

Appendix -III
Fall 2026
Scheme of Study
BS in Business Analytics

Degree Title: BS in Business Analytics

Program Educational Outcomes (PEOs)

- Graduates will establish successful careers as business analysts, data analysts, or analytics-enabled managers by applying quantitative, statistical, and computational techniques to solve real-world business problems across diverse industries.
- Graduates will demonstrate ethical judgment, critical thinking, and responsible leadership in data-driven decision-making, considering organizational goals, societal impact, and data governance principles.
- Graduates will engage in continuous professional development through advanced education, professional certifications, or self-directed learning to adapt to evolving analytics tools, technologies, and business environments.

Program Learning Outcomes (PLOs)

By the end of a BS in Business Analytics degree, a graduate shall be able to

- Apply foundational knowledge of business, statistics, data analytics, artificial intelligence, and information systems to analyze complex organizational problems and generate actionable insights.
- Collect, clean, analyze, and visualize structured and unstructured data using appropriate analytical tools, programming languages, databases, and business intelligence platforms to support evidence-based decision-making.
- Employ critical thinking, quantitative reasoning, and analytical modeling techniques to evaluate alternative solutions, forecast outcomes, and recommend optimal business strategies under uncertainty.
- Communicate analytical findings effectively through written reports, data visualizations, and oral presentations for both technical and non-technical stakeholders, while working collaboratively in multidisciplinary teams.
- Demonstrate ethical reasoning, awareness of data governance, privacy, sustainability, and social responsibility in the design and implementation of analytics-driven business solutions

Regulations Relating to the Degree of “BS in Business Analytics”

Eligibility Criteria

The basic eligibility requirement for admission is a Higher Secondary School Certificate (HSSC), A-levels, or an equivalent qualification recognized by the IBCC, involving 12 years of schooling **with a minimum of 50% marks.**

Program Duration:

Regular/Minimum Duration: 04 Years (Eight Regular Semesters)

Maximum Duration: 06 Years (Twelve Regular Semesters)

Further extendible for 01 Year (Two Regular Semesters) with the permission of the statutory bodies

Academic Standing / Passing Criteria Grade Point Average:

Maximum Grade Point Average: **4.00**

Minimum Grade Point Average for obtaining the BS in Business Analytics degree: **2.50**

Minimum CGPA Requirement per Semester to Remain Enrolled:

Semester	Minimum CGPA
1st	0.75
2nd	1.00
3rd	1.25
4th	1.50
5th	1.75
6th	2.00
7th	2.25
8th	2.50

SINGLE MAJOR

SUMMARY		Cr.Hrs
General Courses		34
Allied/Interdisciplinary Courses		12
Disciplinary/Major Courses		78
Internship/Field Experience		03
Capstone Project		03
Total		130

SEMESTER-I

	Course Code	Course Title	Credit Hours	Academic Cluster	Remarks
1.	QR-401	Quantitative Reasoning-I	3(3-0)	General Education	Approved
2	ENG-301	Functional English	3(3-0)	General Education	Approved
3.	CS-100	Applications of Information and Communication Technologies	3(2-1)	General Education	Approved
4.	MGT-411	Principles of Management	3(3-0)	Mandatory Core Course	Approved

5.	MGT-321	Fundamentals of Accounting	3(3-0)	Mandatory Core Course	Approved
6.	ECON-301	Principles of Economics	3(3-0)	Interdisciplinary	New Course/ Same as BBA26
		Total Cr. Hrs	18		

SEMESTER-II

S. No	Course Code	Course Title	Credit Hours	Academic Cluster	Remarks
1.	QR-402	Quantitative Reasoning-II	3(3-0)	General Education	Approved
2.	ANTH-401	Social psychology	2(2-0)	General Education	Approved
3.	ENG-302	Expository Writing	3(3-0)	General Education	Approved
4.	SSH-301	Civics and Community Engagement	2(2-0)	General Education	Approved
5.	FQ-301	Fehm-e-Quran – I (for Muslim Students)	1(0-1)	General Education	Approved
6.	MGT-351	Principles of Marketing	3(3-0)	Mandatory Core Course	Approved
7.	MGT-475	Digital transformation and innovation	3(3-0)	Mandatory Core Course	New Course/ Same as BS A&F26
		Total Cr. Hrs	17		

SEMESTER-III

S. No	Course Code	Course Title	Credit Hours	Academic Cluster	Remarks
1.	MGT-317	Entrepreneurship	2(2-0)	General Education	New Course/ Same as BBA26
2.	SSH-303	Pakistan Studies	2(2-0)	General Education	Approved
3.	FQ-302	Fehm-e-Quran – II (for Muslim Students)	1(0-1)	General Education	Approved
4.	MGT-512	Organizational Behavior	3(3-0)	Mandatory Core Course	Approved
5.	MGT-473	Managerial Accounting	3(3-0)	Mandatory Core Course	Approved
6.	BAN--301	Fundamentals of Business Analytics	3 (3-0)	Domain Core Course Decided by HEIs	New Course

7.	MGT-409	CSR and Ethical Governance	3(3-0)	Interdisciplinary	New Course/ Same as BS A&F26
		Total Cr. Hrs	17		

SEMESTER-IV

S. No	Course Code	Course Title	Credit Hours	Academic Cluster	Remarks
1.	NS-402	Science of Global Challenges	3(3-0)	General Education	Approved
2.	SSH-302	Ideology and Constitution of Pakistan	2(2-0)	General Education	Approved
3.	FL-302	Foreign Language	2(2-0)	General Education (Arts and Humanities)	New Course/ Same as BBA26
4.	IS-302	Islamic Studies	2(2-0)	General Education	Approved
5.	MGT-424	Business Finance	3(3-0)	Mandatory Core Courses	Approved
6.	BAN-401	Data Analytics for Business	3(3-0)	Domain Core Course Decided by HEIs	New Course
		Total Cr. Hrs	15		

SEMESTER-V

S. No	Course Code	Course Title	Credit Hours	Academic Cluster	Remarks
1.	BAN 512	Predictive Analytics for Business	3(3-0)	Domain Core Course/ Decided by HEIs	New Course
2.	MGT-525	Financial Management	3(3-0)	Mandatory Core Course	Approved
3.	MGT-595	Inferential Statistics	3(3-0)	Interdisciplinary	Approved
4.	MGT-662	Digital Marketing	3(3-0)	Mandatory Core Courses/	Approved
5.	BAN-511	Data Mining for Business	3(3-0)	Domain Core Course/ Decided by HEIs	New Course
		Total Cr. Hrs	15		

SEMESTER-VI

S. No	Course Code	Course Title	Credit Hours	Academic Cluster	Remarks
1.	FINT-501	Data structure & Algorithms in financial analysis	3(2-1)	Domain Core Course Decided by HEIs	Approved
2.	MGT-697	(Business & Management Relevant Certification) *	3(3-0)	Domain Core Course Decided by HEIs	
3.	MGT-513	Business Law and taxation	3(3-0)	Interdisciplinary	Approved
4.		Elective-I	3(3-0)	Elective	
5.		Elective-II	3(3-0)	Elective	
		Total Cr. Hrs	15		

SEMESTER-VII

S. No	Course Code	Course Title	Credit Hours	Academic Cluster	Remarks
1.	MGT-493	Business Research Methods	3(3-0)	Mandatory Core Courses	Approved
2.	FINT-624	Data Visualization	3(3-0)	Domain Course Decided by HEIs	Approved
3.	MGT-580	Strategic Management	3(3-0)	Mandatory Core Courses	Approved
4.		Elective-III	3(3-0)	Elective	Approved
5.		Elective-IV	3(3-0)	Elective	Approved
6.	MGT-698	Internship/Field Experience	3(3-0)	Field Experience	Approved
		Total Cr. Hrs	18		

SEMESTER VIII

S. No	Course Code	Course Title	Credit Hours	Academic Cluster	Remarks
1.	BAN-612	Machine Learning Applications in Business	3(2-1)	Domain Core Course Decided by HEIs	New Course
2.	MGT - 606	Accounting information system	3(3-0)	Domain Core Course Decided by HEIs	Approved
3.		Elective-V	3(3-0)	Elective	Approved

4.		Elective-VI	3(3-0)	Elective	Approved
5.	MGT-699	Capstone Project	3(3-0)	Capstone Project	Approved
		Total Cr. Hrs	15		

Elective Courses

S. No	Course Code	Course Title	Credit Hours	Remarks
1.	BAN-613	Big Data Management & Analytics	3(3-0)	New Course
2.	BAN-614	Marketing & Customer Analytics	3(3-0)	New Course
3.	BAN-615	Financial & Risk Analytics	3(3-0)	New Course
4.	BAN-616	Supply Chain & Operations Analytics	3(3-0)	New Course
5.	BAN-617	Text Mining & Social Media Analytics	3(3-0)	New Course
6.	BAN-618	HR & People Analytics	3(3-0)	New Course
7	BAN-619	Decision Modeling & Optimization	3(3-0)	New Course
8	CSC-202	Information Security	3 (2-1)	Already approved in UIIT
9	BAN-620	Business Intelligence Systems & Dashboards	3(3-0)	New Course
10	BAN-621	Analytics for Sustainability & ESG	3(3-0)	New Course

Outlines of New Courses

BAN-301 Fundamentals of Business Analytics 3(3-0)

Course Description:

This course introduces students to the core concepts and applications of business analytics. It covers the role of analytics in decision-making, the data life cycle, basic analytical techniques, business metrics, and the use of analytical tools in solving business problems. Students will explore real business scenarios where analytics adds value.

Course Objectives:

By the end of the course, students will be able to:

1. Understand the role and scope of business analytics in organizations.
2. Explain key analytical concepts and terminology.
3. Identify types of data and appropriate analytics methods.
4. Interpret basic analytical results for business decisions.
5. Recognize ethical issues in analytics use.

Learning Outcomes:

Upon successful completion, students will be able to:

1. Define core business analytics concepts.
2. Distinguish between descriptive, predictive, and prescriptive analytics.
3. Use basic analytical techniques to explore data.
4. Communicate analytical findings using business metrics.
5. Reflect on ethical considerations in analytics.

Course Contents:

- Introduction to Business Analytics: Definition, Scope, and Role in Business
- Types of Analytics: Descriptive, Diagnostic, Predictive, Prescriptive
- Data Sources and Data Life Cycle
- Basic Data Visualization and Business Metrics
- Introduction to Spreadsheets for Analytics, Statistical Concepts for Business (Mean, Variance, Correlation)
- Decision-Making with Data
- Analytics in Functional Areas (Marketing, Finance, HR, Operations)
- Ethics, Privacy, and Governance in Business Analytics

Recommended Books:

1. Sharda, R., Delen, D., & Turban, E. *Business Intelligence and Analytics: Systems for Decision Support* (2020)
2. Marr, B. *Data Strategy: How to Profit from a World of Big Data, Analytics and the Internet of Things* (2018)
3. Laursen, G. H., & Thorlund, J. *Business Analytics for Managers* (2018)

BAN-401

Data Analytics for Business

3(3-0)

Course Description:

This course builds on fundamentals of analytics and focuses on applying analytical methods to real business problems. It emphasizes data preparation, exploratory data analysis, hypothesis testing, business reporting, and the use of analytics software to support managerial decision making.

Course Objectives:

By the end of the course, students will be able to:

1. Prepare and clean business data for analysis.
2. Apply exploratory analysis techniques to uncover patterns.
3. Conduct statistical analysis to support business decisions.
4. Use analytics software for business reporting.
5. Interpret analytic findings for functional business problems.

Learning Outcomes:

Upon successful completion, students will be able to:

1. Conduct data cleaning and preprocessing.

2. Apply descriptive and inferential statistics.
3. Perform exploratory analysis using charts and summaries.
4. Use analytics software (Excel, Power BI, etc.) for reports.
5. Translate analytical outputs into business insights.

Course Contents:

- Data Acquisition and Quality Assessment
- Data Cleaning, Transformation, and Integration
- Exploratory Data Analysis: Visual and Numerical Summaries
- Statistical Inference for Business Decisions
- Hypothesis Testing: t-tests, ANOVA, Chi-square
- Regression Analysis Concepts for Business
- Business Reporting and Dashboards
- Introduction to Analytics Tools (Excel, Power BI, Tableau)
- Communicating Insights to Stakeholders
- Case Studies from Marketing, Finance, and Operations

Recommended Books:

1. **Dhar, V.**, *Data Analytics for Business* (2020)
2. Albright, S. C., Winston, W. L., & Zappe, C. *Data Analysis & Decision Making* (2019)
Few, S. *Information Dashboard Design* (2013)
3. Kimball, R., & Ross, M. *The Data Warehouse Toolkit* (2018)

BAN-511

Data Mining for Business

3(3-0)

Course Description:

This course introduces students to data mining concepts, techniques, and tools used to discover patterns and knowledge from large business datasets. It covers classification, clustering, association analysis, predictive modeling, evaluation metrics, and real business use cases.

Course Objectives:

By the end of the course, students will be able to:

1. Understand the data mining process and its business applications.
2. Apply classification and clustering techniques.
3. Discover association rules and patterns in data.
4. Evaluate and validate data mining models.
5. Translate data mining results into business insights.

Learning Outcomes:

Upon successful completion, students will be able to:

1. Explain the data mining process.
2. Build classification models using real data.
3. Perform clustering and segmentation.
4. Assess model performance with appropriate metrics.
5. Integrate data mining findings into business decisions.

Course Contents:

- Introduction to Data Mining and Knowledge Discovery
- Data Preprocessing and Feature Engineering
- Classification Techniques: Decision Trees, k-NN, Naïve Bayes
- Clustering Techniques: k-Means, Hierarchical Clustering
- Association Rule Mining and Market Basket Analysis
- Predictive Modeling Basics
- Model Evaluation and Validation (Accuracy, ROC, Confusion Matrix)
- Text and Web Mining Applications
- Tools for Data Mining (RapidMiner, Orange, Python/R basics)
- Business Case Studies and Ethical Issues

Recommended Books:

1. Han, J., Kamber, M., & Pei, J. *Data Mining: Concepts and Techniques* (4th Edition, 2018)
2. Shmueli, G., Bruce, P., & Gedeck, P. *Data Mining for Business Analytics* (2019)
3. Witten, I. H., Frank, E., & Hall, M. A. *Data Mining: Practical Machine Learning Tools and Techniques* (4th Edition, 2016)

3(3-0)

BAN-512

Predictive Analytics for Business

Credit Hours: 3(3-0)

Course Description:

This course introduces predictive analytics techniques used to analyze historical data and forecast future business outcomes. Emphasis is placed on statistical modeling, business forecasting, and predictive decision-making using real organizational data.

Course Objectives:

By the end of the course, students will be able to:

1. Understand predictive analytics concepts and business relevance.
2. Apply predictive models to solve managerial problems.
3. Interpret analytical results for decision-making.
4. Use forecasting models for planning and control.
5. Evaluate model accuracy and limitations.

Learning Outcomes:

Upon successful completion, students will be able to:

1. Explain predictive analytics techniques and tools.
2. Develop regression and classification models.
3. Apply forecasting models to business data.
4. Evaluate predictive model performance.
5. Present predictive insights to management.

Course Contents:

- Overview of Predictive Analytics and Business Value
- Data Understanding, Cleaning, and Preparation

- Exploratory Data Analysis for Prediction
- Linear and Multiple Regression Models
- Logistic Regression and Classification Models
- Time Series Forecasting and Trend Analysis
- Model Validation, Accuracy Measures, and Overfitting
- Ethical Issues and Bias in Predictive Analytics
- Business Case Studies and Applications

Recommended Books:

- Shmueli, G., Bruce, P., Gedeck, P. *Data Mining for Business Analytics* (2019).
- Kuhn, M., & Johnson, K. *Applied Predictive Modeling* (2019)
- Provost, F., & Fawcett, T. *Data Science for Business* (2013).

BAN-612 Machine Learning Applications in Business

Credit Hours: 3(2-1)

Course Description:

This course focuses on machine learning techniques and their applications in business environments. Students learn how ML models support prediction, classification, clustering, and automation in organizational decision-making.

Course Objectives:

1. Understand core machine learning concepts and algorithms.
2. Apply machine learning techniques to business problems.
3. Compare supervised and unsupervised learning models.
4. Evaluate model accuracy and performance.
5. Understand ethical and governance issues in ML.

Learning Outcomes:

1. Explain major machine learning algorithms.
2. Apply supervised learning models to business data.
3. Use unsupervised learning for pattern discovery.
4. Evaluate and tune ML models.
5. Interpret ML outcomes for business use.

Course Contents:

- Introduction to Machine Learning in Business Context
- Supervised Learning: Regression and Classification
- Decision Trees, Random Forests, and k-NN
- Unsupervised Learning: Clustering and Association Rules
- Model Training, Testing, and Validation
- Overfitting, Underfitting, and Model Tuning
- ML Tools and Platforms for Business
- Ethical, Legal, and Social Issues of ML
- Business Use Cases

Recommended Books:

Géron, A. *Hands-On Machine Learning with Scikit-Learn, Keras & TensorFlow* (2022).
James, G., Witten, D., Hastie, T., Tibshirani, R. *An Introduction to Statistical Learning* (2021).
Raschka, S., & Mirjalili, V. *Python Machine Learning* (2022)
Burkov, A. *The Hundred-Page Machine Learning Book* (2019)

BAN-613 Big Data Management & Analytics

Credit Hours: 3(3-0)

Course Description:

This course provides an understanding of big data concepts, architectures, and analytics methods used to manage and analyze large-scale business data.

Course Objectives:

1. Understand big data characteristics and ecosystems.
2. Learn big data storage and processing techniques.
3. Apply analytics to structured and unstructured data.
4. Address data governance and security challenges.
5. Support strategic decisions using big data.

Learning Outcomes:

1. Explain big data technologies and platforms.
2. Analyze large-scale business datasets.
3. Apply big data analytics techniques.
4. Manage data quality and security.
5. Interpret insights from big data analytics.

Course Contents:

- Introduction to Big Data and the 5Vs
- Big Data Architecture and Ecosystems
- Data Storage Technologies
- Big Data Processing and Analytics
- Structured vs Unstructured Data Analysis
- Data Governance, Privacy, and Security
- Big Data Strategy and Business Value
- Industry Case Studies

Recommended Books:

Marr, B. *Big Data in Practice* (2016).
Ikonopoulos, P., et al. *Big Data Analytics* (2020)
O'Reilly, T. *Streaming Systems* (2018)
Chen, M., Mao, S., Liu, Y. *Big Data: Related Technologies* (2019)
Minelli, M., Chambers, M., Dhiraj, A. *Big Data, Big Analytics* (2013).

BAN-614 Marketing & Customer Analytics

Credit Hours: 3(3-0)

Course Description:

This course examines analytical techniques used to understand customer behavior, evaluate marketing performance, and support data-driven marketing decisions.

Course Objectives:

1. Apply analytics in marketing strategy formulation.
2. Analyze customer and market data.
3. Measure marketing effectiveness.
4. Apply segmentation and targeting techniques.
5. Improve customer acquisition and retention.

Learning Outcomes:

1. Analyze customer behavior and preferences.
2. Apply marketing analytics models.
3. Evaluate marketing campaign performance.
4. Develop data-driven marketing strategies.
5. Interpret customer analytics insights.

Course Contents:

- Introduction to Marketing Analytics
- Customer Data and Market Research
- Segmentation, Targeting, and Positioning Analytics
- Customer Lifetime Value and Retention Analysis
- Digital and Social Media Marketing Analytics
- Marketing Performance Metrics and Dashboards
- Predictive Analytics in Marketing
- Case Studies

Recommended Books:

Lilien, G., et al. *Marketing Engineering* (2020)

Grigsby, M. *Marketing Analytics* (2018)

Winer, R., & Dhar, R. *Marketing Management* (2021)

Wedel, M., & Kannan, P. *Marketing Analytics for Data-Rich Environments* (2016).

Farris, P., Bendle, N., Pfeifer, P., Reibstein, D. *Marketing Metrics* (2010).

BAN-615 Financial & Risk Analytics

Credit Hours: 3(3-0)

Course Description:

This course introduces analytical tools and models used in financial decision-making and risk management.

Course Objectives:

1. Apply analytics to financial planning and control.
2. Assess and manage financial risks.
3. Use quantitative models for investment decisions.
4. Analyze financial performance.
5. Interpret risk analytics outputs.

Learning Outcomes:

1. Apply financial analytics tools.
2. Analyze market, credit, and operational risks.
3. Use forecasting models in finance.
4. Interpret financial risk measures.
5. Support financial decision-making.

Course Contents:

- Introduction to Financial Analytics
- Financial Data Analysis and Forecasting
- Risk Measurement and Risk Models
- Portfolio and Investment Analytics
- Credit Risk and Market Risk Analytics
- Stress Testing and Scenario Analysis
- Regulatory and Ethical Issues
- Case Studies

Recommended Books:

De Prado, M. *Advances in Financial Machine Learning* (2018).
Fabozzi, F., et al. *Financial Risk Management* (2019)
Ruppert, D. *Statistics and Data Analysis for Financial Engineering* (2020)
Alexander, C. *Market Risk Analysis* (2022)

BAN-616 Supply Chain & Operations Analytics

Credit Hours: 3(3-0)

Course Description:

This course focuses on applying analytics to supply chain and operations management for efficiency and optimization.

Course Objectives:

1. Apply analytics to supply chain decisions.
2. Improve demand forecasting accuracy.
3. Optimize inventory and logistics.
4. Measure operational performance.
5. Support data-driven operations strategy.

Learning Outcomes:

1. Analyze supply chain and operations data.
2. Apply forecasting and optimization models.
3. Improve inventory and logistics decisions.
4. Evaluate operational performance.
5. Support operational excellence initiatives.

Course Contents:

- Supply Chain Analytics Overview
- Demand Forecasting Techniques
- Inventory Management Analytics
- Logistics and Transportation Analytics
- Process Optimization and Efficiency
- Supply Chain Performance Measurement
- Risk and Resilience in Supply Chains
- Case Studies

Recommended Books:

Chopra, S., & Meindl, P. *Supply Chain Management* (2023).

Simchi-Levi, D., Kaminsky, P., Simchi-Levi, E. *Designing and Managing the Supply Chain* (2021)

Ivanov, D. *Supply Chain Analytics and Modeling* (2020)

Slack, N., et al. *Operations Management* (2022)

BAN-617 Text Mining & Social Media Analytics

Credit Hours: 3(3-0)

Course Description:

This course introduces techniques for analyzing text and social media data to extract business insights.

Course Objectives:

1. Understand text mining and NLP concepts.
2. Analyze unstructured textual data.
3. Apply sentiment and opinion analysis.
4. Evaluate social media metrics.
5. Support branding and marketing decisions.

Learning Outcomes:

1. Apply text mining techniques.
2. Perform sentiment analysis.
3. Analyze social media data.
4. Interpret text analytics outputs.
5. Generate actionable insights.

Course Contents:

- Introduction to Text Mining and NLP

- Text Preprocessing and Feature Extraction
- Sentiment and Opinion Mining
- Topic Modeling and Text Classification
- Social Media Analytics and Metrics
- Brand and Reputation Analytics
- Tools and Platforms for Text Analytics
- Case Studies

Recommended Books:

Silge, J., & Robinson, D. *Text Mining with R* (2017).

Feldman, R., & Sanger, J. *The Text Mining Handbook* (2018)

Aggarwal, C., & Zhai, C. *Mining Text Data* (2018)

Kumar, V., et al. *Social Media Analytics* (2022)

BAN-618

HR & People Analytics

Credit Hours: 3(3-0)

Course Description:

This course explores the use of analytics in human resource management to support workforce planning and talent decisions.

Course Objectives:

1. Apply analytics to HR decision-making.
2. Analyze workforce and performance data.
3. Improve talent acquisition and retention.
4. Measure HR effectiveness.
5. Address ethical issues in people analytics.

Learning Outcomes:

1. Analyze HR and workforce metrics.
2. Apply people analytics tools.
3. Support strategic HR planning.
4. Interpret employee data.
5. Improve HR decision quality.

Course Contents:

- Introduction to People Analytics
- Workforce Data and HR Metrics
- Talent Acquisition and Performance Analytics
- Employee Engagement and Retention Analytics
- Workforce Planning and Productivity
- Ethical and Legal Issues in HR Analytics
- HR Analytics Case Studies

Recommended Books:

Edwards, M., & Edwards, K. *Predictive HR Analytics* (2019)

Marr, B. *People Analytics in the Era of Big Data* (2018)
Rasmussen, T., & Ulrich, D. *HR Analytics* (2020)
Fitz-enz, J., & Mattox, J. *Predictive Analytics for Human Resources* (2014).
Bassi, L. *Good Company* (2011).

BAN-619 Decision Modeling & Optimization

Credit Hours: 3(3-0)

Course Description:

This course introduces quantitative decision models and optimization techniques for managerial decision-making.

Course Objectives:

1. Understand decision modeling concepts.
2. Apply optimization techniques to business problems.
3. Analyze decision alternatives.
4. Use decision support systems.
5. Improve strategic and operational decisions.

Learning Outcomes:

1. Build quantitative decision models.
2. Apply optimization methods.
3. Analyze business decisions systematically.
4. Interpret model results.
5. Support managerial decision-making.

Course Contents:

- Decision Theory and Decision Models
- Linear Programming and Optimization
- Integer and Nonlinear Programming
- Sensitivity and Scenario Analysis
- Decision Trees and Simulation
- Decision Support Systems
- Business Applications and Case Studies

Recommended Books:

Hillier, F., & Lieberman, G. *Introduction to Operations Research* (2021).
Winston, W. *Operations Research: Applications and Algorithms* (2020)
Powell, W. *Optimization for Decision Making* (2019)
Render, B., et al. *Quantitative Analysis for Management* (2020)
Winston, W. *Operations Research* (2004).

BAN-620 Business Intelligence Systems & Dashboards

Credit Hours: 3(3-0)

Course Description:

This course covers business intelligence systems, data warehousing, and dashboard development to support managerial decision-making.

Course Objectives:

1. Understand BI system architecture.
2. Design effective dashboards.
3. Visualize business data.
4. Support strategic decisions.
5. Evaluate BI tools and technologies.

Learning Outcomes:

1. Explain BI concepts and systems.
2. Develop dashboards.
3. Interpret visual analytics.
4. Communicate insights effectively.
5. Support data-driven management.

Course Contents:

- Introduction to Business Intelligence
- Data Warehousing and ETL Processes
- Dashboard Design Principles
- Data Visualization Techniques
- BI Tools and Platforms
- Performance Measurement Systems
- BI Applications and Case Studies

Recommended Books:

- Sharda, R., Delen, D., Turban, E. *Business Intelligence and Analytics* (2020)
- Few, S. *Information Dashboard Design* (2013 – still accepted classic)
- Kirk, A. *Data Visualization* (2019)
- Nussbaumer Knaflic, S. *Storytelling with Data* (2020)

BAN-621 Analytics for Sustainability & ESG

Credit Hours: 3(3-0)

Course Description:

This course focuses on applying analytics to sustainability and ESG performance measurement and reporting.

Course Objectives:

1. Understand sustainability and ESG concepts.
2. Apply analytics to ESG data.
3. Measure environmental and social impact.
4. Support sustainable decision-making.

5. Evaluate ESG performance metrics.

Learning Outcomes:

1. Analyze sustainability and ESG data.
2. Apply sustainability analytics tools.
3. Interpret ESG indicators.
4. Support responsible business strategies.
5. Communicate sustainability insights.

Course Contents:

- Introduction to Sustainability and ESG
- ESG Metrics, Standards, and Reporting
- Environmental Impact and Climate Analytics
- Social and Governance Performance Analytics
- Risk, Compliance, and ESG Strategy
- Data-Driven Sustainable Decision-Making
- Global ESG Case Studies

Recommended Books:

- Berg, F., et al. *Aggregate Confusion: ESG Ratings* (2022)
- Schaltegger, S., et al. *Sustainability Accounting* (2020)
- Eccles, R., Klimenko, S. *The Investor Revolution* (2019)
- Kotsantonis, S., & Serafeim, G. *ESG and Corporate Performance* (2019)
- Eccles, R., Ioannou, I., Serafeim, G. *The Impact of Corporate Sustainability* (2014)
- Schaltegger, S., Bennett, M., Burritt, R. *Sustainability Accounting and Reporting* (2006).