GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Engineering

Level: Postgraduate

Branch: Computer Engineering (Cybersecurity)

Course / Subject Code: ME01059051

Course / Subject Name : Secure Software Design Concepts

w. e. f. Academic Year:	2024-25
Semester:	I
Category of the Course:	Program Elective Course-01

Prerequisite:	• Basic Concepts of Computer Programming and Software Engineering.
Rationale:	• Students should be made aware of software flaws and bugs. • Students will be able to understand software design and how to fix software flaws and bugs. • Students will be able to understand various issues viz. weak random number generation, information leakage, poor usability, and weak or no encryption on data traffic. • Students will be able to apply techniques for successfully implementing and supporting network services on an Enterprise scale for heterogeneous systems environment.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Understand the process and scope of enterprise system administration.	UN
02	Apply robust software-level security for an enterprise system resource.	AP
03	Apply a secure infrastructure for a heterogeneous system environment.	AP
04	Analyze the resources utilization for timely availability in an enterprise environment.	AN
05	Evaluate the performance of secure software in the context of an enterprise.	EL

**Revised Bloom's Taxonomy (RBT)*

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial / Practical		
L	T	PR	C	ESE (E)	PA/CA (M)	PA/CA (I)	ESE (V)	
3	0	2	4	70	30	20	30	150

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Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	**Secure Software Design** Identify software vulnerabilities and perform software security analysis, Master security programming practices, Master fundamental software security design concepts, Security risk management, Secure coding techniques, Perform security testing and quality assurance.	8	20
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.	8	20
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).	8	20
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.	8	20
5.	**Defending Applications and Future Trends** Handle insecure exceptions and command/SQL injection, Defend web and mobile applications against attackers, software containing minimum vulnerabilities and flaws. Latest development in the field of secure enterprise planning for Gigafactories.	8	20
	Total		**100**

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
-	20	40	20	20	-

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

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

(b) Open source software and website:

- Selenium, Appium, JMeter, SoapUI, Review Board, Phabricator, Collaborator, CodeScene, Rhodecode, Veracode, Grabber, Vega, Wapiti, WebScarab, Ratproxy, SQLMap

Suggested Course Practical List:

- The practical work will be carried out based on the content covered during the academic sessions.

List of Laboratory/Learning Resources Required:

Suggested Project List:

Suggested Activities for Students: If any

Any Other:

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