



Ivey Business School

Coursework description

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Business Statistics

Program:

- Understanding, measuring and working with uncertainty
- Probability fundamentals
- Statistical inference
- Hypothesis testing
- Statistical modelling
- Data driven decision making
- Regression
- Statistics with R
- Combined applications

Causal Inference

Program:

- Causality
 - Describing causal relationships
 - Structural equation models
 - Potential outcomes causal model
 - Directed Acyclic Graphs - DAG
 - Causal identification
 - Average treatment effects
 - Estimators, estimands, and identification
 - Selection bias and heterogenous treatment effect bias
 - Confounders
 - Experiments
 - Experiments and randomized treatment
 - Monte Carlo methods and uncertainty
 - Quantifying uncertainty
 - Adjustments
 - Matching
 - Weighting
 - Regression
 - Regression for causal inference
 - Fixed effects
 - Propensity scores
 - Backdoor criterion
 - Good and bad controls
 - Natural experiments
 - Instrumental variables
 - Regression discontinuity designs
 - Difference-in-Difference
 - Panel Data
 - DD Designs
 - Simple 2-period DD
 - Dynamic DD and event plots
 - Staggered treatment
 - Double machine learning
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Big Data Analytics

Program:

- Predictive modelling - Supervised Learning
 - Statistical classification models
 - Logistic regression
 - Neural networks
 - Naïve bayes classifier
 - Regression models
 - Generalized linear model
 - Neural networks
 - Decision Trees
 - Random forest
- Predictive modelling - Unsupervised Learning
 - Clustering models
 - K-Means clustering
 - K-Nearest-Neighbours clustering
 - Hierarchical cluster analysis
- Survival analysis
 - Life tables
 - Kaplan–Meier curves
 - Survival function
 - Hazard function
 - Cox proportional hazards regression
 - Parametric survival models
 - Exponential distribution
 - Weibull distribution
 - Gamma distribution

Art of Modelling

Program:

- Decision Analysis fundamentals
 - Decision trees
 - Information cost
 - Influence diagram
 - Analyzing sequential decisions
 - Data-driven decision making
 - Decision making under uncertainty
 - Simulation fundamentals
 - Modelling fundamentals
 - Model building
 - Spreadsheet modelling
 - Optimization fundamentals
 - Simultaneous decision problems
 - Linear programming formulation
 - Sensitivity analysis
 - Combined applications
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Data Management

Program:

- Design high fidelity graphical data models
- Linear applications and matrix representation
- Convert data models into practical database structures
- Relational database software tools such as MySQL and phpMyAdmin
- Query structured relational databases using SQL and BI tools
- Explore unstructured “big data” datasets,
- Frameworks, concepts and tools such as Hadoop, NoSQL, MongoDB, Tableau and Python

Prescriptive Analytics

Program:

- Theory of optimization
- Model decision problems
- Mathematical formulation
- Linear Programming
 - Graphical and numerical solving
 - SIMPLEX matrix notation
 - Sensitivity analysis
- Integer Linear Programming
 - Branch and bound
- Implementation of optimization models using Python to call CPLEX Solver
- Managerial insights

Simulation and Risk Analysis

Program:

- Discrete simulation
- Continuous simulation
- Systems modelling
- Statistical input data analysis
- Output sensitivity analysis
- Queuing theory
- Time series
- Markov chain

Programming

Program:

- Programming skills related Coursera certificates
 - University of Michigan - Introduction to Data Science with Python
 - University of California, Davis - SQL for Data Science

Pricing and Revenue Analytics

Program:

- Introduction to revenue management
- Demand forecasting
- Capacity allocation & Overbooking
- Customer choice modeling
- Price optimization and markdown pricing
 - Dynamic pricing with constrained supply
 - Peak load pricing
 - Personalized promotions
 - Personalized pricing

Global Corporate Finance

Program:

- Investment decisions
 - Net present value
 - Internal rate of return
 - Terminal value
- Weighted average cost of capital
 - Capital structure and cost of debt
 - Cost of equity and other claims
 - Capital asset pricing model
- Modigliani-Miller
 - Optimal capital structure
 - Cost of equity and equity betas
- Corporate valuation
 - Discounted cash flow analysis
 - Comparables analysis
 - Adjusted present value
 - Past acquisitions
 - Raising equity