17.2XB3   **ENVIRONMENTAL STATISTICS**   F Avram

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This course follows on from course 17.1XA2: *Statistics for Science & Engineering.* In 17.1XA2 basic techniques in data analysis, discrete and continuous probability theory, inference from single samples, and index numbers were covered. The present course looks at inference for two samples, modelling (regression), and events occurring in time and space. Applications to data from environmental studies are emphasised throughout. Computation is mainly through the Minitab package.

SYLLABUS

- **Revision.** Exploratory Analysis (Mean, Standard deviation, Frequencies, Graphic Display,etc). Standardization and the empirical law.

    Probability models: The binomial model and the normal approximation. The Central Limit Theorem.

- **Inference.** Test of hypothesis and Confidence intervals. One and two sample methods.

- **Events in Time and Space.** The Poisson distribution and The Poisson process. The exponential distribution. Simulation.

- Chi^2 **Test**

- **Regression.** Simple and multiple regression models. Estimation and prediction. Confidence intervals.

- **Statistical Computing.** The Minitab package.

BOOKLIST

The required set of tables is:

- *New Cambridge Statistical Tables*: D.V. Lindley and W.F. Scott (CUP, 1995) (£3.50). These tables will be supplied for use in the examination.

The recommended textbook is

- *Introductory statistics* by Wonnacott. T.H., Fifth. ed, Wiley (£25.95).

Other textbooks which cover parts of the syllabus are:

- *MINITAB Handbook* (3rd edition): B.F. Ryan and B.L. Joiner (Duxbury Press, 1994). (£19.95)

    This book gives a comprehensive coverage of the Minitab language. Numerous examples illustrate how Minitab is used in the analysis of data.

- *Understanding statistics* by William Mendenhall and Lyman Ott, 5-th ed.

  Various readings from this text are recommended in the lecture notes. Other textbooks available in the library are:

- *An introduction to statistical methods* and data analysis by Lyman Ott, 3rd ed

- *Essential Statistics* (3rd edition): D.G. Rees (Chapman and Hall)

The chapers to be covered are Summary statistics, Probability distributions, One and two sample methods, The Chi^2 Test and Regression, as well as sections which show how Minitab can be used to do data analysis and probability calculations.

TIMETABLE

Week 1	:	3 lectures + 1 workshop		
Weeks 2–7	:	2 lectures + 1 tutorial + 1 workshop		
Lectures	:	Monday	12–15	LT3
	:	Wednesday	12–15	LT3
Tutorials	:	Friday	12–15	LT3
Workshops	:	Monday	2–15	P156A (Physics)
and		Thursday	12–15	MG13 (Mathematics)

Notes: Two Monday workshops fall on University holidays and will need to be rescheduled.

ASSESSMENT

The assessment is in two parts: a project and a two hour end-of-module examination. The project will count for 20% of the final mark and the examination will count for the other 80%. The pass mark is 40%.

- **The project.** The project will be given out at the Friday tutorial in week 5 and will be due Friday three weeks later. The project will involve writing a report on the analysis of some environmental data; Minitab will be used to do the analysis. An important part of the project is its preparation to timetable. Two marks will be deducted for each weekday late; a project more than ten days late will be given a mark of zero.

- **The exam.** You will be given a formula sheet and a copy of *New Cambridge Elementary Statistical Tables* (Lindley & Scott) in the examination. You will be expected to interpret Minitab output. A specimen examination paper will be provided.

A resit opportunity will be available in the autumn diet.