



National Institute of Technology Meghalaya

An Institute of National Importance

CURRICULUM

Programme	Doctor of Philosophy (Ph.D.)	Year of Regulation	2019-20						
Department	Humanities and Social Sciences (HS)	Semester	I/II						
Course Code	Course Name	Credit Structure				Marks Distribution			
		L	T	P	C	INT	MID	END	Total
HS 505	Quantitative Techniques and Operations Research	3	0	0	3	50	50	100	200
Course Objectives	To understand the measures of central tendency and probability distribution.	Course Outcomes	CO1	Ability to understand different measures of central tendency and to understand probability distribution.					
	To understand the fundamentals of Operations Research.		CO2	Ability to apply different operational research tools.					
	To understand the decision making using uncertainty and multi-criteria decision making models.		CO3	Ability to apply different multi-criteria decision making models.					
SYLLABUS									
No.	Content					Hours	COs		
I	Introduction: An Analytical Scientific Approach to Problem Solving, Quantitative Analysis, Operational Research Models & Modeling Process for Managerial Decision Making					06	CO1 CO2 CO3		
II	Statistics for Management: Measures of Central Tendency & Dispersion, Probability Concepts, Bayes Theorem & Applications, Probability Distributions- Binomial, Poisson, Normal & Exponential, Sampling & Sampling, Distributions, Testing of Hypothesis, Correlation, Regression & Multivariate Analysis, Forecasting Methods & Time Series Analysis, Stochastic Process					10	CO1		
III	Decision Analysis: Decision Trees & Utility Theory, Decision Making under Uncertainty, under Risk, under Certainty & under Conflict. Game Theory, Linear Programming - Graphical, Simplex Method, Dual Simplex, Sensitivity Analysis & Duality, Integer Programming, Transportation, Transshipment & Assignment Models					10	CO3		
IV	Multi-criteria Decision Making: Linear Goal Programming, Scoring Models, Fuzzy outranking, Introduction to Concepts of AHP (Analytic Hierarchy Process) & ANP (Analytic Network Process), Inventory Models (Static, Dynamic, Probabilistic & Stochastic), Waiting Line/Queueing Models Steady State Operation (M/M/1), Simulation Concepts & Applications for Inventory & Q-ing Situations, Network Models; Shortest Route, Maximal Flow Problem, PERT, CPM, Glimpses of Metaheuristics (Tabu, Simulated Annealing & Genetic algorithm), Markov Chains & Decision Processes, Sequencing, Dynamic Programming & Nonlinear Programming (Quadratic & Geometric Programming), Case Studies & Applications					10	CO3		
Total Hours						36			
Essential Readings									
1. Charles A. Gallagher and Hugh. J. Watson, "Quantitative Methods for Business Decisions", McGraw Hill international Book Company, 1985.									
2. M. P. Gupta and R. B. Khanna, "Quantitative Techniques for Decision Making", Prentice Hall of India, 2004.									
3. P. Rama Murthy, "Operations Research", New Age International Publishers, 2007.									
Supplementary Readings									
1. George E. Monahan, "Management Decisions Making", Cambridge University Press, 2000.									
2. C. K. Mustafi, "Operations Research Methods and Practice", New Age International Publishers, 2004.									
3. C. R. Kothari, "An Introduction to Operational Research", Vikas Publishing House, 1992.									
4. D. John Rodney and Bernard R. Siskin, "Quantitative Techniques for Business Decisions", Prentice Hall of India, 1977.									
5. MIK Wisniewski, "Quantitative Methods for Decision Makers", Macmillan India Ltd., 2004.									
6. Hamdy A Taha, "Operations Research: An Introduction", Prentice Hall of India, 2006.									
7. G. Hadley, "Linear Programming", Addison Wesley Publication Company, 1972.									