# COLLEGE OF COMPUTER STUDIES

Introduction to Data Science

BSCS 2205

Second Semester, School Year 2025-2026

# COLLEGE OF COMPUTER STUDIES

# INSTITUTIONAL PVM

**Philosophy** The University of Perpetual Help System DALTA believes and invokes Divine Guidance in the betterment of the quality of life through national development and transformation, which are predicated upon the quality of education of its people. Towards this end, the Institution is committed to the ideals of teaching, community service and research as it nurtures the value of “Helpers of God”, with “Character Building is Nation Building” as its guiding principle.

**Vision** The University of Perpetual Help System DALTA shall emerge as a premier university in the Philippines. It shall provide a venue for the pursuit of excellence in academics, technology and research through local and international linkages.

The University shall take the role of a catalyst for human development. It shall inculcate Christian values and Catholic doctrine, as a way of strengthening the moral fiber of the Filipino, a people who are “Helpers of God”, proud of their race and prepared for the exemplary global participation in the sciences, arts, humanities, sports and business.

It foresees the Filipino people enjoying a quality of life in abundance, living in peace and building a nation that the next generation will nourish, cherish and value.

**Mission** The University of Perpetual Help System DALTA is dedicated to the development of the Filipino as a **LEADER**. It aims to graduate **DYNAMIC STUDENTS** who are physically, intellectually, socially and spiritually committed to the achievement of the highest quality of life.

As a system of service in health and in education, it is dedicated to the **FORMATION OF CHRIST-CENTERED, SERVICE ORIENTED, AND RESEARCH – DRIVEN INDIVIDUALS WITH GREAT SOCIAL CONCERN** and **COMMITMENT TO THE DELIVERY OF QUALITY EDUCATION AND HEALTH CARE.**

It shall produce Perpetualites as “**HELPERS OF GOD**”, a vital ingredient to nation building.

**MISSION KEYWORDS: A - LEADER**; **B - DYNAMIC STUDENTS**, **C - FORMATION OF CHRIST-CENTERED, SERVICE ORIENTED, AND RESEARCH-DRIVEN INDIVIDUALS**; **D - WITH GREAT SOCIAL CONCERN**; **E - COMMITMENT TO THE DELIVERY OF QUALITY EDUCATION AND HEALTH CARE**; **F - HELPERS OF GOD**

# COLLEGE OF COMPUTER STUDIES

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| **THE EIGHT PERPETUALITE CORE VALUES** | **GRADUATE ATTRIBUTES** | **CORE COMPETENCIES OF UPHSD** |
| 1. **Love of God, Love of Self, Family, and Neighbor** 2. **Love of Country and Good Governance** 3. **Academic and Professional Excellence** 4. **Health and Ecological Consciousness** 5. **Peace and Global Solidarity** 6. **Filipino Christian Leadership** 7. **Value of Catholic Doctrine** 8. **UPHSD and the Perpetualite** |  | 1. **Excellence in Teaching and Learning** 2. **Excellence in Community Extension Service** 3. **Excellence in Research and Innovation** |

# COLLEGE OF COMPUTER STUDIES PVM

**PHILOSOPHY** The College of Computer Studies is committed to the realization of the university’s objective of providing a venue for the pursuit of excellence particularly the areas of information technology education.

**VISION** The UPHSD College of Computer Studies envisions a cadre of graduates who shall successfully meet the challenges of a technology driven global society. Hence the college shall endeavor to become the leading Information Technology School in the CALABARZON Area offering quality instruction in IT and CS.

**MISSION** The College cultivates a culture of excellence by delivering quality programs in IT and CS to produce competent graduates who shall meet the needs of the IT industry locally and internationally.

**EOMS OBJECTIVES OF THE COLLEGE OF COMPUTER STUDIES**

1. To act in accordance with the specified standards of the Commission on Higher Education (CHED) in connection to the BSCS and BSIT program.
2. To be knowledgeable in the concept and theories, algorithmic foundations, implementation and application of information and computing solutions.
3. To demonstrate effectiveness as team members or as team leaders in their job and careers.
4. To be committed to high standards of professionalism.
5. To be linked with ICT industries and Students Apprenticeship Program of BSCS and BSIT programs.

# COLLEGE OF COMPUTER STUDIES

**Graduate Attributes in Relation to Mission Keywords**

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| **GRADUATE ATTRIBUTES** | **Mission Key Words** | | | | | |
| **A** | **B** | **C** | **D** | **E** | **F** |
| **CHARACTER** |  |  |  |  |  |  |
| 1. Graduates **demonstrate a deep faith in God**, embodying professional, humanistic, and altruistic values in their personal and professional lives. |  | ✔ | ✔ |  |  | ✔ |
| 2. Graduates **serve a**s **Helpers of God**, dedicating their knowledge and skills to the betterment of others. |  |  | ✔ | ✔ |  | ✔ |
| 3. Graduates **exemplify servant leadership**, guiding others with integrity, humility, and a commitment to the common good. | ✔ |  |  | ✔ |  | ✔ |
| 4. Graduates **uphold ethical responsibility** in both physical and digital environments, practicing responsible citizenship and promoting positive engagement and interactions. | ✔ |  |  | ✔ | ✔ |  |
| **COMPETENCE** |  |  |  |  |  |  |
| 1. Graduates **communicate effectively** across diverse contexts, demonstrating clarity, coherence, and cultural sensitivity. | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| 1. Graduates **apply critical and creative thinking** to solve complex problems and innovate in their respective fields. |  | ✔ |  |  | ✔ | ✔ |
| 1. Graduates **exhibit** competence and excellence in their professional practice, continuously striving for high standards of performance. | ✔ |  | ✔ | ✔ | ✔ |  |
| 1. Graduates **embrace lifelong learning, engage in reflective practice, and contribute to research and innovation** for societal advancement**.** | ✔ |  | ✔ | ✔ |  |  |
| **COMMITMENT TO SERVICE** |  |  |  |  |  |  |
| 1. Graduates **actively contribute to nation-building** by engaging in meaningful service and leadership roles in their communities. | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| 1. Graduates **advocate** for environmental sustainability, integrating ecological consciousness into their decisions and actions. |  |  | ✔ |  |  | ✔ |
| 1. Graduates **collaborate effectively** in diverse teams, demonstrating commitment, adaptability and teamwork in achieving shared goals. | ✔ | ✔ |  |  | ✔ |  |

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**Program Educational Objectives (PEO’s) in Relation to Graduate Attributes**

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| **PROGRAM EDUCATIONAL OBJECTIVES**  After five years of graduation, the graduates can: | **GRADUATE ATTRIBUTES** | | | | | | | | | | |
| **CHARACTER** | | | | **COMPETENCE** | | | | **COMMITMENT TO SERVICE** | | |
| **GA1** | **GA2** | **GA3** | **GA4** | **GA5** | **GA6** | **GA7** | **GA8** | **GA9** | **GA10** | **GA11** |
| 1.**Technical Mastery and Innovation** Graduates will demonstrate strong technical competence and creative problem-solving skills in designing, implementing, and managing IT systems that address real-world challenges in organizations and communities. |  |  |  |  | ✔ | ✔ | ✔ | ✔ |  |  |  |
| 2. **Professionalism, Leadership, and Ethics** Graduates will exemplify ethical leadership, professionalism, and collaborative engagement in multidisciplinary IT projects, ensuring adherence to legal, social, and organizational standards. | ✔ | ✔ | ✔ | ✔ | ✔ |  |  |  | ✔ | ✔ | ✔ |
| 3. **Lifelong Learning and Global Adaptability** Graduates will pursue lifelong learning and continuous skill enhancement to remain responsive to evolving technologies, industry demands, and global IT trends. |  |  |  |  |  | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| 4. **Societal Contribution and Sustainable Development** Graduates will contribute to inclusive and sustainable digital transformation by developing IT solutions that address societal, environmental, and organizational needs across diverse sectors. | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |

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**Program Learning Outcomes (PLOs) in Relation to Program Educational Outcomes (PEOs)**

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| **PROGRAM LEARNING OUTCOMES (PLOs)**  Graduates of Education programs are teachers who: | **PROGRAM EDUCATIONAL OUTCOMES (PEOs)** | | | |
| **1** | **2** | **3** | **4** |
| 1. **Computing Knowledge and Problem Solving** Apply knowledge of computing, science, and mathematics to analyze, design, and solve complex IT problems in various domains. | ✔ |  |  |  |
| 2. **IT Systems Design and Integration** Design, implement, and optimize IT-based solutions that meet user requirements, industry standards, and sustainability goals. | ✔ | ✔ | ✔ |  |
| 3. **Innovative and Interactive IT Applications** Develop creative, immersive, and user-centered digital systems using advanced tools, emerging technologies, and programming environments. | ✔ |  |  | ✔ |
| 4. **Communication and Collaboration** Communicate effectively in oral, written, and digital forms and work productively in diverse teams to deliver quality IT solutions. |  | ✔ |  |  |
| 5. **Ethics, Legal, and Social Responsibility** Uphold ethical, legal, and professional standards in IT practice, ensuring data privacy, security, and inclusivity while addressing organizational and societal challenges. |  | ✔ |  |  |
| 6. **Lifelong Learning and Professional Development** Engage in lifelong learning to stay current with advancements in information technology and to support professional growth. |  | ✔ | ✔ |  |

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**Course Learning Outcomes (CLOs) in Relation to Program Learning Outcomes (PLOs)**

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| **COURSE LEARNING OUTCOMES (CLOs)**  At the end of the course, the students can | **PROGRAM LEARNING OUTCOMES (PLOs)** | | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** |
| Explain the principles of Data Science, including its processes, required skill sets, ethical considerations, and collaborative practices, and apply data collection techniques such as web scraping and API usage. | ✔ |  |  |  |  |  |
| Apply statistical inference, exploratory data analysis (EDA), probability distributions, and basic statistical modeling using R to analyze and interpret data through case studies. | ✔ |  |  |  |  |  |
| Implement machine learning techniques, feature engineering and selection methods, and recommendation system approaches to build predictive models and effectively communicate data-driven insights. | ✔ |  |  |  |  |  |

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**Lesson Learning Outcomes (LLOs) in Relation to Course Learning Outcomes (CLOs)**

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| **LESSON LEARNING OUTCOMES (LLOs)**  At the end of the lesson, the students can | **COURSE LEARNING OUTCOMES (CLOs)** | | | | | | | |
| **1** | **2** | **3** |  |  |  |  |  |
| **PRELIM** |  |  |  |  |  |  |  |  |
| **FIRST WEEK** |  |  |  |  |  |  |  |  |
| 1. *Learners will develop an appreciation for the importance of Data Science in transforming raw data into meaningful insights and informed decisions. (A)* | ✔ |  |  |  |  |  |  |  |
| 1. *Learners will be able to identify the key skill sets required in Data Science and analyze real-world problems within the current data-driven landscape. (S)* | ✔ |  |  |  |  |  |  |  |
| 1. *Learners will be able to define Data Science, explain datafication, and describe the current perspectives and trends shaping the field. (K)* | ✔ |  |  |  |  |  |  |  |
| **SECOND WEEK – THIRD WEEK** |  |  |  |  |  |  |  |  |
| 1. *Learners will develop an appreciation for the role of populations and samples in making reliable data-driven conclusions. (A)* | ✔ |  |  |  |  |  |  |  |
| 1. *Learners will be able to apply statistical modeling concepts, probability distributions, and model fitting techniques to analyze data. (S)* | ✔ |  |  |  |  |  |  |  |
| 1. *Learners will be able to explain the fundamentals of statistical modeling and demonstrate basic proficiency in using R for statistical analysis. (K)* | ✔ |  |  |  |  |  |  |  |
| **FOURTH WEEK – FIFTH WEEK** |  |  |  |  |  |  |  |  |
| *Learners will develop an appreciation for the importance of Exploratory Data Analysis (EDA) and its role in understanding data before formal modeling. (A)* | ✔ |  |  |  |  |  |  |  |
| *Learners will be able to apply basic EDA tools such as plots, graphs, and summary statistics to analyze real-world datasets and case studies. (S)* | ✔ |  |  |  |  |  |  |  |
| *Learners will be able to explain the philosophy of EDA and describe the stages of the Data Science Process and how they interact. (K)* | ✔ |  |  |  |  |  |  |  |

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| **LESSON LEARNING OUTCOMES (LLOs)**  At the end of the lesson, the students can | **COURSE LEARNING OUTCOMES (CLOs)** | | | | | | | |
| **1** | **2** | **3** |  |  |  |  |  |
| **MIDTERM** |  |  |  |  |  |  |  |  |
| **SEVENTH WEEK** |  |  |  |  |  |  |  |  |
| 1. *Learners will develop an appreciation for the role of basic machine learning algorithms in discovering patterns and making predictions from data. (A)* |  | ✔ |  |  |  |  |  |  |
| 1. *Learners will be able to apply Linear Regression, k-Nearest Neighbors (k-NN), and k-means algorithms to solve basic predictive and clustering problems. (S)* |  | ✔ |  |  |  |  |  |  |
| 1. *Learners will be able to explain the concepts, assumptions, and use cases of Linear Regression, k-NN, and k-means. (K)* |  | ✔ |  |  |  |  |  |  |
| **EIGHTH WEEK – NINTH WEEK** |  |  |  |  |  |  |  |  |
| 1. *Learners will develop an appreciation for selecting appropriate machine learning models for real-world problems such as spam filtering. (A)* |  | ✔ |  |  |  |  |  |  |
| 1. *Learners will be able to perform data wrangling using APIs and web scraping tools and apply Naive Bayes to a spam filtering task. (S)* |  | ✔ |  |  |  |  |  |  |
| 1. *Learners will be able to explain why Linear Regression and k-NN are unsuitable for spam filtering and why Naive Bayes is an effective alternative. (K)* |  | ✔ |  |  |  |  |  |  |
| **TENTH WEEK – ELEVENTH WEEK** |  |  |  |  |  |  |  |  |
| 1. *Learners will develop an appreciation for the role of feature generation and selection in improving models for user (customer) retention problems. (A)* |  | ✔ |  |  |  |  |  |  |
| 1. *Learners will be able to generate meaningful features using domain knowledge and apply basic feature selection algorithms to improve model performance. (S)* |  | ✔ |  |  |  |  |  |  |
| 1. *Learners will be able to explain the concepts of feature generation, the importance of domain expertise and creativity, and common feature selection methods. (K)* |  | ✔ |  |  |  |  |  |  |

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| **LESSON LEARNING OUTCOMES (LLOs)**  At the end of the lesson, the students can | **COURSE LEARNING OUTCOMES (CLOs)** | | | | | | | |
| **1** | **2** | **3** |  |  |  |  |  |
| **FINAL** |  |  |  |  |  |  |  |  |
| **TWELFTH WEEK – THIRTEENTH WEEK** |  |  |  |  |  |  |  |  |
| 1. *Learners will develop an appreciation for the value of recommendation systems in personalizing user experiences and supporting data-driven decisions. (A)* |  |  | ✔ |  |  |  |  |  |
| 1. *Learners will be able to apply dimensionality reduction techniques such as Singular Value Decomposition (SVD) and Principal Component Analysis (PCA) to build a basic recommendation system. (S)* |  |  | ✔ |  |  |  |  |  |
| 1. *Learners will be able to explain the algorithmic foundations of recommendation engines, including dimensionality reduction, SVD, and PCA. (K)* |  |  | ✔ |  |  |  |  |  |
| **FOURTEENTH WEEK** |  |  |  |  |  |  |  |  |
| 1. *Learners will develop an appreciation for representing social networks as graphs and understanding how network structure reveals relationships and communities. (A)* |  |  | ✔ |  |  |  |  |  |
| 1. *Learners will be able to analyze graph data by applying clustering, community detection, partitioning, and neighborhood analysis techniques. (S)* |  |  | ✔ |  |  |  |  |  |
| 1. *Learners will be able to explain fundamental graph concepts, including social networks as graphs, clustering, community discovery, partitioning, and neighborhood properties. (K)* |  |  | ✔ |  |  |  |  |  |
| **FIFTEENTH WEEK** |  |  |  |  |  |  |  |  |
| 1. *Learners will develop an appreciation for the power of data visualization in communicating insights and influencing decisions. (A)* |  |  | ✔ |  |  |  |  |  |
| 1. *Learners will be able to apply basic visualization principles and tools to create effective visual representations of complex datasets. (S)* |  |  | ✔ |  |  |  |  |  |
| 1. *Learners will be able to explain fundamental data visualization concepts and evaluate industry examples of impactful visualizations. (K)* |  |  | ✔ |  |  |  |  |  |
| **SIXTEENTH WEEK – SEVENTEENTH WEEK** |  |  |  |  |  |  |  |  |
| 1. *Learners will develop an appreciation for ethical responsibility, privacy, and security in the practice of Data Science. (A)* |  |  | ✔ |  |  |  |  |  |
| 1. *Learners will be able to evaluate data science practices by considering ethical, privacy, and security implications in real-world contexts. (S)* |  |  | ✔ |  |  |  |  |  |
| 1. *Learners will be able to explain key ethical issues in Data Science, reflect on its evolution, and describe the roles and competencies of next-generation data scientists. (K)* |  |  | ✔ |  |  |  |  |  |

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**COURSE SYLLABUS**

**Course Code : BSCS 2205**

**Course Title : Introduction to Data Science**

**Prerequisite(s) : No prerequisite**

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| **Credit Units :** | **3 Units Lec** |
| **Course Description:** | **Data Science is the study of the generalizable extraction of knowledge from data. Being a data scientist requires an integrated skill set spanning mathematics, statistics, machine learning, databases and other branches of computer science along with a good understanding of the craft of problem formulation to engineer effective solutions. This course will introduce students to this rapidly growing field and equip them with some of its basic principles and tools as well as its general mindset. Students will learn concepts, techniques and tools they need to deal with various facets of data science practice, including data collection and integration, exploratory data analysis, predictive modeling, descriptive modeling, data product creation, evaluation, and effective communication. The focus in the treatment of these topics will be on breadth, rather than depth, and emphasis will be placed on integration and synthesis of concepts and their application to solving problems. To make the learning contextual, real datasets from a variety of disciplines will be used.** |

**COLLEGE OF COMPUTER STUDIES**

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| **Learning Outcome** | **Topic** | **Time Frame** | **Learning Activity/ Performance Task** | **Assessment Strategy and Tool** | **Result & Evidence** |
| **WEEK 1** |  |  |  |  |  |
|  | Introduction: What is Data Science? |  |  |  |  |
| * Learners will develop an appreciation for the importance of Data Science in transforming raw data into meaningful insights and informed decisions. (A) * Learners will be able to identify the key skill sets required in Data Science and analyze real-world problems within the current data-driven landscape. (S) * Learners will be able to define Data Science, explain datafication, and describe the current perspectives and trends shaping the field. (K) | * Big Data and Data Science hype– and getting past the hype * Why now?– Datafication * Current landscape of perspectives * Skill sets needed | 3 hours | **Face-to-face**   * Discussion of the course syllabus * Discussion of the Formal Logic | * Recitation * Implementation and hands-on exercises * Quizzes * **Assignments** | * Graded Recitation * Graded Rubrics scores |

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| **Learning Outcome** | **Topic** | **Time Frame** | **Learning Activity/ Performance Task** | **Assessment Strategy and Tool** | **Result & Evidence** |
| **WEEK 2 - 3** |  |  |  |  |  |
| * Learners will develop an appreciation for the role of populations and samples in making reliable data-driven conclusions. (A) * Learners will be able to apply statistical modeling concepts, probability distributions, and model fitting techniques to analyze data. (S) * Learners will be able to explain the fundamentals of statistical modeling and demonstrate basic proficiency in using R for statistical analysis. (K) | Statistical Inference   * Populations and samples. * Statistical modeling, probability distributions, fitting a model * Intro to R | 6 hours | **Face-to-face**   * Discussion of the Lesson * Lab Demonstration | * Recitation * Implementation and hands-on exercises * Quizzes   **Assignments** | * Graded Recitation * Graded Rubrics scores |
| **WEEK 4 - 5** |  |  |  |  |  |
| * Learners will develop an appreciation for the importance of Exploratory Data Analysis (EDA) and its role in understanding data before formal modeling. (A) * Learners will be able to apply basic EDA tools such as plots, graphs, and summary statistics to analyze real-world datasets and case studies. (S) * Learners will be able to explain the philosophy of EDA and describe the stages of the Data Science Process and how they interact. (K) | Exploratory Data Analysis and the Data Science Process   * Basic tools (plots, graphs and summary statistics) of EDA * Philosophy of EDA * The Data Science Process * Case Study: RealDirect (online real estate firm) | 6 hours | **Face-to-face**   * Discussion of the Lesson * Lab Demonstration | * Recitation * Implementation and hands-on exercises * Quizzes   **Assignments** | * Graded Recitation   Graded Rubrics scores |
| **WEEK 6 Prelim Exam** |  |  |  |  |  |

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| **PRELIMINARY EXAMINATION** |

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| **Learning Outcome** | **Topic** | **Time**  **Frame** | **Learning Activity/ Performance Task** | **Assessment Strategy and Tool** | **Result & Evidence** |
| **WEEK 7** |  |  |  |  |  |
| * + - Learners will develop an appreciation for the role of basic machine learning algorithms in discovering patterns and making predictions from data. (A)     - Learners will be able to apply Linear Regression, k-Nearest Neighbors (k-NN), and k-means algorithms to solve basic predictive and clustering problems. (S)     - Learners will be able to explain the concepts, assumptions, and use cases of Linear Regression, k-NN, and k-means. (K) | Three Basic Machine Learning Algorithms   * Linear Regression * k-Nearest Neighbors (k-NN) * k-means | 3 hours | **Face-to-face**   * Discussion of the Lesson * Lab Demonstration | * Recitation * Implementation and hands-on exercises * Quizzes   **Assignments** | * Graded Recitation   Graded Rubrics scores |
| **WEEK 8-9** |  |  |  |  |  |
| * + - Learners will develop an appreciation for selecting appropriate machine learning models for real-world problems such as spam filtering. (A)     - Learners will be able to perform data wrangling using APIs and web scraping tools and apply Naive Bayes to a spam filtering task. (S)     - Learners will be able to explain why Linear Regression and k-NN are unsuitable for spam filtering and why Naive Bayes is an effective alternative. (K) | One More Machine Learning Algorithm and Usage in Applications   * Motivating application: Filtering Spam * Why Linear Regression and k-NN are poor choices for Filtering Spam * Naive Bayes and why it works for Filtering Spam * Data Wrangling: APIs and other tools for scrapping the Web | 6 hours | **Face-to-face**   * Discussion of the Lesson * Lab Demonstration | * Recitation * Implementation and hands-on exercises * Quizzes   **Assignments** | * Graded Recitation   Graded Rubrics scores |
| **WEEK 10-11** |  |  |  |  |  |

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| * Learners will develop an appreciation for the role of feature generation and selection in improving models for user (customer) retention problems. (A) * Learners will be able to generate meaningful features using domain knowledge and apply basic feature selection algorithms to improve model performance. (S) * Learners will be able to explain the concepts of feature generation, the importance of domain expertise and creativity, and common feature selection methods. (K) | Feature Generation and Feature Selection (Extracting Meaning From Data)   * Motivating application: user (customer) retention * Feature Generation (brainstorming, role of domain expertise, and place for imagination) * Feature Selection algorithms * Filters; Wrappers; Decision Trees; Random Forests | 6 hours | **Face-to-face**   * Discussion of the Lesson * Lab Demonstration | * Recitation * Implementation and hands-on exercises * Quizzes   **Assignments** | * Graded Recitation   Graded Rubrics scores |

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| **MIDTERM EXAMINATION** |

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| **Learning Outcome** | **Topic** | **Time**  **Frame** | **Learning Activity/ Performance Task** | **Assessment Strategy and Tool** | **Result & Evidence** |

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| **WEEK 12-13** |  |  |  |  |  |
| * **Learners will develop an appreciation for the value of recommendation systems in personalizing user experiences and supporting data-driven decisions. (A)** * **Learners will be able to apply dimensionality reduction techniques such as Singular Value Decomposition (SVD) and Principal Component Analysis (PCA) to build a basic recommendation system. (S)** * **Learners will be able to explain the algorithmic foundations of recommendation engines, including dimensionality reduction, SVD, and PCA. (K)** | Recommendation Systems: Building a User-Facing Data Product   * Algorithmic ingredients of a Recommendation Engine * Dimensionality Reduction * Singular Value Decomposition * Principal Component Analysis * Exercise: build your own recommendation system | 6 hours | **Face-to-face**   * Discussion of the Lesson * Lab Demonstration | * Recitation * Implementation and hands-on exercises * Quizzes   **Assignments** | * Graded Recitation   Graded Rubrics scores |
| **WEEK 14** |  |  |  |  |  |
| * **Learners will develop an appreciation for representing social networks as graphs and understanding how network structure reveals relationships and communities. (A)** * **Learners will be able to analyze graph data by applying clustering, community detection, partitioning, and neighborhood analysis techniques. (S)** * **Learners will be able to explain fundamental graph concepts, including social networks as graphs, clustering, community discovery, partitioning, and neighborhood properties. (K)** | Mining Social-Network Graphs   * Social networks as graphs * Clustering of graphs * Direct discovery of communities in graphs * Partitioning of graphs * Neighborhood properties in graphs | 3 hours | **Face-to-face**   * Discussion of the Lesson * Lab Demonstration | * Recitation * Implementation and hands-on exercises * Quizzes   **Assignments** | * Graded Recitation   Graded Rubrics scores |

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| **WEEK 15** |  |  |  |  |  |
| * **Learners will develop an appreciation for the power of data visualization in communicating insights and influencing decisions. (A)** * **Learners will be able to apply basic visualization principles and tools to create effective visual representations of complex datasets. (S)** * **Learners will be able to explain fundamental data visualization concepts and evaluate industry examples of impactful visualizations. (K)** | Data Visualization   * Basic principles, ideas and tools for data visualization * Examples of inspiring (industry) projects * Exercise: create your own visualization of a complex dataset | 3 hours | **Face-to-face**   * Discussion of the Lesson * Lab Demonstration | * Recitation * Implementation and hands-on exercises * Quizzes   **Assignments** | * Graded Recitation   Graded Rubrics scores |
| **WEEK 16-17** |  |  |  |  |  |
| * **Learners will develop an appreciation for ethical responsibility, privacy, and security in the practice of Data Science. (A)** * **Learners will be able to evaluate data science practices by considering ethical, privacy, and security implications in real-world contexts. (S)** * **Learners will be able to explain key ethical issues in Data Science, reflect on its evolution, and describe the roles and competencies of next-generation data scientists. (K)** | Data Science and Ethical Issues   * Discussions on privacy, security, ethics * A look back at Data Science * Next-generation data scientists | 6 hours | **Face-to-face**   * Discussion of the Lesson * Lab Demonstration | * Recitation * Implementation and hands-on exercises * Quizzes   **Assignments** | * Graded Recitation   Graded Rubrics scores |

|  |
| --- |
| **FINAL EXAMINATION** |

**COLLEGE OF COMPUTER STUDIES**

**Course Evaluation: Base 0 Grade Computation**

**Class Standing**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Quizzes** |  |  |  | **30%** |  | | |
| **Research work**  **Recitation/Participation** |  | **x** | **20** | **20%** |
| **Assignment** |  | **x** | **20** |  |
| **Seatwork** |  | **x** | **10** | **50%** |
| **Total** |  |  |  | **100%** | **x** | **70% = Total Class Standing (2/3)** | |
| **Periodical Examination Final Grade** |  | **Transmuted Grade x** | | | | **30% = Major Examination 100%** | **(1/3)** |

Term Grade is Class Standing + Major Exam = Periodic Grade

Final Grade is the AVERAGE of the Preliminary Period Grade, Midterm Period Grade and Final Period Grade within the semester.

The minimum passing grade is 75% or its equivalent of 3.0.

**REFERENCES:**

Wengrow, J. (2020). A common-sense guide to data structures and algorithms: Level up your core programming skills. (2nd ed.). The Pragmatic Bookshelf.

Bae, S. (2019). JavaScript data structures and algorithms: An introduction to understanding and implementing core data structure and algorithm fundamentals. Apress.

Mohanty, S. N. & Tripathy, P. K. (Eds.). (2021). Data structure and algorithms using C++: A practical implementation. Scrivener Pub.

Gordon, V. (2021). Computer Graphics Programming in OpenGL with Java.Mercury Learning.

Cossu, S. M. (2021). Beginning game AI with unity: Programming artificial intelligence with C#. Apress.

**WEBSITES:**

GeeksforGeeks. (n.d.). Data structures and algorithms tutorial. GeeksforGeeks. https://www.geeksforgeeks.org/dsa/dsa-tutorial-learn-data-structures-and-algorithms

VisuAlgo. (n.d.). Data structures and algorithms visualizations. https://visualgo.net

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Programiz. (n.d.). Learn data structures and algorithms. Programiz. https://www.programiz.com/dsa

Google. (n.d.). Data structures & algorithms pathway. Google Tech Dev Guide. https://techdevguide.withgoogle.com/paths/data-structures-and-algorithms

**Affirmed:**

**Ms. Joy Dee R. Bacsa, MLIS, RL, LPT**

LRC, Chief Librarian

UPSHD – Molino Campus

**Contact Information: email of faculty**

**Consultation Schedule:**

**e.g. EVERY MONDAY 4-5 pm**