



PONTIFICAL CATHOLIC UNIVERSITY OF RIO DE JANEIRO
CENTER OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF INDUSTRIAL ENGINEERING

IND2628 PROCESS ANALYSIS AND SIMULATION

TOTAL HOURS: 45 HOURS

CREDITS: 3 – CRITERIA: 12

REQUIREMENTS(S): None

GOALS	To offer theoretical and practical resources for the simulation and analysis of processes, with and without temporal dependence.
SYLLABUS	Linear Regression. Time Series. Introduction to Simulation. Data Modeling and Conceptual Model Design. Discrete-Event Simulation. Monte Carlo Simulation. Nonparametric Techniques. Model Analysis. Time Series Simulation. Queueing Theory Review. Design of Experiments in Simulation.
PROGRAM	Hypothesis Testing and Probability Distributions Review. Goodness-of-Fit Tests. Linear Regression: modeling and analysis practice. Time Series: overview of Stochastic Processes, Smoothing Method and Dynamic Regression, analysis and practical modeling. Introduction to Simulation. Models, applications, and methodologies. Input Data Modeling. Conceptual Model Building. Monte Carlo Simulation. Random Number Generation. Methods to generate Discrete and Continuous Random Variables. Nonparametric Techniques: Jackknife and Bootstrap. Statistical Analysis of Results. Time Series Simulation Modeling and Applications. Scenario Generation. Queueing Theory Review. Design of Experiments in Simulation. Computational Applications.
BIBLIOGRAPHY	Law, A. M. Simulation Modeling and Analysis. 6 ^a ed. McGraw-Hill Companies, 2024. Ross, S. M. Simulation. 6th Edition. Academic Press, 2022. Hyndman, R. J., Athanasopoulos, G. Forecasting: Principles and Practice. 3 ^a ed. OTexts, 2021.
ADDITIONAL REFERENCES	James, G.; Witten, D; Hastie, T.; Tibshirani, R. An Introduction to Statistical Learning. New York: Springer, 2021. Rossetti, M. D. Simulation modeling and Arena. John Wiley & Sons, 2015. Banks, J.; Nicol D.; Carson J.; Nelson B. Discrete-Event System Simulation. 5 ^a ed. Pearson. 2013. Robert, C.P.; Casella G. Introducing Monte Carlo methods with R. New York: Springer, 2010. Winston, W. L. Operations Research: Applications and Algorithms. 4 rd Edition. Belmont, Calif.: Duxbury Press, 2004.