COURSE OUTLINE

Unit Code: RCS 103 **Unit Title:** CALCULUS **Credit Hours:** THREE

Academic Year: 2022/2023 **Trimester:** One

Class Hours & Room No.: Thursday 8.00-11.00 A.M **Lecturer:** Dr. KARANJAH A.N

Hours of Consultation: Thursday 11.00 AM-1.00 P.M **E-mail:** tkaranjah@riarauniversity.ac.ke

Prerequisite: NIL

Course Purpose

The aim of the course is to develop basic knowledge of calculus and ability to apply this knowledge in real-life applications.

Course Content

Limits and Continuity; Differentiation: Derivatives of elementary functions. Sums, products, quotients and composite functions. Maxima, minima, points of inflexion., Application of derivatives ; Integration : Indefinite and definite integration of simple algebraic, trigonometric, log and exponential functions; Substitution techniques; Area under curve and volume of rotation; Numerical integration; Simpson‟s rule; Applications of Integration;

Class schedule	Contents/Topics	Reading Texts
Week 1	**Preparation for Calculus** • Numbers and real line , Counting, Natural, Integers, Real numbers, Rational Numbers • Intervals • Inequalities and Equations Absolute Value • Cartesian Coordinates and axis	. Robert, A. Adams (2007). Calculus: A Complete Course, 6th ed. Prentice Hall, 2007. ISBN-10: 0321270002. ISBN-13: 9780321270009
Week 2	**Preparation for Calculus** • Increament and distance • Straight Lines and their Equations • Functions and their graphs • Combining Functions	. Robert, A. Adams (2007). Calculus: A Complete Course, 6th ed. Prentice Hall, 2007. ISBN-10: 0321270002. ISBN-13: 9780321270009 Page 50-58
Week 3	**Limits and Continuity**	Robert, A. Adams (2007). Calculus: A

	• Growth rate • Limits of functions • Continuity	Complete Course, 6th ed. Prentice Hall, 2007. ISBN-10: 0321270002. ISBN-13: 9780321270009 Page 59-62
Week 4	**Differentiation** • Derivatives of elementary functions using limits approach • Sums • Products, • Quotients	Robert, A. Adams (2007). Calculus: A Complete Course, 6th ed. Prentice Hall, 2007. ISBN-10: 0321270002. ISBN-13: 9780321270009 Page 63-112
Week 5	CAT / Assignment	Course evaluation feed back given to the lecturer
Week 6	**Differentiation** • Composite functions • Chain Rule • Natural logarithms • Trigonometric functions	Robert, A. Adams (2007). Calculus: A Complete Course, 6th ed. Prentice Hall, 2007. ISBN-10: 0321270002. ISBN-13: 9780321270009 Page 115-118/169-180
Week 7	**Differentiation** • Maxima, • minima, • points of inflexion., • Application of derivatives	Robert, A. Adams (2007). Calculus: A Complete Course, 6th ed. Prentice Hall, 2007. ISBN-10: 0321270002. ISBN-13: 9780321270009 Page 232-236/182-187
Week 8	CAT / Assignment/exercises	Course evaluation feed back given to the lecturer
Week 9	**Integration** : • Integration as reverse of derivatives • Indefinite and definite integration of simple algebraic	Robert, A. Adams (2007). Calculus: A Complete Course, 6th ed. Prentice Hall, 2007. ISBN-10: 0321270002. ISBN-13: 9780321270009 Page 288-309
Week 10	**Integration** : • log and • exponential functions; • integration by parts	Robert, A. Adams (2007). Calculus: A Complete Course, 6th ed. Prentice Hall, 2007. ISBN-10: 0321270002. ISBN-13: 9780321270009 Page 331-351
Week 11	**Integration** : • Substitution techniques • Area under curve and volume of rotation	Robert, A. Adams (2007). Calculus: A Complete Course, 6th ed. Prentice Hall, 2007. ISBN-10: 0321270002. ISBN-13: 9780321270009 Page 390-430
Week 12	**Integration** • Numerical integration; • Simpson‟s rule; • Applications of Integration;	Robert, A. Adams (2007). Calculus: A Complete Course, 6th ed. Prentice Hall, 2007. ISBN-10: 0321270002. ISBN-13: 9780321270009 Page 375-379

Week 13	CAT / Assignment/exercises	Course evaluation feed back given to the lecturer
Week 14	Final Examination	

Main Text Books

1. Robert, A. Adams (2007). Calculus: A Complete Course, 6th ed. Prentice Hall, 2007. ISBN-10: 0321270002. ISBN-13: 9780321270009.

2. James, Stewart (2007). Essential Calculus, Thompson – Brooks Cole: ISBN 0 – 495-01442-7.

Further Reading

1. Adams, Robert A. & Essex, Christopher (2009). The learner Solutions Manual for Calculus: a Complete Course. Addison-Wesley.

2. Goldstein, L. J., Lay, D. C. & Schneider, D. I. (2006). Brief Calculus and Its Applications. 9th ed. Upper Saddle River; Prentice Hall.

3. Robert, C. Wrede & Murray Spiegel; Schaum's Outline of Advanced Calculus, 2nd ed :(Paperback - February 20, 2002).

Teaching Resources

 LCD; White Board

Course Assessment

Students registered for the unit are required to complete all CATs which will comprise 30% (15% CAT 1 and 15% CAT 2) of the final grade and the final end of trimester examination will comprise 70%. If a student failed to do the CAT or the final exam, the result is reported as “I” (incomplete).