DEREE COLLEGE SYLLABUS FOR: MA 4333 MATHEMATICAL STATISTICS 3/0/3

UK LEVEL: 6
UK CREDITS: 15

(FALL 2025)
(Previously MA 3333)

PREREQUISITES:	MA1024 Algebra & Trigonometry or MA1008 College Algebra **or** ITC3006 Mathematics for Computing MA2131 Calculus I **or** MA2105 Applied Calculus MA2240 Calculus II
CATALOG DESCRIPTION:	The course aims to introduce a formal framework dedicated to the study of probability theory and statistical inference. Axiomatic approach to probability and counting techniques. Discrete and continuous distributions along with their properties and uses. Further topics in probability such as a generating functions and fundamental theorems (Central Limit Theorem). General Principles for Statistical Inference. Sampling distributions. Confidence intervals and significance tests. Correlation and Regression.
RATIONALE:	This course is designed to equip students with the foundational mathematical principles that form the basis of statistical science. Students will acquire a comprehensive understanding of mathematical statistics, complemented by the development of generic skills. This course introduces techniques applicable in diverse real-life situations, laying the groundwork for the advanced methods necessary to address more complex problems.
LEARNING OUTCOMES:	*As a result of taking this course, the student should be able to:* 1. Derive simple results in probability using an axiomatic approach. 2. Know how to derive properties of discrete and continuous probability distributions. 3. Apply the ideas of statistical theory to determine estimators and their properties satisfying a range of estimation criteria. 4. Calculate confidence intervals and carry out hypothesis tests in simple situations.
METHOD OF TEACHING AND LEARNING:	In congruence with the teaching and learning strategy of the college, the following tools are used: • Lectures and class discussions. • Homework assignments. • Office hours held by the instructor to provide further assistance to students. • Use of library facilities for further study and preparation for the exams. • Use of the Blackboard course management platform to further support communication, by posting lecture notes, assignment instruction, timely announcements, formative quizzes and online submission of assignments.
ASSESSMENT:	**Summative:** 1st assessment: Midterm Examination — **40%** 2nd assessment: Portfolio of student work — 10% Final assessment: Final Examination — 50% **Formative:** Online exercises and word problems assigned through Blackboard. — **0%** ▪ The first assessment tests Learning Outcomes 1 and 2.

	▪ The second assessment tests Learning Outcomes 1, 2, and 3. ▪ The final assessment tests Learning Outcomes 1, 2, 3, and 4. ▪ The formative assessment aims to prepare students for the examinations. The final grade for this module will be determined by averaging all summative assessment grades, based on the predetermined weights for each assessment. If students pass the comprehensive assessment that tests all Learning Outcomes for this module and the average grade for the module is 40 or higher, students are not required to resit any failed assessments. Students are required to resit failed assessments in this module.
INDICATIVE READING:	**REQUIRED READING:** • D. Wackerley, W. Mendenhall, and R. L. Scheaffer, *Mathematical Statistics with Applications*; 7th Ed., 2008, Duxbury (Thomson Brooks/Cole) **RECOMMENDED READING:** • HYPERLINK "http://prob140.org/textbook/"Adhikari & Pitman, Probability for Data Science • Rice, J. A. Mathematical statistics and data analysis, c2007 3rd edition, international edition (*Cengage*) • Ross, A First Course in Probability; Latest Edition; Pearson Education • Moore, McCabe and Craig, Introduction to the practice of Statistics; Latest Edition; Macmillan International Higher Education • P.G. Hoel, Introduction to Mathematical Statistics; Latest Edition; John Wiley & Sons
INDICATIVE MATERIAL: *(e.g. audiovisual, digital material, etc.)*	**REQUIRED MATERIAL:** N/A **RECOMMENDED MATERIAL:** Journal of the American Statistical Association Journal of the Royal Statistical Society Series B (Methodology) Journal of the Royal Statistical Society Series C (Applied Statistics)
COMMUNICATION REQUIREMENTS:	Oral and written communication skills using academic / professional English.
SOFTWARE REQUIREMENTS:	MS Office and Blackboard CMS Any software distributed with the course textbook.
WWW RESOURCES:	HYPERLINK "http://www.wolframalpha.com"www.wolframalpha.com www.statsoft.com/textbook www.sosmath.com www.freestatistics.info www.mathacademy.com/
INDICATIVE CONTENT:	1. Probability 2. Discrete and Continuous random variables 3. Probability Distributions 4. Further topics in probability 5. General Principles for Statistical Inference 6. Sampling distributions 7. Confidence intervals and significance tests 8. Correlation and Regression