NATIONAL UNIVERSITY OF ENGINEERING
COLLEGE OF INDUSTRIAL AND SYSTEMS ENGINEERING
SYSTEMS ENGINEERING PROGRAM

SYLLABUS - ST214 DATA BASES ADMINISTRATION

I. GENERAL INFORMATION

CODE	:	ST214
SEMESTER	:	7
CREDITS	:	3
HOURS PER WEEK	:	4 (Theory – Practice)
PREREQUISITES	:	ST213 Systems Design and Analysis
CONDITION	:	Compulsory
INSTRUCTOR	:	Tino Reyna, Manuel Velarde

II. COURSE DESCRIPTION

This course presents students the concepts and techniques for the managing of data bases as one important component of an information system. Students apply normalization techniques to optimize data base models and construct data bases for diverse requirements.

III. COURSE OUTCOMES

1. Define and identify database concepts and the importance of it in society.
2. Identify and organize data from an entity to generate database structures.
3. Understand and apply the relational algebra to optimize the data query to a database.
4. Understand and apply normalization techniques to optimize database models as basis for an Information System.
5. Analyze accesses to database and choose the way of optimizing such accesses.

IV. LEARNING UNITS

1. DATABASE MODELING AND IMPLEMENTATION: ENTITY – RELATIONSHIP DIAGRAMS AND NORMALIZATION / 25 HOURS
Database technology / Statistic database design / Functions and components of a database management system / DBMS architecture / Data independence / Entity-relationship model / relational system / Normalization/ 1FN-2FN-3FN.

2. OPTIMIZATION WITH THE USE OF INDEXES / 5 HOURS
Index structure / Level indexes / Multiple-level indexes / Dynamics indexes / Tree B / Hash.

3. DATABASE QUERY LANGUAGE AND RELATIONAAL ALGEBRA. QUERY SENTENCES ANALYSIS SQL / 15 HOURS
Relational algebra / Relational algebra operations / Structured Query Language (SQL) / SQL support for relational algebra operations.

4. CREATION AND USE OF VIEWS AND TRIGGERS / 10 HOURS
Use and importance of views / Creation of views / View update / Relationship among views and database / Use of triggers / Creation of triggers / Trigger operation.

5. TRANSACTIONAL PROCESSING / 10 HOURS
Transactional processing / Data recovery techniques / Concurrency control techniques / Query optimization.

6. CREATION AND USE OF PROCEDURES AND STORED FUNCTIONS / 10 HOURS
Importance of Stored Procedures (SP)/ SP creation / SP advantages and disadvantages / SP with and without parameters / SP with return values.

V. LABORATORIES AND PRACTICAL EXPERIENCES:

Lab 1: Programming with transact SQL.
Lab 2: Transact SDQL and DDL and DML sentences.
Lab 3: Database advanced queries.
Lab 4: Data integrity implementation.
Lab 5: Data integrity implementation.
Lab 6: Index creation and planning.
Lab 7: Relational algebra implementation in SQL server.
Lab 8: Use of views.
Lab 9: Use of triggers.
Lab 10: Management of transaction
Lab 11: Use of stored procedures.

VI. METHODOLOGY

The course is carried out in theory and lab sessions. In theory sessions, the instructor expose concepts, examples and analyze the solutions and the acquired results, comments the applications in the work environment. In lab sessions, SGL server is used is used to apply concepts provided in theory sessions and to implement the solutions to proposed problems. In all theory and lab sessions, students' active participation is encouraged.

VII. EVALUATION FORMULA

The average grade PF is calculated as follows:

PF = 0.25 EP+ 0.25 EF + 0.20 (P1+P2+P3+P4)/4 + 0.30 (L1+L2+L3+L4)/4

EP: Mid-Term Exam	EF: Final Exam
P#: Quizzes	L#: Graded laboratories.

VIII. BIBLIOGRAPHY

1. **DATE, C.J.**
   Introduction to Database Systems (Spanish)
   Pearson Education Editorial, 2001
2. **ELMASRI, RAMES AND NAVATHE, SHAMKANT**
   Database Systems (Spanish)
   Pearson Addison-Wesley Editorial, 2002