PABLO

MATH 109: Engineering Maths I / Calculus 1 (3 Credits)

Pre-requisite: Elective Mathematics

Objective: To build the students understanding in mathematical concepts used in modeling engineering problems such as heat flow medium, transmission of sound etc.

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 II: 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, Indeterminate forms. Repeated differentiation. Partial & Total differentiation: 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.

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

- Donkoh E. K. (2022). Course Material for Engineering Maths and Calculus

- Swokoski, E. W. (1983).Calculus with Analytic Geometry/ISBN:0-87150-341-7. PWS Publishers/Alternate Edition

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