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| C:\Users\HP\Desktop\ECCD files\logo\psu logo.png  Republic of the Philippines  **PANGASINAN STATE UNIVERSITY**  Lingayen Campus  **COMPUTER SCIENCE and INFORMATION TECHNOLOGY DEPARTMENT** | | | | | | | | |
| **VISION**  To become an ASEAN premier state university in 2020. | | | | | | | | |
| **MISSION**  The Pangasinan State University, through instruction, research, extension and production commits to develop highly principled morally upright, innovative and globally competent individuals capable of meeting the needs of industry, public service and civil society. | | | | | | | | |
| **INSTITUTIONAL OUTCOMES**  The Pangasinan State University Institutional Learning Outcomes (PSU ILO) are the qualities that PSUnians must possess. These outcomes are anchored on the core values: **A**ccountability and Transparency, **C**redibility and Integrity, **C**ompetence and Commitment to Achieve, **E**xcellence in Service Delivery, **S**ocial and Environmental Responsiveness and **S**pirituality – (ACCESS). Anchored on these values, the PSU graduates are able to:   1. demonstrate through institutional mechanisms, systems, policies, and processes which are reflective of transparency, equity, participatory decision making, and accountability; 2. engage in relevant, comprehensive and sustainable development initiatives through multiple perspectives in decisions and actions that build personal and professional credibility and integrity; 3. set challenging goals and tasks with determination and sense of urgency which provide continuous improvement and producing quality outputs leading to inclusive growth; 4. exhibit life-long learning and global competency proficiency in communication skills, inter/interpersonal skills, entrepreneurial skills, innovative mindset, research and production initiatives and capability in meeting the industry requirements of local, ASEAN and international human capital market through relevant and comprehensive programs; 5. display, socially and environmentally responsive organizational culture, which ensures higher productivity among the university constituents and elevate the welfare of the multi-sectoral communities and; 6. practice spiritual values and morally upright behavior which promote and inspire greater harmony to project a credible public image. | | | | | | | | |
| **Program Outcomes** | | | | | | | | |
| **Graduate Attributes** | **Graduate Outcomes Code** | | **Graduate Outcomes** | | | | **Performance Indicators** | |
| Knowledge  for  Solving  Computing  Problems | CS01 – Apply knowledge of computing fundamentals, knowledge of a computing specialization, and mathematics, science, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements. | | 1. Conceptualize solution models *at different levels of abstraction* by applying knowledge of computing fundamentals, technical concepts and practices, best practices and standards in the application of core information technologies, mathematics, science, and domain knowledge appropriate for the computing specialization 2. Use mathematics to model requirements into computer- ‐based models based on domain needs and requirements. 3. Assess computer--‐based models *at various levels of abstraction* based on identified user or domain needs and requirements which solved the defined problem. | | | Knowledge  for  Solving  Computing  Problems | | |
| Problem  Analysis | CS02 - Identify, analyze, formulate, research literature, and solve complex computing problems and requirements reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines | | 1. Identify user needs and requirements using fundamental principles of mathematics, computing sciences, and relevant domain disciplines 2. Formulate literature necessary for the understanding of requirements and solutions. 3. Research on related literature that will guide reaching substantiated conclusions (including *ideas of solutions*) to complex computing problems. 4. Gather information to understand user or domain needs. 5. Analyze user needs guided by gathered literature. 6. Each substantiated conclusions (including ideas of solution) using fundamental principles of mathematics, computing fundamentals, technical concepts and practices in the core computing science, and relevant domain disciplines. | | | Problem  Analysis | | |
| Design, development of solutions | CS03 – An ability to apply mathematical foundations, algorithmic principles and computer science theory in the *modeling and design* of computer--‐based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices | | 1. Design and model computer--‐based system (and its components) applying mathematical foundations, algorithmic and computer science theory, following industry acceptable standards.   a. Model the different software components  b. Design user interfaces following industry standards   1. Formulate different design and model alternatives 2. Assess the different design and models on their respective advantage and tradeoffs. 3. Select a final design and model to use in the solution. | | | Design, development of solutions | | |
|  | CS04 – Knowledge and understanding of information security issues in relation to the design, development and use of information systems | | 1. Assess the information system in its adherence and compliance to security regulation and policies. 2. Test information systems (software) for security loopholes and vulnerability. 3. Design or develop (implement) modules or software components (software patches) that will address security issues in information systems. 4. Recommend design changes to information systems. | | |  | | |
|  | CS05 – Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. | | 1. Design solutions (systems, components or processes) for complex computing problems with resourceful, imagination, insight, originality, aesthetic judgment, enterprise and risk taking approach to meet specified user needs and standards with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. 2. Develop solutions (systems, components or processes) for complex computing problems to meet specified user requirements, following standards and frameworks with appropriate consideration for public health, safety, cultural, societal and environmental considerations. 3. Evaluate (including assessment and testing) possible solutions (systems, components or processes) for complex computing problems if they meet specified user requirements and standards with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. 4. Implement adjustments to solutions (systems, components or processes) for complex computing problems to meet desired user requirements and standards. | | |  | | |
| Modern Tool Usage | CS06 - Create, select, adapt and apply appropriate techniques, resources and modern computing tools to complex computing activities, with an understanding of the limitations to accomplish a common goal Individual & Team. | | 1. Evaluate techniques, methodologies, standards/frameworks and tools for its appropriateness to the complex computing activities to be performed considering its advantages and limitations. 2. Select, use and adapt appropriate techniques, methodologies, standards/frameworks and tools to complex computing activities. 3. Create new tools as necessary to improve the efficiency and effectiveness of performing tasks and achieve goals. 4. Create new tools that perform computing activities and define its limitations. 5. Adapt and apply appropriate techniques, resources, and modern computing tools in solving complex computing activities with an understanding of its limitations. 6. Identify and understand limitation of each techniques resources and modern computing tools. | | | Modern Tool Usage | | |
| Individual and Team  Work | CS07 – Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings. | | As a team member:   * Acquire necessary knowledge, skills and resources to be able to contribute in the completion of the assigned tasks. * Coordinate with other business professionals and professionals from other disciplines to achieve goals and complete tasks. * Raise issues and concerns to the team in order to seek consensus resolutions. * Perform the assigned tasks without the need for prodding.   As a leader of a team:   1. Set proper goals and timeline of activities to complete team objectives. 2. Allocate tasks according to team member skills and capabilities. 3. Monitor task completion and performance of team members. 4. Provide expertise, assistance and support to team members to achieve team goals. 5. Manage resources needed by the team to achieve goals. 6. Resolve and reduce conflicts within the team. 7. Provide clear instructions to team members. | | | Individual and Team  Work | | |
| Communication | CS08 – Communicate effectively with the computing community and with society at large about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions. | | 1. Interview clients to gather background information, situation, existing concerns and issues necessary to frame and achieve common understanding of problems to be addressed by computing solutions.  * Write effective reports and documentations about the results of performing specific computing and professional tasks. * Comprehend reports and other documentations with the team members and clients. * Develop effective presentation material that will enhance understanding of ideas being communicated. * Deliver presentations effectively and efficiently to various audience (computing community, society at large, and users) using English and Filipino as needed, with appropriate tone, correct grammar and construction.  1. Choose appropriate language suitable to the audience and respectful to the audience background and culture. | | | Communication | | |
| Computing  Professionalism and  Social Responsibility | CS09 – The ability to recognize the legal, social, ethical and professional issues involved in the utilization of computer technology and be guided by the adoption of appropriate professional, ethical and legal practices. | | 1. Assess computer technology utilizations if they conform to appropriate professional, ethical, legal and societal practice. 2. Create and implement a computing environment/procedure that conforms to appropriate professional, ethical, legal and societal practice. 3. Act upon situations that are not compliant to appropriate professional, ethical, legal and societal practice. | | | Computing  Professionalism and  Social Responsibility | | |
| Life-Long Learning | CS10 – Recognize the need, and have the ability, to engage in independent learning for continual development as a computing professional. | | 1. Collaborate personal work with the computing society. 2. Evaluate personal performance if it conforms to computing standards. 3. Design a personal development plan. 4. Engage in personal development activities. | | | Life-Long Learning | | |
| Knowledge  for  Solving  Computing  Problems | CS01 – Apply knowledge of computing fundamentals, knowledge of a computing specialization, and mathematics, science, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements. | | 1. Conceptualize solution models *at different levels of abstraction* by applying knowledge of computing fundamentals, technical concepts and practices, best practices and standards in the application of core information technologies, mathematics, science, and domain knowledge appropriate for the computing specialization 2. Use mathematics to model requirements into computer- ‐based models based on domain needs and requirements. 3. Assess computer--‐based models *at various levels of abstraction* based on identified user or domain needs and requirements which solved the defined problem. | | | Knowledge  for  Solving  Computing  Problems | | |
| Problem  Analysis | CS02 - Identify, analyze, formulate, research literature, and solve complex computing problems and requirements reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines | | 1. Identify user needs and requirements using fundamental principles of mathematics, computing sciences, and relevant domain disciplines 2. Formulate literature necessary for the understanding of requirements and solutions. 3. Research on related literature that will guide reaching substantiated conclusions (including *ideas of solutions*) to complex computing problems. 4. Gather information to understand user or domain needs. 5. Analyze user needs guided by gathered literature. 6. Each substantiated conclusions (including ideas of solution) using fundamental principles of mathematics, computing fundamentals, technical concepts and practices in the core computing science, and relevant domain disciplines. | | | Problem  Analysis | | |
| Design, development of solutions | CS03 – An ability to apply mathematical foundations, algorithmic principles and computer science theory in the *modeling and design* of computer--‐based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices | | 1. Design and model computer--‐based system (and its components) applying mathematical foundations, algorithmic and computer science theory, following industry acceptable standards.   a. Model the different software components  b. Design user interfaces following industry standards   1. Formulate different design and model alternatives 2. Assess the different design and models on their respective advantage and tradeoffs. 3. Select a final design and model to use in the solution. | | | Design, development of solutions | | |
| **COURSE INFORMATION** | | | | | | | | |
| **Course code:**  **CS – 205** | | **Course Title:**  **DATABASE SYSTEMS** | | **Lecture:**  **2 units** | **Laboratory:**  **1 unit** | | | **Credit Units:**  **3 units** |
| **Course Description:**  This course covers the discussion involving database systems and database management systems. Data modeling and ER modeling are covered in this course as well for database design purposes.    The course covers discussion of database systems, the nature of the data, data association, data semantics and data models. Structured Query Language (SQL) would be used to implement data models for use in business application programs. | | | | | | | | |
| **Course Prerequisite:** IT – 202 (Object – Oriented Programming) | | | | **Course Schedule:** | | **Time:** | | |
| **Program Outcomes Code** | **Course Outcomes (CO)** | | | | | | | |
| CO1 | Reach substantiated conclusions using fundamental principle of mathematics, computing fundamentals, technical concepts and practices in the core information technologies and relevant domain disciplines | | | | | | | |
| CO2 | Design and implement a simple database driven application, based on a given specification, with proper code organization and functional abstraction by applying their knowledge in the course. | | | | | | | |
| CO3 | Create a correct ER diagram based on the given business rules and normalize tables according to the rules. | | | | | | | |

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| **LEARNING PLAN** | | | | | | | | | |
| **Course Outcome** | **Intended Learning Outcomes** | | **Topics** | | **Hours** | **Learning Activities** | | **Assessment Activities** | **Resources** |
| 1. **LECTURE (36 Hours)** | | | | | | | | | |
|  | Orient the students as to what to expect as well as the requirements to pass the course. | | **Course Orientation**   1. Vision, Mission, Strategic Goals of the University 2. Course Requirements 3. Classroom Policies 4. Grade Computation | | 1 | Discussion | |  | Powerpoint Presentation |
| CO1 | Compare and contrast database from DBMS  and identify its different types  Explain the importance of database design  Explain the characteristics of a database  List the users of DBMS  Explain the role/function of DBMS | | **Introduction to Database Systems**   1. Data vs. Information 2. Data Management 3. What is a Database? 4. ACID in Database 5. What is a Database System 6. What is a DBMS? 7. The Role of a DBMS 8. Types of DBMS 9. Advantages and Disadvantages of a DBMS | | 4 | Lecture  Discussion | | Quiz 1 |  |
| CO1 | Explain the different data models used in the database design process. | | **Data Modeling Concepts**   1. What is a Data Model? 2. Building Blocks of a Data Model 3. The Concept on Business Rules 4. Types of Data Models 5. The Levels of Data Abstraction | | 4 | Lecture  Discussion | | Quiz 2  Prelim Exam |  |
| CO1 | Identify the relational model and its basic components.  Identify the primary and foreign key based from the given table  Apply the different usage of relational database operators. | | **The Relational Database Model**   * Logical View of a Relational Database * Data Types in a Relational Database Model * Keys on Relational Database Model * Data Integrity * Integrity Rules | | 8 | Lecture  Discussion | | Quiz 3  Midterm Exam |  |
| CO2 | Identify the main characteristics of entity relationship component.  Describe the process of database design.  Translate written business requirements into conceptual entity-relationship data model. | | **ER Modeling**   * The Entity Relationship Diagram * Representing Relationships using ERD * How to develop an ERD? * ERD Examples | | 12 | Lecture  Discussion | | Quiz 4  Quiz 5  Semi – Final Exam |  |
| CO2 | Apply knowledge of normalization in the database design process.  Normalize database tables through INF, 2NF, 3NF.  Convert 3NF into an ER diagram. | | **Normalization**   * Normalization through 1NF * Normalization through 2NF * Normalization through 3NF * Converting 3NF to an ERD | | 9 | Lecture  Discussion | | Quiz 6  Final Exam |  |
| 1. **LABORATORY (54 Hours)** | | | | | | | | | |
| CO2,  CO3 | Apply the knowledge of basic SQL commands using a relational database management system. | | **Introduction to SQL**   1. SQL DDL Commands 2. SQL DML Commands 3. Exploitng the SELECT Commands 4. SQL Wildcards 5. Joining Tables 6. SQL Functions 7. Multiple Table Queries | | 30 | Discussion  Live Coding  Hands-on  Laboratory | | Laboratory Exercises |  |
| CO2,  CO3 | Demonstrate how to connect a database through the use of the different connection strings | | **Database Connectivity**   1. Final Project Includes a Simple Database System   using either VB6, VB.Net, ASP.Net, or PHP as the  Front – End, with MySQL the DBMS on the Back – End | | 24 | Discussion  Live Demonstration  Hands-on  Laboratory | | Develop a simple database system that applies the CRUD operation on databases |  |
| **COURSE REFERENCES and SUPPLEMENTAL READINGS** | | | | | | | | | |
| **Books:**   1. Pratt, Philip (2012) Concepts of Database Management, 7th Edition, Cengage Learning Asia Pte., Ltd., Melbourne 2. Pratt, Philip (2011) A Complete Guide to MySQL, Cengage Learning Asia Pte., Ltd., Melbourne  * Caballero, Jonathan, Hernandez, Alexander (2010) Introduction to MySQL, Mindshapers Co., Inc., Manila * Adamski, Pratt (2010) Database Management System, Cengage Learning Asia PTe., Ltd., Singapore * Carlos, Peter (2009) Database Systems, Cengage Learning Course Technology | | | | **Electronic Sources:**   * <http://beginnersbook.com/2015/04/dbms-tutorial/> * <http://www.studytonight.com/dbms/> * <http://www.sqlcourse.com/> * <https://www.tutorialcup.com/dbms/normalization.htm> | | | | | |
| **Course Requirements:**   1. Major Examinations (Prelim, Midterm, Semi – Final, Final Exam) 2. Quizzes and Assignments 3. Hands – On Activities (Laboratory Exercises) | | | | **Grading System:**  **Written Examinations -------------------------------- 40%**   * Midterm / Final Examination ---- (16%) * Quizzes ---- (12%) * Class Participation ---- (12%)   **Practicum / Activities -------------------------------- 60%**   * Case Study / Project(s)   **Total** **-------------** **100%** | | | | | |
| **Class Policies**   1. Attendance in the class signifies readiness to participate in class discussions and activities. 2. A student is responsible for his/her absence; no make-up projects will be given. 3. A student will be automatically marked DP (Dropped) after eight (8) consecutive absences. 4. Requirements must be submitted within the designated date of submission. 5. Others (agreed upon by the class): | | | | | | | | | |
| **Prepared by:**  **CHRISTIAN A. FAJARDO, MACE**  Instructor III | | **Checked by:**  **MARVIN C. SANTILLAN, MIT MAILA ROSARIO S. PUZON, MS MATH**  Chair, CSIT Department College Dean, Computing Sciences | | | | | **Approved by:**  **RUBY ROSA V. CRUZ, Ph.D.**  Campus Executive Director | | |