RESEARCH DESIGN IN SOCIAL DATA SCIENCE
MODULE ONE: WHAT IS SOCIAL DATA SCIENCE?

TOPIC 1: WHAT IS SCIENCE?
- What makes science different to art and culture?
- History of science and scientific methods
- How science leads to knowledge generation?
- What are the elements of scientific methods?

TOPIC 2: HOW CAN WE COMMUNICATE OBSERVATIONS?
- Observation and measurement as the first steps in scientific activities
- Finding measurable parameters, variables, quantifying
- Phenomenology and its importance

TOPIC 3: HOW CAN WE TEST OUR THEORIES?
- Randomized Controlled Trial
- Quasi and natural experiments
- Observational Study

TOPIC 4: WHAT CHALLENGES WE HAVE IN STUDYING HUMANS?
- Intrinsic differences between human systems and natural systems
- Agency and adaptivity
- Ethical aspect of studying humans
MODULE TWO: HOW TO DESIGN A RESEARCH PROJECT?

TOPIC 5: WHAT ARE THE BOUNDARIES OF YOUR RESEARCH?
- How to answer questions that determine the research boundaries: what, when, where, who.

TOPIC 6: WHAT IS THE SCALE AND TIME RESOLUTION OF YOUR RESEARCH?
- Units of analysis: individuals, groups, societies
- Units of time: seconds, minutes, years, life-time, history

TOPIC 7: HOW TO COLLECT DATA AND MINIMIZE BIAS?
- Sampling techniques, self-selection, bias
- Online APIs, 3rd party organizations, online experiments

TOPIC 8: WHAT IS CONSENT IN DATA COLLECTION?
- Implicit and explicit consent
- Ethical consequences
- Minors and 3rd party consent
MODULE THREE: ARE OUR RESULTS VALID?

TOPIC 9: HOW YOUR RESEARCH COULD BE VALIDATED AND GENERALIZED?
- Internal and external validity
- Statistical tests
- p-value and alternative explanations
- Correlation and causality

TOPIC 10: CAN YOUR RESEARCH BE REPLICATED?
- Replication and data sharing
- Science vs. anthropology vs. journalism

TOPIC 11: CAN YOU MAKE A PREDICTION?
- Producing theory and models
- Prediction as a test vs. prediction as an application
MODULE FOUR: WHAT METHODS WE CAN USE?

TOPIC 12: WHAT ARE QUANTITATIVE METHODS?
- Data analysis
- Machine learning
- Network analysis
- Text mining
- Survey research

TOPIC 13: WHAT ARE QUALITATIVE METHODS?
- Interview
- Qualitative coding

TOPIC 14: WHY DO WE NEED TO MIX METHODS?
- Agent-based modelling
- Informed sampling
- Triangulation and multi-method research

MODULE FIVE: WHAT ETHICAL ISSUES SHOULD WE BE AWARE OF?

TOPIC 15: WHAT ARE THE ETHICAL CHALLENGES OF SOCIAL DATA SCIENCE?
- Privacy
- Security
- Consent
- Data management
- Anonymization
- Data sharing