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RESOURCES (UENR)

OF ESERGY AND NATURAL

MATHEMATICS 1 / CALCULUS 1

FOR

ENGZVEERING . COMPUTER SCIENCE AND CHEMISTRY STUDENTS

BY

K- Donkoh(Ph.D) AND Dominic Otoo (Ph.D)

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MATH 109: Engineering Mathematics I (3 Credits)

Objective

This course will introduce students to the fundamentals of mathematics and lay solid foundation on the principles necessary for solving engineering problems.

Content

Algebra I: The set R of real numbers, Relation of order in R. Principle of Mathematical Induction. Complex numbers.

Analysis Il: Notion of functions, limit of functions and continuity; Odd, Even and Periodic Functions, Hyperbolic functions and their graphs. Differentiation of functions: Rolle's Theorem and the mean-value theorems, Chain rule, Implicit differentiation. Series

representation of functions, Taylor's Theorem, Application for differentiation, Indetermi-

nate forms. R.e.peat,ed differentiation. Partial and Total differentiat.ion: Functions of several variables, continuity and partial derivatives. Total differentials, approximate calculations using differentials. Extremum problems, without and with constraints, Lagrange

multipliers, global extremum.

Vector Analysis: Rectangular coordinates in space, vector in space, the dot product, the cross product and triple products. Vector differentiation: Ordinary derivatives, Differential of vectors, The vector differential operator: del. Gradient, Divergence, Curl.

Mode of Delivery

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Lectures, tutorials, seminars, group work and assignments.

Reading Material

- Calculus by James Stewart, January 1, 2011 — ISBN-10•. 0538497815 — ISBN-13: 978-0538497817 — Edition: 7

- Calculus by Ron Larson, Robert P. Hostetler and Bruce H. Edwards. January 11, 2005 — ISBN-10: 061850298X — ISBN-13: 978-0618502981 Edition: 8

Otoo D. and Donkoh E. K. (2016). Course Material for Engineering Maths and Calculus

• Swokoski, E. W. (1983).Ca1cu1us with Analytic pws