MATH 612 – FIBER BUNDLES I

Semester:	Spring 2006		
Instructor:	Alex Degtyarev	**E-mail:**	degt@fen.bilkent.edu.tr
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Assistant:			

Exams & Grading: 2 Midterms (100 pts each)
- **1st Midterm** $\sim$ 5th week
- **2nd Midterm** $\sim$ 10th week

Final exam (150 pts)
- **Final Exam** Finals week

Homework ($\sim$ 50 pts)

Course Schedule:	Tuesday	15:40–16:30	Room SAZ-20
	Friday	13:40–15:30	Room SAZ-20
Office Hours:	Tuesday	14:40-15:30	
	Friday	10:40–11:30	

Textbook:	Lecture notes
Supplementary:	J. W. Milnor, *Characteristic classes.* Princeton University Press (1974)

Tentative course contents

- An introduction to (co-)homology (upon request)
- An introduction to homotopy groups (upon request)
- Obstruction theory
- Vector bundles (real, complex, oriented, *etc.*); basic constructions
- A generalization: G-bundles, sheaf-theoretical approach (??)
- Classical characteristic classes (*via* obstructions)
- Characteristic classes of smooth manifolds; applications to cobordisms; embeddings/immersions to Euclidean spaces
- Classifying spaces; characteristic classes revisited;
- An introduction to topological K-theory
- Cohomology operations and topological Riemann-Roch theorems; Wu classes and Wu formulas; divisibility theorems; other applications

Examples, generalizations, applications, and calculations will be considered whenever applicable. Familiarity with homotopy theory and algebraic topology is assumed (the concept of homotopy and homotopy equivalence; basic understanding of the (co-) homology and homotopy groups); however, a very brief introduction will be given if necessary.

The contents is subject to change without notice.