



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

DATABASE SECURITY								
VI Semester: CSE (CS)								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
ACCD14	Elective	L	T	P	C	CIA	SEE	Total
		3	0	0	3	40	60	100
Contact Classes: 48	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 48			
Prerequisites: There are no prerequisites to take this course								

I. COURSE OVERVIEW:

Database security has a great impact on the design of today's information systems. This course will provide an overview of database security concepts and techniques and discuss new directions of database security in the context of Internet information management. The topics will cover database application security models, database and data auditing, XML access control, trust management and privacy protection

II. COURSE OBJECTIVES:

The students will try to learn:

- I The fundamentals of security related to database system
- II The security mechanisms to solve the problems.
- III The essentials of secure software design.
- IV The various types of attacks and intruder detection system for secure database model.

III. COURSE OUTCOMES:

At the end of the course, students should be able to:

- CO1 Analyze database security problems and evaluate security models.
- CO2 Apply security models and mechanisms for user authentication and protection.
- CO3 Design secure DBMS and software using security design methodologies.
- CO4 Evaluate statistical database protection and intrusion detection systems.
- CO5 Assess protection models for frame-based and object-oriented databases.
- CO6 Implement advanced models for protecting new-generation database systems.

IV. COURSE CONTENT:

MODULE – I: INTRODUCTION AND SECURITY MODEL-I (09)

Introduction to databases security problems in databases security controls conclusions; Security models: Introduction access matrix model; Take-grant model; Acten model; PN model; Hartson and Hsiao's Model; Fernandez's model Bussolati and Martella's model for distributed databases.

MODULE – II: SECURITY MODEL-II AND SECURITY MECHANISMS (10)

Security models 2: Bell and LaPadula's model; Bib's model; Dion's model; Sea view model; Jajodia and Sandhu's model; The lattice model for the flow control conclusion; Security mechanisms: User identification/authentication; Memory protection; Resource protection; Control flow mechanisms isolation security functionalities in some operating systems; Trusted computer system evaluation criteria.

MODULE – III: SECURITY SOFTWARE DESIGN (09)

Introduction: A methodological approach to security software design; Secure operating system. Secure Software Development Life Cycle (SSDLC)

Design secure DBMS: Design security packages database security design, Security Design Principles, authentication and Authorization Mechanisms.

MODULE - IV: STATISTICAL DATABASE PROTECTION AND INTRUSION DETECTION (10)

Discovery introduction statistics concepts and definitions; Types of attacks; Inference controls evaluation criteria for control comparison; Introduction IDES system; RETISS system; ASES system.

MODULE–V: MODEL FOR PROTECTION OF NEW GENERATION DATABASE SYSTEMS (10)

Models for the protection of new generation database Systems-1: A model for the protection of frame based systems; A model for the protection of object-oriented systems: SORION model for the protection of object-oriented databases; models for the protection of new generation database systems-2: The orion model, Jajodia and Kogan's model; A model for the protection of active databases conclusions. .

V. TEXTBOOKS:

1. Hassan A, Afyouni, “Database Security and Auditing Protecting Data Integrity and Accessibility”, Cengage Publisher, 1st Edition, 2009.
2. Maria Grazia Fugini, Silvana Castano, Giancarlo Martella, “Database Security”, Pearson Education, 1st Edition, 1994.

VI. REFERENCE BOOKS:

1. Alfred Basta, Melissa Zgola, “Database Security”, Cengage Publisher, 1st Edition, 2012.
2. P. K. Suri, “Database Security: Concepts, Approaches, and Challenges”, Pearson Education, 1st Edition, 2013.
3. Vassilis Prevelakis, Pankaj R. Gupta, “Secure Database Systems: Models, Techniques, and Applications”, Wiley, 1st Edition, 2015.

VII. ELECTRONIC RESOURCES:

1. <http://www.applicure.com/blog/database-security-best-practice>
2. https://docs.oracle.com/cd/B19306_01/network.102/b14266/apdvntro.htm#DBSEG12000
3. <http://www.cse.msu.edu>
4. <http://cms.gcgl.ac.in/>

VIII. MATERIALS ONLINE

1. Course template
2. Tutorial question bank

3. Tech talk topics
4. Open-ended experiments
5. Definitions and terminology
6. Assignments
7. Model question paper – I
8. Model question paper – II
9. Lecture notes
10. PowerPoint presentation
11. E-Learning Readiness Videos (ELRV)