GUJARAT TECHNOLOGICAL UNIVERSITY

BRANCH NAME: M. E Computer Engineering
SUBJECT NAME: Secure Software Design and Enterprise Computing
SUBJECT CODE: 3715910

Type of course: Elective

Prerequisite: Computer Programming and Software Engineering

Rationale:. Students should be made aware with secure software design issues and understand how to fix software flaws and bugs in various software. Students will come to understand various issues like weak random number generation, information leakage, poor usability, and weak or no encryption on data traffic. They will be able to learn and apply techniques for successfully implementing and supporting network services on an Enterprise scale and heterogeneous systems environment. Study of methodologies and tools to design and develop secure software containing minimum vulnerabilities and flaws.

Teaching and Examination Scheme:

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

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	**Unit 1:** **Secure Software Design** Identify software vulnerabilities and perform software security analysis, Master security programming practices, Master fundamental software security design concepts, Perform security testing and quality assurance.	9	20
2	**Unit 2:** **Enterprise Application Development** Describe the nature and scope of enterprise software applications, Design distributed N-tier software application, Research technologies available for the presentation, business and data tiers of an enterprise software application, Design and build a database using an enterprise database system, Develop components at the different tiers in an enterprise system, Design and develop a multi-tier solution to a problem using technologies used in enterprise system, Present software solution.	12	25
3	**Unit 3: Enterprise Systems Administration** Design, implement and maintain a directory-based server infrastructure in a heterogeneous systems environment, Monitor server resource utilization for system reliability and availability, Install and administer network services (DNS/DHCP/Terminal Services/Clustering/Web/Email).	10	20
4	**Unit 4: Enterprise Network** Obtain the ability to manage and troubleshoot a network running multiple services, Understand the requirements of an enterprise network and how to go about managing them.	10	20

5	**Unit 5: Defending Applications** Handle insecure exceptions and command/SQL injection, Defend web and mobile applications against attackers, software containing minimum vulnerabilities and flaws.	**7**	**15**

Reference Books:

1. Theodor Richardson, Charles N Thies, Secure Software Design, Jones & Bartlett
2. Kenneth R. van Wyk, Mark G. Graff, Dan S. Peters, Diana L. Burley, Enterprise Software Security, Addison Wesley.

Course Outcome:

After learning the course the students should be able to:

Differentiate between various software vulnerabilities.

- Software process vulnerabilities for an organization.
- Monitor resources consumption in a software.
- Interrelate security and software development process..

Practicals & Assignments :

1. Study of various open source security tools for Application testing, Code Review, Penetration Testing, Vulnerability Assessment, Vulnerability Scanner etc.
2. Design and develop multi tier application for an enterprise.
3. Installation of Directory based Server and monitoring resource utilization.
4. Practicals based on network services such as DNS/DHCP/Terminal Services/Clustering/Web/Email
5. Study of SQL Injection Problem.
6. Developing application that can defend SQL injection problem.