

MO1903
Mathematics for ISSO Space Systems Operations Specialization
November-December (AY04 Q1), 2003
SYLLABUS

The course is a brief survey of the following topics: Ordinary Linear Differential Equations and their Applications, Complex Numbers, Fourier Series and the Fourier Transform Specific goals for each topic are provided in the attached Course Objectives.

Instructor: Bard Mansager, Office G364, 656-2695, bkmansag@nps.navy.mil
Office Hours Posted or by appointment,

Text: **Differential Equations** (Second Edition), by Richard Bronson,
Schaum's

Outlines, McGraw-Hill, 1973. **(DE)**

Fourier Analysis by Carroll Wilde and Bard Mansager. Class Notes,
1992. **(FA)** Provided in class.

Applied Fourier Analysis by H.P. Hsu. College Outline Series, Harcourt
Brace and Jovanovich, 1984. **(AFA)** Provided in class.

Mathematics Tables, Mathematics Department, Naval Postgraduate

Hours	Topic
6	1 st Order ODEs
2	Theory of ODEs
6	2 nd Order ODEs
5	Complex Numbers
7	Fourier Series
5	Fourier Transforms
1	Review
3	Exams
<u>1</u>	Holiday
36	Total

Exams: Use of Math Dept. Tables and one 8.5"x11" piece of paper permitted.

Grade: 60% Quizzes (3)
40% Comprehensive Final

<u>Lsn</u>	<u>Topic</u>	<u>Assignment</u>
1	Basic Concepts; Classifications of First order DEs	READ: DE , Chap 1 , p 1-2. Solved Problems: 1.1 – 1.3, 1.5, 1.7, 1.9, 1.11, 1.13, p 3-6. Supp Problems: 1.14 - 1.54 (even), p 6-7.
2	Separable, First Order DEs	READ: DE , Chap 2, p 8-9(exclude Bernoulli, Homogeneous Equations) Chap 3, p. 14-15 (exclude Reduction of Homogeneous Eqns) Solved Problems: 2.1-2.7, 2.10-2.11, p 9-12. 3.1-3.8, p 15-18 Supp Problems: p 13, 2.15-2.25, 2.26, 2.28; p.23, 3.24, 3.39, 3.40, 3.45
3	Exact First Order DEs	READ: DE , Chap 4 (exclude Integrating Factors), p 24 Solved Problems: p 26-30, 4.1-4.13 Supp Problems: p. 33; 4.24-4.27, 4.59, 4.60.
4	Linear First Order DEs	READ: DE , Chap 5 (exclude Reduction of Bernoulli Eqns), p. 35. Solved Problems: p. 35-39; 5.1-5.15 Supp Problems: p. 41; 5.20-5.36 (even), 5.50- 52.
5	Applications of First Order DEs (Growth/Decay, Temperature Problems)	READ: DE , Chap 6, p. 43 Solved Problems: 6.1-6.6, 6.8-6.10, p 46-52. Supp Problems: 6.26, 6.31, 6.33, 6.36, 6.45, 6.48, p 60-63
6	Applications of First Order DEs Falling Body Problems, Electrical Circuits	READ: DE , Chap 6, p 43-45. Solved Problems: 6.11-6.13, 6.19, 6.20, 6.22, p 58-59. Supp Problems: 6.51, 6.58, 6.71, 6.76, p 63-65.
7	Linear DEs:Theory of Solutions	READ: DE Chap 7 p 67-68 Solved Problems: 7.1-7.3, 7.5-7.12, 7.16-

		7.23 p. 68-73 Supp Problems: 7.33-7.35, 7.36-7.54 (even), 7.65-7.67 p. 75-76.
8	Second Order Linear Homogeneous DEs with constant coefficients	READ: DE Chap 8. P 77-78. Solved Problems: 8.1-8.15, p 78-81. Supp Problems: 8.17, 8.23, 8.27, 8.31, 8.35, 8.39, 8.43.
9	Nth Order Linear Homogeneous with Constant Coefficients	READ: DE Chap 9 p83-84 Solved Problems: 9.1-9.8, p84-85
10	Undetermined Coefficients	READ: DE Chap 10 p 88-89. Solved Problems: 10.1-10.3 p 89-90. Supp Problems: 10.15, 10.19, 10.21, 10.44, 10.49
11	Variation of Parameters	READ: DE Chap 11 Solved Problems: 11.3, 11.4 Supp Problems: 11.9, 11.13, 11.16
12	Initial Value Problems	READ: DE Chap 12, p104. Solved Problems: 12.1, 12.3, p 104-105. Supp Problems: 12.7-12.13 (odd) p 107
13	Applications of Second Order Linear DEs	READ: DE Chap 13, p 108-111 Solved Problems: 13.1 – 13.12 Supp Problems: 13.26 – 13.51 (every third problem)
14	Applications of Second Order Linear DEs	READ: DE Chap 13, p 108-111 Solved Problems: 13.1 – 13.12 Supp Problems: 13.26 – 13.51 (every third problem)
15	Review Session	REVIEW: Lessons 1-14
16	QUIZ I	REVIEW: Lessons 1-14
17	Complex Numbers: Introduction	READ: problem 4.1 p 13, p 282-333 -1.15 T5 17

Form of Complex Numbers

PROBS: p 11, 1-25

32	Fourier Transforms:	READ: AFA p 75-76 Solved Probs: p 85-86, 1-3
33	Fourier Transforms: Properties of Fourier Transforms	READ: AFA p 76-81 Solved Probs: p 87-88, 4-7
34	Fourier Transforms: Properties of Fourier Transforms	READ: AFA p 76-81 Solved Probs: p 87-88, 4-7
35	Review Session	REVIEW: Lsns 23-31
36	QUIZ III	REVIEW: Lsns 23-31

(9/22/03)