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

TOPIC 1: WHAT IS SCIENCE?
- 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 THROUGH EXPERIMENTATION?
- Randomized Controlled Trial
- Quasi and natural experiments
- Observational Study

TOPIC 4: CHALLENGES WHEN STUDYING HUMANS
- Intrinsic differences between human systems and natural systems
- Agency and adaptivity
- Ethical aspect of studying humans
MODULE TWO: HOW TO DETERMINE DESIGN ELEMENTS AND DATA SOURCES OF 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, why.

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: WHAT IS BIG DATA AND HOW DOES IT DIFFER TO TRADITIONAL DATA COLLECTION?
- What are found data and big data?
- Sampling techniques and self-selection bias

TOPIC 8: WHAT IS CONSENT IN DATA COLLECTION?
- Implicit and explicit consent
- Integrity and ethical consequences
MODULE THREE: WHAT METHODS CAN WE USE IN SOCIAL DATA SCIENCE?

TOPIC 9: QUANTITATIVE METHODS FROM DATA SCIENCE
- Data mining
- Text mining
- Social network analysis

TOPIC 10: QUALITATIVE METHODS FROM SOCIAL SCIENCE AND MIXED METHODS
- Interview and focus groups
- Qualitative questionnaire
- Qualitative coding and content analysis
- How to mix qualitative and quantitative methods

MODULE FOUR: WHAT CAN BE LEARNT FROM YOUR RESEARCH?

TOPIC 11: FROM RESEARCH QUESTION TO HYPOTHESIS
- How to develop a good research question
- The role of hypothesis generation and testing in research design

TOPIC 12: VALIDITY
- Internal and external validity
- Sampling bias
- Correlation vs. causation
- Generalisability

TOPIC 13: REPRODUCIBILITY AND REPLICABILITY
- Open science and data sharing
- Documentation and transparency
TOPIC 14: ETHICAL CONSIDERATIONS IN SOCIAL DATA SCIENCE

- Privacy
- Recruitment
- Consent
- Data management
- Data security