

**5 MOST IMPORTANT POINTS:****Exam 1 covered: #1 Synthesis of Alternatives**== methods for **Creating Ideas****Decompose** a problem into smaller pieces Exploration of many options**Functional analysis** - identify basic functions required to accomplish overall objective**Screen Ideas** Safety & Environmental implication on \$'s and decisions**Codes & Regulations** - lots of Building Codes, Health & Safety rules, Environmental**#2 COST ESTIMATING == Cost Indexes, Size & Weight Scaling**

Capital Investment methods = Turnover Ratio, Functional Units, Size Scaling,

% Purchased Equipment + Lang Factors or Variable Factors, Vendor Quote

Manufacturing Operating Costs = Variable, Fixed, General Expenses

**Exam 2 covered: #3 TIME VALUE of MONEY & PROFITABILITY***Cost Accounting* == Balance Sheet, Income Statement, Inventory Valuation Methods**Time Value of Money** == the value of money changes with time

Compound interest, Present Worth &amp; Discounting, Annuities, Capitalized Cost

**Taxes** == Property, Income, Payroll, Sales; **Insurance****Depreciation** == accounting for the decay in value of assets, Book value

Capital recovery, Estimating future market value, Income tax law; \$ Basis, Life, Method

6 methods = Straight Line, Declining Balance, Sum-of-Years Digits

Sinking Fund, Unit-of-Production (or depletion), Tax Law **MACRS****#4 PROFITABILITY CRITERIA == Total \$'s, Annual Rate, Time**

Cumulative Profit = Net Present Worth, Venture Worth, Capitalized Cost

Rate of Return = average Return on Investment (ROI) = \$/yr / \$ invested

= Discounted Cash Flow Return (IRR) = life cycle time value  $i$ 

Payout Time = time to recover investment - before or after taxes; \$ time value

also Incremental Investment; Replacement Analysis

**Exam 3 covered: #5 OPTIMIZATION****What to Optimize?** == Maximum Profit, Venture Worth, ROI, Minimum Cost, etc.  
Significant Independent Variables?**Way to Measure Response?** == Derive response function or experimental method**How? - Optimization Technique**1<sup>st</sup> Derivatives = 0 == Partial Derivatives & Simultaneous solution

Golden Section Search == one variable Region Elimination

== multi-variable = interactions between variables

Evolutionary Operations EVOP == statistical noise

**Evaluate Result!**

Assumptions Valid? + Unimodal or Multi-Modal? + Local or Overall?

Sensitive? + Incremental Investment? + Reasonable?

+ Practical Recommendations?