ME 555 LIST OF CONCEPTS - 1

Terms in *italics* were not explicitly used in class lectures but are discussed in the text.

MODELING (Chapters 1, 2)
Configuration vs. proportional design
Objective
Constraints
Negative null form
Set Constraint
Design variables, parameters, constants
Finite-dimensional vs. infinite dimensional variables
Continuous vs. discrete variables
Feasible domain
Design vs. analysis models
Vector (multicriteria) optimization
Pareto optimum
Optimality
Local vs. global optima
Parametric study
Hierachical levels
Decomposition
Activity
Well boundedness
Monotonicity
Interior vs. boundary optima
Constraint-bound optima
Degrees of freedom
Model validity constraints
Variable transformation
Model transformation
Intermediate variables
Model repair
Surrogate models
Metamodels
Curve fitting
Families of curves
Least squares
Neural net
Kriging
QFD

MONOTONICITY ANALYSIS (Ch.3, 6, and notes)
Model reduction
Variable elimination
Monotonicity: coordinatewise
Monotonic variable
Monotonicity principles
Monotonicity table
Optimality rules
Relevant variable
Redundant constraint
Conditional activity
Dominance
Activity map
Regional monotonicity
Parametric models
Case decomposition
Directing equalities
Partial minimization
Activity theorem
Conditional criticality
Multiple criticality
Relaxation
Uncriticality

INTERIOR OPTIMA (Ch. 4)
Necessary conditions
Sufficient conditions
Weierstrass Theorem
Compact set
Gradient
Hessian
Taylor Series
Linear Approximation
Quadratic Approximation
Remainder -negligible term
Positive-definite matrix
Positive-semidefinite matrix
Indefinite matrix
Convex set
Convex function
Gradient method
Newton's method
Line search
Stabilization of Newton's method
Cholesky factorization