duration of Examination: 3 hrs*

*Maximum Marks: 100*  
*(a) External Exam: 80*  
*(b) Internal Exam: 20*

### Unit I

Locally convex spaces & their characterizations. Hahn-Banach theorem & its simple consequences. Duality & polar topologies. Compatible linear (locally convex) topologies.

### Unit II

Duality invariance of bounded & closed convex sets. Equicontinuity and Alaoglu-Bourbaki theorem. Bipolar theorem. Barrelled, infrabarrelled and bornological spaces. Banach-Steinhaus theorem.

### Unit III

Existence of Mackey topology & Mackey-Arens theorem. Reflexivity & semi-reflexivity in Lcs and their characterization.

### Unit IV

Examples of an incomplete reflexive Fréchet space. Inductive limits & continuous linear maps on inductive limits. Bornological spaces as inductive limits of normed spaces.

### References

1. Ballobas, B. Linear Analysis(Comb. Univ.Press.)
2. Goffman, C and Pedrick, G; A first course in functional Analysis (Prentice Hall.)
3. Beauzamy, B; Introduction to Banach Spaces and their geometry ( North Holland)  
Wilansky, A: Modern Methods in topological Vector Spaces ( McGraw Hill).
4. Swatz C: Topological vector Spaces ( Marcel Dekker)
5. Rudin, W; Functional analysis ( Tata McGrawHill).
6. Jarchow ,H,.Locally Convex Spaces ( Teubner Texts).
7. Sachafer, H,H. topological Vector Spaces ( Springer Verlag).
8. Bachman, G & Narici, L., topological Vector spaces ( Marcel Dekker)