Business Analytics Department

First level - Semester 1

جامعة الإسكندرية
ALEXANDRIA UNIVERSITY
كلية الحاسبات وعلوم البيانات

Linear Algebra

Systems of linear equations, Matrices, Determinants, Euclidean spaces, Linear combinations and linear span, Subspaces, Linear independence, Basis and dimension, Rank of a matrix, Inner products, Eigen values and Eigen vectors

Calculus

Functions and models, Limits and derivatives, Differentiation rules, Applications of differentiation, Integrals and applications of integration, Techniques of integration, Differential equations, Partial differential equations

Computer Systems

Introduction to computer systems, Representation and manipulation of information, Machine level representation of programs, Introduction to computer organization, Memory hierarchy, System I/O, Introduction to computer networks.

Data Science

Introduction to data science, Data science ecosystem, Data representation and manipulation, Tools for data scientists, Data analytics tracks, Case studies using R

Programming I

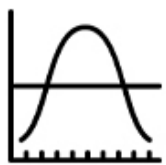
Introduction to programming, Basic programming constructs, Branching and Iteration, Decomposition, Abstractions and Functions, Recursion, Structure types, Mutability, High order functions, Testing and debugging

Critical Thinking

Business Analytics Department

First level - Semester 2

جامعة الإسكندرية
ALEXANDRIA UNIVERSITY
كلية الحاسبات وعلوم البيانات



Probability & Statistics I

Sets, Techniques of counting, Probability spaces, Independence and dependence, Conditional probabilities, Random variables, Expectation, variance, and moments, Moment generating functions, Independence of random variables, Conditional expectation, Discrete and continuous distributions, Joint and marginal distributions

Discrete Structures

Sequences and Summations, Growth of functions, Logic and Predicates, Proof techniques, Recursive relations, Advanced counting techniques, Functions and Relations, Graph and Tree structures, Introduction to number theory: Groups, Rings, and Fields

Data Structures & Algorithms

Arrays, Linear lists, Queues, and Stacks, Tree structures and traversals, Dictionaries and Search trees, Heaps, Tries, Sorting and Searching, Hashing, Basic graph algorithms: Traversals, Minimum Spanning Trees, Shortest Paths

Intro to AI

Reasoning, Intelligent agents, Knowledge representation techniques, Problem solving by searching, Constraint satisfaction problems, Logic programming, Uncertain knowledge and probabilistic reasoning, Planning, Applications

Programming II

Object-oriented programming concepts, UML and requirement analysis, Object-oriented design, Encapsulation and information hiding, Separation of interface and implementation, Classes and objects, Methods, Members, Subclasses and inheritance, Polymorphism, Using an object oriented programming language, Message passing, Operator overloading, Genericity, Programming using threads, Using APIs, Software design patterns.

Innovation & Entrepreneurship

Business Analytics Department

Second level - Semester 3

جامعة الإسكندرية
ALEXANDRIA UNIVERSITY
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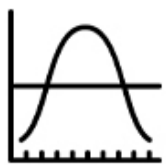
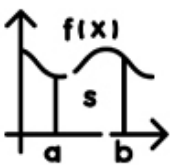


Probability & Statistics II

Normal distribution, Law of large numbers, Central limit theorem, Distributions derived from Normal distribution: Chi-squared, Student-t, and F distributions, Statistical estimation, point estimation, Confidence intervals, Test of hypotheses, Fitting straight lines, Analysis of variance, Stochastic models, Poisson processes

Intro to Databases

Information management concepts, Database systems concepts, Data modeling, The relational data model and Relational algebra, Logical database design, Normalization, Query languages, Query optimization, Physical database design, B trees and Indices, Transaction processing concepts, Concurrency control, Recovery, Recent trends in database systems



Numerical Computations

Matrix manipulation, Simultaneous linear equations and matrix inversion, Vector space and basis, Eigen values and Eigen vectors, Approximation of roots of equations, Error analysis and Numerical instability, Numerical differentiation and integration, Interpolation and Extrapolation, Least-square approximation, Differential equations

Intro to Business

This course will expose you to business terminology, concepts, and current business practices. It will help students to establish a viable business vocabulary, foster critical and analytical thinking, and refine their business decision-making skills

Accounting as an Information System

This course focuses on accounting concepts, principles and theory with an emphasis on problems that arise in applying these concepts for external reporting purposes. Specific emphasis is placed on measurement of assets, liabilities, equities and income, as well as disclosure of additional information that may assist users understand the financial reports.

University Elective

Business Analytics Department

Second level - Semester 4

جامعة الإسكندرية
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كلية الحاسبات وعلوم البيانات

Cloud Computing

Introduction to Cloud Computing, Cloud computing platforms and infrastructure, Parallel programming in the Cloud, Distributed storage systems, Virtualization, Cloud security, Cloud performance.

Machine Learning

Feature representation, Similarity, Dimensionality reduction, Supervised learning, Regression, Unsupervised learning, Evaluation, Fundamentals of neural networks (Feedforward and Backpropagation), Reinforcement learning, Applications.

Data Mining & Analytics

Introduction to data mining, Data exploration and visualization, Data preprocessing, Classification, Mining frequent patterns and associations, Clustering, Selected advanced topics (text mining), Current trends in data mining.

System Analysis & Design

This course deal with planning the development of information systems through understanding and specifying in detail what a system should do and how the components of the system should be implemented and work together.

Financial Planning & Analysis

The course covers the concepts of cash flows, fund flow statements and the numerous financial ratios explained through cases and examples.

University Elective

Second level - Summer Semester

Field Training I

Business Analytics Department

جامعة الإسكندرية
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Business Analytics Department

Third level - Semester 5

جامعة الإسكندرية
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Business Process Modeling & Integration

This course will introduce the best-practice industry process modeling standards in order to equip the student with a solid understanding of practical tools and techniques for business processes modeling in preparation of analysis and improvement of business process performance.

Quantitative Analysis

This course helps the student to quickly learn and review topics related to quantitative decision making in business. Related to the decision-making tools and models used by managers at every stage of product development and distribution.

Data Warehousing & Business Intelligence

This course will allow student to learn in a very simple way how to identify, design and develop analytical information systems, such as Business Intelligence with a descriptive analysis on data warehouses.

Faculty Elective

Faculty Elective

University Elective

Business Analytics Department

Third level - Semester 6

ALEXANDRIA UNIVERSITY
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Data Visualization

This course helps students to learn how to design and create data visualizations based on data available and tasks to be achieved. This process includes data modeling, data processing, mapping data attributes to graphical attributes, and strategic visual encoding based on known properties of visual perception.

Enterprise Information Systems

This course aims to provide students with solid understanding of IT role at the enterprise. It is viewed as a combination of business management practice and technology.

Data Driven Marketing

This course focus on helping students define strategies and tactics to distil actionable insights from the data they have available and applying them to their marketing.

Faculty Elective

Faculty Elective

Third level - Summer Semester

Field Training II

Business Analytics Department

جامعة الإسكندرية
ALEXANDRIA UNIVERSITY
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Business Analytics Department

Fourth level - Semester 7

ALEXANDRIA UNIVERSITY
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Leadership & People Analytics

This course is an introduction to the theory of people analytics, and is not intended to prepare learners to perform complex talent management data analysis. People analytics is a data-driven approach to managing people at work.

Data & IT Governance

This course provides understanding of the IT Governance, its characteristics, and importance. Understand IT Governance elements and domains. And the IT Governance Frameworks.

Information Retrieval

This course introduces standard concepts in information retrieval such as documents, queries, collections, and relevance. It also covers the tasks of indexing, searching, and recalling data, particularly text or other unstructured forms.

Project I

An opportunity for the student to become closely associated with a professor in a research effort to develop research skills and technique and/or to develop a program of independent in depth study in a subject area in which the professor and the student have a common interest.

Program Elective

Prgoram Elective

Business Analytics Department

Fourth level - Semester 8

جامعة الإسكندرية
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Text & Social Media Mining

This course will cover the major techniques for mining and analyzing text data in social media to discover interesting patterns, extract useful knowledge, and support decision making, that can be generally applied to text data in any natural language with no or minimum human effort.

Logistics & Supply Chain Analytics

The fundamental concepts and the foundational skills for logistics and supply chain management from both analytical and practical perspectives. Students will learn how to develop and apply analytic tools, approaches, and techniques used in the design and operation of logistics systems and integrated supply chains.

IT Laws & Ethics

This course focuses on the regulatory framework that governs information technology within international and domestic settings. Also focuses on legal and regulatory aspects of the Internet and related technologies.

Project II

The students continue the study performed in the previous semester.

Program Elective

Prgoram Elective

Business Analytics Department

Faculty Electives

جامعة الإسكندرية
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Software Engineering

Concepts of software development, Software life cycle and process models, Software project management, Software tools and environments, Requirement's engineering, Data and process modeling, etc...

Systems Analysis & Design

Introduction to systems analysis and design, Analysis and design tools, Advanced systems design concepts, Case studies and practical projects, Current trends in systems development.

Algorithm Design

Asymptotic notations, solving recursive relations, Basic analysis measures: Worst and average-case complexity bounds, Amortized analysis, Randomization, Fundamental design strategies.

Distributed Processing

Parallel and distributed systems architecture models, Distributed communication and message passing, Distributed naming, Distributed file systems, Distributed synchronization, Fault tolerance and recovery protocols, Consistency models, etc..

Business Analytics Department

Faculty Electives

جامعة الإسكندرية
ALEXANDRIA UNIVERSITY
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Mobile Programming

Mobile application development frameworks, Design techniques, Methodologies for mobile application development, Android development w/ Java, iOS development w/ Swift.

Web Programming

Web fundamentals, Programming Languages for the Web, HTML Basics, Using HTML, Using CSS and templates, Basics of JavaScript, Programming with JavaScript, Introduction to front end programming, PHP, Django, AngularJS, React, responsive web design, Full stack state management.

Operating Systems

Overview of operating systems, Operating systems principles and structure, Processes and threads, Synchronization, Scheduling, Memory management and virtual memory, I/O device management, File systems, Virtual machines, etc..

Computer Networks

Introduction to network architecture, layering, and protocols, Principles of network applications and application layer protocols examples, Socket programming, Introduction to transport layer protocols.

Business Analytics Department

Program Electives

جامعة الإسكندرية
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Human Computer Interaction

This course is an introductory course on human-computer interaction, covering the principles, techniques, and open areas of development in HCI. It provides a business oriented approach to Human Computer Interaction (HCI).

Gamification & Games Development

In this course students will learn the basics of Gamification with a highly practical approach. They will especially focus on how to design gamified experiences in real life and gain knowledge in areas such as: game design, management, or education.

Technology Trends & Innovation

This course Looks at technology and innovation from the perspective of a chief information officer (CIO). Learn about cybersecurity and risk management, IT investments, and vendor management.

GIS & spatial Data Mining

This course constitutes an introduction to GIS and require no prior knowledge. By following this introduction to GIS you will quickly acquire the basic knowledge required to create spatial databases and identify trends and patterns in data so that users can extract hidden predictive information.

Managing Tech Projects

This course addresses project management in the context of IT projects, including software projects. It covers detailed topics of the basic concepts of IT project management, including initiating, planning, controlling, executing, and closing projects.

Business Analytics Department

Program Electives

ALEXANDRIA UNIVERSITY
كلية الحاسبات وعلوم البيانات

Smart Cities & E-Government

This course provides students with the foundational elements of a smart city and to address the breadth of systems that comprise it as well as the Concepts, Methods and model of e-Governance.

Digital Transformation & Digital Economics

This course helps students to get knowledge on how Internet, sharing economy, social networks, Big Data and mobile communications change global businesses and how to create value for humans and enterprises in the digital society.

Manufacturing Analytics

This course helps students to analyze big data to see what's important and take action when it matters. It introduces the power of internet of things in manufacturing.

Predictive Analytics

This course introduces students to the statistical techniques that extend the ideas of regression analysis and how to build models for predicting categorical responses. It will take a “modern” approach applicable to managerial decision making in the presence of large data sets.

NLP &Semantic Analysis

This course is designed to give an introduction to the algorithms, techniques and software used in natural language processing (NLP).

First Level – Semester 1 (17 Credits)

02-24-00101
Linear Algebra

Systems of linear equations, Matrices, Determinants, Euclidean spaces, Linear combinations and linear span, Subspaces, Linear independence, Basis and dimension, Rank of a matrix, Inner products, Eigen values and Eigen vectors

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02-24-00102
Calculus

Functions and models, Limits and derivatives, Differentiation rules, Applications of differentiation, Integrals and applications of integration, Techniques of integration, Differential equations, Partial differential equations

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02-24-00103
Introduction to Computer Systems

Introduction to computer systems, Representation and manipulation of information, Machine level representation of programs, Introduction to computer organization, Memory hierarchy, System I/O, Introduction to computer networks.

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02-24-00104
Introduction to Data Sciences

Introduction to data science, Data science ecosystem, Data representation and manipulation, Tools for data scientists, Data analytics tracks, Case studies using R

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02-24-00105
Programming I

Introduction to programming, Basic programming constructs, Branching and Iteration, Decomposition, Abstractions and Functions, Recursion, Structure types, Mutability, High order functions, Testing and debugging

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02-00-000XX
Critical Thinking

First Level – Semester 2 (17 Credits)

02-24-00106
Probability and Statistics I

Sets, Techniques of counting, Probability spaces, Independence and dependence, Conditional probabilities, Random variables, Expectation, variance, and moments, Moment generating functions, Independence of random variables, Conditional expectation, Discrete and continuous distributions, Joint and marginal distributions

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02-24-00107
Discrete Structures

Sequences and Summations, Growth of functions, Logic and Predicates, Proof techniques, Recursive relations, Advanced counting techniques, Functions and Relations, Graph and Tree structures, Introduction to number theory: Groups, Rings, and Fields

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02-24-00108
Data Structures and Algorithms

Arrays, Linear lists, Queues, and Stacks, Tree structures and traversals, Dictionaries and Search trees, Heaps, Tries, Sorting and Searching, Hashing, Basic graph algorithms: Traversals, Minimum Spanning Trees, Shortest Paths
02-24-00105

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02-24-00109
Introduction to Artificial Intelligence

Reasoning, Intelligent agents, Knowledge representation techniques, Problem solving by searching, Constraint satisfaction problems, Logic programming, Uncertain knowledge and probabilistic reasoning, Planning, Applications
Pre-requisite(s): 02-24-00103.

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02-24-00110
Programming II
Object-oriented programming concepts, UML and requirement analysis, Object-oriented design, Encapsulation and information hiding, Separation of interface and implementation, Classes and objects, Methods, Members, Subclasses and inheritance, Polymorphism, Using an object-oriented programming language, Message passing, Operator overloading, Genericity, Programming using threads, Using APIs, Software design patterns.
Pre-requisite(s): 02-24-00105
02-00-000XX
Innovation & Entrepreneurship

Second Level – Semester 3 (17 Credits)

02-24-00201
Probability and Statistics II
Normal distribution, Law of large numbers, Central limit theorem, Distributions derived from Normal distribution: Chi-squared, Student-t, and F distributions, Statistical estimation, point estimation, Confidence intervals, Test of hypotheses, Fitting straight lines, Analysis of variance, Stochastic models, Poisson processes
Pre-requisite(s): 02-24-00106.

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02-24-00202
Introduction to Databases
Information management concepts, Database systems concepts, Data modeling, The relational data model and Relational algebra, Logical database design, Normalization, Query languages, Query optimization, Physical database design, B trees and Indices, Transaction processing concepts, Concurrency control, Recovery, Recent trends in database systems
Pre-requisite(s): 02-24-00108.

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02-24-00203
Numerical Computations
Matrix manipulation, Simultaneous linear equations and matrix inversion, Vector space and basis, Eigen values and Eigen vectors, Approximation of roots of equations, Error analysis and Numerical instability, Numerical differentiation and integration, Interpolation and Extrapolation, Least-square approximation, Differential equations
Pre-requisite(s): 02-24-00101.

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02-24-02201
Introduction to Business
This course will expose you to business terminology, concepts, and current business practices. It will help students to establish a viable business vocabulary, foster critical and analytical thinking, and refine their business decision-making skills.

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02-24-02202
Accounting as an Information Systems
This course focuses on accounting concepts, principles and theory with an emphasis on problems that arise in applying these concepts for external reporting purposes. Specific emphasis is placed on measurement of assets, liabilities, equities and income, as well as disclosure of additional information that may assist users understand the financial reports.

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02-0X-000XX
University Elective

Second Level – Semester 4 (17 Credits)

Course Code
Pre-requisites

02-24-00204
Cloud Computing
Introduction to Cloud Computing, Cloud computing platforms and infrastructure, Parallel programming in the Cloud, Distributed storage systems, Virtualization, Cloud security, Cloud performance.
Pre-requisite(s): 02-24-00108.

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02-24-00205
Machine Learning
Feature representation, Similarity, Dimensionality reduction, Supervised learning, Regression, Unsupervised learning, Evaluation, Fundamentals of neural networks (Feedforward and Backpropagation), Reinforcement learning, Applications.
Pre-requisite(s): 02-24-00109.

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02-24-00206
Data Mining and Analytics
Introduction to data mining, Data exploration and visualization, Data preprocessing, Classification: concepts, basic techniques and evaluation, advanced methods (support vector machines and Bayesian networks), Mining frequent patterns and associations: concepts, techniques and evaluation, Clustering: concepts, techniques, and evaluation, Selected advanced topics (text mining), Current trends in data mining.
Pre-requisite(s): 02-24-00201.

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02-24-02203
System Analysis & Design
This course deal with planning the development of information systems through understanding and specifying in detail what a system should do and how the components of the system should be implemented and work together. System analysts solve business problems through analyzing the requirements of information systems and designing such systems by applying analysis and design techniques. This course deals with the concepts, skills, methodologies, techniques, tools, and perspectives essential for systems analysts. The practical component of COMP 361 is object oriented and use-case driven, requiring students to go through the steps of system analysis and design to solve a real-life business problem. **Pre-requisite(s):** 02-24-00202.

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02-24-02204
Financial Planning and Analysis
The course covers the concepts of cash flows, fund flow statements and the numerous financial ratios explained through cases and examples.
Pre-requisite(s): 02-24-02201

02-0X-000XX
University Elective

Second Level – Summer Semester (2 Credits)

02-24-02205
Field Training, I

Third Level – Semester 5 (17 Credits)

02-24-02301
Business Process Modeling and Integration

This course will introduce the best-practice industry process modeling standards in order to equip the student with a solid understanding of practical tools and techniques for business processes modeling in preparation of analysis and improvement of business process performance. Business process modeling is essential to business management success and documenting all the processes aids communication throughout an organization. This has always been a key aspect of quality management programs, business process re-engineering and ongoing improvement approaches.
Pre-requisite(s):02-24-02203

02-24-02302
Quantitative Analysis

This course helps the student to quickly learn and review topics related to quantitative decision making in business. Related to the decision-making tools and models used by managers at every stage of product development and distribution
Pre-requisite(s): 02-24-00102.

Data Warehousing & Business Intelligence

This course will allow student to learn in a very simple way how to identify, design and develop analytical information systems, such as Business Intelligence with a descriptive analysis on data warehouses. They will be able to understand the problem of integration and predictive analysis of high volume of unstructured data (big data) with data mining and the Hadoop framework. Also, they can Create a data model Diagram through the Multidimensional Design from analytical business requirements and OLTP system. The course helps the student to know how to Create a physical database system, Extract, Transform and load data to a data-warehouse.
Pre-requisite(s): 02-24-00202.

02-24-0X0XX
Faculty Elective
02-24-0X0XX
Faculty Elective
02-0X-000XX
University Elective

Third Level – Semester 6 (15 Credits)

02-24-02304
Data Visualization

This course helps students to learn how to design and create data visualizations based on data available and tasks to be achieved. This process includes data modeling, data processing (such as aggregation and filtering), mapping data attributes to graphical attributes, and strategic visual encoding based on known properties of visual perception as well as the task(s) at hand. It also highlights the techniques for processing and manipulating information for the purpose of visualization and methods for evaluating information visualizations. **Pre-requisite(s):** 02-24-00202.

02-24-02305
Enterprise Information Systems

This course aims to provide students with solid understanding of IT role at the enterprise. It is viewed as a combination of business management practice and technology. Course is intended to introduce current IT trends to future managers and develop practical skills in the field of decision support technologies, facilitates the application of knowledge of database-driven systems within a business context, and provides opportunities to gain knowledge of processes, tools and techniques involved in information management within an enterprise as well as database systems design and management. **Pre-requisite(s):** 02-24-02301.

02-24-02306
Data Driven Marketing
This course focus on helping students define strategies and tactics to distil actionable insights from the data they have available and applying them to their marketing. **Pre-requisite(s):** 02-24-00206.

02-24-0X0XX
Faculty Elective
02-24-0X0XX
Faculty Elective

Third Level – Summer Semester (2 Credits)

02-24-02307
Field Training II

Fourth Level – Semester 7 (18 Credits)

02-24-02401
Leadership and People Analytics

This course is an introduction to the theory of people analytics, and is not intended to prepare learners to perform complex talent management data analysis. People analytics is a data-driven approach to managing people at work. For the first time in history, business leaders can make decisions about their people based on deep analysis of data rather than the traditional methods of personal relationships, decision making based on experience, and risk avoidance. **Pre-requisite(s):** 02-24-00206.

02-24-02402
Data and IT Governance

This course provides understanding of the IT Governance, its characteristics, and importance. Understand IT Governance elements and domains. And the IT Governance Frameworks. **Pre-requisite(s):** 02-24-02201.

02-24-02403
Information Retrieval

This course introduces standard concepts in information retrieval such as documents, queries, collections, and relevance. It also covers the tasks of indexing, searching, and recalling data, particularly text or other unstructured forms. It has an important role to play in a large number of applications, digital libraries, office automation, internet and e-commerce. The aim of the course is to study theoretical aspects as well as implementation issues of classical and modern retrieval problems.
Pre-requisite(s): 02-24-00108.

02-24-02404
Project I
An opportunity for the student to become closely associated with a professor in a research effort to develop research skills and technique and/or to develop a program of independent in depth study in a subject area in which the professor and the student have a common interest.

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02-24-024XX
Program Elective
02-24-024XX
Program Elective

Fourth Level – Semester 8 (18 Credits)
Course Code
02-24-02405
Text and Social Media Mining

This course will cover the major techniques for mining and analyzing text data in social media to discover interesting patterns, extract useful knowledge, and support decision making, that can be generally applied to text data in any natural language with no or minimum human effort. Detailed analysis of text data requires understanding of natural language text, which is known to be a difficult task for computers. Also, it will learn the basic concepts, principles, and major algorithms in text mining and their potential applications. **Pre-requisite(s):** 02-24-00206.

02-24-02406
Logistics and Supply Chain Analytics

This course Learn fundamental concepts and the foundational skills for logistics and supply chain management from both analytical and practical perspectives. Students will learn how to develop and apply analytic tools, approaches, and techniques used in the design and operation of logistics systems and integrated supply chains. The material is taught from a managerial perspective, with an emphasis on where and how specific tools can be used to improve the overall performance and reduce the total cost of a supply chain. We place a strong emphasis on the development and use of fundamental mathematical models to illustrate the underlying concepts involved in both intra- and inter-company logistics operations. **Pre-requisite(s):** 02-24-00206.

02-24-02407
Information Technology Laws and Ethics
This course focuses on the regulatory framework that governs information technology within international and domestic settings. Also focuses on legal and regulatory aspects of the Internet and related technologies. It covers topics of concern to individuals as well as business and government, including protection of intellectual property in a digital environment, electronic contracts, computer and information security, and cybercrime.
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02-24-02408
Project II
The students continue the study performed in the first semester.02-24-02404
02-24-024XX
Program Elective
02-24-024XX
Program Elective

Program Elective

02-24-02409 - Human Computer Interaction
This course is an introductory course on human-computer interaction, covering the principles, techniques, and open areas of development in HCI. It provides a business-oriented approach to Human Computer Interaction (HCI). It merges theories and concepts with methods of design, evaluation, and implementation of any interactive business system such as enterprise resource planning (ERP), organizational decision support, project management, and other business applications. HCI combines educational and cognitive psychology, business administration, as well as ergonomics and computer science in designing the business system that can greatly increase productivity, help in decision making and gain marketing advantages. Students do not only study the theory and principles of HCI design, but also design an interactive system that enables the users to do tasks quickly and work in an environment of proficiency and satisfaction.
Pre-requisite(s): 02-24-02203.

02-24-02410 - Gamification and Games Development
In this course students will learn the basics of Gamification with a highly practical approach. They will especially focus on how to design gamified experiences in real life and gain knowledge in areas such as: game design, management, or education. Our main goal will be to understand and master the principles of gamification to design experiences that make things more fun and engaging
Pre-requisite(s): 02-24-00110

02-24-02411 - Technology Trends and Innovation
This course Looks at technology and innovation from the perspective of a chief information officer (CIO). Learn about cybersecurity and risk management, IT investments, and vendor management. Also helps learn the role of the CIO and prepare professionals for digital transformation skills at the intersection of business and technology.

02-24-02412 - GIS and spatial Data Mining
This course constitutes an introduction to GIS and require no prior knowledge. By following this introduction to GIS you will quickly acquire the basic knowledge required to create spatial databases and identify trends and patterns in data so that users can extract hidden predictive information.
Pre-requisite(s): 02-24-00206

02-24-02413 - Managing Technology Projects
This course addresses project management in the context of IT projects, including software projects. It covers detailed topics of the basic concepts of IT project management, including initiating, planning, controlling, executing, and closing projects. This course is mainly designed to prepare IT project managers, novice or experienced, with project management skills needed to better manage IT projects.

02-24-02414 - Smart Cities and E-Government
This course provides students with the foundational elements of a smart city and to address the breadth of systems that comprise it as well as the Concepts, Methods and model of e-Governance. Case studies will be used to illustrate the approaches. The course is designed to build awareness of the potential for IT to improve the interactions between mankind in cities and the planet, and the potential for harm.
Pre-requisite(s): 02-24-02402.

02-24-02415 - Digital Transformation and Digital Economics
This course helps students to get knowledge on how Internet, sharing economy, social networks, Big Data and mobile communications change global businesses and how to create value for humans and enterprises in the digital society. It introduces basic theory in digital economics, including value creation models, digital business models and market regulations. Students will examine key issues of the transformation of real economy into digital economy and examine the role of technology revolution in global economy, identify the components of digital economy's ecosystem, review the regression analysis in order to better understand machine learning and artificial intelligence.
Pre-requisite(s): 02-24-02402.

02-24-02416 - Manufacturing Analytics
This course helps students to analyze big data to see what's important and take action when it matters. It introduces the power of internet of things in manufacturing and emphasizes the importance of Analytics to power the Internet of Things for a Connected Factory. **Pre-requisite(s):** 02-24-00206

02-24-02417 - Predictive Analytics
): This course introduces students to the statistical techniques that extend the ideas of regression analysis and how to build models for predicting categorical responses. It will take a "modern" approach applicable to managerial decision making in the presence of large data sets. The course is designed to allow future managers–both data scientists and not–to communicate effectively with the data science team within an organization. The course will also prepare the learner for a career in the field of data analytics.
Pre-requisite(s): 02-24-00206, 02-24-02204.

02-24-02418 - NLP and Semantic Analysis

This course is designed to give an introduction to the algorithms, techniques and software used in natural language processing (NLP). Their use will be illustrated by reference to existing applications, particularly speech understanding, information retrieval, machine translation and information extraction. The course will try to make clear both the capabilities and the limitations of these applications. **Pre-requisite(s):** 02-24-02403.

Faculty Elective

02-24-00301 - Software Engineering

Concepts of software development, Software life cycle and process models, Software project management, Software tools and environments, Requirement's engineering, Data and process modeling, Software design techniques, Software coding, Software verification and validation, Software evolution, Software reliability, Formal methods
Pre-requisite(s): 02-24-00110.

02-24-00302 - Systems Analysis and Design
Introduction to systems analysis and design, Analysis and design tools, Advanced systems design concepts, Case studies and practical projects, Current trends in systems development

02-24-00303 - Algorithm Design

Asymptotic notations, solving recursive relations, Basic analysis measures: Worst and average-case complexity bounds, Amortized analysis, Randomization, Fundamental design strategies: Divide-and-conquer, Dynamic programming, and Greedy methods, String algorithms, Geometric algorithms, Number-theoretic algorithms, Complexity classes, NP-complete problems, Approximation algorithms
Pre-requisite(s): 02-24-00108.

02-24-00304 - Distributed Processing
Parallel and distributed systems architecture models, Distributed communication and message passing (Case Studies: sockets, RPC, RMI, MPI), Distributed naming, Distributed file systems (Case Studies: Network File System, Andrew File System, Google File System), Distributed synchronization, Fault tolerance and recovery protocols, Consistency models (replication), Relaxed consistency (Case Study: Dynamo), Distributed agreement (Case Study: Paxos), Web services, Example Case studies: MapReduce, Pig, Distributed GraphLab.
Pre-requisite(s): 02-24-00103, 02-24-00108.

02-24-00305 - Mobile Programming
Mobile application development frameworks, Design techniques, Methodologies for mobile application development, Android development w/ Java, iOS development w/ Swift, Using Native React, RESTful and Non-RESTful apps, Creating Web/Cloud services, Mobile sensors, Security and trust management, Privacy and ethics, Usability
Pre-requisite(s): 02-24-00105.

02-24-00306 - Web Programming
Web fundamentals, Programming Languages for the Web, HTML Basics, Using HTML, Using CSS and templates, Basics of JavaScript, Programming with JavaScript, Introduction to front end programming, PHP, Django, AngularJS, React, responsive web design, Full stack state management, Security pitfalls and basic solutions
Pre-requisite(s): 02-24-00105.

02-24-00307 - Operating Systems
Overview of operating systems, Operating systems principles and structure, Processes and threads, Synchronization, Scheduling, Memory management and virtual memory, I/O device management, File systems, Virtual machines, System performance evaluation, Security and protection, distributed operating systems, Case studies, Recent trends in operating systems
Pre-requisite(s): 02-24-00103, 02-24-00105.

02-24-00308 - Computer Networks
Introduction to network architecture, layering, and protocols, Principles of network applications and application layer protocols examples, Socket programming, Introduction to transport layer protocols: Principles of reliable data delivery (error control, congestion control, and flow control), TCP protocol, Introduction to the network layer: Network layer addressing, Routing and forwarding, Principles of routing algorithms
Pre-requisite(s): 02-24-00103, 02-24-00605.