FORBES COLLEGE
Legazpi City

ITPC101 – ADVANCED DATABASE MANAGEMENT SYSTEM

Degree Program:	**BS Information Technology**

	Schedule:	Day	Time	Room.
CHRISTIAN M. LANA Name of Faculty	Lecture:			
	Laboratory:			

Credit Units: 3 units   **Time Allotment:**   90 Hours (Lec=36hrs & Lab=54hrs)

COURSE DESCRIPTION

Advanced Database Management System is an advanced-level course that delves into the theoretical and practical aspects of designing, implementing, and managing complex database systems. The course builds upon the foundational knowledge of database concepts and covers advanced topics, techniques, and technologies used in modern database management systems. Students will learn about advanced database modeling, indexing, query optimization, transaction management, and emerging database technologies. Through hands-on projects and case studies, students will gain practical experience in designing and optimizing high-performance databases

COURSE PRE-REQUISITE(s):

ITCC105 – Information Management

INSTITUTIONAL OUTCOMES (IO):

FORBESIAN VALUES			
VISION	**MISSION**	**GOAL**	**INFORMATION TECHNOLOGY EDUCATION (ITE) GOAL**
Forbes College aims to be the first school of choice of students going to higher education within the Bicol region.	Enhancing lives through quality education.	Provide practical and affordable quality education	The Information Technology Education Programs aim to produce globally competitive IT professionals and socially responsible technopreneurs guided by Forbesian values.

COURSE OUTCOMES (CO):

On the completion of the course, student is expected to be able to do the following:

Graduate Outcomes		Course Outcomes
Apply knowledge of computing, science, and mathematics appropriate to the discipline Understand best practices and standards and their applications	CO1	Design a database based on user requirements using widely used modeling notation and be able to use declarative query language to elicit information
Analyze complex problems, and identify and define the computing requirements appropriate to its solution Identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems	CO2	Analyze an existing database system with respect to quality issues: Reliability, scalability, efficiency, effectiveness and security
Design, implement and evaluate computer-based systems, processes, components, or programs to meet desired needs and requirements under various constraints	CO3	Propose possible improvements in the implemented application to enhance security/avoid vulnerabilities

Apply knowledge through the use of current techniques, skills, tools and practices necessary for the IT profession Analyze the local and global impact of computing information technology on individuals, organizations, and society Understand professional, ethical, legal, security and social issues and responsibilities in the utilization of information technology	CO4	Examine the different techniques of warehousing and mining data that will support organizational decisions

LEARNING OUTPUTS (LO):

As evidence of attaining the above learning outcomes, the student has to do and submit the following:

	Learning Output	Description and other Details	Course Outcomes it represents
LO1	Set of Compiled Software Solutions	Students must design and implement an appropriate solution by applying their understanding of the topics discussed. The solution must be compiled without syntax errors nor warnings. The compiled software must run on a specific operating system.	CO1 CO2 CO3 CO4
LO2	Set of Formatted Source Code (Soft Copies)	Each source code of the solutions to programming exercises and programming challenge problems must be formatted using an appropriate coding standard. Each source code file must be prepared separately with the following documentation header information: 1.Student Information (ID, Name, Course, Major) 2.Date of Completion 3.Declaration of Known Bugs 4.Brief Description of the source file Each function or method must have the following documentation specifications: 1.Brief Description of what the routine does 2.Brief Description of parameters and their use 3.Side-effect(s) of the routine to the parameters 4.Assumptions and Assertions 5.Expected return value	CO1 CO2 CO3 CO4

RUBRIC TO ASSESS LEARNING OUTPUTS (R):

Criteria	Exemplary 5	Acceptable 3	Developing 2	Beginning 1	No Output 0
Program Correctness	The application meets all the requirements specified in the project specification. The code is syntactically and logically correct for all cases. Implementation of the program follows the Indicated guidelines and does not violate indicated restrictions. The implementation also exhibits	The code works for typical input, but fails for minor special cases; the major requirements are met, though some minor ones are not. Some implementation of the program violates indicated restrictions.	The code sometimes fails or typical input. Many parts of the program implementation violate indicated restrictions and some parts of the solution are not implemented using appropriate programming	The code often fails, even for typical input. Most indicated restrictions were violated.	Program that does not run and /or implemented incorrectly (based on specifications and restrictions) automatically gets 0 for this course output.

	appropriate use of programming constructs.		constructs.		
Effective Communication / Concept Under-standing	Answers to questions are correct, reasonable, and reflective of the code. The justifications provided are sound.	Answers to questions are correct, but some justifications provided are weak.	Answers to questions are correct, but cannot justify solution (e.g., solution via trial and error, rather than proper understanding and application of concepts).	Correct understanding of the problem, but was unable to explain workings of code provided.	Failure to explain and justify workings of the code submitted will automatically merit for this course output.
Readability	The program conforms to a coding standard that promotes code readability. Internal documentation is comprehensive.	Minor code formatting does not exhibit consistency in coding standard.	Not all functions / program features have proper internal documentation.	Minimal internal documentation and code readability.	No internal documentation and code is not readable.

OTHER REQUIREMENTS AND ASSESSMENTS (AA)

Aside from the final output, the student will be assessed at other times during the term by the following:

Assessment Activity	Description and other Details	Course Outcomes it represents
QIZ	Quiz: Brief written tests given to assess students' understanding of course topics discussed	CO1, CO2, CO3, CO4
REC	Recitation: Recitations will be given to gauge students in coping with the course topics	CO1, CO2, CO3
LAB	Laboratory Activity: Laboratory activities will be given to evaluate the technical skills of students	CO1, CO2, CO3, CO4
MAJ	Major Exam: A Comprehensive Exam covering the one fourth of the knowledge areas required in the course	CO1, CO2, CO3, CO4
PRJ	Project: Submission of a Comprehensive Project to evaluate students' knowledge per major period	CO1, CO2, CO3, CO4

GRADING SYSTEM

The final grade in this course will be composed of the following items and their weights in the final grade computation:

Assessment Item	Grade Source (Score or Rubric Grade)	Percentage of Final Grade
PRE	Score for prelim exam	15%
MID	Score for midterm exam	20%
PRF	Score for pre-final exam	25%
FIN	Score for final exam	40%

The Grade of each student per major exam			
Lecture (40%)		Laboratory (60%)	
Quiz	20%	Activities	20%
Recitation	25%	Exam	25%
Major Exams	30%	Project	50%
Attendance	5%	Attendance	5%
Project	20%		
Total	100%	Total	100%

REQUIRED READING (Textbook)
- Gould, H. (2015) Database Design and Implementation: A Practical Introduction Using Oracle SQL (1st Edition) Bookboon
- Coronel, C. Morris, S. (2018) Database Systems: Design, Implementation, & Management 13th Edition. Cengage Learning
- Silberschatz, A. et. al (2019) Database System Concepts 7th Edition. McGraw Hill

SUGGESTED READINGS
- https://www.tutorialspoint.com/dbms/index.htm
- https://www.javatpoint.com/dbms-tutorial

CLASSROOM POLICIES:

The provisions articulated in the Student Manual regarding uniforms, absences, and late exams apply.

LEARNING PLAN:

In order to achieve the outcomes of this course, learners will go through this learning plan

Week		LO	Course TOPIC	Intended Learning Outcomes (ILOs)	Teaching Learning Activities (TLAs)	ASSESSMENT Task (ATs)	Time Frame
1	Lec	LO1	▪ Review of the ERD/EER ▪ Logical Database Design and Relational Model	▪ Mastery of the EER and EERD Symbols and its usage, cardinalities ▪ Application of supertypes/subtypes, generalization/specialization, completeness, disjointness, constraints ▪ Transforming ERD and EER to relations	Lecture using PowerPoint Presentation which involves student's participation. Case–based learning.	▪ Short Quiz ▪ Recitation ▪ Assignment ▪ Machine Problems ▪ Observation ▪ Oral Questioning	P R E L I M
	Lab	LO2					
2 3 4	Lec	LO1	▪ Data Normalization ▪ Well-Structured relations ▪ First to Third Normal Form ▪ Boyce-Codd Normal Form ▪ Fourth and Fifth Normal Form	▪ Use normalization to convert anomalous tables to well-structured relations	Lecture using PowerPoint Presentation which involves student's participation. Case–based learning.	▪ Short Quiz ▪ Recitation ▪ Assignment ▪ Machine Problems ▪ Observation ▪ Oral Questioning	
	Lab	LO2					
5	Lec		**Prelim Examination**	**To assess the level of attainment of the desired outcomes.**	**Not Applicable**	**Prelim Examination**	
	Lab						
Week		LO	Course TOPIC	Intended Learning Outcomes (ILOs)	Teaching Learning Activities (TLAs)	ASSESSMENT Task (ATs)	Time Frame
6	Lec	LO1	▪ Indexing and Storage	▪ Data on External Storage ▪ File Organization and Indexing ▪ Index Data Structures ▪ Primary vs. Secondary Indexes ▪ Clustered vs. Unclustered Indexes	Lecture using PowerPoint Presentation which involves student's participation. Case–based learning.	▪ Short Quiz ▪ Recitation ▪ Assignment ▪ Machine Problems ▪ Observation ▪ Oral Questioning	M I D T E R M
	Lab	LO2					
7	Lec	LO1 LO2	▪ Query Processing	▪ Centralized query processing ▪ Distributed query processing ▪ Query Optimization ▪ Query Execution	Lecture using PowerPoint Presentation which involves student's participation.	▪ Short Quiz ▪ Recitation ▪ Assignment ▪ Machine Problems	

Week		LO	Course TOPIC	Intended Learning Outcomes (ILOs)	Teaching Learning Activities (TLAs)	ASSESSMENT Task (ATs)	Time Frame
	Lab				Case–based learning.	▪ Observation ▪ Oral Questioning	
8	Lec Lab	LO1 LO2	▪ Data Concurrency Controls	▪ Lock-based Protocols ▪ Timestamp-based Protocols ▪ Validation-Based Protocols ▪ Multiple Granularity ▪ Multiversion Schemes ▪ Deadlock Handling ▪ Insert and Delete operations ▪ Concurrency in Index Structures	Lecture using PowerPoint Presentation which involves student's participation. Case–based learning.	▪ Short Quiz ▪ Recitation ▪ Assignment ▪ Machine Problems ▪ Observation ▪ Oral Questioning	
9	Lec Lab		**Midterm Examination**	**To assess the level of attainment of the desired outcomes.**	**Not Applicable**	**Midterm Examination**	
Week		**LO**	**Course TOPIC**	**Intended Learning Outcomes (ILOs)**	**Teaching Learning Activities (TLAs)**	**ASSESSMENT Task (ATs)**	**Time Frame**
10 11	Lec Lab	LO1 LO2	▪ Designing and Creating Views, Procedures, Functions, and Triggers	▪ SQL Triggers ▪ Triggers vs. Stored Procedures ▪ Types of Triggers ▪ Creating User-Defined SQL Functions ▪ SQL Stored Procedures ▪ Creating, Updating and Dropping View	Lecture using PowerPoint Presentation which involves student's participation. Case–based learning.	▪ Short Quiz ▪ Recitation ▪ Assignment ▪ Machine Problems ▪ Observation ▪ Oral Questioning	P R E - F I N A L
12 13	Lec Lab	LO1 LO2	▪ Transaction Processing	▪ Transaction-processing Monitors ▪ Transactional Workflows ▪ High-Performance Transaction Systems ▪ Long-Duration Transactions ▪ Transaction Management in Multidatabase systems	Lecture using PowerPoint Presentation which involves student's participation. Case–based learning.	▪ Short Quiz ▪ Recitation ▪ Assignment ▪ Machine Problems ▪ Observation ▪ Oral Questioning	
14	Lec Lab		**Pre-Final Examination**	**To assess the level of attainment of the desired outcomes.**	**Not Applicable**	**Pre-Final Examination**	
Week		**LO**	**Course TOPIC**	**Intended Learning Outcomes (ILOs)**	**Teaching Learning Activities (TLAs)**	**ASSESSMENT Task (ATs)**	**Time Frame**

			Topic	Content	Teaching-Learning Activities	Assessment	
15	Lec	LO1	▪ Database Recovery	▪ Purpose of Database Recovery ▪ Types of Failures ▪ Transaction Log ▪ Data Updates ▪ Data Caching ▪ Transaction Roll-back and Roll-Forward ▪ Checkpointing ▪ Recovery Schemes ▪ Recovery in Multidatabase Systems	Lecture using PowerPoint Presentation which involves student's participation. Case–based learning.	▪ Short Quiz ▪ Recitation ▪ Assignment ▪ Machine Problems ▪ Observation ▪ Oral Questioning	
	Lab	LO2					
16	Lec	LO1	▪ Data Warehousing	▪ History and the evolution of use of Data Warehouse ▪ Data Warehouse Architecture ▪ Strategic Uses of Data Warehouses ▪ Disadvantage of Data Warehouses	Lecture using PowerPoint Presentation which involves student's participation. Case–based learning.	▪ Short Quiz ▪ Recitation ▪ Assignment ▪ Machine Problems ▪ Observation ▪ Oral Questioning	F I N A L
	Lab	LO2					
17	Lec	LO1	▪ NoSQL	▪ NoSQL vs SQL ▪ History of NoSQL ▪ Advantages and Disadvantages of NoSQL	Lecture using PowerPoint Presentation which involves student's participation. Case–based learning.	▪ Short Quiz ▪ Recitation ▪ Assignment ▪ Machine Problems ▪ Observation ▪ Oral Questioning	
	Lab	LO2					
18	Lec		**Final Examination**	**To assess the level of attainment of the desired outcomes.**	**Not Applicable**	**Final Examination**	
	Lab						