## Approval: 4th Senate Meeting

**Course Name** : Theory and Methods of Policy Analysis
**Course Number** : HS-563
**Credits** 3-0-0-3
**Prerequisites** : IC 210: Probability, Statistics and Random Processes; or, after instructor's approval.
**Intended for** : 3rd, 4th year B. Tech.; M.S., Ph.D.
**Distribution** : Elective for all B. Tech. students
**Semester** : Odd, Even

**Preamble:** This course is the second course in the series of public-policy courses, the first being HS 301 Policy Analysis and Advocacy Skills. The focus of HS 301 is on learning skills that help one to effectively communicate policy alternatives; however, the focus of HS 563 is on learning the theory, methods, and tools of policy analysis that allows one to do effective policy analysis and generate policy alternatives. Thus, this course teaches fundamental topics in policy analysis to students and complements the communication aspects of policy analysis that are covered in HS 301. This course also forms one of the courses in the basket for the minor in Public Management.

**Course Outline:** The objective of this course is to introduce students from various backgrounds to the theory and methods used in policy analysis. Students will study the theory behind policy analysis and understand why conducting policy analysis is important. In addition, students will also study certain tools and techniques that are commonly used in policy analysis. As real-world policy problems have lots of uncertainty, the integration of uncertainty into formal methods is a fundamental component of this course.

**Modules:**

Module 1: Introduction to Policy Analysis: (6 hours)
Policy research and analysis; policy analysis versus natural science; goals versus analysis; philosophical frameworks for analysis; motivations for taking policy analysis.

Module 2: Discounting and CBA: (8 hours)
Discounting; real/nominal discount rates; social discount rate; borrowing, leasing, depreciation, and taxes; cost-benefit analysis.

Module 3: Decision Analysis and Uncertainty: (8 hours)
Elements of policy (decision) problems; decisions, outcomes, and values; time value of money; nature and sources of uncertainty; structuring decisions: decision trees; risk profile and using decision trees to make choices; sensitivity analysis; multi-attribute decisions.

Module 4: Modeling Uncertainty: (8 hours)

Probability basics; subjective probability and biases; probability models (binomial, poisson, exponential, normal, and beta distributions); using data to construct distributions; Monte Carlo estimation.

Module 5: Modeling Preferences (6 hours)
Evaluating risk attitudes; cost-effectiveness; risk analysis; and, value of life analysis.

Module 6: Conflicting Objective, Utility Axioms, Paradoxes, and Policy Implications: (6 hours)
Axioms for expected utility; paradoxes; conflicting objectives analyses; implications for policy analysis

**Textbooks:**

1. Clemen: "Making Hard Decisions", Clemen and Reilly, Duxbury/Thomson, ISBN 0534365973.
2. Morgan, Henrion, and Small: “Uncertainty: A Guide to Dealing with Uncertainty in Quantitative Risk and Policy Analysis”, Cambridge University Press, ISBN: 0521427444

**References:**

1. Sepulveda et al: "Schaum's Outlines of Engineering Economics", McGraw-Hill, ISBN 0070238340 (paperback). Note this is a "study guide" type book on the subject of engineering economics.
2. Campbell: "Benefit-Cost Analysis", Campbell and Brown, Cambridge University Press, ISBN 0521528984
3. Boardman, Greenberg, and Vining:“ Cost Benefit Analysis: Concepts and Practice”, Prentice Hall; 3rd edition, ISBN: 0131435833