**Advance Data Analysis**

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| Program | **PhD Education**  |
| Course Code | ED798 |
| Credit Hours | **3** |
| Resource Person | **Dr. Fariha Gull**  |
| Contact | Fariha.gul@umt.edu.pk |

**Description of the course**

This course builds on the foundations of research and statistics and introduces advanced statistical techniques commonly used in educational research. Focus is on developing skills in parametric and nonparametric analyses through the use of statistical analysis software.

This course also covers research design, the scientific method, data quality and validity, data management, and research ethics in data analysis.  Students should attempt to identify data sets relevant to their specific interests prior to the course. Instructor will approve data set suitability. If students cannot identify appropriate datasets, the instructor will provide a dataset. Designated time outside of the classroom is required for each student to work with the team partner to provide and receive feedback on homework assignments. Lab/technical sessions will be conducted in lab during each session as per time table.

**Objectives of the course**

* Apply quantitative and/or qualitative data analysis skills and techniques to an appropriate set of data.
* Understand general principles of quantitative and qualitative data analysis.
* Apply quantitative and/or qualitative data analysis skills and techniques to an appropriate set of data.
* Analyze data.
* Understand and apply principles of interpretation and data presentation/representation to analysis and research writing.

**Grade Evaluation Criteria**

Following is the criteria for the distribution of marks to evaluate final grade in a semester.

**Marks Evaluation Marks in percentage**

Class activities 15

Mid Term exam 25

Class presentation 30

Final term Project 30

Total **100**

**Reference material**

* Field, A. (2005). Discovering statistics using SPSS (2nd ed). London: Sage.
* Grimm, L. G., & Yarnold, P. R. (1994). Reading and understanding multivariate statistics. Washington, DC: American Psychological Association.
* Grimm, L. G., & Yarnold, P. R. (2000). Reading and understanding more multivariate statistics.
* American Psychological Association. (1994). Publication manual of the American Psychological Association (5th ed). Washington, DC: Author.
* Babbie, E. R. (2003). Practice of social research (10th ed). Belmont, CA: Wadsworth.
* Cone, J. D., & Foster, S. L. (2006). Dissertations and theses from start to finish (2nd ed). Washington, DC: American Psychological Association.
* Creswell, J. W. (2001). Educational research: Planning, conducting, and evaluating quantitative and qualitative research. Upper Saddle River, NJ: Prentice Hall.
* Gay, L. R., & Airasian, P. W. (2002). Educational research: Competencies for analysis and applications (7th ed). Upper Saddle River, NJ: Prentice Hall.
* Newton, R., & Rudestam, K. E. (1999). Your statistical consultant. Thousand Oaks, CA: Sage Publications. ISBN: 0-8039-5823-4

**Calendar of Course contents to be covered during semester**

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| **Week** | **Activity**  | **Reference**  |
| **1** | Statistical Decision Theory | ***The elements of statistical learning chapter 1*** |
| **2** | Statistical models  | ***----do---***  |
| **3** | Review of Descriptive/ Statistics and Data Screening  |  |
| **4** | Simple Factorial/ ANOVA |  |
| **5** | Testing for Interactions |  |
| **6** | Simple Main Effects Tests | **Field, 2005**  |
| **7** | Linear Regression  | Wooldridge Chapter 3, 4 |
| **8** | Multiple Regression | Wooldridge Chapter 3, 4 |
| **9** | Multiple Analysis of Variance (MANOVA) |  |
| **10** | Discriminate Analysis |  |
| **11** | Data Reduction/Factor Analysis |  |
| **12** | Bootstrap versus maximum likelihood |  |
| **13** | Miscellaneous Specification Issues: Logs or Not, Non-nested Tests, Multiple Hypothesis Testing, Weighted Least Squares, Over Controlling, Simultaneity | Wooldridge Chapter 6.3, 9.1, 16.1, 16.2 |
| **14** | Solutions: Panel Data Strategies | Wooldridge Chapter 13, 14 |
| **15** | ***Project presentation*** |  |

**Assessment of Student Learning:**

Students will have equal opportunities to exhibit their understanding. They will be assessed on the basis of:

* Class participation
* Reflections on the assigned work
* Submissions
* Quiz ( both announced and surprise)
* Test