Course Syllabus

Understanding Environmental Data

Instructor: Dr. Boaz Barak

Course number: 0920.6480.01
Academic year: 2013-14
Semester: Fall (10 weeks)
Credit hours: 2

Lecturer information
Office hours: by appointment
Phone: 052-3953533
Email: boazb@post.tau.ac.il

Course description
General course objectives: The focus of this course will be to present the ideas of data, data acquisition, and basic data analysis in a conceptual, non-mathematical framework.

Learning objectives: The course will provide tools for understanding and critically evaluating different types of data. Simple data analysis techniques will be presented and practiced. Examples will be taken from data sets encountered in the environmental field.

Course format/delivery: The course will be divided into lectures and labs with each 2-hour lecture followed by a 4-hour lab. The lectures will focus on the topics described below. The labs, using the Microsoft EXCEL Program, will focus on organizing and understanding different data sets as well as provide guided practice in applying simple statistical analysis using readily accessible EXCEL statistical functions.

Course policies
Attendance: Attendance is mandatory in all lectures and labs.

Grading: 50% Final test
40% Lab exercises
10% active participation
### Course topics:

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<th>Topic #</th>
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| 1       | October 16 | Understanding Data  
Motivation  
Statistical terms and variables  
Descriptive Statistics  
Displaying data: Graphs, Figures, Maps, Tables |
| 2       | October 23 | Distribution of One Variable  
Distribution shapes  
Measures of Central Tendency  
Normal Distributions  
Measures of Distribution  
Lab. |
| 3       | October 30 | Probability  
Expectancy  
Probability of sums  
Binomial, Poisson and Normal Distribution  
Central Limit Theorem  
Sampling Distribution |
| 4       | November 6 | Inferential Statistics  
Confidence Intervals  
Hypothesis Testing  
Standardized Mean  
Z-test  
Types of Errors |
|         | November 13| Topics: 3, 4  
Lab. |
| 5       | November 20| Significance Levels and testing  
T-test distribution  
Degrees of Freedom  
Chi-squared  
Goodness of fit  
Parametric vs non-Parametric |
|         | November 27| Topic: 5  
Lab. |
| 6       | December 4 | Understanding Relationships  
Correlations  
Spearman Correlation  
Pearson Correlation  
Linear Regression |
|         | December 11| Topic 6  
Lab. |
| 7 | December 18 | Non-Parametric tests  
Mann-Whitney  
Wilcoxon signed rank test  
Analysis of Variance (ANOVA)  
Kruskal Wallis |
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<tr>
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<td>January 8</td>
<td>FINAL EXAM</td>
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**References**

Probability and Statistics Ebook  
UCLA Statistics Online Computational Resource (SOCR)  

HyperStat Online Statistics Textbook  
Developed by David Lane, Rice University  