

## APPLIED MATHEMATICS 643 "PERTURBATION THEORY"

**Calendar Description: H(3-0)**

Perturbation problems for ordinary differential equations, matrices and more general operators. Applications. Methods will be motivated by discussion of physical problems.

**Prerequisite:** Familiarity with complex variables, linear algebra and differential equations.

### *Syllabus*

<u>Topics</u>	<u>Hours</u>
Linear operators in Hilbert space, eigenvalue problems. Examples involving matrix and differential operators	8
Linearly perturbed eigenvalue problems. Perturbation series. Simple, semisimple and non-semisimple eigenvalues.	8
Nonlinearly perturbed problems (regular case)	3
Bifurcation from simple eigenvalues. Lyapunov-Schmidt method.	5
Singular perturbations. WKB method, multiple scaling	8
<b>TOTAL HOURS:</b>	<b>36</b>

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