**Week 1**

* what do you want?

1. real data analysis research experience
2. knowledge of statistical modeling and data analysis techniques
3. networking

* what do you need?

1. deeper understanding of the statistical methods that will be covered in this course
2. more time to read and think about the project
3. more communication and network

* what are your definitions of getting most of your money from this course?

1. come up with a good project and research paper
2. make friends with all the student there
3. Understand the foundational knowledge of the methods in this course and know how to use them in other data set

* what does you current or future organization need for you to get this course?

1. more real data analysis experience, better with publication
2. a comprehensive and interesting story of my project during the interview

* Models to focus (need to choose one, and everyone is two weeks blocks)

1. survey models (e.g., for dropout analysis)

2. hierarchical linear models (the assumption of independence, within and between group level analysis)

3. hierarchical growth model (nest time inside people and looking at the change over time)

4. latent class analysis (factor analysis with people into clusters)

* Research question and solution
* How do we make convincing arguments?
* SPSS and M-plus
* Personalized learning
* Course issues

1. Review the paper with 2 weeks extension for the midterm but no review opportunity for the final

2. second class we need to choose the one in the class.

3. first class will be presentation about the application and examples, the following week will be the students’ time to run the class. Talk trough the ideas and show how to run the models and the details.

**Week 2**

* Theory and research 🡺 specific research question 🡺 use the data set and models to analyze the question
* Researchers as instrument (qualitative research)
* Cattell’s data box: variables \* subjects \* occasions
  + Specific subject with different variable and occasions 🡺 diagnosis (teachers)
  + Specific variable for different subjects and occasions 🡺 educator
  + Specific occasion for different subject and variable 🡺 policy makers
    - You can still get different group of subjects
* Readings
  + Take the survey for yourself to understand the items / data manuals / report
    - Usually SPSS
  + Purpose of the articles
  + Opportunities
    - Cross-national 🡺 measurement and invariance
    - Longitudinal / repeated studies
    - Nice format
    - Able to replicate the research
  + Challenge / Limitation
    - Merge the data set
      * Data linkage. In particular, the de-identified data
    - Compare across constructs
    - Casual inference 🡺 how and why
    - Missing data
    - Limitation of data. In particular the key variable
    - Limitation of technique
      * Missing data
* Galloway (2004)
  + Relationships among variables
  + Significant group different
  + Prediction of group membership
  + Exploring underlying structure of data
  + Time course of events

**Week 3 – Week 5**

* **Framework for investigating event occurrence** 
  + Methodological feature
    - Target event
    - Beginning of time
      * The distance from beginning time until event occurrence: event time
    - Metric for clocking time: the scale in which the event occurrence is recorded.
  + Define of event occurrence: individual’s transition from on state to another state
    - state is usually defined as binary, but can be polytomous)
    - state transition can be once or repeatable
      * spell: single transition into one of series of repeatable status
  + Censoring
    - Non-informative and informative censoring
    - Right and left censoring
* **Discrete-time event: occurrence data**
  + Censored even time provides only partial information.
  + The life table:
    - Number of individuals entered the interval
    - Number of individuals experience the target event during the interval
    - Number of individuals censored at the end of the interval
    - Hazard function: conditional probability that individual will experience the event in the time period , given that he or she did not experience it in any earlier time. Unique risk associated with each time period.
    - Survivor function: Cumulate the period-by-period risks of event together.
  + Risk set is defined irreversibly.
  + Median lifetime (m is the time interval when the sample survivor function is just above 0.5):
* **Hazard Modeling**
  + Model assumption:
    - Population
    - Identical for each subject and for each time period
    - Homogeneity through pseudo-intercept and predictors