



GUJARAT TECHNOLOGICAL UNIVERSITY
Syllabus for Integrated MSc, 9th Semester
Branch: Computer Science
Subject Name: Web and Database Security
Subject Code: 1390309

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE(E)	PA (M)	PA (I)	ESE(V)	
3	0	2	4	70	30	20	30	150

Content:

Sr. No.	Content	Teaching Hours	Module Weightage (%)
1	Introduction Web Application: Introduction, HTTP Protocol, Web Functionality, Encoding Schemes, Enumerating Content and Functionality, Analyzing the Application	5	10
2	Authentication Security & Injection Attacks: Authentication Techniques, Design Flaws in Authentication, Implementation Flaws in Authentication, Securing Authentication, Path Traversal Attacks, Injecting into Interpreted Contexts, SQL Injection, NoSQL Injection, XPath Injection, LDAP Injection, XML Injection, Http Injection, Mail Service Injection	7	15
3	Cross Site Scripting (XSS): Types of XSS, XSS in Real World, Finding and Exploiting XSS Vulnerabilities, Preventing XSS Attacks, Inducing User Actions, Capturing Cross-Domain Data, Client-Side Injection Attacks, Local Privacy Attacks, ActiveX Control attacks, Browser Attacks	7	20
4	Vulnerability Analysis of Source Code: Approaches to Code Review, Signatures of Common Vulnerabilities, Analysis of Java platform, Analysis of ASP.NET platform, Analysis of PHP, Analysis of Perl, Analysis of Javascript, Analysis of SQL	06	10
5	Introduction To Database Security & Database Access Control: Fundamental Data Security Requirements, Data Security Concerns, Compliance Mandates, Security Risks, Developing Enterprise Security Policy, Defining a Security Policy, Implementing a Security Policy, Techniques to Enforce Security, User Authentication, Protecting Passwords, Creating Fixed Database Links, Encrypting Database Link Passwords, Using Database Links Without Credentials, Using Database Links And Changing Passwords, Auditing With Database Links, Restricting A Database Link With Views, Trust Management & Negotiation	09	25



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6	Database Security Issues & Framework For Database Security:: Database Security Basics, Security Checklist, Reducing Administrative Effort, Applying Security Patches, Default Security Settings, Secure Password Support, Enforcing Password Management, Protecting The Data Dictionary, System and Object Privileges, Secure Data Outsourcing, Security in Advanced Database Systems, Managing Enterprise User Security , Security for Workflow Systems, Secure Semantic Web Services, Spatial Database Security, Security Reengineering, Strong Authentication, Single Sign-On, Public Key Infrastructure (PKI) Tools, Configuring SSL on the Server, Certificates, Using Kerberos for Authentication	09	20
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Reference Books:

1. “The Web Application Hacker’s Handbook”, Dafydd Stuttard, Wiley India Pvt. Ltd.
2. “Database Security”, S.Castano, M. Fugini, G. Martella,P. Samarati, Addison-Wesley
3. “Database Security “Alfred Basta, Melissa Zgola, Cengage Publication, 2012

Course Outcome:

1. Understand the fundamentals of web application architecture, the HTTP protocol, and security considerations such as encoding schemes and functionality enumeration to build secure web systems.
2. Analyze authentication vulnerabilities by identifying design and implementation flaws in authentication mechanisms and apply secure practices to mitigate injection attacks like SQL, NoSQL, XPath, LDAP, and XML.
3. Evaluate Cross-Site Scripting (XSS) vulnerabilities and other client-side injection attacks and design strategies to mitigate risks while safeguarding user privacy and securing interactions.
4. Perform vulnerability analysis of source code across platforms (e.g., Java, ASP.NET, PHP, Perl, JavaScript) by identifying common flaws and using systematic code review techniques to improve application security.
5. Develop and implement robust database security policies and frameworks by addressing data security requirements, enforcing access controls, and integrating techniques like encryption, auditing, and authentication mechanisms.

List of Experiments:

1. Reset password of Ubuntu and Cent OS (I forget the password of my machine).
2. Create the password less Authentication between 2 machines. (a. Two Linux machine b. One window and another is Linux). Use key based authentication.
3. Set strong password policy in Linux machine for authentication perform this task in Windows machine. Prevent reusing old password. Set minimum password length. Set password complexity.



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Set password expiration period. Also set accounts lock out policy after 5 attempts.

4. Make a vulnerable web application
5. Launch the Cross-site Scripting Attack, Cross-Site Request Forgery Attack, and Sql injection attack on a vulnerable web application and also perform Web Tracking using web tracking technology based on Elgg based labs on Seeds lab
6. Install Game over in your VMWARE and access it through browser. Study and perform the tests given in Section 1 and 2 also prepare the report according to your understanding.
7. Install Nginx in Linux and secure it (https) by creating your own certificate. Use different keys for encryption.
8. Collect Log Events from Windows Server by using Log Parser tool.
9. How to protect WordPress from XML-RPC Attacks on Ubuntu.
10. Configure SQUID proxy server and block social websites and chat application.