

Course Code	Course Title	L	T	P	C
BAMGT223	Advanced Decision Analytics and Forecasting Techniques	2	0	2	3
Pre-requisite	NIL	Syllabus Version			
		1			
Course Objectives					
Introduce students to advanced multi-criteria and multi-attribute decision-making (MCDM/MADM) frameworks, including fuzzy and group decision models. Equip learners with analytical and modelling competencies in time series forecasting, emphasizing ACF/PACF interpretation and Excel-based applications. Facilitate the application of integrated decision-making and forecasting approaches in managerial and strategic contexts					
Course Outcomes					
Explain the concepts and applications of MCDM and MADM techniques. Analyze multi-criteria decision-making techniques to decision problems. Analyze multi-attribute decision-making methods for evaluation and selection. Analyze forecating using time series techniques Evaluate advanced forecasting models (machine learning) for strategic decision-making.					
Module:1	Introduction to Advanced MCDM and MADM	5 hours			
Overview of decision analyticsâ€™classification of methodsâ€™introduction to MCDM and MADMâ€™quantitative vs. qualitative criteriaâ€™developing alternatives and criteria matrixâ€™brief on applications.					
Module:2	Multi Criteria Decision Making Techniques	6 hours			
Concept and steps of DEMATEL for modeling causal relationshipsâ€™Fuzzy DEMATEL theory and implementation for uncertaintyâ€™WINGS method for interdependence and influence among criteriaâ€™Fuzzy WINGS extension and computational toolsâ€™GINA method: foundational principles, advantages, and practical example.					
Module:3	Multi Attribute Decision Making Techniques	6 hours			

Classical TOPSIS and its assumptionsâ€”Extending TOPSIS to the fuzzy environmentâ€”Best-Worst Method (BWM): steps, pairwise comparison, consistency checking, â€”Comparative study with real-world cases.		
Module:4	Forecasting Foundations and Time Series Analysis	5 hours
Fundamentals of forecastingâ€”time series componentsâ€”auto-correlationâ€”partial auto-correlation functions (ACF/PACF) â€”moving averagesâ€”exponential smoothingâ€”ARIMA.		
Module:5	Advanced Forecasting	6 hours
Machine learning-based forecasting methods-regression trees- random forests-support vector regression â€”scenario-based forecastingâ€”model validationâ€”MAE-MSE-RMSE-MAPE		
Module:6	Contemporary Issues	2 hours
Recent Trends; Guest lecture by Industry Experts		
Total Lecture Hours:		30 hours
Text Book(s)		
Nguyen, V. T., Nguyen, N. V., & Truong, V. C. , " Multi-Criteria Decision-Making and Optimum Design with Machine Learning: A Practical Guide ", Routledge, 1 st Edition, 2024 Hyndman, R.J., & Athanasopoulos, G., " Forecasting: principles and practice ", OTexts, 3 rd Edition, 2021		
Reference Books		
Chakraborty, S., Chatterjee, P., & Das, P. P. , " Multi-Criteria Decision-Making Methods in Manufacturing and Service Environments ", Taylor and Francis, 1 st Edition, 2023 James, G., Witten, D., Hastie, T., & Tibshirani, R. , " An Introduction to Statistical Learning: with Applications in R ", Springer, 2 nd Edition, 2021		
Indicative Experiments		
1. DEMATEL and Fuzzy DEMATEL application in Excel/Python/R		5 hours
2. WINGS and Fuzzy WINGS for criteria impact modeling in Excel/Python/R		5 hours
3. TOPSIS (crisp and fuzzy) implementation and comparison in Excel/Python/R		5 hours

4. Single/Double/Triple exponential smoothing in Excel	5 hours
5. ARIMA in Excel	5 hours
6. Regression using Excel/R	5 hours
Total Laboratory Hours:	30 hours
Text Book(s)	
Nguyen, V. T., Nguyen, N. V., & Truong, V. C., "Multi-Criteria Decision-Making and Optimum Design with Machine Learning: A Practical Guide", Routledge, 1st Edition, 2024 Hyndman, R.J., & Athanasopoulos, G., "Forecasting: principles and practice", OTexts, 3rd Edition, 2021	
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Mode of Evaluation: Continuous Assessment Test, Quiz, Final Assessment Test, Lab Continuous Assessment, Lab Final Assessment, Seminar, Course Project	
Recommended by Board of Studies :	26-09-2025
Approved by Academic Council : No. 80	20-11-2025