BMME 730
Digital Signal Processing II
Course Syllabus

1. *Department*: Joint Dept. of Biom. Engr. *Number*: BMME 730 *Credit Hours*: 3
Title: Digital Signal Processing II *Elective*

2. *Course Description*:

Advanced techniques for analyzing biomedical systems and signals, including signal characterization, pattern recognition, parameter estimation, and machine learning. Examples from biomedical research are studied.

3. *Prerequisite(s):* BMME 121, MATH 128.

4. *Textbook(s) and/or other required material*:
Assorted research and review papers

5. *Course objectives. By the end of this course, the student should be able to:*

1. Have an understanding of theoretical bases of different data analysis approaches.
2. Choose an analytical method appropriate for a given research problem.
3. Identify significant patterns and regularities in high-dimensional data.
4. Perform linear and nonlinear factor analysis.
5. Have computer-programming skills to be able to develop problem-specific analytical software applications.

6. *Topics covered (number of lectures per topic, based on 38 50-minute lectures per semester)*:
1. Correlation analysis (2)
2. Nonlinear Dynamical Theory (6)
3. Dynamical system modeling (3)
4. Principal Component Analysis (6)
5. Cluster Analysis (3)
6. ROC curves (2)

7. Linear Neural Networks (3)
8. Multi-Layer Perceptrons (3)
9. Support Vector Machines (3)
10. Linear Discriminant Analysis (2)
11. Independent Component Analysis (2)
12. SINBAD Factor Analysis (3)

7. *Class/laboratory schedule (sessions per week and duration of each session)*:
Two 75-minutes lectures

Date of preparation and person(s) who prepared this description:
O. V. Favorov, November 10, 2005