

Executive Master's in Data Science and Management

Academic Year

1446 AH / 2024-25 G

Executive Master's in Data Science and Management, Department of Information Systems, College of Computer and
Information Sciences,
1446 AH ,2024-25 G

- **Introduction**

The Department of Information Systems is considered one of the main departments of the College of Computer and Information Sciences since its inception in the year 1404. Since its establishment, the department has strived to meet the growing needs of human resources in the computer and information technology sector by providing distinguished academic programs. The department's academic programs varied between bachelor's, master's, and PhD. In light of the department's endeavor to keep pace with developments in the national economy and changes in the labor market, the department offers the Executive Master's Program in Data Science and Management, which aims to provide the labor market with specialists in data science and management and prepare leaders in this field in the public and private sectors.

- **Degree Names**

- ❖ Executive Master's in Data Science and Management.

- **Program Language**

- ❖ English

- **Significance and Justifications of the Program**

1. Keeping pace with the targets of Vision 2030, which emphasized the importance of data, as demonstrated by the establishment of the Saudi Data and Artificial Intelligence Authority, by establishing a specialized executive program to supply the labor market with specialists and leaders in the field of data science and management, and in fulfilling the demand created by the Royal Decree number 59766 dated 20/11/1439 AH to establish data management offices in all governmental institutions.
2. The emergence of the paramount importance of data in all business institutions and its impact on the quality of decision-making and determining future trends, which requires the provision of qualitative programs to qualify students with skills related to the latest data technologies, engineering, and analysis, and applying this in a practical way.
3. Meeting the noticeable demands for specialists in the fields of data in various business sectors by providing an executive program that combines cognitive and applied aspects to help them develop and keep pace with the latest developments in techniques, tools and methods for dealing with data.

- **Program Vision**

To be a pioneer in qualifying a high-quality graduate for a distinguished professional career in the field of data science and management.

- **Program Mission**

Providing an educational and applied environment that equips students with the skills and knowledge that enable them to achieve their professional ambitions in the field of data science and data management.

- **Program Objectives**

1. Deliver a solid curriculum in data science and management, which conforms to guidelines laid down by the Deanship of Graduate Studies at King Saud University.
2. Offering a new higher education opportunity targeted at IT professionals.
3. Supply the labor market with qualified personnel in the field of data science and data management in support of the royal decree to establish data management offices in all public and semi-private institutions.
4. Preparing graduates for various professions in dealing with data technologies, data management and data analytics.

- **Program Outcomes**

A– Knowledge and Comprehension:

- ❖ Acquiring comprehensive knowledge of data science and management principles, encompassing current trends, research, and application-based understanding.
- ❖ Understand advanced data analysis techniques and data technologies to support organizational decision-making.
- ❖ Comprehend the critical aspects of data quality and management within organizations, including associated tools and techniques.

B– Mental Skills:

- ❖ Gain advanced skills in analyzing data and discovering patterns and trends.
- ❖ Develop and apply advanced skills in critical analysis, evaluation and synthesis in consideration of the range of strategy, governance, theories, concepts and techniques in use within the domain of data science and management.
- ❖ Identify major aspects associated with the quality and management of organizational data and recommend tools/techniques for dealing with them.
- ❖ Integrate knowledge of analyzing, evaluating, and dealing with complex problems, issues, and situations related to the data in various work environments.
- ❖ Identify and formulate questions to plan and execute advanced tasks within given time frames as well as to evaluate this work.

C– Professional and Practical Skills:

- ❖ Demonstrate critical awareness of current legal, social, ethical and professional issues related to the data.
- ❖ Develop and utilize advanced problem-solving skills to resolve issues related to data management and analysis.
- ❖ Gain the ability and skill to apply data science, management, and analysis techniques to support the decision-making process in the work environment.

D– General Skills:

- ❖ Acquire advanced and specialized skills in the field of data science and management.
- ❖ Acquire advanced data management and data analysis skills capable of achieving goals of knowledge-based economy.
- ❖ Acquire effective communication skills in a data-driven work environment.
- ❖ Work autonomously and within teams, as appropriate, demonstrating a capability for both taking and critically reflecting on roles and responsibilities.

• Program Beneficiaries:

- ❖ Students who want to gain knowledge of the latest developments in the field of data science and management.
- ❖ Employees who are interested in gaining new skills to serve their future career endeavors.
- ❖ Employers who are looking for skilled workers in the data science and data management fields.

- ❖ Faculty members with research interest related to topics taught in the program.

- **Employment Opportunities Available:**

- ❖ Data Science and Management Executive
- ❖ Data Science and Management Consultant
- ❖ Data Science and Management Architect
- ❖ Data Scientist/Data Manager

- **Admission Requirements**

In addition to the admission requirements mentioned in the unified regulations for graduate studies in Saudi universities and the organizational and executive rules and procedures for postgraduate studies at King Saud University, the department requires the following to enroll in the program:

1. Applicants must hold a BSc. Degree in Information Systems, Computer Science, Information technology, Software Engineering, Computer Engineering, Computer Education, or BSc. Degrees from Business Administration College, Engineering College, Science College, from King Saud University or a University recognized by the Ministry of Education, with at least a (Good) rank and a minimum GPA of 2.75 out of 5.00 or equivalent.
2. The applicant should submit an English language test result or a proof that the BSc, diploma study language is English.
3. Prior work experience of 2 years at least in IT-related field.
4. Students with bachelor's degrees that are obtained from non-Saudi universities must provide equivalency letters from the Ministry of Education in Saudi Arabia.

- **Requirements for Obtaining the Degree**

- Passing (36) study units of master's courses including the research project.

- **Program General Structure:**

Number of units required are (33) including the capstone project as follows:

Type of Courses	No. of Courses	No. of Units Required
Core courses	(11)	(33) Study units
Elective courses	(0)	(0) Study units
Capstone Project	(1)	(3) Study units
Total	(12)	(36) Study units

• Program's Study Plans

○ First Level

#	Course Code	Name	No. of Study Units	Activity	Assessment GPA: (incl./excl.)	Pre-requisite
1	EDSM 510	Advanced Data Management	3(3+0)	Lecture	Included	
2	EDSM 511	Databases, Data Integration, and Data Warehousing	3 (3+0)	Lecture	Included	
3	EDSM 512	Data Science Concepts and Techniques	3 (3+0)	Lecture	Included	
Total			(9) Study Units			

○ Second Level

#	Course Code	Name	No. of Study Units	Activity	Assessment GPA: (incl./excl.)	Pre-requisite
1	EDSM 520	Advanced Data Governance	3 (3+0)	Lecture	Included	
2	EDSM 521	Machine Learning for Data Science and Management	3 (3+0)	Lecture	Included	
3	EDSM 522	Distributed Data Intensive Systems	3 (3+0)	Lecture	Included	
Total			(9) Study Units			

○ Third Level

#	Course Code	Name	No. of Study Units	Activity	Assessment GPA: (incl./excl.)	Pre-requisite
1	EDSM 530	Advanced Data Quality	3 (3+0)	Lecture	Included	
2	EDSM 531	Temporal and Sequential Data Mining	3 (3+0)	Lecture	Included	
3	EDSM 532	Data Visualization	3 (3+0)	Lecture	Included	
Total			(9) Study Units			

○ Fourth Level

#	Course Code	Name	No. of Study Units	Activity	Assessment GPA: (incl./excl.)	Pre-requisite
1	EDSM 540	Data Management Strategy	3 (3+0)	Lecture	Included	
2	EDSM 541	Enterprise Content Management	3 (3+0)	Lecture	Included	
3	EDSM 599	Capstone Project	3 (0+6)	Project	Included	(18) study units
Total			(9) Study Units			

● Program Courses Description

EDSM 510	Advanced Data Management	3 (3+0)
This course provides an exploration of all data management dimensions including the role that data plays in making decisions, the standard methods of data collection and quality management, data storage systems, data operations modelling, data storage architecture, and open data. You will also examine the fundamentals of data privacy and ethical handling of data. Moreover, participants would gain practical expertise in how to assess data management in an organization using the National Data Index (NDI). The course will also deal with data-driven decision-making and ethical issues related to data management. Hands-on experience with industry-standard tools will be given.		
EDSM 511	Databases, Data Integration, and Data Warehousing	3 (3+0)
This course provides an exploration of modern databases, data integration and data warehouses. Students will learn fundamental principles of database management systems, examining various database types such as relational and NoSQL databases. Additionally, the course provides the best practice in designing and optimization of databases. Additionally, the course offers a comprehensive understanding of data warehouses. Students gain hands-on experience in querying, data modelling, and data warehousing techniques, preparing them to effectively manage and manipulate complex datasets crucial for data-driven decision-making in diverse industries. Students will prepare a practical project using modern tools in Databases, Data Integration and Data Warehousing.		
EDSM 512	Data Science Concepts and Techniques	3 (3+0)
The course will provide students with data science methodologies and technology, including data understanding, modelling, and analysis. Basic algorithms and software tools dealing with data are given. The topics covered include data cleaning and preparation, association analysis, classification using decision tree and KNN, clustering, recommender system, scaling up analytics. Hands-on experience with industry-standard tools will be given to the students.		
EDSM 520	Advanced Data Governance	3 (3+0)
A comprehensive, strategic, and policy-driven approach to data governance, focusing on the development, implementation, and enforcement of data management policies in enterprise environments. It explores how data governance principles can be applied to create robust policies that ensure data integrity, security, privacy, and compliance with the required regulations. The course explores the alignment of data governance with corporate governance, IT governance, and		

cybersecurity frameworks, ensuring compliance and strategic integration. It covers national and international regulations (e.g., GDPR) and introduces cross-border governance challenges. Students will develop governance charters, performance metrics, and mechanisms for measuring effectiveness and business impact. Emerging topics such as governance of generative AI, LLMs, and agentic AI are included. The course allows the students to apply national and international data regulations to local cases by developing data governance frameworks preceded by examining prominent case studies in the field. Also, hands-on experience with industry-standard tools will be given.

EDSM 521	Machine Learning for Data Science and Management	3 (3+0)
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This course provides a broad introduction to machine learning. Topics covered include neural networks (perceptron and multilayer networks backpropagation), Supervised Learning, Bayesian Learning, Bayesian Belief Network, Ensemble Learning, decision trees and random forests, Dimensionality reduction, Semi-Supervised Learning Models, Unsupervised Learning. The course emphasizes how ML techniques are used to address organizational challenges in areas such as customer analytics, risk management, fraud detection, and operational optimization. Students will also examine emerging trends such as AutoML, gaining insight into their potential to transform industries. Students will gain practical skills in data preprocessing, feature engineering, model building, and evaluation of a project of their chosen by using tools and specialized.

EDSM 522	Distributed Data Intensive Systems	3 (3+0)
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This course introduces the fundamental concepts and computational paradigms of large-scale distributed data management. This course covers the essential properties for modern distributed databases such as scalability, high availability, and consistency. Students will explore how cloud platforms, big data infrastructures, and emerging technologies like edge computing support real-time analytics, global operations, and competitive advantage. Case studies highlight strategic issues, including cost-benefit tradeoffs and alignment with organizational goals. By the end of the course, participants will be able to evaluate distributed data strategies and oversee their adoption to create business value. Relevant tools like Hadoop/HDFS (for distributed file systems), MongoDB (for distributed databases) and Hadoop's MapReduce (for parallel processing) will be explored.

EDSM 530	Advanced Data Quality	3 (3+0)
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This course offers a hands-on approach to data quality management, focusing on best practices, frameworks, and methodologies to ensure high-quality data across enterprise systems. The course equips students with the knowledge, tools and techniques necessary to evaluate, improve, and maintain data quality to support better business intelligence, analytics, and operational

performance. Through practical exercises, students will develop hands-on experience in data quality dimensions, including accuracy, completeness, consistency, timeliness, uniqueness, and validity. The course also covers practical applications of data quality such as data profiling, cleansing, and enrichment techniques, as well as automation and AI-driven data quality monitoring where industry-standard software will be explored. Students will work with real-world datasets to diagnose and resolve data quality issues, simulate enterprise scenarios, and implement automated data quality workflows. By the end of the course, students will be able to apply these techniques in real enterprise data environments, improving decision-making and operational outcomes.

EDSM 531	Temporal and Sequential Data Mining	3 (3+0)
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This course offers comprehensive exploration into the specialized field of temporal and sequential data mining, focusing on real-world tools and methods for processing and analyzing data where time is a key element. The primary aim of this course is to provide students with both theoretical foundations and practical skills necessary to understand, process, model, and interpret time-based data effectively across various domains. Students will be introduced to various software tools and libraries, which support time series analysis, sequence modeling, and temporal pattern discovery. Key topics include temporal data preprocessing, sequence modeling, temporal pattern discovery, temporal logic rule induction, time-based association analysis with time element as key, time series classification and prediction, and temporal clustering.

EDSM 532	Data Visualization	3 (3+0)
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This course combines theoretical foundations with hands-on experience to provide students with the tools and techniques needed to extract valuable insights from data. Students will be introduced to the fundamentals of data visualization and gain practical experience with popular industry-leading business intelligence tools and programming libraries to create interactive and dynamic visualizations. Through real-world projects, students will learn to create interactive dashboards, create effective visualizations, and analyze real-world business scenarios. The course also explores how to visualize different types of data and use data storytelling techniques to clearly communicate insights to stakeholders and solve practical business problems.

EDSM 540	Data Management Strategy	3 (3+0)
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In this course, examples of global data management case studies will be discussed (both successful and failed cases) along with local cases stemming mainly from the student's organizations they work at. This course examines how to design and implement effective data management strategies that align with business objectives, regulatory requirements, and emerging industry trends. Participants

will gain expertise in establishing data management vision, mission and strategic objectives. Moreover, they would define the required data management initiatives with respect to all data management dimensions and accordingly build the target road map, providing a comprehensive, strategic approach for business leaders, data managers, and IT professionals. Concepts of this course will be applied through a project where students find a suitable dataset then go through the entire steps of data lifecycle management, including data identification and governance to ensure data is consistent, secure, and aligned with business goals. This includes practical skills in data quality assessment, data security measures, data integration processes, master data management (MDM), and using data management tools to maintain data integrity and deliver business value.

EDSM 541	Enterprise Content Management	3 (3+0)
This course provides an overview of ECM process, ECM components and the history of ECM. Then a survey of ECM technologies is presented including document management (DM), records management (RM), business process management (BPM) and collaboration, XML and meta-data, web content management (WCM), ontology and semantic web, web services, web content delivery and RSS, WCM trends. Students will engage in hands-on activities using ECM platforms to manage digital content, automate workflows, and apply metadata structures. The course will show how this technology helps in complying with local and global regulations in privacy and information security, with providing practical case studies on how ECM solutions are implemented to meet regulatory requirements such as the Personal Data Protection Law (PDPL) and guidelines from the National Data Management Office (NDMO).		
EDSM 599	Capstone Project	3 (0+6)
Students will apply knowledge and skills gained over the three semesters in a real-world project in data science and management under a faculty supervision with a focus on modern topics and technology. The project could be a reflection on the student's organization, to solve a problem or seize an opportunity. The final report should be comprehensive, well written and well organized.		