

Introduction to the Main Courses of Big Data Management and Application

Course Title	Main Course Content	Skills Acquired
Principles of Economics	The main content includes: market supply and demand, market equilibrium and elasticity theory, consumer behavior theory, firm behavior theory, firm equilibrium theory in market structure and different market structures, market failure problems, and government policies to solve market failure problems.	(1) Be able to apply professional basic knowledge, basic principles, analytical methods, and knowledge of business and social operations to identify, understand, express, and analyze practical problems. (2) Being able to conduct research on practical issues in business society based on the principles of big data science and using scientific methods, including big data analysis and interpretation, obtaining reasonable and effective conclusions through synthesis, and proposing management strategies with reference value.
Introduction to Big Data Management	It mainly includes the basic conceptual foundation of big data, data collection and governance, data management, data analysis, data visualization, data security and privacy protection, and big data processing platforms, application cases of big data in different fields, as well as legal and policy norms for data openness and sharing and big data.	(1) Master the fundamentals of management and economics, apply big data theory and technology to analyze business problems, master knowledge of business society, and lay the foundation for solving practical business problems. (2) Utilize professional knowledge, principles, and methods to identify, understand, express, and analyze practical problems, and seek effective solutions. (3) Using big data management knowledge to design business problem solutions, reflecting innovative awareness. (4) Based on the principles of big data and using scientific methods to study business problems, conduct big data analysis and interpretation, propose reasonable conclusions and valuable management strategies.

Principles of Management	The course content mainly includes: basic functions of management, strategic management, human resource management, team building, incentive theory, management control systems, performance evaluation, globalization and cross-cultural management, corporate social responsibility and ethics, innovation management, etc.	(1) Master the basic concepts and theories of this course systematically. (2) Be able to comprehensively apply basic theories, analyze and study case practices. (3) Based on the core thinking mode of management, innovatively solve the theoretical and practical problems currently faced in the field of management.
Advanced Language Programming (Java)	The course introduces the basic concepts, principles, and technologies of Java language. The course content is divided into three major parts: Fundamentals of Programming, Object Oriented Programming, and Common Java Class Libraries and Principles of Use.	(1) Master the basic principles and knowledge of Java language. (2) Master the specific technologies of Java in graphical interface design, multithreading concurrency, network communication, and database operations, and have preliminary design capabilities. (3) Cultivate students' ability to use Java language and technology to solve problems.
Digital Supply Chain	The course content mainly includes production planning and supply and demand planning in the supply chain environment, inventory management and planning, transportation and procurement management strategies, coordination, and pricing decisions.	(1) Master the core concepts, strategic elements, driving factors, and evaluation indicators of supply chain management, as well as distribution network design and online sales strategies, and cultivate students' ability to discover and solve problems. (2) Understand the basics of network planning, demand forecasting, and coordination in supply chain management, enabling students to propose preliminary systematic solutions. (3) Familiar with inventory management, procurement, and transportation decisions in the supply chain cycle, using computer software for calculations.

Statistics	The main content of the course includes: data feature description, probability and sampling distribution, parameter estimation, hypothesis testing, analysis of variance, contingency analysis, correlation and regression analysis, time series analysis, etc.	(1) Master and understand the basic concepts and categories related to statistics; (2) Master and be able to apply basic statistical methods for statistical design, investigation, organization, and analysis; (3) Enable students to master and apply this tool to serve their majors, such as Excel, SPSS, R, Python, etc., to process and analyze data.
Operational Research	The course mainly covers fundamental operational research models and their solution methods, with an emphasis on problem modeling techniques and the use of relevant software for solving and analyzing output results.	(1) Understand and proficiently master basic theories and mathematical models in operations research such as linear programming, duality theory, and integer programming. (2) Proficient in modeling classic application scenarios such as common production planning problems, human resource allocation problems, and nesting and material cutting problems. (3) Proficient in using relevant software of management operational research, such as QM software, EXCEL planning and solving module, LINGO, etc. to solve problems, perform sensitivity analysis on output results, and correctly interpret and apply the results.
Database Principles & Applications	The course introduces the basic principles, design, and application technologies of database systems. The content includes basic knowledge of databases, relational data models, relational database language SQL, and other related knowledge. In addition, this course combines current mainstream commercial database systems to introduce the maintenance, querying, and statistics of databases and data tables.	(1) Understand and master the basic principles of database systems. (2) Can use database operation language to achieve data queries and updates, and can analyze and design commonly used databases. (3) Cultivate students' ability to use database technology to solve problems.

Data Structures	The main content includes algorithm complexity analysis, linear tables (sequential tables, linked lists, stacks, queues), data structures such as trees and graphs, as well as algorithms and program design ideas such as sorting, searching, and indexing.	(1) Master the organization, storage, and processing methods of data in computers, understand the relationship between data structures and algorithms, and be familiar with the basic methods of algorithm design and analysis. (2) Understand basic data structures such as linear tables, trees, and graphs, as well as their storage structures, and master typical algorithms such as sorting, searching, traversing, spanning trees, and shortest paths. (3) Deep understanding of programming ideas and methods, able to design reasonable data structures and algorithms, build efficient software systems and program structures, and solve practical problems.
Data Mining	The main content of the course includes: data preprocessing, classification and regression, association analysis, cluster analysis, anomaly detection, etc.	(1) Familiar with data types and preprocessing methods, proficient in classification models such as decision trees, clustering models such as K-means, and association algorithms such as Apriori. (2) Understand the specific process of data mining. (3) Use R and Python software to write code, implement multiple data mining models, and use them to solve practical problems.
Python for Data Analysis	Based on the comprehensive application of various Python open-source libraries, this course helps students proficiently master data analysis and processing skills centered on Pandas, providing necessary programming skills for data analysis.	(1) Master the basic principles and knowledge of data analysis. (2) Proficient in various commonly used Python open-source libraries such as Pandas and sklearn, possessing comprehensive data analysis abilities such as data acquisition, analysis and processing, visualization exploration, and modeling evaluation.

Econometrics	This course is a core subject for disciplines such as management and economics. It builds upon students' foundational knowledge in probability theory, statistics, and other related subjects, to further study the basic principles and analytical methods of econometric theory.	(1) Master how to analyze and process data through econometric modeling. (2) Gain a preliminary understanding of empirical research methods, mastering scientific research methods through hypothesis analysis and model testing. (3) Acquire proficiency in software methods for econometric modeling such as Stata.
Optimization Theory and Methods	Based on the comprehensive application of various Python open-source libraries, this course helps students comprehensively master the basic knowledge and skills of data analysis, providing necessary programming skills for data analysis.	(1) Empower students to comprehend the fundamental principles and foundational knowledge of mathematical optimization, nurturing their fundamental abilities in identifying and resolving problems. (2) Provide students with crucial knowledge in optimization modeling, enabling them to cultivate initial skills in modeling and solving data analysis oriented problems.
Mathematical Modeling and Optimization	This course is a highly integrated blend of applied mathematics, mathematics software applications, and computer programming. Topics covered include optimization models, graph theory models, differential equation models, difference equation models, statistical regression models, interpolation and fitting models, etc.	(1) Gradually enhance students' mathematical competency and cultivate their ability to solve real-world problems using mathematical models and tools. (2) Equip students to transform real-world problems into mathematical terms, establish appropriate mathematical models, solve them using computers and other means, and then interpret and apply the results.
Machine Learning	The course mainly includes classical machine learning theories, covering basic concepts, linear models and extensions, graphical models, learning paradigms, etc.	(1) Enable students to establish suitable machine learning models for working goals, design appropriate solution algorithms, and evaluate the rationality of the design scheme. (2) Capable of using famous tools to solve models.

Data Governance	The course goal is for students to understand its main purpose and tasks. The course includes the developments of data governance and related content from DAMA Data Management Guide to Knowledge.	(1) Being able to design data governance solutions tailored to the characteristics of government departments and enterprises, as well as designing data management processes and links that meet specific needs. (2) Capable of employing scientific methods and data governance technology to conduct research in practice, draw reasonable and effective conclusions, and (3) Proficiently use related software tools.
Deep Learning	The fundamentals of deep learning encompass key concepts such as forward propagation, backward propagation, loss functions, and optimization algorithms.	(1) The capability to identify, articulate, and evaluate research relevant to real-world issues in the commercial sector using deep learning. (2) Proficiency in selecting suitable deep learning technology to conduct data analysis, decision-making, and provide recommendations for addressing economic, cultural impacts and social challenges.
Planning and Design of Big Data System	This course systematically introduces the key technologies of big data system, including big data foundation, big data storage and management, big data processing and analysis, big data application and so on.	(1) Be able to apply the basic theory and technology of big data to the analysis of commercial and social problems, contact and master the operational knowledge of commercial society, and lay a knowledge foundation for solving practical commercial problems. (2) Be able to use the professional knowledge of big data management to design solutions to problems in the commercial society, and be able to reflect the innovation consciousness in the design process.