Course Outline

Part I

Programme Title	**:**	Doctor of Education
Programme QF Level	**:**	7
Course Title	**:**	Advanced Statistics for Educational Assessment
Course Code	**:**	EMA7001
Department	**:**	Psychology
Credit Points	**:**	3
Contact Hours	**:**	39
Pre-requisite(s)	**:**	Nil
Medium of Instruction	**:**	EMI
Course Level	**:**	7

Part II

The University's Graduate Attributes and seven Generic Intended Learning Outcomes (GILOs) represent the attributes of ideal EdUHK graduates and their expected qualities respectively. Learning outcomes work coherently at the University (GILOs), programme (Programme Intended Learning Outcomes) and course (Course Intended Learning Outcomes) levels to achieve the goal of nurturing students with important graduate attributes.

In gist, the Graduate Attributes for Undergraduate, Taught Postgraduate and Research Postgraduate students consist of the following three domains (i.e. in short "PEER & I"):

- **P**rofessional **E**xcellence;
- **E**thical **R**esponsibility; **&**
- **I**nnovation.

The descriptors under these three domains are different for the three groups of students in order to reflect the respective level of Graduate Attributes.

The seven GILOs are:

1. Problem Solving Skills
2. Critical Thinking Skills
3. Creative Thinking Skills

4a. Oral Communication Skills

4b. Written Communication Skills

5. Social Interaction Skills
6. Ethical Decision Making
7. Global Perspectives

1. Course Synopsis

The course is offered to strengthen statistical skills of candidates in the various areas of educational assessment where statistical methodologies are frequently applied. Students will develop competence in advanced statistical models and techniques such as univariate and multivariate analysis of variance and covariance, multiple regression, principal component analysis, factor analysis, structural equation modeling, and hierarchical linear modeling. Computer software will be used. Philosophical under-pinnings of quantitative methodologies and ethical issues in educational assessment will provide the background for these studies.

2. Course Intended Learning Outcomes (CILOs)

Upon completion of this course, students will be able to:

$CILO_1$ Understand the key concepts and assumptions of the methods and models;

$CILO_2$ Apply and conduct appropriate advanced data analysis in a professional manner, interpret results accurately to answer research questions;

$CILO_3$ Report statistical results in accordance with APA standards and conventions.

3. Content, CILOs and Teaching & Learning Activities

Course Content	CILOs	Suggested Teaching & Learning Activities
Review of univariate and bivariate statistics	$CILO_{1-2}$	Lectures
Analysis of covariance	$CILO_{1-2}$	Lectures; Data analysis exercises
Multivariate analysis of variance and covariance	$CILO_{1-2}$	Lectures; Data analysis exercises
Structural Equation Modeling	$CILO_{1-2}$	Lectures; Data analysis exercises
Hierarchical Linear Modeling	$CILO_{1-2}$	Lectures; Data analysis exercises
Principal component and factor analysis	$CILO_{1-2}$	Lectures; Data analysis exercises
SPSS workshop	$CILO_{1-3}$	Demonstration and exercises
R workshop	$CILO_{1-3}$	Demonstration and exercises
Research project	$CILO_{1-3}$	Presentation, data analysis

4. Assessment

Assessment Tasks	Weighting (%)	CILO
a. Mid-term Exam This is an open-notes open-books quiz, which may compose of both multiple choice and short answer questions. It aims to assess each student's understanding of the topics and their ability to apply the methods to address different research questions.	40%	$CILO_{1-2}$
b. Oral presentation of the final project Student will be asked to provide a brief summary of their research project in the presentation. It aims to assess if students can communicate their research findings with other researchers effectively.	10%	$CILO_{1-2}$
c. Project Report The project report (around 1500 words) assess student's competence to apply the statistical methods in real research setting. It aims to assess if students can interpret and report statistical results in a professional and ethical manner.	50%	$CILO_{1-2}$

5. Required Text(s)

Nil

6. Recommended Readings

Finch, W. H., & French, B. F. (2015). *Latent variable modeling with R*. Routledge.

Ho, R. (2013). *Handbook of univariate and multivariate data analysis with IBM SPSS* (2nd ed.). Taylor and Francis.

Mertler, C. A. & Vannatta, R. A. (2022). *Advanced and multivariate statistical methods: Practical application and interpretation* (7th ed.) Routledge.

Meyers, L. S., Gamst, G. C., & Guarino, A. J. (2013). *Performing data analysis using IBM SPSS*. Wiley.

Pituch, K. A., & Stevens, J. P. (2016). *Applied multivariate statistics for the social sciences: Analyses with SAS and IBM's SPSS* (6th ed.). Routledge.

Tabachnick, B. G. & Fidell, L. S. (2019). *Using multivariate statistics* (7th ed.). Pearson.

7. Related Web Resources

- Multivariate Analysis with SPSS: http://core.ecu.edu/psyc/wuenschk/spss/SPSS-MV.htm
- Applied multivariate analysis course serial: http://www.chrisbilder.com/multivariate/schedule.html
- Against All Odds (one-year introduction to statistics) https://www.learner.org/series/against-all-odds-inside-statistics/

8. Related Journals

Annals of applied statistics
British Journal of Mathematical and Statistical Psychology
Journal of Educational and Behavioral Statistics
Journal of statistical software
Journal of the American Statistical Association
Journal of the Royal Statistical Society
Multivariate Behavioral Research
Psychometrika
Structural Equation Modeling: A Multidisciplinary Journal

9. Academic Honesty

The University adopts a zero tolerance policy to plagiarism. For the University's policy on plagiarism, please refer to the *Policy on Academic Honesty, Responsibility and Integrity with Specific Reference to the Avoidance of Plagiarism by Students* (https://www.eduhk.hk/re/modules/downloads/visit.php?cid=9&lid=89). Students should familiarize themselves with the Policy.

10. Others

Nil

TPg Courses with other Study Modes

Programme Title : Doctor of Education
Course Title : Advanced Statistics for Educational Assessment
Course Code : EMA7001
Offering Unit : Psychology
Credit Points : 3

Delivery mode:

☐ **Online learning as the primary delivery mode**

Range of classroom-based contact hours (0-15)	Range of hours for online learning (24-39)	Total No. of Contact Hours
		39

☑ **Directed study mode**

Range of classroom-based contact hours (4-15)	Range of guided independent learning hours (24-35)	Total No. of Contact Hours
15	24	39