| جامعة الإمام محمد بن سعود الإسلامية<br>كلية العلوم |  | قسم الرياضيات والإحصاء<br>دكتوراه الفلسفة في الرياضيات |
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# Program of PhD admission exam

| No | Subject | Subject words |
|---|---|---|
| **1** | Advanced Linear Algebra | Vectors spaces; Eigenvalues and Linear operators; Inner product; Quadratic forms. |
| **2** | Algebra | Groups; Rings and fields |
| **3** | Topology | Topological spaces; Metric spaces; Connectedness and compactness; Countability and separation axioms. |
| **4** | Complex Analysis | Functions of complex variables; Continuity and differentiability; Complex integral; Complex sequences and series; Residues and the residue theorem. |
| **5** | Numerical Analysis | Error and numerical representation; Solving equations; Solving linear systems; Eigenvalue problems. |
| **6** | Measure and Integration | Lebesgue measure on R; Lebesgue measurable functions; Lebesgue integration; Convergence theorems; Lp spaces. |
| **7** | Functional Analysis | Normed and Banach spaces; Inner product and Hilbert spaces; Continuous liner operator on normed spaces; Duality of normed spaces. |
| **8** | Partial Differential Equations | Distributions; Hyperbolic; Parabolic; and Elliptic partial differential equations. |

# References

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2- D. Dummit, R. Foote, Abstract Algebra; John Wiley, 3rd ed. 2003.
3- J. R. Munkres, Topology; Pearson, 2nd Ed. 2000.
4- R.P. Agarwal, K. Perera, S. Pinelas; An Introduction to Complex Analysis, Springer, 1st Ed. 2011
5- R.L. Burden, J.D. Faires, Numerical Analysis, Brooks Cole, 9th Edition, 2011
6- H.L. Royden, P.M. Fitzpatrik, Real Analysis, Pearson, 4th Edition, 2010.
7- E. Kreyszig, Introductory Functional Analysis; Wiley, 1st Ed. 1989.
8- R. Haberman, Applied Partial Differential Equations with Fourier Series and Boundary Value Problems; Pearson 2012