# Introduction to the Main Courses of Digital Guangdong Big Data Management Elite Training Program

| Course Name | Main Course Content | Learning Outcomes |
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| 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.<br>(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 their 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.<br>(2) Capable of using famous tools to solve models. |
| Blockchain and Privacy Computing | Blockchain technology, one of the core technologies in the new infrastructure field, is dedicated to resolving trust and cooperation issues between enterprises, and has wide applications in areas such as supply chains, cryptocurrencies, credit and risk control, etc.<br>Privacy computing aims at realizing the transformation and release of data value without compromising data and privacy safety, to make data "available but invisible". | (1) Help students understand the basic principles of blockchain and privacy computing and familiarize themselves with development platforms of blockchain and privacy computing.<br>(2) Apply technical features of blockchain and privacy computing in conjunction with relative scenarios to build trustworthy applications. |

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| Digital Operation | This course progressively introduces the ideas from the strategy of corporate digital transformation, loopholes and design of digital operating system, to managing digital operating system. It systematically and comprehensively presents theories and practices related to digital operations management in manufacturing enterprises, and explores the digital transformation of the entire value chain from order to delivery in enterprises. | (1) Educate students on major concepts and methods pertaining to user behavior analysis to prepare them for practical application of their knowledge.<br>(2) Proficient in applying fundamental principles and methods for user behavior analysis, conducting market research, developing business models, and composing business plans. |
| Data Governance | The course goal is for students to understand its main purpose and tasks. The course introduces the developments of data governance and related content from DAMA Data Management Guide to Knowledge. | (1) Design data governance solutions that cater to the characteristics of government departments and enterprises, design data management processes and links that meet specific needs, and show innovation in the design process by considering factors like data openness, data privacy and data security.<br>(2) Capable of employing scientific methods and data governance technology to conduct research in practice, draw reasonable and effective conclusions, and proficiently use related software tools. |
| Big Data Systems Planning and Design | The course covers fundamental concepts of big data, the Hadoop architecture for big data processing, the HDFS distributed file system, the HBASE distributed database, NoSQL databases, cloud databases, distributed parallel programming models like MapReduce, stream computing, data visualization, and applications in various fields such as the internet, biomedicine, and logistics. | Enhances understanding and proficiency in essential big data technologies through the organization of foundational tasks on Hadoop, HDFS, HBASE, MapReduce, and others. |

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| User Behavior Analysis | This course primarily discusses the main concepts and basic methods of user behavior analysis, including data planning, collection and analysis, A/B testing, user behavior portrait, data products etc. | The objectives of the course are:<br>(1) to instruct students in the application of methods such as A/B testing and user behavior profiling for real data analysis;<br>(2) to comprehend commonly utilized metrics and traditional optimization models in user behavior analysis; and<br>(3) to gain proficiency in constructing user profiles and labeling systems. |
| Data Visualization Analysis | The course consists of three main components:<br>(1) instruction on fundamental concepts of visualization, visual perception, Gestalt theory, visual channels, the data visualization analysis process, and framework;<br>(2) extensive case studies on data visualization analysis of large datasets; and<br>(3) practical computer lab sessions. | The course aims to:<br>(1) provide students with a strong theoretical foundation in data visualization analysis.<br>(2) Develop students' skills in using visualization and visual analysis techniques to address practical problems across diverse fields and application scenarios, and to improve their ability to identify and resolve issues using big data.<br>(3) Ensure students become proficient in 1-2 commonly used visualization platforms and industry tools, integrating data visualization analysis and design theories with practical applications, to equip them with the foundational design and development capabilities necessary for mainstream industry roles. |
| Introduction to Digital Government | This course introduces students to the evolving trends in digital government, covering fundamental concepts, governance content, and governance systems. | (1) Provide students with a comprehensive understanding of the digital government knowledge system and cultivate their foundational problem-solving skills.<br>(2) Familiarize students with the key technologies of digital government and develop their |

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| | | initial capability to implement a digital government prototype system.<br>(3) Develop expertise in designing digital government systems and cultivate the initial capability to formulate digital government solutions. |