Brief course description- Course Plan Development and Updating Procedures\ **Data Science**	QF01/0409-3.0E

Faculty	Sciences and Information Technology	Academic Department	Artificial Intelligence	Number of the course plan (2023-2024)
Number of Major requirement courses	17	Date of plan approval	02/04/2024	

This form is just for the major requirement courses

Course number	Credit hours	**Title of the course**	Prerequisite-co-requisite
0142711	3	Data Science and Engineering	None
This graduate course offers a comprehensive exploration of data science and engineering, integrating theoretical foundations with hands-on experience in real-world applications. Students will develop proficiency in data collection, processing, analysis, and interpretation, utilizing cutting-edge tools and methodologies. By mastering the interdisciplinary skills at the intersection of data science and engineering, participants will be prepared to tackle complex challenges and drive innovation in diverse industries.			
Course number	Credit hours	**Title of the course**	Prerequisite-co-requisite
0142721	3	Advanced Machine Learning	None
This graduate course delves deeply into advanced machine learning concepts, covering sophisticated algorithms and techniques for modeling complex data patterns. Students will explore topics such as deep learning, reinforcement learning, and ensemble methods, gaining practical experience through hands-on projects and experimentation. By mastering these advanced techniques, participants will be equipped to tackle intricate real-world problems and drive innovation in machine learning applications.			
Course number	Credit hours	**Title of the course**	Prerequisite-co-requisite
0142731	3	Advanced Information Retrieval	None
This graduate course offers an in-depth exploration of information retrieval techniques, focusing on methods to efficiently search, organize, and extract relevant information from vast datasets. Students will study a range of algorithms and models used in search engines, text mining, and natural language processing to understand how information is retrieved and presented to users. Through practical exercises and projects, participants will develop the skills to design and optimize effective information retrieval systems for various applications.			
Course number	Credit hours	**Title of the course**	Prerequisite-co-requisite
0142741	3	Big Data Analytics	None
This graduate course delves into the principles and applications of big data analytics, focusing on techniques to extract valuable insights from large and complex datasets. Students will explore advanced analytics methodologies, including machine learning, data mining, and predictive modeling, to uncover patterns and trends. Through hands-on projects and case studies, participants will develop the expertise to leverage big data analytics for informed decision-making and innovation in diverse industries.			
Course number	Credit hours	**Title of the course**	Prerequisite-co-requisite
0142751	3	Computational Statistics	None
This graduate course delves into the intersection of statistics and computation, equipping students with the tools to analyze complex datasets efficiently. Participants will explore advanced statistical			

techniques, including Monte Carlo methods, bootstrapping, and Bayesian inference, implemented through computational algorithms. Through practical applications and theoretical foundations, students will develop the skills to address real-world statistical challenges and drive data-informed decision-making.

Course number	Credit hours	**Title of the course**	Prerequisite-co-requisite
0142771	3	Scientific Research Methodology	None

The course aims to provide in-depth knowledge of research design and methodology and train the student in writing a study plan and critically reviewing scientific literature.

Course number	Credit hours	**Title of the course**	Prerequisite-co-requisite
0142722	3	Deep Learning	None

This graduate course provides an intensive exploration of deep learning methodologies, focusing on neural network architectures and their applications in solving complex problems across various domains. Students will delve into advanced topics such as convolutional neural networks (CNNs), recurrent neural networks (RNNs), and generative adversarial networks (GANs), gaining hands-on experience through projects and practical exercises. By mastering deep learning techniques, participants will be prepared to tackle cutting-edge challenges and drive innovation in artificial intelligence and machine learning.

Course number	Credit hours	**Title of the course**	Prerequisite-co-requisite
0142732	3	Computational Linguistics	None

This graduate course delves into the interdisciplinary field of computational linguistics, exploring the intersection of linguistics, computer science, and artificial intelligence. Students will study algorithms and methodologies for processing and analyzing natural language data, covering topics such as syntax, semantics, and pragmatics. Through practical applications and theoretical foundations, participants will develop the skills to develop computational models, linguistic tools, and language technologies to tackle challenges in areas like machine translation, sentiment analysis, and natural language understanding.

Course number	Credit hours	**Title of the course**	Prerequisite-co-requisite
0142733	3	Web and Social Network Analysis	None

In this course, you will learn how relationships between people, artifacts, and ideas within learning settings can be analyzed and interpreted through social network analysis (SNA). You will learn how to prepare data and map these relationships to help you understand how people communicate and exchange information.

Course number	Credit hours	**Title of the course**	Prerequisite-co-requisite
0142742	3	Advanced Data Mining	None

This graduate course delves into the theory and practical applications of data mining, emphasizing the extraction of valuable insights and knowledge from vast datasets. Students will explore various algorithms and techniques for uncovering hidden patterns, trends, and relationships in data, enabling them to solve complex real-world problems. By mastering the principles of data mining, participants will be equipped to make informed decisions and drive innovation across industries.

Course number	Credit hours	**Title of the course**	Prerequisite-co-requisite

0142737	3	Data Exploration and Visualization	None
This graduate course focuses on mastering data exploration and visualization techniques, equipping students with the skills to extract insights from diverse datasets using advanced tools and methodologies. Through hands-on practice, participants will learn to uncover patterns, trends, and relationships, enabling them to effectively communicate findings for informed decision-making across various domains.			
Course number	Credit hours	**Title of the course**	Prerequisite-co-requisite
0142744	3	Non Structural Data Base	None
This graduate course delves into the intricacies of non-structural databases, focusing on modern approaches to handling unstructured and semi-structured data. Students will explore the principles of NoSQL databases, learning to design, implement, and optimize solutions tailored to diverse data types and applications. Through practical projects and case studies, participants will gain expertise in managing dynamic data environments, preparing them for the challenges of contemporary data management landscapes.			
Course number	Credit hours	**Title of the course**	Prerequisite-co-requisite
0142761	3	Business Data Analysis	None
Business Data Analysis refers to technologies, applications, and practices that would assist in business analysis. The purpose of business analysis is to support better business decision making.			
Course number	Credit hours	**Title of the course**	Prerequisite-co-requisite
0142712	3	Advanced Artificial Intelligence	None
This graduate course delves deeply into advanced artificial intelligence (AI) techniques, covering state-of-the-art algorithms and methodologies for solving complex problems. Students will explore topics such as reinforcement learning, deep neural networks, and natural language processing, gaining hands-on experience through projects and simulations. By mastering advanced AI concepts, participants will be equipped to pioneer innovations in diverse fields, from robotics and autonomous systems to healthcare and finance.			
Course number	Credit hours	**Title of the course**	Prerequisite-co-requisite
0142752	3	Selected Topics in Data Science	None
Study of selected areas in data science. Designed for special needs of advanced students.			
Course number	Credit hours	**Title of the course**	Prerequisite-co-requisite
0142772	3	Artificial Intelligence Seminar	None
A seminar may have several purposes or just one purpose. For instance, a seminar may be for the purpose of Artificial Intelligence, such as a lecture, where the participants engage in the discussion of an academic subject for the aim of gaining a better insight into the subject.			
Course number	Credit hours	**Title of the course**	Prerequisite-co-requisite
0142773	3	Data Science Seminar	None

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