Syllabus: Research Methods 1

The aim of the course is to provide skills and tools for critical evaluation of research results. The theme of the course is causal inference: strength and weaknesses of various cause-probing designs, fallacies and paradoxes of causal interpretations, and tools for thinking clearly about causation, including data simulations. In addition, two seminars are dedicated to research ethics. A group assignment involves designing simulating data. A satellite course entitled “learn R by EXample” (REX) is included, to get started with data simulations in R.

Course code
Master program: PSMT58; Doctoral program: PS302FO. It is the same course given at two levels, the only difference is examination criteria and grades.

Prior knowledge
The course assumes prior knowledge corresponding to the content of courses in methodology at Psychology 1-3 at Stockholm University (see literature lists for these courses at www.psychology.su.se).

Learning outcomes
After completing the course, you are expected to have improved your ability to:
1. Understand and contribute to theoretical discussions of causality, causal inference and cause probing research designs;
2. Specify a causal research question, choose a cause probing design, and simulate data;
3. Analyze research proposals and studies from an ethical perspective

Course content
The course will cover the following topics:
- Causal effect estimates
- Potential outcome model of causality
- Directed Acyclical Graphs
- Cause probing research designs.
- Confounding and other biases
- Fallacies and paradoxes
- Basic probability (to understand conditioning, independence, and association)
- Data simulation using R
- Research ethics

Hybrid teaching: In real life and online
The course consists of lectures, seminars, and group discussions linked to the individual assignment. Teaching will take pace in real life with possibilities for online participation (so called “hybrid’’ teaching). It is up to you whether you participate in real life or online (using zoom). The lecture rooms are equipped for real time streaming of lectures and for interaction from online participants. Hopefully, this technology will work fine, so everyone may participate in the discussions. My guess is that you will benefit more from the seminars if you attend in real life, so make that your first choice.
Activities
The lectures deal with behavioral science research methodology, with a focus on causal inference, and with research ethics. Seminars and group discussions focus on specific methodological problems or research articles from a methodological perspective. To be able understand and participate in the seminar discussions, you should have read the literature assigned to each occasion (see schedule on Athena).

Examination
After completing the course, you are expected to be able to:

<table>
<thead>
<tr>
<th>Learning outcome 1:</th>
<th>Understand and contribute to theoretical discussions of causality, causal inference and cause probing research design</th>
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<tbody>
<tr>
<td>Learning outcome 2:</td>
<td>Specify a causal research question, choose a cause probing design, and simulate data</td>
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<tr>
<td>Examination:</td>
<td>Written exam (individual) and Group assignment</td>
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| Learning outcome 3: | Analyze research proposals and studies from an ethical perspective |
| Examination:        | Active participation at the Research ethic seminars 1 and 2 |

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<thead>
<tr>
<th>Type of examination</th>
<th>Grade</th>
<th>Form</th>
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<tbody>
<tr>
<td>Group assignment</td>
<td>Excellent/Pass</td>
<td>Oral presentation using slide-show software</td>
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<tr>
<td></td>
<td>/Fail</td>
<td></td>
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<tr>
<td>Research ethics seminar</td>
<td>Pass/Fail</td>
<td>Seminar discussion</td>
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<tr>
<td>Written examination</td>
<td>0-30 points</td>
<td>Written exam on Athena</td>
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The written exam is scored 0 to 30 points. The group assignment is scored pass or fail (= revise), but up to 3 points may be awarded for excellence and be added to the exam score of each group participant. Together, the written examination and the individual assignment may give a total score of at most 30 + 3 points.

Grading Master level (PSMT58). The course is graded on the seven-point ECTS-scale (A, B, C, D, E, Fx, F). Grade A requires a total score of at least 27 points, B 24-26 points, C 21-23 points, D 18-20 points and E 15-17 points (Fx: < 15 points). In addition, grades A-E requires passed research ethics seminar, and passed group assignment.

Grading Doctoral level (PS302FO). The course is graded “pass” or “fail”. Grade “pass” requires a total score of at least 21 points. In addition, grade “pass” requires passed research ethics seminar, and passed group assignment.

Literature
Articles will be uploaded on Athena:
10-20 theoretical articles,
10-20 empirical articles,
Texts on research ethics.

Schedule
Date, time and room: see Athena