DEREE COLLEGE SYLLABUS FOR: MA 2240 CALCULUS II

US CREDITS: 3/1.5/4

(Effective Fall 2022)

PREREQUISITES:	MA 1008 College Algebra MA 2130 Calculus I **or** MA 2105 Applied Calculus
CATALOG DESCRIPTION:	This course is a continuation of Calculus I and provides a further study of integral calculus techniques for univariate functions with applications of the definite integral, including numerical integration, improper integrals, infinite series, parametric equations and curves in polar coordinates.
RATIONALE:	This mathematics module aims to introduce advanced integral calculus techniques for univariate functions that are necessary for calculus-based science and engineering courses. The knowledge gained in this course will provide students with important transferable skills required to use integral calculus in real-life applications.
LEARNING OUTCOMES:	Upon successful completion, the students should be able to: 1. Apply integration techniques to solve problems with applications in science and engineering. 2. Make use of numerical integration to approximate integrals and evaluate improper integrals. 3. Demonstrate understanding of infinite series and use power series to represent functions and approximate integrals. 4. Demonstrate understanding of the concepts of parametric curves and polar coordinates and use them in various applications.
METHOD OF TEACHING AND LEARNING:	In congruence with the teaching and learning strategy of the college, the following tools are used: ➢ Classes will consist of lectures where the concepts of the course will be introduced. Coursework will be regularly assigned and discussed in class with students actively participating in the discussion. Computer software will be available both as a teaching aid and as the medium for solving problems. ➢ Office hours: students are encouraged to make full use of the office hours of their instructor, where they can ask questions, see their exam paper, and/or go over lecture material. ➢ Use of a blackboard site, where instructors post lecture notes, assignment instructions, timely announcements, as well as additional resources.
ASSESSMENT:	**Summative:** First Assessment: Midterm Examination — **40%** — Solving calculus exercises and word-problems, interpretation of results Second Assessment: Portfolio — **10%** — Solving calculus problems using software, interpretation of results Final Assessment: Final Examination — **50%** — Solving calculus exercises and word-problems, interpretation of results **Formative:** Online exercises and word problems assigned through Blackboard. — **0%** — Solving calculus exercises and word-problems, interpretation of results ▪ The first assessment (midterm exam) tests Learning Outcomes 1 and 2. ▪ The second assessment (portfolio) tests Learning Outcomes 1, 2, 3, and 4. ▪ The final assessment (final exam) 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. Students are not required to resit failed assessments in this module. Failure to pass the module results in module repeat.

INDICATIVE READING:	**REQUIRED READING:** Ron Larson, Bruce Edwards, *Calculus: Early Transcendental Functions,* Cengage, © 2019, 7th Edition (International Metric Edition, WebAssign e-book) **RECOMMENDED READING:** • Robert Smith, Roland Minton, *Calculus*, McGraw Hill, © 2011, 4th Edition. • Sophie Goldie, Roger Porkess, *Pure Mathematics 2 and 3*, Cambridge International AS and A Level Mathematics-Hodder Education ©2012
INDICATIVE MATERIAL:	**REQUIRED MATERIAL:** N/A **RECOMMENDED MATERIAL:** • College Mathematics • Mathematics Magazine • American Mathematical Monthly
COMMUNICATION REQUIREMENTS:	Oral and written communication skills using academic / professional English.
SOFTWARE REQUIREMENTS:	Any software distributed with the course textbook. Opensource math software *Scilab* (www.scilab.org)
WWW RESOURCES:	http://mathworld.wolfram.com http://sosmath.com https://www.khanacademy.org/math https://www.symbolab.com
INDICATIVE CONTENT:	**1. Integration Techniques** 1.1 Basic integration rules 1.2 Integration by parts 1.3 Trigonometric substitution 1.4 Integration of rational functions using partial fractions 1.5 Numerical integration 1.6 Improper integrals **2. Applications of Integration** 2.1 Growth and decay models 2.2 Volumes: The disk and washer methods 2.3 Volumes by cylindrical shells 2.4 Arc length 2.5 Area of a surface of revolution **3. Infinite Series** 3.1 Convergent and divergent series 3.2 The integral test for convergence 3.3 Power series - Taylor and Maclaurin series **4. Parametric Equations and Polar Graphs** 4.1 Plane curves and parametric equations 4.2 Parametric equations and calculus 4.3 Polar coordinates and graphs 4.4 Area and arc length in polar coordinates