
| Module Title | Research Methods 2: Quantitative Approaches |
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| **Code** | MCCf423 |
| **Degree Programme** | Master of Science – Circular Innovation and Sustainability |
| **ECTS Credits** | 3 |
| **Workload** | 90 hours |
| **Module Coordinator** | Name: Prof. Dr. Gernot Pruschak<br>Phone: +41 31 848 41 63<br>E-mail: gernot.pruschak@bfh.ch<br>Address: BFH Business School, Brückenstrasse 73, 3005 Bern |
| **Lecturers** | - |
| **Entry Requirements** | Prerequisite:<br>• Attend the compulsory session "Software Installation and Check"<br>• Successful completion of the Self-Evaluation: Basics of Statistics |
| **Competencies upon Completion** | **Competencies**<br>After completing the module, students will be able to:<br>• understand the importance of data science;<br>• clean and structure data;<br>• perform descriptive statistical analysis;<br>• know the elementary methods of quantitative data analytics;<br>• understand the utility and differences of linear and logistic regression analysis as well as propensity score matching;<br>identify the most appropriate statistical method for a given situation and apply it correctly;<br>• use AI tools to write, debug, and optimize code in R for data analysis tasks.<br><br>**Outcomes**<br>After completing the module, students will be able to:<br>• reflect on issues/problems when applying data analysis methods;<br>• apply data science to appropriate topics in the context of sustainability;<br>• proficiently understand data structures and analysis procedures;<br>• use R to perform data analysis tasks. |
| **Content** | The module offers a hands-on application-oriented approach to gathering, structuring, cleaning, visualizing, and analysing data. In addition to lectures, hands-on self-study exercises are provided during which students apply defined methods to their own "method-oriented" projects.<br><br>This module comprises four sections. First, we address why data science has become more important in recent years and where it can be applied. Second, data cleaning and structuring approaches are explained. Third, essential elements of descriptive statistics are reviewed (distribution, central tendency, dispersion, correlation). Fourth, methods for hypothesis testing and group comparisons are introduced.<br><br>R-Studio, an open-source software, will be used for the programming part. Each student needs to have their own laptop (Windows OR Mac) for this module. |

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| **Teaching and Learning Methods** | • Flipped classroom<br>• Project-Based Learning<br>• Individual exercises<br>• Learning videos |
| **Competency Assessment** | • Moodle quizzes at the beginning of lectures (40%)<br>• Individual assignment on statistical analysis (60%)<br><br>Students who receive an insufficient overall grade of 3.5, are given the opportunity to carry out a *subsequent improvement* of written assignments defined by the *Module Coordinator*. The maximum overall grade that can then be obtained is 4. This still counts as the same attempt. |
| **Mode of Repetition** | Should a student fail the module, they have one more attempt.<br>They may either:<br>• Submit a new assignment (100%), defined by the *Module Coordinator*, for the next resit examination session.<br>• Repeat the entire module next time it is offered. |
| **Format** | 2 lessons per week over 7 weeks<br>+ "Software Installation and Check" in Calendar Week 04<br>+ Additional coaching sessions as announced |
| **Attendance** | Mandatory onsite lectures (Moodle quizzes) |
| **Module Type** | Compulsory |
| **Timing of the Module** | Spring Semester, Calendar Weeks 08 to 14<br>+ "Software Installation and Check" in Calendar Week 04 |
| **Venue** | Onsite \| Brückenstrasse 73, 3005 Bern |
| **Literature** | • Matter, U.; (2025). Data Analysis with AI and R: Using OpenAI, Copilot, and aider. Manning Publications. |
| **Language** | English |
| **Links to Other Modules** | • MCCf013 Introduction to Circular Economy and Scientific Literature<br>• MCCf413 Research Methods 1: Qualitative Approaches<br>• MCCf433 Research Methods 3: Transdisciplinary Approaches<br>• MCCf443 Impact Assessment |
| **Last Update** | February 2026 |