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Stuart School of Business
ILLINOIS INSTITUTE OF TECHNOLOGY

GREAT LAKES
INSTITUTE OF MANAGEMENT

Post-Graduate Program in

Business Analytics & Business Intelligence

(PGP-BABI)

Course Curriculum

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What's In Here?

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PROGRAM OVERVIEW

Great Lakes PG Program in Business Analytics & Business Intelligence is a **12-month program** that builds candidates' analytical and management capabilities through a structured learning framework, hence preparing them for business and functional roles in the analytics industry.

PGP-BABI uses a **combination of learning methods** that include classroom teaching, self-learning through videos and reading materials, team-based problem solving, and sessions with industry experts. **Classes are conducted on weekends** and assisted by online webinars, discussions, and assignments. Candidates can access the course content online even after they have graduated. The **capstone project** is a mandatory application-oriented industry project undertaken by all candidates to develop the acumen to solve real-life business problems in collaboration with their mentors. **Industry experts** and **Great Lakes faculty** mentor you through the entire duration of the capstone project.

The program has about **240 hours of classroom sessions** and **200 hours of online learning** including capstone project delivered by Great Lakes faculty and industry professionals from the field of analytics. This ensures a remarkable learning experience for the candidates combining academically-elegant and industry-relevant coursework.

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LEARNING JOURNEY

Business Foundation

- Statistical Foundations
- Business Context (What-How-Why)
- Getting Started with R

Analytics – Deep Dive

- Analytics
- Predictive Modeling
- Machine Learning Techniques

Industry Application Modules

- Industry-Led Domains + Capstone Project
- Financial Risk Analytics
- Marketing Analytics
- Supply Chain Analytics
- Web & Social Media Analytics

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DETAILED CURRICULUM

Modules:

Foundations

- Introduction to Analytics
- Statistical Methods for Decision Making
- Business Finance
- Marketing and CRM

Analytics Techniques

- Advance Statistics
- Data Mining
- Predictive Modeling
- Time Series Forecasting
- Machine Learning
- Optimization Techniques

Domain Exposure

- Market and Retail Analytics
- Web and Social Media Analytics
- Finance and Risk Analytics
- Suppy Chain and Logistics Analytics

Visualization and Insights

- Data Visualization Using Tableau

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MODULE: FOUNDATIONS

Course: Introduction to Analytics

- **Introduction to Business Analytics**
- **R for Data Science**
- **Introduction to R and R Studio**
  - Syntax
  - Basic Functions in R
  - R Packages
  - Getting Help
- **Dealing with Data Using R**
  - Initial Data Exploration
  - Data Frames
  - Sub Setting Data
  - Basic Statistical Analysis
- **Visualization Using R**
  - Introduction to ggplot2
- **R-Markdown**
- **Missing Value Treatment**
- **Exploratory Data Analysis Using R**

Course: Statistical Methods for Decision Making

- **Descriptive Statistics**
  - Data Collection, Presentation and Visuals
  - Measures of Central Tendency and Dispersion
  - Five Number Summary, Box Plots
  - Correlation
- **Introduction to Probability**
  - Probability Basics
    - Types of Probability
    - Mutually Exclusive Events, Independent Events
    - Marginal Probability
  - Conditional Probability
  - Bayes Theorem
    - Applications of Bayes Theorem in Real-Life Scenario
- **Probability Distributions**
  - Continuous Distributions
  - Normal Distributions and Its Applications
  - Central Limit Theorem
  - Case Study: Hands-On Using R
  - Discrete Distributions
  - Poisson's Distribution and Its Applications
  - Binomial Distribution and Its Applications
  - Case Study: Hands-On Using R
- **Hypothesis Testing and Estimation**
  - Basics of Hypothesis Testing
  - Null and Alternate Hypothesis
  - Test of Proportions
  - Test of Means
  - T- Testing: One Sample, Two Samples, Paired
  - Case Study: Hands-On Using R
  - Type 1 and Type 2 Errors
  - Applications of Hypothesis Testing
- **Goodness of Fit**
  - Goodness of Fit
  - Chi Square Test of Independence

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MODULE: FOUNDATIONS

Course: Business Finance

- **Fundamentals of Finance**
  - Finance as a Function
  - Financial Management Decisions
  - Financial Statement Analysis Using Financial Ratios
- **Working Capital Management**
  - Understanding the Concepts of Working Capital
  - Operating and Cash Operating Cycle of a Firm
  - Investment and Financing of Working Capital
- **Capital Budgeting**
  - Discounted Cash Flow
  - Time Value of Money
  - Net Present Value
  - Making Capital Investment Decision
- **Capital Structure**

Course: Marketing and CRM

- **Core Concepts of Marketing**
  - Segmentation, Targeting & Positioning
  - Marketing Mix
- **Customer Life Time Value**
  - Customer Relationship Management Framework
  - Consumer Behavior
  - Recency, Frequency & Monetary Analysis
  - Computation of CLTV
- **Marketing Metrics for CRM**

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MODULE: ANALYTICS TECHNIQUES

Course: Optimization Techniques

- **Linear Programming**
  - Problem Formulation
  - Applications
  - Case Study
- **Goal Programming**
  - Problem Formulation
  - Applications
- **Integer Programming**
  - Problem Formulation
  - Applications
  - Mixed Integer Programming
- **Non Linear Programming**

Course: Advanced Statistics

- **Analysis of Variance**
  - Basics of ANOVA
  - One Way ANOVA
  - Applications of ANOVA
  - ANOVA with Interaction Effects
    - Two Way ANOVA
  - Case Study: Hands-On Using R
- **Regression Analysis**
  - Simple Linear Regression
    - Ordinary Least Sum of Squares
    - Simple Linear Regression: Assumptions & Evaluation
  - Multiple Linear Regression
    - Assumptions & Evaluation
  - Multi-Collinearity
  - Case Study: Hands-On Using R
- **Dimension Reduction Techniques**
  - Requirement for Dimension Reduction
  - Principal Component Analysis
  - Factor Analysis
  - Case Study: Hands-On Using R

Course: Data Mining

- **Introduction to Supervised and Unsupervised Learning**
- **Clustering**
  - Formulating a Clustering Problem
  - Hierarchical Clustering
  - Building & Profiling Hierarchical Clusters: Hands-On Using R
  - K-Means Clustering
  - K-Means Clustering: Model Building Using R
- **Decision Trees**
  - Decision Trees
  - Classification and Regression Tree
  - Hands-On Using R
  - Model Performance Evaluation
    - Rank Ordering Computation
    - Concordance Computation
    - Gini Coefficient
    - Classification Error & Confusion Matrix

Random Forest

- Ensemble Modeling
- Random Forest Algorithm
- Building a Random Forest Model- Hands-On Using R
- Measuring Random Forest Model Performance Using R

Neural Networks

- Neural Networks & Its Application
- Building a Random Forest Model: Hands-On Using R
- Single & Multi- Layer Neural Network
- Back-Propagation and Gradient Descent

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MODULE: ANALYTICS TECHNIQUES

Course: Predictive Modeling

- **Multiple Linear Regression (MLR) for Predictive Analytics**
  - Problems and Resolutions
  - Step-Wise Regression
  - Dummy Regression
  - Case Study: Hands-On Using R
- **Logistic Regression**
  - Why Logistic Regression
  - Odds and Probabilities
  - Log Likelihood Ratio Test
  - Pseudo R Square
  - ROC Plot
  - Classification Table
  - Case Study: Hands-On Using R
- **Linear Discriminant Analysis**
  - Discriminant Function
  - Linear Discriminant Analysis
  - Case Study: Hands-On Using R

Course: Time Series Forecasting

- **Introduction to Time Series**
  - Examples
  - Time Series Objects in R
  - Trends and Seasonality Variation
  - Decomposition of Time Series
- **Correlation**
  - Autocorrelation
  - Partial Autocorrelation
  - Interpretation of ACF and PACF
- **Forecasting**
  - Exponential Smoothing
  - Holt Winters Method
- **Autoregressive Moving Average (ARMA) Models**
- **Autoregressive Integrated Moving Average (ARIMA) Models**
- **Case Studies**
  - Forecasting Case Studies in Different Domains

Course: Machine Learning

- **Handling Unstructured Data**
  - Image Data
  - Text Data
- **Machine Learning Algorithms**
  - Naïve Bayes
  - KNN
- **Bias Variance Trade-off**
  - Lasso vs Ridge Regression
- **Handling Unbalanced Data**
  - SMOTE
- **Boosting**
- **Model Validation**

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MODULE: DOMAIN EXPOSURE

Course: Marketing and Retail Analytics

- **Marketing and Retail Terminologies: Review**
- **Customer Analytics**
  - Customer Segmentation: RFM Analysis
  - Customer Segmentation: K Means Clustering
  - Customer Segmentation: Consumer Lifecycle Segmentation
  - Hands-On Session Using R
  - Customer Life Time Value Computation
- **KNIME**
  - Introduction to KNIME
  - Hands-On Session: Case Study
- **Retail Dashboards**
- **Customer Churn**
  - Customer Attrition Models
  - Hands-On Session Using KNIME
- **Association Rules Mining**
  - Market Mix Modeling
  - Market Basket Analysis
  - Hands-On Session Using R

Course: Web & Social Media Analytics

- **Web Analytics: Understanding the Metrics**
- **Basic & Advanced Web Metrics**
- **Google Analytics: Demo & Hands-On**
- **Campaign Analytics**
  - Social Media Analytics
- **Text Mining**
  - Frequency Analysis & Finding Associations
  - Topic Modelling
  - Hands-On Session Using R
  - Sentiment Analysis
  - Hands-On Session Using R

Course: Finance and Risk Analytics

- **Why Credit Risk-Using a Market Case Study**
- **Comparison of Credit Risk Models**
- **Overview of Probability of Default (PD) Modeling**
- **PD Models, Types of Models, Steps to Make a Good Model**
- **Market Risk**
- **Value at Risk: Using Stock Case Study**
- **Fraud Detection**

Course: Supply Chain and Logistics Analytics

- **Introduction to Supply Chain**
- **Dealing with Demand Uncertainty**
  - Bull-Whip Effect
- **Inventory Control & Management**
- **Inventory Classification Methods (EOQ)**
- **Inventory Modeling (Reorder Point, Safety Stock)**
- **Advanced Forecasting Methods**
- **Procurement Analytics**

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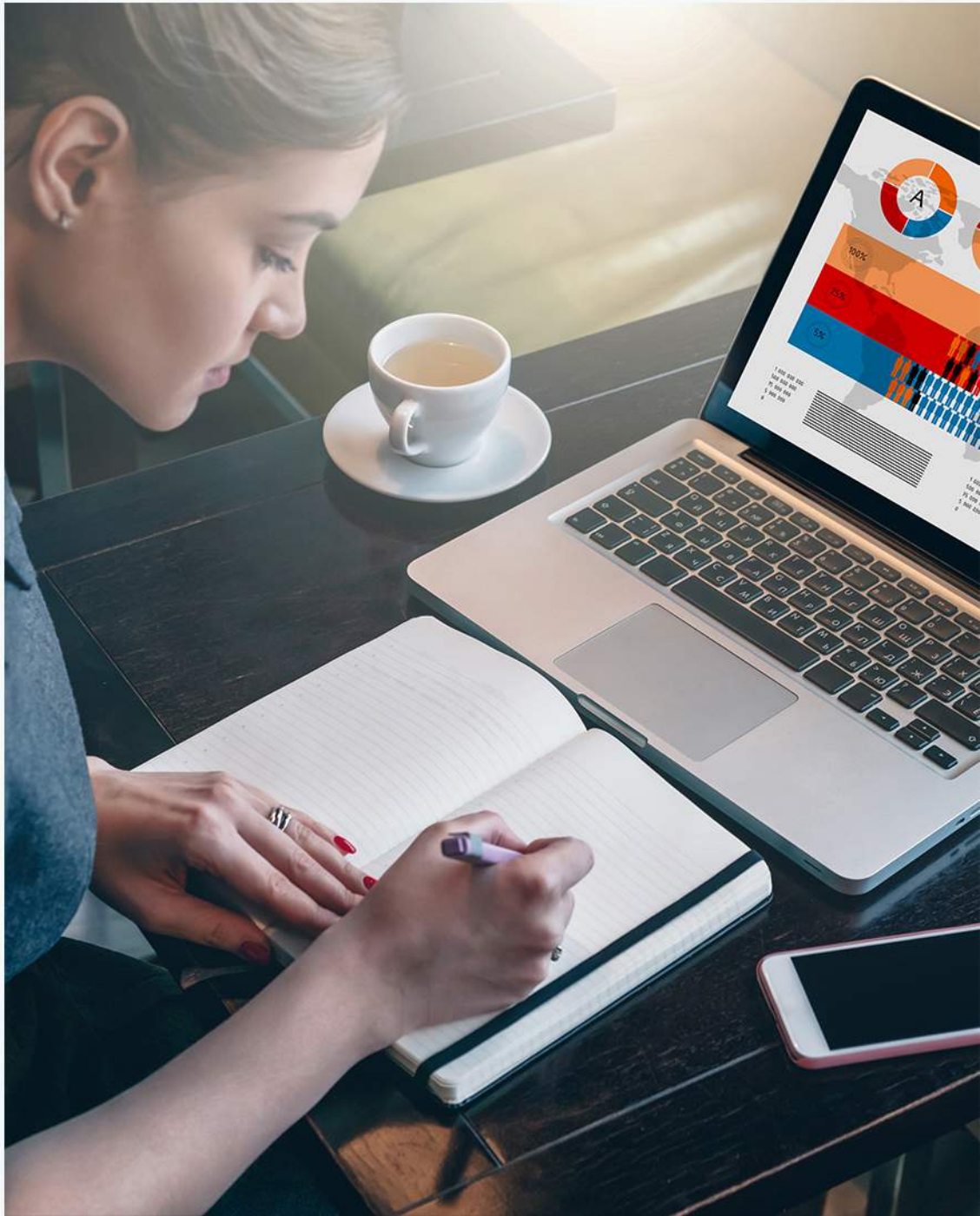
MODULE: VISUALIZATION AND INSIGHTS

Course:
Data Visualization using Tableau

- Introduction to Data Visualization
- Introduction to Tableau
- Basic Charts and Dashboard
- Descriptive Statistics, Dimensions and Measures
- Visual Analytics: Storytelling Through Data
- Dashboard Design & Principles
- Advanced Design Components/Principles: Enhancing the Power of Dashboards
- Special Chart Types
- Case Study: Hands-On Using Tableau
- Integrate Tableau with Google Sheets

TOOLS & MORE

- R
- Tableau
- SAS (online)
- Python
- Hackathons
- E-Portfolio



PROJECTS

1 Prediction of Sales at Titan Insurance Company

Description: This project Uses Hypothesis testing and visualization to have an early view on the success or failure of a new incentive payment scheme on sales in Titan Insurance Company. It provides an overview of Statistical Methods, especially the parametric methods used in decision making in real life business problems.

Tools: R
Techniques: Hypothesis Testing, Data Visualization, Business Statistics
Dataset/ Case: Titan Case Study

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2 Analyze the Annual Report of an Indian Company and Evaluated Their Annual Performance

Description: This project involves ratio analysis on the financial statements of an Indian company and evaluation of their annual performance. Prepare a concluding report about the challenges faced and proposed recommendations.

Tools: Excel
Techniques: Ratio Analysis, Financial Statement Analysis
Dataset/ Case: Annual Reports of Selected Companies

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3 Analyze the Existing Segmentation, Targeting and Positioning Strategy of a Product/Service and Proposed Recommendations for Future Expansion of Market by the Company

Description: This project involves identifying the Segmentation, Targeting and Positioning strategy of an Indian product/service using secondary research. The product-market profile of the chosen product is to be analyzed and categories for future expansion in the market are accordingly recommended.

Tools: Excel
Techniques: Secondary Research, STP Analysis

PROJECTS

4 Factor Analysis of Consumer Perception on Cereal Brands

Description: Consumer perceptions towards a brand can be built on various parameters depending upon the product. This project uses Factor Analysis to evaluate and identify the most significant attributes that contribute towards the consumer perception of the different cereal brands

Tools: R
Techniques: Advanced Statistics, Factor Analysis, Dimension Reduction Techniques
Dataset/Case: Cereal Data

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5 Neural Network Model on Employee Attrition

Description: The Project investigates the factors that cause employee attrition in organizations. An Employee attrition model is built using moderate Neural Network Model and Random Forest. After generating common performance parameters for both the models, an Ensemble Model is created that identified the cause of employee attrition.

Tools: R
Techniques: Neural Network, Random Forest, Ensemble Modeling
Dataset/ Case: HR Attrition

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6 Predicting Customer Churn in the Telecom Industry

Description: The primary objective is to develop a Logistic Regression Model to investigate and predict the parameters contributing for customer churn (attrition) in the Telecom Industry. The project uses all aspects of one of the most important and popular Supervised Data Mining Techniques – Logistic Regression.

Tools: R
Techniques: Logistic Regression, Churn Modeling
Dataset: Cell Phone Dataset

PROJECTS

7 Build a Machine Learning Model for Predicting Election Outcome

Description: : The objective of the project is to predict the results of a forthcoming election in India. Develop a model using machine learning algorithms on historical election data to predict future election outcomes.

Tools: R
Techniques: Model Selection, Model Validation, Machine Learning
Dataset/ Case: Election Dataset

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8 Visualizing Art House Sales Data Using Tableau

Description: This project explores the art of problem solving with the aid of visual analytics. Tableau's data visualization tools are used to create interactive dashboards to uncover hidden insights to identify performance of an Art Auction House in terms of profitability and sales.

Tools: R
Techniques: Data Visualization
Dataset/ Case: Syndicate Data

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9 Design a Spreadsheet Simulation Model to Compare Operations of New Ordering Design Alternatives for Country Beverage Drive-Through

Description: Design a spreadsheet simulation model to compare operations of new ordering design alternatives for Country Beverage Drive-thru. Pros & Cons of each design alternative are identified and the best design and staffing plan was recommended for Country Beverage

Tools: Excel
Techniques: Monte Carlo Simulation, Design Optimization
Dataset/ Case: Country Beverage-Drive Thru

PROJECTS

10 Consumer Behaviour and Retail Analytics on Cafe Chain Data

Description: : The Project involves investigating on ways to increase revenues to a Cafe Chain after doing an in-depth analysis of Point of Sale data. It involves identifying trends of consumer behaviour and tying it up with retail analytics like identifying the correlation between price and menu.

Tools: : **R/KNIME**
Techniques: **Retail Analytics, Trend Analysis, Consumer Behaviour**
Dataset/ Case: **Café Chain Dataset**

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11 Prediction Model for Default on Loans

Description: The project involves an in-depth analysis of identifying customers who will default on their loan payments. The complex decisions involved in the consumer lending business makes it rely more on statistical models than human discretion. Thus, logistic regression using R is used to build a prediction model for predicting defaults on loans.

Tools: **R**
Techniques: **Logistic Regression, Predictive Analytics, Default Modelling**
Dataset/ Case: **Test Data & Training Data**

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12 Brand Perception Analysis Using Text Mining on Twitter Data

Description: Analyze brand perception of a multi-national organization by extracting Twitter mentions for the brand and conducting text mining (Correlation, Frequency, Topic Modelling, Sentiment Analysis) on it.

Tools: **Excel**
Techniques: **Sentiment Analysis, Social Media Analytics, Text Mining**
Dataset/ Case: **Live Twitter Data**

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ADMISSION DETAILS

Eligibility:

- Bachelor's Degree in any discipline with a minimum of 50% aggregate marks in graduation or equivalent
- Minimum of two years full time post qualification work experience
- Preference will be given to candidates with Engineering, Mathematics, Statistics, and Economics background
- For applicants with exceptional qualification and/or industry experience, a relaxation in the minimum eligibility criteria may be considered

Selection Process:

1. The faculty panel will review all the applications and shortlist candidates based on their profiles.
2. The shortlisted candidates will then be going through a telephonic interview round which will then be reviewed.
3. The admissions will be conducted on a rolling basis and the admission process shall be closed once the requisite number of candidates have taken admission into the program.

Contact Us:

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