LTCC Basic Statistics Course

- Title: **Fundamental Theory of Statistical Inference**
- Basic Details:
  - Core Audience: Statistics
  - Course Format: Core (10h)
- Course Description:
  - Keywords: Bayesian methods, data reduction, decision theory, Fisherian statistics, frequentist inference, likelihood.
  - Syllabus:
    1. Approaches to statistical inference: frequentist, Bayesian, Fisherian. [1]
    2. Decision theory: risk, utility, decision rule, criteria for a decision rule, minimax, Bayes rules. [2]
    3. Bayesian methods: fundamental ideas, general form of Bayes rules, choice of prior, empirical Bayes, hierarchical modelling, computational ideas. [2]
    4. Special families of models: exponential families, transformation families. [2]
- Recommended reading:
- Additional/Optional reading:
  - J. Berger (2003). ‘Could Fisher, Jeffrey’s and Neyman have agreed on testing (with discussion)?’ *Statistical Science* 18, 1-32.
- Prerequisites: basic knowledge of ideas of statistical inference, distribution theory.
- Preliminary reading: Chapters 1-12 of L. Wasserman *All of Statistics: A Concise Course in Statistical Inference* (Springer, 2003) would provide a very suitable revision of background material, as well as an introduction to key aspects of the course.
- Format:
- No. of problem sheets: a single problem sheet, containing comprehensive exercises for each section, will be given, with solutions at the end of the course.
- Electronic lecture notes: lecture material will be made available to download.
- Lecture/Computer session split: the 10hrs will be split as indicated in the syllabus, but each section will contain extensive discussion of example sheet material.

- Lecture details:
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