# PONDICHERRY ENGINEERING COLLEGE, PUDUCHERRY – 605 014

## CURRICULUM AND SYLLABI FOR AUTONOMOUS STREAM

# **M.TECH. (INFORMATION SECURITY) COURSES**

### (FOR STUDENTS ADMITTED FROM ACADEMIC YEAR 2015-16 ONWARDS)

# **CURRICULUM**

#### **I SEMESTER**

Subject	Name of the Subject	Catagory#	Category <sup>#</sup>		s		Marks	*	Credit
Code	Name of the Subject	Category	L	Т	Ρ	СА	SE	ТМ	creuit
CS162	Mathematical Foundations of Information Security	ΤY	3	1	-	40	60	100	4
CS163	Advanced Data Structure and Algorithms	ΤY	3	1	-	40	60	100	4
CS164	Security Threats and Trusted Computing	ΤY	3	1	-	40	60	100	4
CS165	Secure Software Engineering	ΤY	3	1	-	40	60	100	4
	Elective-I	ΤY	3	1	-	40	60	100	4
	Elective-II	ΤY	3	1	-	40	60	100	4
CS166	Information Security Laboratory-I	LB	-	-	3	60	40	100	2
	Total Cre	dits	•		•	•	•	•	26

#### **II SEMESTER**

Subject	Subject	Catagory <sup>#</sup>		Periods	5	I	Marks	k	Credit
Code	Subject	Category <sup>#</sup>	L	Т	Р	СА	SE	ТМ	Credit
CS167	Security Standards and Information Security Management	TY	3	1	-	40	60	100	4
CS168	Applied Cryptography	TCM	3	-	2	50	50	100	4
	Elective-III	ΤY	3	1	-	40	60	100	4
	Elective-IV	ΤY	3	1	-	40	60	100	4
	Elective-V	ΤY	3	1	-	40	60	100	4
	Elective-VI	TY	3	1	-	40	60	100	4
CS169	Information Security Laboratory-II	LB	-	-	3	60	40	100	2
CS159	Research Methodology	PR	-	-	3	100	-	100	1
	Total C	redits							27

#### **III SEMESTER**

Subject	Subject	Category <sup>#</sup>		Periods			Marks*	k	Credit
Code	Subject	Category	L	т	Р	CA	SE	ТМ	creat
CS170	Project Work (Phase I)	PR	-	-	-	150	150	300	9
	Total							300	9

#### **IV SEMESTER**

Subject	Subject	Category <sup>#</sup>	Р	eriod	s	MARKS*			Credit
Code	Subject	Category	L	Т	Ρ	CA	SE	тм	Cleuit
CS171	Project Work (Phase II)	PR	-	-	-	200	200	400	14
-	Professional Development Courses (2 one credit courses)	PR	-	-	-	200	-	200	2
	Tota	l Credits							16

A representative list of *Professional Development Courses* is given below (*Limited to one credit*):

- a) Industrial Training
- b) Specific Field Knowledge Training
- c) Seminar related with directed study
- d) Paper Publication in SCI Journals

# CA – Continuous Assessment, SE – Semester Examination, TM – Total Marks

\* TY – Theory, LB – Laboratory, TCM – Theory with a Mini Project, PR – Practice

### LIST OF ELECTIVES

SI.No.	Subject Code	Subject	Category
1.	CSE67	Internals of Operating System	TY
2.	CSE68	Distributed System Security	TY
3.	CSE69	Ethical Hacking	TY
4.	CSE70	Embedded Systems	TY
5.	CSE71	Information Theory and Coding	TY
6.	CSE72	Digital and Cyber Forensics	TY
7.	CSE73	Mobile Wireless Security	TY
8.	CSE74	Security Assessment and Verification	TY
9.	CSE75	Internet Security Protocols	TY
10.	CSE76	Network Security Essentials	TY
11.	CSE77	Human Aspects in Information Security	TY
12.	CSE78	Game Theory	TY
13.	CSE79	Database Security and Auditing	TY
14.	CSE80	Intelligent Systems	TY
15.	CSE81	Cloud and Big Data Security	TY
16.	CSE82	Data Hiding and Biometric Security	TY
17.	CSE83	Intellectual Property Rights	TY
18.	CSE84	Information Security Policies	TY
19.	CSE85	Secure Coding	TY
20.	CSE86	Web Application Security	TY

**SYLLABUS (Core Subjects)** 

		e and Engineering				(Informati	on Secur	ity)	
Semester : On	le		Catego	-		1			
Subject Code	Subject		Но	urs / W	eek	Credit	Maxin	num M	arks
Subject code	505,000		L	Т	Р	С	CA	SE	TN
CS162	Mathematica Information S	l Foundations of ecurity	3	1	-	4	40	60	100
Prerequisite	-								
Objectives		ovide concepts of securit arn mathematical backgro	•		ight of i	nformatio	n securit	v	
Outcomes	<ul><li>apply</li><li>math</li></ul>	completion of the course the concepts in the imple ematically prove the effic rm crypt analysis	ementation	of secu	rity issue	es		-	
UNIT – I								Hours:	09
the Euclidean a Euler's phi func	algorithm – C tion – Fermat	heory: O and $\Omega$ notation ongruences: Definitions is Little Theorem – Chi	and prope nese Remai	rties – nder Th	linear o leorem	congruenc – Applica	es, resid tions to	due cla factor	asses
	lauratic residu	es and reciprocity: Quad	ratic residu	es – Leg	enure sy	ymbol – Ja			
UNIT – II		L		C . I		<b>C</b>		Hours:	
Cryptosystems -	Cryptanalysis	ohering Matrices – – Block ciphers –Use of Id Permutation Cipher – S	Block Ciph	ers – N	Iultiple	•		•	
UNIT – III				tosysten				Ноц	rs: 09
	l tosystems: The	idea of public key cry	ntogranhy -	- The D	iffio_Ho	llman Key	Agreem		
- RSA Cryptosyste	em – Bit securit	cy of RSA – ElGamal Encry Cryptography to Commu	ption - Disc	rete Log	garithm	– Knapsa	ck prob		
UNIT – IV				Lunty - C				Цоц	rs: 09
Primality and Fa		doprimes – the rho (γ) e Quadratic Seieve metho		Forma	t factor	ization ar	nd factor		
UNIT – V								Ноц	rs: 09
Number Theory Curve Primality T	est – Elliptic Cu	Geometry: Elliptic curv rve Factorization.			Elliptic	Curve Cry	ptosyste		
		ed from all the units in th	1			<b></b> .			
Total contact Ho	urs: 45	Total Tutorials: 15	Total Prac	ctical Cla	isses: -	lota	al Hours:	60	
Text Books:		1. NI		. L. ond	<b>E</b> 1	6	2002		
2. Johannes	s A. Buchman, I	in Number Theory and ntroduction to Cryptogra					, 2002.		
<b>Reference Books</b>									
	-	cal Introduction to Cryp	otography –	- Applic	ations f	or Comm	unicatior	n Secur	ity,
1. Serge Va Springer,	, 2006.								
Springer	houp, A Comp	utational Introduction to	Number 1	Theory	and Alg	ebra, Cam	bridge U	niversi	ty
Springer, 2. Victor SI Press, 20 3. A. Mane	noup, A Comp 105. zes, P. Van Oors	utational Introduction to schot and S. Vanstone, Ha nematics of Ciphers – Nur	and Book of	Applied	Crypto	graphy, CF	RC Press,	2001.	-
Springer, 2. Victor Sl Press, 20 3. A. Mane 4. S.C. Cout	noup, A Comp 105. zes, P. Van Oors	schot and S. Vanstone, Ha	and Book of	Applied	Crypto	graphy, CF	RC Press,	2001.	-

Department : Co	•				ech. (Info	Jilliatioi	Securi	-
Semester : O	ne		gory	: TY	1	ľ		
Subject Code	Subject	Но	urs / V	/eek	Credit		imum l	Marks
-		L	Т	Р	C	CA	SE	TM
CS163	Advanced Data Structure and Algorithms	3	1	-	4	40	60	100
Prerequisite	-							
Objectives	<ul> <li>To learn techniques for designing a</li> <li>To develop the data structures for i</li> <li>To identify a problem and analyze needed to solve it</li> </ul>	mpleme	nting t	he algo	orithms			matio
Outcomes	<ul> <li>On successful completion of the course, the</li> <li>Familiarize the student with good Down design</li> <li>Develop skills of design and ana organization</li> <li>Solve problems using different dat their performance and tradeoffs</li> <li>Prove correctness and analyze run</li> </ul>	l progra lysis of ta struct	mming algorit ures a	; desig hms ir nd des	n metho n prograi ign techi	n devel	opment	and
UNIT – I							Hours	: 09
Time Creet Tree	ations – Solving Recurrence Equations – Me		•	itatioi	or wurt	I-uniteris		inays
<b>UNIT – II</b> Heapsort – Quid Binary Search T	deoff. 	Time – I	Elemer	itary D	ata Struc	tures –	<b>Hours</b> Hash T	: <b>09</b> ables
Binary Search T Emde Boas Tree	deoff. 	Time – I	Elemer	itary D	ata Struc	tures –	<b>Hours</b> Hash T ti Heap	<b>: 09</b> ables s – va
UNIT – II Heapsort – Quie Binary Search T Emde Boas Tree UNIT – III Divide-and-Cond	deoff. 	Time – I way Sea	Elemer rch Tr	itary D ees –	ata Struc 3-Trees-	ctures – Fibonaco	Hours Hash T ti Heap Hours	<b>: 09</b> ables s – va <b>: 09</b>
UNIT – II Heapsort – Quid Binary Search T Emde Boas Tree UNIT – III Divide-and-Cond techniques.	deoff. cksort – Topological sort - Sorting in Linear rees – AVL Trees – Red-Black trees – Multi- s – Data Structures for Disjoint Sets.	Time – I way Sea	Elemer rch Tr	itary D ees –	ata Struc 3-Trees-	ctures – Fibonaco	Hours Hash T ti Heap Hours	: <b>09</b> ables s – va : <b>09</b> -Bound
UNIT – II Heapsort – Quie Binary Search T Emde Boas Tree UNIT – III Divide-and-Cone techniques. UNIT – IV Elementary grap	deoff. cksort – Topological sort - Sorting in Linear rees – AVL Trees – Red-Black trees – Multi- s – Data Structures for Disjoint Sets.	Time – I way Sea nortized	Elemer rch Tr Analys	itary D ees – I iis - Ba	ata Struc 3-Trees- cktrackir	ctures – Fibonacc g – Brar	Hours Hash T i Heap Hours nch-and Hours	: 09 ables s – va : 09 -Bound
UNIT – II Heapsort – Quie Binary Search T Emde Boas Tree UNIT – III Divide-and-Cone techniques. UNIT – IV Elementary grap	deoff. cksort – Topological sort - Sorting in Linear rees – AVL Trees – Red-Black trees – Multi- s – Data Structures for Disjoint Sets. quer – Greedy – Dynamic Programming – An bh Algorithms – Minimum Spanning Trees – Si	Time – I way Sea nortized	Elemer rch Tr Analys	itary D ees – I iis - Ba	ata Struc 3-Trees- cktrackir	ctures – Fibonacc g – Brar	Hours Hash T i Heap Hours nch-and Hours	: 09 ables s – va : 09 -Bound : 09 Paths
UNIT – II Heapsort – Quid Binary Search T Emde Boas Tree UNIT – III Divide-and-Cond techniques. UNIT – IV Elementary grap Maximum Flow UNIT – V Linear program	deoff. cksort – Topological sort - Sorting in Linear rees – AVL Trees – Red-Black trees – Multi- s – Data Structures for Disjoint Sets. quer – Greedy – Dynamic Programming – An bh Algorithms – Minimum Spanning Trees – Si	Time – I way Sea nortized ngle-Sou	Elemer rch Tr Analys rce Sho	itary D ees – I iis - Ba ortest I	ata Struc 3-Trees- cktrackir Paths- All	tures – Fibonaco g – Brar - Pairs SI	Hours Hash T i Heap Hours nch-and Hours nortest	: 09 ables s – va : 09 -Boun : 09 Paths : 09
UNIT – II Heapsort – Quid Binary Search T Emde Boas Tree UNIT – III Divide-and-Cond techniques. UNIT – IV Elementary grap Maximum Flow UNIT – V	deoff. cksort – Topological sort - Sorting in Linear rees – AVL Trees – Red-Black trees – Multi- s – Data Structures for Disjoint Sets. quer – Greedy – Dynamic Programming – An bh Algorithms – Minimum Spanning Trees – Si - Multithreaded Algorithms. ming – Polynomials and FFT – Number-Theor	Time – I way Sea nortized ngle-Sou	Elemer rch Tr Analys rce Sho	itary D ees – I iis - Ba prtest I 5 – NP-	ata Struc 3-Trees- cktrackir Paths- All Complet	tures – Fibonaco g – Brar - Pairs SI	Hours Hash T i Heap hours hort-and Hours hortest Approxi	: 09 ables s – va : 09 -Boun : 09 Paths : 09 matio
UNIT – II Heapsort – Quid Binary Search T Emde Boas Tree UNIT – III Divide-and-Cond techniques. UNIT – IV Elementary grap Maximum Flow UNIT – V Linear program Algorithms. Total contact He Text Books: 1. Thomas PHI, 3rd 2. G. Brass	deoff.  cksort – Topological sort - Sorting in Linear rees – AVL Trees – Red-Black trees – Multi- s – Data Structures for Disjoint Sets.  quer – Greedy – Dynamic Programming – An bh Algorithms – Minimum Spanning Trees – Si - Multithreaded Algorithms.  ming – Polynomials and FFT – Number-Theor burs: 45 Total Tutorials: 15 Total H. Coreman, Charles E. Leiserson, Ronald L. R Edition, 2010. aard and P. Bratley, Algorithmics: Theory and F	Time – I way Sea nortized ngle-Sou etic Algo tal Practi ivest and	Elemer rch Tr Analys rce Sho prithms	itary D ees – iis - Ba prtest I s – NP- sses: - rd Stei	ata Struc 3-Trees- cktrackir Paths- All Complet	rtures – Fibonaco g – Brar - Pairs Sl eness – A <b>Total Ho</b>	Hours Hash T i Heap hours hoch-and Hours hortest Hours Approxi	: 09 ables s – va : 09 -Boun : 09 Paths : 09 matio
UNIT – II Heapsort – Quid Binary Search T Emde Boas Tree UNIT – III Divide-and-Cond techniques. UNIT – IV Elementary grap Maximum Flow UNIT – V Linear program Algorithms. Total contact Ho Text Books: 1. Thomas PHI, 3rd 2. G. Brass Reference Book 1. E. Horov 2. E. Horov	deoff.  cksort – Topological sort - Sorting in Linear rees – AVL Trees – Red-Black trees – Multi- s – Data Structures for Disjoint Sets.  quer – Greedy – Dynamic Programming – An bh Algorithms – Minimum Spanning Trees – Si - Multithreaded Algorithms.  ming – Polynomials and FFT – Number-Theor burs: 45 Total Tutorials: 15 Total H. Coreman, Charles E. Leiserson, Ronald L. R Edition, 2010. aard and P. Bratley, Algorithmics: Theory and F	Time – I way Sea nortized ngle-Sou etic Algo tal Practi ivest and Practice, s of Data gorithms	Elemer rch Tr Analys rce Sho prithms d Cliffo Printic struct s/C++,	itary D ees – I iis - Ba ortest I s – NP- sses: - rd Stei e –Hall ures in 2nd Ed	ata Struc 3-Trees- cktrackir Paths- All Complet n, Introdu , 1997. C++, Uiv ition, Un	rtures – Fibonaco g – Brar - Pairs SI eness – A <b>Total Ho</b> action to ersity Pr iversity F	Hours Hash T i Heap hours hoch-and Hours hortest Hours Approxi Durs: 60 Algorit	: 09 ables s – va : 09 Paths : 09 matio hms,
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Department : Co	• • •	Progra					,	
Semester : Or		Catego		TY		1		
Subject Code	Subject	Hou	rs / We	ek	Credit		imum N	/larks
-		L	Т	Р	С	CA	SE	TM
CS164	Security Threats and Trusted Computing	3	1	-	4	40	60	100
Prerequisite	-							
Objectives	<ul> <li>To introduce the various types of the and threat containment.</li> <li>To familiarize the vulnerability scannet.</li> <li>To introduce the concept of Trusted</li> </ul>	ing proc	ess and				reat mo	odelin
Outcomes	<ul> <li>On successful completion of the course, the s</li> <li>Understand the various threats to se</li> <li>Perform threat modeling to identify,</li> <li>Understand the operation of Trusted</li> </ul>	curity ar prioritiz	nd their e and n	relati	on to vul			
UNIT – I	Introduction						Hour	s: 09
Assessment – Vi	ity threats – Motives – Consequences of Threa ulnerability Assessment Tools – Vulnerability Threats – Environmental Threats.		-					
UNIT – II	Network Security Threats						Hour	rs: 09
	Site Scripting – Cross Site Request Forgery –	SQL Inje	ction-	Wardi	aling – W	/arFlyin	g – War	drivin
– War Chalking – UNIT – III Approaches to th	Site Scripting – Cross Site Request Forgery – - Network Reconnaisance – Cloud Threats. Threat Modeling nreat modeling – Threat Identification – STRIDE Elicitation Approaches – Threat Prioritization -	E metho	d – Atta	ick Tre	es – Mai		Hour	s: 09
– War Chalking – <b>UNIT – III</b> Approaches to th Threats – Threat	- Network Reconnaisance – Cloud Threats. Threat Modeling nreat modeling – Threat Identification – STRIDE	E metho	d – Atta	ick Tre	es – Mai		Hour	ressin
– War Chalking – UNIT – III Approaches to th Threats – Threat UNIT – IV	- Network Reconnaisance – Cloud Threats. Threat Modeling nreat modeling – Threat Identification – STRIDE Elicitation Approaches – Threat Prioritization -	E metho - Threat	d – Atta Modeli	ick Tre ng Too	ees – Mai ols.	naging a	Hour nd Add	ressin
– War Chalking – UNIT – III Approaches to th Threats – Threat UNIT – IV Introduction to	- Network Reconnaisance – Cloud Threats. Threat Modeling nreat modeling – Threat Identification – STRIDE Elicitation Approaches – Threat Prioritization - Trusted Computing	E metho - Threat	d – Atta Modeli	ick Tre ng Too	ees – Mai ols.	naging a	Hour nd Add	ressin
– War Chalking – UNIT – III Approaches to th Threats – Threat UNIT – IV Introduction to	- Network Reconnaisance – Cloud Threats. Threat Modeling preat modeling – Threat Identification – STRIDE Elicitation Approaches – Threat Prioritization – Trusted Computing Trusted Computing – Secure Co processors	E metho - Threat	d – Atta Modeli	ick Tre ng Too	ees – Mai ols.	naging a	Hour nd Add	<b>s: 09</b> ressin <b>s: 09</b> ruste
<ul> <li>War Chalking -</li> <li>UNIT - III</li> <li>Approaches to the theorem of theorem of the theorem of theorem of theorem of theorem of the</li></ul>	<ul> <li>Network Reconnaisance – Cloud Threats.</li> <li>Threat Modeling</li> <li>nreat modeling – Threat Identification – STRIDE Elicitation Approaches – Threat Prioritization –</li> <li>Trusted Computing</li> <li>Trusted Computing – Secure Co processors es – Motivating scenarios.</li> <li>Design Goals and Implementation</li> <li>Trusted Computing modules – Trusted computing</li> </ul>	E method - Threat - Crypto uting and	d – Atta Modeli ographi d Secur	ick Tre ng Too c acce e Stor	ees – Mar bls. elerators age – Tr	– Dong usted C	Hour nd Add Hour gles – 1 Hour omputi	<b>s: 09</b> ressin <b>s: 09</b> Trustec <b>s: 09</b> ng and
<ul> <li>War Chalking -</li> <li>UNIT - III</li> <li>Approaches to the Threats - Threat</li> <li>UNIT - IV</li> <li>Introduction to platform module</li> <li>UNIT - V</li> <li>Design goals of Secure Identificat</li> <li>Total contact Homes</li> </ul>	<ul> <li>Network Reconnaisance – Cloud Threats.</li> <li>Threat Modeling</li> <li>nreat modeling – Threat Identification – STRIDE Elicitation Approaches – Threat Prioritization –</li> <li>Trusted Computing</li> <li>Trusted Computing – Secure Co processors es – Motivating scenarios.</li> <li>Design Goals and Implementation</li> <li>Trusted Computing modules – Trusted computing</li> </ul>	E methoo - Threat – Crypto	d – Atta Modeli ographi d Secur	ick Tre ng Too c acce e Stor	ees – Mar bls. elerators age – Tr	naging a – Dong	Hour nd Add Hour gles – 1 Hour omputi	<b>s: 09</b> ressin <b>s: 09</b> Trustec <b>s: 09</b> ng and
<ul> <li>War Chalking -</li> <li>UNIT - III</li> <li>Approaches to the Threats - Threat</li> <li>UNIT - IV</li> <li>Introduction to platform module</li> <li>UNIT - V</li> <li>Design goals of Secure Identificat</li> <li>Total contact Hot</li> <li>Text Books:         <ol> <li>John Vac</li> <li>Adam Sh</li> <li>David Charry Frusted With Charles and Sh</li> </ol> </li> </ul>	<ul> <li>Network Reconnaisance – Cloud Threats.</li> <li>Threat Modeling</li> <li>nreat modeling – Threat Identification – STRIDE Elicitation Approaches – Threat Prioritization –</li> <li>Trusted Computing</li> <li>Trusted Computing – Secure Co processors es – Motivating scenarios.</li> <li>Design Goals and Implementation</li> <li>Trusted Computing modules – Trusted computing tion – Administration of Trusted Devices.</li> <li>Design Information Security, 2 nd Edition</li> <li>Ca, Managing Information Security, 2 nd Edition</li> </ul>	E method - Threat - Crypto uting and I <b>Practic</b> on, Syngr y, John V Safford,	d – Atta Modeli ographi d Secur <b>al Class</b> ess, 20: Viley ar Leende	e Stor e Stor fes: - 14. nd Sor ert Van	ees – Mar elerators age – Tr 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	– Dong usted C	Hour nd Add Hour gles – 1 Hour omputi	ressin ressin ruste ruste rs: 09 ng an
<ul> <li>War Chalking -</li> <li>UNIT - III</li> <li>Approaches to the Threats - Threat</li> <li>UNIT - IV</li> <li>Introduction to platform module</li> <li>UNIT - V</li> <li>Design goals of Secure Identificat</li> <li>Total contact Hoto Secure Identificat</li> <li>Total contact Hoto Secure Identificat</li> <li>I. John Vac 2. Adam Shan Shan Shan Chart Books:</li> <li>1. John Vac 2. Adam Shan Shan Shan Shan Shan Shan Shan Shan</li></ul>	<ul> <li>Network Reconnaisance – Cloud Threats.</li> <li>Threat Modeling</li> <li>nreat modeling – Threat Identification – STRIDE Elicitation Approaches – Threat Prioritization –</li> <li>Trusted Computing</li> <li>Trusted Computing – Secure Co processors es – Motivating scenarios.</li> <li>Design Goals and Implementation</li> <li>Trusted Computing modules – Trusted computing modules – Trusted computing.</li> <li>Trusted Computing modules – Trusted computing.</li> <li>Trusted Computing modules – Trusted computing.</li> <li>Total Tutorials: 15 Total</li> <li>Total Computing for Securit nallener, Kent Yoder, Ryan Catherman, David Computing, Pearson Education, 2007.</li> </ul>	E method - Threat - Crypto uting and I Practic on, Syngr y, John V Safford, ats, Ceng	d – Atta Modeli ographi d Secur <b>al Class</b> ess, 20: Wiley ai Leende	c acce e Stor e Stor es: - 14. nd Sor ert Var arning	ees – Mar ols. elerators age – Tr as, 2014. n Doorn , 2010.	– Dong usted C fotal Ho	Hour nd Add Hour gles – 1 Hour omputi	ressin ressin ruste ruste rs: 09 ng an
<ul> <li>War Chalking -</li> <li>UNIT - III</li> <li>Approaches to the threats - Threat</li> <li>UNIT - IV</li> <li>Introduction to platform module</li> <li>UNIT - V</li> <li>Design goals of the test of te</li></ul>	<ul> <li>Network Reconnaisance – Cloud Threats.</li> <li>Threat Modeling</li> <li>nreat modeling – Threat Identification – STRIDE Elicitation Approaches – Threat Prioritization –</li> <li>Trusted Computing</li> <li>Trusted Computing – Secure Co processors es – Motivating scenarios.</li> <li>Design Goals and Implementation</li> <li>Trusted Computing modules – Trusted computing information of Trusted Devices.</li> <li>Durs: 45</li> <li>Total Tutorials: 15</li> <li>Total Computing for Securit nallener, Kent Yoder, Ryan Catherman, David Computing, Pearson Education, 2007.</li> <li>s:</li> <li>cil, Network Defense: Security Policy and Thread</li> </ul>	E method - Threat - Crypto uting and I Practic on, Syngr y, John V Safford, ats, Ceng d Applica	d – Atta Modeli ographi d Secur <b>al Class</b> ess, 20: Viley au Leende gage Lea	c acce e Stor e Stor es: - 14. nd Sor ert Var arning Spring	ees – Mar ols. elerators age – Tr as, 2014. n Doorn , 2010. eer Scien	– Dong usted C <b>Fotal Ho</b> , A Prac	Hour nd Add Hour gles – 1 Hour omputi ours: 60	ressin ressin ruste ruste rs: 09 ng an uide t

	mputer Science and Engineering	Progra	amme	: M.Tech	n. (Informati	on Securit	:y)	
Semester : Or	e	Categ		: TY				
Subject Code	Subject	Но	urs / W	eek	Credit	Max	imum N	/larks
Subject Code	Subject	L	Т	Р	С	СА	SE	ТМ
CS165	Secure Software Engineering	3	1	-	4	40	60	100
Prerequisite	-							
Objectives	<ul> <li>To understand the security software development</li> <li>To understand how the sec</li> </ul>						-	
	On successful completion of the co	urse, the st	udents	will be	able to:			
Outcomes	• appreciate the importance	of security	consid	erations	in software	engineer	ing	
	<ul> <li>design and develop secure</li> </ul>					C	U U	
UNIT – I	Introduction to Secure Software Er						Hour	s: 09
Security Issues	n Software – Software Assurance		are Se	curity –	Threats an	d Source	s of Sc	ftwar
•	efits of Detecting Software Security			•				
Defining Propert	ies of Secure Software – How to Influ	ence, Assei	t and S	Specify D	Desired Secu	rity Prope	erties.	
UNIT – II	Requirements Gathering for Secur	e Software	9				Hour	's: 09
Introduction – N	lisuse and Abuse Cases – The SQUAF	RE Process	Model	– SQUA	RE Sample C	Dutputs –	Require	ement
Elicitation – Requ	irements Prioritization.					•	•	
UNIT – III	Secure Software Architecture and	Design					Hour	s: 09
Software Securit	y Practices for Architecture and Desig	gn: Archite	ctural F	lisk Ana	lysis – Softw	vare Secur	ity Kno	wledg
for Architecture	and Design: Security Principles – Secu	- urity Guidel	ines ar	d Attacl	k Patterns.		-	-
UNIT – IV	Secure Coding and Testing	-					Hour	's: <b>0</b> 9
Code Analysis -	Coding Practices – Software Securit	y Testing -	- Secu	rity Test	ing Conside	rations Th	nrougho	out th
SDLC.								
				<u> </u>				
UNIT – V	Security – Complexity and Manage	ement for S	Secure	Softwar	е		Hour	's: <b>09</b>
	Security – Complexity and Manage – Functional and Attacker Perspect					Complexi		
Security Failures		tives for Se	ecurity	Analysis	s – System	•	ty Drive	ers and
Security Failures Security – Deep	- Functional and Attacker Perspec	tives for Se overnance	ecurity and Se	Analysis ecurity -	s – System – Adopting	an Enterp	ty Drive prise Sc	ers an
Security Failures Security – Deep	<ul> <li>Functional and Attacker Perspect</li> <li>Technical Problem Complexity – G</li> <li>ork – Required Level of Security – Sec</li></ul>	tives for Se overnance curity and F	ecurity and Se Project	Analysis ecurity -	s – System – Adopting ement – Mat	an Enterp	ty Drive orise Sc ractice.	ers and oftware
Security Failures Security – Deep Security Framew	<ul> <li>Functional and Attacker Perspect</li> <li>Technical Problem Complexity – G</li> <li>ork – Required Level of Security – Sec</li></ul>	tives for Se overnance curity and F	ecurity and Se Project	Analysis ecurity - Manage	s – System – Adopting ement – Mat	an Enterp urity of Pi	ty Drive orise Sc ractice.	ers and oftware
Security Failures Security – Deep Security Framew Total contact Ho Text Books:	<ul> <li>Functional and Attacker Perspect</li> <li>Technical Problem Complexity – G</li> <li>ork – Required Level of Security – Sec</li></ul>	tives for Se overnance curity and F <b>Total</b>	ecurity and Se Project <b>Practic</b>	Analysis ecurity - Manage al Classe	s – System – Adopting ement – Mat e <b>s: -</b>	an Enterp urity of Pr Total Ho	ty Drive orise Sc ractice.	ers an oftwar
Security Failures Security – Deep Security Framew Total contact Ho Text Books: 1. Allen Jul	<ul> <li>Functional and Attacker Perspect</li> <li>Technical Problem Complexity – G</li> <li>ork – Required Level of Security – Security</li> <li>urs: 45</li> <li>Total Tutorials: 15</li> </ul>	tives for Se overnance curity and F <b>Total</b> rity Engine	ecurity and Seroject Practic ering:	Analysis ecurity - Manage al Classe	s – System – Adopting ement – Mat e <b>s: -</b>	an Enterp urity of Pr Total Ho	ty Drive orise Sc ractice.	ers and oftwar
Security Failures Security – Deep Security Framew Total contact Ho Text Books: 1. Allen Jul	<ul> <li>Functional and Attacker Perspect</li> <li>Technical Problem Complexity – Gork – Required Level of Security – Security - Securits</li> <li>Total Tutorials: 15</li> <li>Total Tutorials: 6</li> <li>Figure Figure Security - Secu</li></ul>	tives for Se overnance curity and F <b>Total</b> rity Engine	ecurity and Seroject Practic ering:	Analysis ecurity - Manage al Classe	s – System – Adopting ement – Mat e <b>s: -</b>	an Enterp urity of Pr Total Ho	ty Drive orise Sc ractice.	ers and oftwar
Security Failures Security – Deep Security Framew Total contact Ho Text Books: 1. Allen Jul Software Reference Books	<ul> <li>Functional and Attacker Perspect</li> <li>Technical Problem Complexity – Gork – Required Level of Security – Security - Securits</li> <li>Total Tutorials: 15</li> <li>Total Tutorials: 6</li> <li>Figure Figure Security - Secu</li></ul>	tives for Se overnance curity and F <b>Total</b> rity Engine ssional, 201	ecurity and Se Project Practic ering: . 3.	Analysis ecurity - Manage al Classe A Guide	s – System – Adopting ement – Mat es: - for Project	an Enterp urity of Pr <b>Total Ho</b> Managers	ty Drive orise Sc ractice. ours: 60	ers an oftwar eries i
Security Failures Security – Deep Security Framew Total contact Ho Text Books: 1. Allen Jul Software Reference Books 1. Mouratio	<ul> <li>Functional and Attacker Perspect</li> <li>Technical Problem Complexity – Gork – Required Level of Security – Securits</li> <li>Total Tutorials: 15</li> <li>Total Tutorials: 15</li> <li>Total Tutorials: 9</li> <li>Figure Security – Security – Security – Security – Security</li> </ul>	tives for Se overnance curity and F <b>Total</b> rity Engine ssional, 201	ecurity and Se Project Practic ering: . 3.	Analysis ecurity - Manage al Classe A Guide	s – System – Adopting ement – Mat es: - for Project	an Enterp urity of Pr <b>Total Ho</b> Managers	ty Drive orise Sc ractice. ours: 60	ers an oftwar eries i
Security Failures Security – Deep Security Framew Total contact Ho Text Books: 1. Allen Jul Software Reference Books 1. Mouratio	<ul> <li>Functional and Attacker Perspect</li> <li>Technical Problem Complexity – G</li> <li>ork – Required Level of Security – Securits</li> <li>Total Tutorials: 15</li> <li>Total Tutorials: 15</li> <li>Total Function of Software Security</li> <li>Engineering, Addison-Wesley Profests</li> <li>Haralambos, Software Engineering</li> </ul>	tives for Se overnance curity and F <b>Total</b> rity Engine ssional, 201	ecurity and Se Project Practic ering: . 3.	Analysis ecurity - Manage al Classe A Guide	s – System – Adopting ement – Mat es: - for Project	an Enterp urity of Pr <b>Total Ho</b> Managers	ty Drive orise Sc ractice. ours: 60	ers an oftwar eries i
Security Failures Security – Deep Security Framew Total contact Ho Text Books: 1. Allen Jul Software Reference Books 1. Mouratio Premier Websites:	<ul> <li>Functional and Attacker Perspect</li> <li>Technical Problem Complexity – G</li> <li>ork – Required Level of Security – Securits</li> <li>Total Tutorials: 15</li> <li>Total Tutorials: 15</li> <li>Total Function of Software Security</li> <li>Engineering, Addison-Wesley Profests</li> <li>Haralambos, Software Engineering</li> </ul>	tives for Se overnance curity and F <b>Total</b> rity Engine ssional, 201	ecurity and Se Project Practic ering: . 3.	Analysis ecurity - Manage al Classe A Guide	s – System – Adopting ement – Mat es: - for Project	an Enterp urity of Pr <b>Total Ho</b> Managers	ty Drive orise Sc ractice. ours: 60	ers an oftwar eries i
Security Failures Security – Deep Security Framew Total contact Ho Text Books: 1. Allen Jul Software Reference Books 1. Mouratio Premier Websites: 1. www.sis	<ul> <li>Functional and Attacker Perspect</li> <li>Technical Problem Complexity – Gork – Required Level of Security – Securits</li> <li>Total Tutorials: 15</li> <li>Total Tutorials: 15</li> <li>Total Tutorials: 15</li> <li>Total Tutorials: 15</li> </ul>	tives for Se overnance curity and F <b>Total</b> rity Engine ssional, 201 ng for Secu nre.pdf	ecurity and So Project Practic ering: . 3. re Syst	Analysis ecurity - Manage al Classe A Guide ems: Ind	s – System – Adopting ement – Mat es: - for Project dustrial and	an Enterp urity of Pr <b>Total Ho</b> Managers Research	y Drive orise Sc actice. ours: 60 5, SEI Se	ers and oftwar eries in

Department : Co	mputer Science and Engineering	Progra	amme :	ne : M.Tech. (Information Security) : LB					
Semester : Or	ie	Categ	ory :	LB					
Cubicat Cada	Cubicat	Но	urs / W	eek	Credit	Max	imum N	1arks	
Subject Code	Subject	L	Т	Р	С	СА	SE	ТМ	
CS166	Information Security Laboratory – I	-	-	3	2	60	40	100	
Prerequisite	-								
	To gain a hands on experience	e of crypt	tograph	nic algor	ithms				
Objectives	To inculcate logical and practi	cal think	ing tow	ards se	curity proble	m solving	g		
	• To learn a hands on experience	e of thre	eats and	d attack	S		_		
	On successful completion of the cours	e, stude	nts will	be able	to:				
_	<ul> <li>Implement cryptographic algo</li> </ul>	orithms t	o solve	specifie	ed problems				
Outcomes	Solve Security Problem for the			·	•				
	<ul> <li>Have the programming skills i</li> </ul>		•	securit	v				
Cycle – I					/		Hou	ırs: 30	
Any Ten of the fo	ollowing exercises have to be Implement	ted							
	anding of cryptographic algorithms and		entatio	n of the	same in C or	C++			
	nance evaluation of various cryptograph								
3. Illustrat	e Intrusion Detection and IPS	Ū							
4. Progran	n to implement AVL tree								
5. Progran	n to implement Dynamic Programming.								
6. To verif	y the integrity of the message using Digi	ital signa	ture.						
7. Penetra	tion Testing and justification of penetra	tion test	ing thro	ough ris	k analysis				
8. Passwor	rd guessing and Password Cracking								
9. Configu	ring S/MIME for e-mail communication								
10. Implem	entation of Access Control List								
11. Develop	an application which should include au	thentica	tion, au	uthoriza	tion and acce	ess contr	ol mech	anism.	
12. Implem	ent Elliptic Curve Cryptosystems								
13. Implem	ent RSA Cryptosystem								
14. Implem	ent the Diffie–Hellman Key Agreement	Protocol							
•	ent Zero-Knowledge Protocol								
16. Implem	ent Oblivious Transfer								
Cycle – II							Hou	ırs: 15	
17. Any Five	e programs related to concern electives	offered i	in this s	emeste	r need to be	impleme	ented.		
Total contact Ho	urs: - Total Tutorials: -	Total				otal Hou			

•	omputer Science			ramme		•		untyj	
Semester : T	vo		Cate	<u> </u>	: TY		r		
Subject Code	Subject			ours / W		Credit		imum N	1
	-		L	Т	Р	C	CA	SE	ТМ
CS167		lards and Information	3	1	-	3	40	60	100
	Security Mana	agement	5	-		5	.0	00	100
Prerequisite:	-								
Objectives	inform • To int develo	ompile, analyze, and ass nation security issues egrate principles and tech opment of information se iderstand the security st	nniques curity sti	of risk ar rategies	nalysis,	project plar	ning an	d ethics	in the
Outcomes	On successful Designed Have securit	completion of the course n information system with knowledge on security s ty n information security b	n high lev tandard:	vel of seo s, laws a	curity b and po	y planning a licies and p	ractice i	n infor	mation
UNIT – I	Introduction							Hour	s: 09
Applying Project Planning – Prect Policy, Standard	t Management ursors to Plann s, and Practices	ent of Information Secu to Security – Project M ing– Strategic Planning – – Planning for Informatic Planning–Components of	lanagem Informa on Secur	ent Too ition Sec ity Imple	ls – Pl curity C ementa	anning for Governance- tion – Planr	Security - Inform iing for (	: The F ation S Conting	Role of ecurity encies:
		Planning-Components of	continge	ency Pla	nning–	BUSINESS RE	sumption	on Plan	ning –
Testing Continge									
UNIT – II		y and Standards erprise Information Securi						Hour	
System Security and Accreditation	Engineering Cap on NIST SP 800-3	Effective Policy – Security Dability Maturity Model (S 7, NSTISS Instruction-100 s in Certification and Accre	SE-CMN 0, ISO 27	l) — Infor 2001/270	matior	Systems Se	curity C	ertificat	
UNIT – III	Risk Managem	ent and Auditing for Secu	urity,						
		0						Hour	s: 09
Selecting a Risk Feasibility and Need for securi Technology base UNIT – IV	Control Strate Cost-Benefit An ty audits – Orga ed audits. Information Se	t: Identifying Risk – Asse gy – Quantitative Versu alysis – Recommended F anizational roles – Auditor ecurity Management in O	essing R s Qualit Risk Con r's roles rganizat	ative Ris trol Prac – Types i <b>ons</b>	sk Con ctices - of sec	rol Practice - Introductio urity audits	es – Ma on to Se – Audit	ol Stra inaging ecurity approa	tegies– Risk – Audits: iches – <b>s: 09</b>
Selecting a Risk Feasibility and Need for securi Technology base UNIT – IV	Control Strate Cost-Benefit An ty audits – Orga ed audits. Information Se	t: Identifying Risk – Asse gy – Quantitative Versu alysis – Recommended F unizational roles – Auditor	essing R s Qualit Risk Con r's roles rganizat	ative Ris trol Prac – Types i <b>ons</b>	sk Con ctices - of sec	rol Practice - Introductio urity audits	es – Ma on to Se – Audit	ol Stra inaging ecurity approa	tegies– Risk – Audits: aches – <b>s: 09</b>
Selecting a Risk Feasibility and Need for securir Technology base <b>UNIT – IV</b> Developing the Components of Training and Aw Access Control Practices: – Be Security: Staffin for Nonemploye	c Control Strate Cost-Benefit An ty audits – Orga ed audits. Information Se Security Program the Security Program Models – Secur Nodels – Secur nchmarking – I g the Security F ees – Employme	t: Identifying Risk – Asse gy – Quantitative Versu alysis – Recommended F inizational roles – Auditor curity Management in Or m: Organizing for Security ogram – Information Security m – Security Management ity Architecture Models Performance Measures in function – Information Security of the security Security Performance Measures in function – Information Security Management	essing R s Qualit Risk Con r's roles rganizati y – Placin urity Rolo t Models – Securi n Inforn	ative Ris trol Prac – Types ions ng Inforr es and T s: Bluepr ty Mana nation S	sk Con ctices - of sec mation itles – ints, Fr agemer ecurity	Frol Practice Introduction urity audits Security with Implementing ameworks, Management	es – Ma on to Se – Audit chin an G ng Secur and Secur Security ent. – F	rol Stra inaging ecurity approa <b>Hour</b> Organiz rity Edu urity Ma Personn Conside	tegies– Risk – Audits: aches – <b>s: 09</b> ation – cation, odels – gement el and rations
Selecting a Risk Feasibility and Need for securi Technology base UNIT – IV Developing the Components of Training and Aw Access Control Practices: – Be Security: Staffin for Nonemploye UNIT – V	c Control Strate Cost-Benefit An ty audits – Orga ed audits. Information Se Security Program the Security Program Models – Secur Models – Secur nchmarking – I g the Security F ees – Employment	t: Identifying Risk – Asse gy – Quantitative Versu alysis – Recommended F inizational roles – Auditor curity Management in O m: Organizing for Security ogram – Information Security Management ity Architecture Models Performance Measures in function – Information Security inction – Information Security Maintenance	essing R s Qualit Risk Con r's roles rganizati y – Placin urity Rold t Models – Securi n Inforn curity Pl	ative Ris trol Prac – Types ions ng Inforr es and T s: Bluepr ty Mana nation S rofessior	sk Con ctices - of sec mation itles – ints, Fr agemer security nal Cre	trol Practice - Introductio urity audits Security with Implementin ameworks, at Models– Managemo dentials – So	es – Ma on to Se – Audit chin an ( ng Secur and Security ent. – F ecurity (	rol Stra inaging ecurity approa Prganiz rity Edu urity Edu urity Manag Personn Conside	tegies– Risk – Audits: Iches – s: 09 ation – cation, odels – gement el and rations
Selecting a Risk Feasibility and Need for securi Technology base <b>UNIT – IV</b> Developing the Components of Training and Aw Access Control Practices: – Be Security: Staffin for Nonemploye <b>UNIT – V</b> Legal, Ethical, an Framework for FISMA Acts – U Organizations a	Control Strate Cost-Benefit An ty audits – Orga ed audits. Information Se Security Program the Security Program Models – Secur Models – Secur nchmarking – I g the Security F ees – Employmen Law, Ethics and Information Sec J.S. Laws – Intern nd their Codes of	t: Identifying Risk – Asse gy – Quantitative Versu alysis – Recommended F inizational roles – Auditor curity Management in Or m: Organizing for Security ogram – Information Security m – Security Management ity Architecture Models Performance Measures in function – Information Security of the security Security Performance Measures in function – Information Security Management	essing R s Qualit Risk Con r's roles rganizati v – Placin urity Rold t Models – Securi n Inforn curity Pl urity: Inf dian Cop al Bodie	ative Ris trol Prac – Types ons ng Inforr es and T :: Bluepr ty Mana nation S rofessior formatio pyright A s –Ethic	sk Con ctices - of sec mation itles – ints, Fr agemen ecurity nal Cre n Secu sct – H cs in Ir	trol Practice - Introduction urity audits Security with Implementing ameworks, of Models- of Managemon dentials - So dentials - So rity and the IPAA of 199 of ormation	es – Ma on to Se – Audit chin an ( ng Secur and Secur Security ent. – F ecurity ( Law – L 6, GLBA Security	rol Stra inaging ecurity approa Hour Organiz rity Edu urity Edu urity Manag Personn Conside Hour aws an a of 199 –Profe	tegies– Risk – Audits: iches – s: 09 ation – cation, odels – gement el and rations s: 09 d Legal 19, and ssional
Selecting a Risk Feasibility and Need for securir Technology base <b>UNIT – IV</b> Developing the Components of Training and Aw Access Control Practices: – Be Security: Staffin for Nonemploye <b>UNIT – V</b> Legal, Ethical, an Framework for FISMA Acts – L	c Control Strate Cost-Benefit An ty audits – Orga ed audits. Information Se Security Program the Security Program Models – Secur Models – Secur Models – Secur nchmarking – I g the Security F ees – Employment Law, Ethics and nd Professional Information Sec J.S. Laws – Into nd their Codes of Forensics.	t: Identifying Risk – Asse gy – Quantitative Versu alysis – Recommended F inizational roles – Auditor curity Management in O m: Organizing for Security ogram – Information Security organize Measures in function – Information Security Performance Measures in function – Information Security of Maintenance Issues in Information Security curity – Indian IT Act– Informational Laws and Leg	essing R s Qualit Risk Con r's roles rganizati r – Placin urity Rolo t Models – Securi n Inforn curity Pl urity: Inf dian Cop al Bodie	ative Ris trol Prac – Types ons ng Inforr es and T :: Bluepr ty Mana nation S rofessior formatio pyright A s –Ethic	sk Con ctices - of sec mation itles – ints, Fr agemer security nal Cre n Secu sct – H cs in Ir nce: Se	trol Practice - Introduction urity audits Security with Implementing ameworks, at Models— Management dentials — Security and the IPAA of 199 aformation Security Management ecurity Management	es – Ma on to Se – Audit chin an ( ng Secur and Secur Security ent. – F ecurity ( Law – L 6, GLBA Security	rol Stra inaging ecurity approa Hour Organiz rity Edu urity Ma Personn Conside Hour aws an of 199 –Profe t Mainte	tegies- Risk – Audits: iches – s: 09 ation – cation, c

- 1. Nina Godbole, Information Systems Security: Security Management, Metrics, Frameworks and Best Practices, First Edition, Wiley India Pvt Ltd, 2008.
- 2. Michael Whitman and Herbert Mattord, Management of Information Security, Fourth Edition, Cengage Learning, 2014.

#### **Reference Books:**

- 1. Michael Whitman and Herbert Mattord, Principles of Information Security, Fifth Edition, Cengage Learning, 2015.
- 2. Harold F. Tipton, Information Security Management Handbook, Sixth edition, CRC Press, 2012.
- 3. Thomas R. Peltier, Information Security Policies and Procedures, 2nd Edition, Auerbach Publications, 2004.

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- 1. http://www.cert.org/octave/
- 2. http://www.isaca.org/
- 3. http://csrc.nist.gov/publications/nistpubs/800-30/sp800-30.pdf
- 4. http://csrc.nist.gov/publications/nistpubs/800-12/800-12-html/chapter18.html

	omputer Science and Engineering				. (Informatio	n Securit	ty)	
Semester : Tw	/0	Catego		TCM				
Subject Code	Subject	Hou	irs / W T	eek P	Credit C	Maxi CA	imum N SE	/larks TM
CS168	Applied Cryptography	3	-	Р 2	4	50	50	100
Prerequisite	-	_		<u> </u>				
Objectives	<ul> <li>To understand the various cr analysis of the cryptographic a</li> <li>To understand the underlying</li> <li>To get an overview of the implement them in mini projet</li> </ul>	algorithm mathem various a	ns atical s	structure	es of cryptog	raphic al	gorithm	l
Outcomes	<ul> <li>On successful completion of the cours</li> <li>Understand the theories and</li> <li>Understand the Cryptographi</li> <li>Design the Cryptographic Algorithm</li> </ul>	concepts c Technic prithms	of Cry Jues	ptograp	hic			
UNIT – I	Cryptographic Protocols						Hour	
Knowledge Proo Oblivious Transfe	Protocol Building Blocks - Basic Protoco fs - Zero-Knowledge Proofs of Identity - er - Oblivious Signatures – Esoteric Proto	Blind Sigi					Cryptog	raphy -
UNIT – II	Cryptographic Techniques Management - Electronic Codebook M						Hour	
Feedback Mode Choosing an Alg Channels -Encry	ynchronizing Stream Ciphers - Cipher-I - Counter Mode - Choosing a Cipher M orithm - Public-Key Cryptography vers oting Data for Storage - Hardware Encry Detecting Encryption – Hiding and Dest	1ode - Int us Symm ption ver	erleav etric C sus Sof	ing - Blo Cryptogr ftware E	ock Ciphers v aphy - Encry	ersus Str pting Co	eam Ci mmunio	phers - cations
UNIT – III	Cryptographic Algorithms	.i Oying in	IUIIIa	.1011.			Hour	s: 09
	eory - Complexity Theory - Number Tl	heory - F	actori	ng - Pri	me Number	Generat		
Logarithms in a l	Finite Field - Data Encryption Standard ncryption - Triple Encryption - CDMF Ke	(DES) – Li	ucifer -	Madry	ga - NewDES			
UNIT – IV	Cryptographic Algorithms Design				-		Hour	s: 09
Stream Ciphers Design - Comple Algorithm (SHA) Message Authen		t Registe oher Desi nmetric I	rs - Sys gn <b>-</b> N	stem-Th I-Hash -	eoretic Appr MD4 - MD5	oach to s - MD2	Stream- - Secure / Algori	-Cipher e Hash ithms -
UNIT – V	Cryptographic Algorithms Application	n					Hour	s: 09
Signature Algorit Shamir -Guillou-	Ilman - McEliece - Elliptic Curve Crypto thm - Discrete Logarithm Signature Scho Quisquater - Diffie-Hellman - Station agement Protocol - MITRENET - Kerbero	emes – O -to-Statio	ngchno n Prot	orr - Sha ocol -Sl	mir -Cellular namir's Three	Automate-Pass P	ta - Feig rotocol	ge-Fiat-
Mini Project							Hour	s: 30
take a real world	ed to form in teams with maximum 3 s l security issues or problem. They have otocols and algorithms.			•		•		
Total contact Ho	ours: 45 Total Tutorials: -	Total I	Practica	al Classe	es: 30	Total Ho	ours: 75	
Inc, 2 <sup>nd</sup> E	chneier, Applied Cryptography: Protoco dition, 2007.	lls, Algori	thms,	and Sou	irce Code in	C, John '	Wiley 8	k Sons,
	<b>s:</b> Mao, Modern Cryptography Theory and ate, Cryptography and Network Securit <sup>,</sup>							

3. William Stallings, Cryptography and Network Security, 3rd Edition, Pearson Education, 2003.

Websites:

- 1. http://cacr.uwaterloo.ca/hac/l
- 2. www.inderscience.com/jhome.php?jcode=IJACT

	mputer Science and Engineering				n. (Informatio	on Securi	ty)	
Semester : Tw	/0 	Categ		: LB	Carally		•	A! :
Subject Code	Subject		urs / W		Credit		imum N	1
CS169	Information Security Laboratory – II	L	Т	<b>Р</b> 3	<b>C</b>	<b>CA</b> 60	<b>SE</b> 40	<b>TM</b> 100
Prerequisite		-	-	5	Z	00	40	100
Freiequisite	<ul> <li>To gain a hands on experience</li> </ul>	ofsecu	rity dog	ign and	lycic and test	ting tool		
Objectives	<ul> <li>To asses and implement web</li> </ul>						>	
	On successful completion of the cours					у		
	<ul> <li>Design solution for to solve spectral</li> </ul>	-						
Outcomes	<ul> <li>Analyze and Design security security security</li> </ul>				applications	and netv	vork lav	ers
	<ul> <li>calculate the strength of the g</li> </ul>				approactorie		,	0.0
	<ul> <li>asses and implement web app</li> </ul>		•		on security			
Cycle – I							Ηοι	urs: 1
-	programs related to concern electives	offered i	n this s	emeste	r need to be i	mpleme		
	wing exercises have to be implemented							
	. Passive Information Gathering	Ũ						
	a. IP Address and Domain Identi	fication of	of log e	ntries				
	b. Information Gathering of a we		Ũ					
	c. Banner Grabbing							
i	i. Detecting Live Systems							
	a. Port Scanning							
	b. Passive Fingerprinting							
	c. Active Fingerprinting							
i	ii. Enumerating Systems							
	a. SNMP Enumeration							
	b. Enumerating Routing Protoco	ls						
i	v. Automated Attack and Penetration To	ools						
	a. Vulnerability Assessment Too	bl						
Ň	<ol> <li>Defeating Malware</li> </ol>							
	a. Building Trojans, Rootkit Hunt	er						
	b. Finding malware							
N N	vi. Securing Wireless Systems							
	a. Scan WAPs							
vi	. Network analysis							
	a. Analyze your network using	-						
	b. Find the Vulnerabilities pres							
	c. Perform Penetration Testing							
	d. Implement Pro-active and R	eactive r	neasur	es to se	cure your net	work		
Cycle – II							Ηοι	urs: 30
-	p the local security policy							
	a web application with secure database							-11- 11
<b>– – – – – – – – – –</b>		vnich is e	easv to	remem	iper and calc	ulate the	a streng	
-	to generate Password automatically w		,	remen			e streng	gin in
generate	ed password							-
generate 6. Develop	-	tion test	ing to d	detect th	ne vulnerabili	ties pres		-

Subject code       Subject       Hours/week       Credit       Maximum marks         CS159       Research Methodology       -       -       3       1       100       0       100         Prerequisite       -       -       -       3       1       100       0       100         Objectives       -       -       -       3       1       100       0       100         Students will be capable to identify and narrow down to the area of research on the bas the requirements of industrial and global requirements       -	Department : C	omputer Science and Er	ngineering	Program	me : N	И.Tech. (I	nformatio	n Security	/)	
Subject code         Subject         L         T         P         C         CA         SE         TN           CS159         Research Methodology         -         -         3         1         100         0         100           Prerequisite         -         -         3         1         100         0         100           Objectives         -         To educate students to different research methods         -         -         3         1         100         0         100           Objectives         -         To educate students to different research methods         -	Semester : T	NO		Category	/ :P	۲R				
L         I         P         C         CA         SE         IN           CS159         Research Methodology         -         -         3         1         100         0         100           Prerequisite         -         -         -         3         1         100         0         100           Objectives         -         To educate students to different research methods         -<	Cubicationdo	Cubicat		Hours/w	veek		Credit	Maxim	um mar	'ks
Prerequisite         -           Objectives         • To educate students to methods of selection of research problems           • To expose students to different research methods         •           • Students will be capable to identify and narrow down to the area of research on the bas the requirements of industrial and global requirements           • Students will exhibit the domain skill to choose suitable research methods to execut research effectively           • Students will possess knowledge to further their academic program, namely, Ph. program.           • Definition of research: Research – Definition; Concept of Construct, Postulate, Proposition, Thesi Hypothesis, Law, Principle. Definition and Dimension of a Theory, Functions and Characteristics; Types of Theory: General Theory and Particular/ Empirical Theory. Cases and their Limitations; Causal Relation Philosophy and validity of research. Objective of research.           • Characteristics of research: Various functions that describe characteristics of research. Qualitative an quantitative approaches.           • Research procedure: Formulating the Research Problem, Literature Review, Developing the objective Preparing the research design including sample. Design, Sample size.           • Outcome of research: Significance of report writing – Layouts of the research report – Types of reports Oral presentation and interpretation of analysis.           • Outcome of research: Total tutorials: - Total practical classes:15 Total hours: 15           Reference books:           • Considerations, Research Methodology-Methods, UBS Publishers and Distributors, New Delhi, 2002	Subject code	Subject		L	Т	Р	С	СА	SE	TM
Objectives         • To educate students to methods of selection of research problems           • To expose students to different research methods         • Students will be capable to identify and narrow down to the area of research on the bas the requirements of industrial and global requirements           • Students will exhibit the domain skill to choose suitable research methods to execut research effectively         • Students will possess knowledge to further their academic program, namely, Ph. program.           • Definition of research: Research – Definition; Concept of Construct, Postulate, Proposition, Thesi Hypothesis, Law, Principle. Definition and Dimension of a Theory, Functions and Characteristics; Types of Theory: General Theory and Particular/ Empirical Theory. Cases and their Limitations; Causal Relation Philosophy and validity of research. Objective of research.           • Characteristics of research: Various functions that describe characteristics of research such as systemati valid, verifiable, empirical and critical approach.           • Types of research: Pure and applied research. Descriptive and explanatory research. Qualitative an quantitative approaches.           • Considerations in selecting research problem: Relevance, interest, available data, choice of data, Analys of data, Generalization and interpretation of analysis.           • Outcome of research: 'Significance of report writing – Layouts of the research report – Types of reports Dral presentation – Mechanics of writing research report – Precautions for writing research reports Plagiarism and copy right violation – Patent writing and filing.           Total contact hours: -         Total tutorials: -         Total practical classes:15	CS159	Research Methodolog	Y	-	-	3	1	100	0	100
<ul> <li>To expose students to different research methods</li> <li>Students will be capable to identify and narrow down to the area of research on the bas the requirements of industrial and global requirements</li> <li>Students will exhibit the domain skill to choose suitable research methods to execut research effectively</li> <li>Students will possess knowledge to further their academic program, namely, Ph. program.</li> <li>Definition of research: Research – Definition; Concept of Construct, Postulate, Proposition, Thesi Hypothesis, Law, Principle. Definition and Dimension of a Theory, Functions and Characteristics; Types of Theory: General Theory and Particular/ Empirical Theory. Cases and their Limitations; Causal Relation Philosophy and validity of research. Objective of research.</li> <li>Characteristics of research: Various functions that describe characteristics of research such as systemati valid, verifiable, empirical and critical approach.</li> <li>Types of research: Pure and applied research. Descriptive and explanatory research. Qualitative and quantitative approaches.</li> <li>Research procedure: Formulating the Research Problem, Literature Review, Developing the objective Preparing the research design including sample. Design, Sample size.</li> <li>Considerations in selecting research problem: Relevance, interest, available data, choice of data, Analys of data, Generalization and interpretation of analysis.</li> <li>Outcome of research: Significance of report writing – Layouts of the research report – Types of reports Oral presentation – Mechanics of writing research report – Precautions for writing research reports Plagiarism and copy right violation – Patent writing and filing.</li> <li>Total tutorials: Total practical classes:15 Total hours: 15</li> <li>Reference books:</li> <li>Dawson, Catherine, Practical Research Methods, UBS Publishers and Distributors, New Delhi, 2002</li> <li>Kuthari, C.R., Research Methodology-Methods and Techniqu</li></ul>	Prerequisite	-								
<ul> <li>To expose students to different research methods</li> <li>Students will be capable to identify and narrow down to the area of research on the bas the requirements of industrial and global requirements</li> <li>Students will exhibit the domain skill to choose suitable research methods to execut research effectively</li> <li>Students will possess knowledge to further their academic program, namely, Ph. program.</li> <li>Definition of research: Research – Definition; Concept of Construct, Postulate, Proposition, Thesi Hypothesis, Law, Principle. Definition and Dimension of a Theory, Functions and Characteristics; Types of Theory: General Theory and Particular/ Empirical Theory. Cases and their Limitations; Causal Relation Philosophy and validity of research. Objective of research.</li> <li>Characteristics of research: Various functions that describe characteristics of research such as systemati valid, verifiable, empirical and critical approach.</li> <li>Types of research: Pure and applied research Problem, Literature Review, Developing the objective Preparing the research design including sample. Design, Sample size.</li> <li>Considerations in selecting research problem: Relevance, interest, available data, choice of data, Analys of data, Generalization and interpretation of analysis.</li> <li>Outcome of research: Significance of report writing – Layouts of the research report – Types of reports Oral presentation – Mechanics of writing research report – Precautions for writing research reports Plagiarism and copy right violation – Patent writing and filing.</li> <li>Total contact hours: - Total tutorials: - Total practical classes:15 Total hours: 15</li> <li>Reference books:</li> <li>Cothari, C.R., Research Methodology-Methods, UBS Publishers and Distributors, New Delhi, 2002</li> <li>Kothari, C.R., Research Methodology, A Step-by-Step Guide for Beginners, (2nd.ed), Pearson Education,</li> </ul>	Objectives	To educate st	udents to metho	ods of sele	ction o	of researd	ch problen	าร		
<ul> <li>butcomes</li> <li>Students will exhibit the domain skill to choose suitable research methods to execut research effectively</li> <li>Students will possess knowledge to further their academic program, namely, Ph. program.</li> <li>Definition of research: Research – Definition; Concept of Construct, Postulate, Proposition, Thesi Hypothesis, Law, Principle. Definition and Dimension of a Theory, Functions and Characteristics; Types of Theory: General Theory and Particular/ Empirical Theory. Cases and their Limitations; Causal Relation Philosophy and validity of research. Objective of research.</li> <li>Characteristics of research: Various functions that describe characteristics of research such as systemati valid, verifiable, empirical and critical approach.</li> <li>Types of research: Pure and applied research. Descriptive and explanatory research. Qualitative an quantitative approaches.</li> <li>Research procedure: Formulating the Research Problem, Literature Review, Developing the objective Preparing the research design including sample. Design, Sample size.</li> <li>Considerations in selecting research problem: Relevance, interest, available data, choice of data, Analys of data, Generalization and interpretation of analysis.</li> <li>Outcome of research: Significance of report writing – Layouts of the research report – Types of reports Oral presentation – Mechanics of writing research report – Precautions for writing research reports Plagiarism and copy right violation – Patent writing and filing.</li> <li>Total contact hours: - Total tutorials: - Total practical classes:15 Total hours: 15</li> <li>Reference books:</li> <li>Dawson, Catherine, Practical Research Methods, UBS Publishers and Distributors, New Delhi, 2002</li> <li>Kothari, C.R., Research Methodology, A Step-by-Step Guide for Beginners, (2nd.ed), Pearson Education,</li> </ul>	Objectives	<ul> <li>To expose stu</li> </ul>	dents to differe	nt researc	h metł	nods				
<ul> <li>Hypothesis, Law, Principle. Definition and Dimension of a Theory, Functions and Characteristics; Types of Theory: General Theory and Particular/ Empirical Theory. Cases and their Limitations; Causal Relation Philosophy and validity of research. Objective of research.</li> <li>Characteristics of research: Various functions that describe characteristics of research such as systemati valid, verifiable, empirical and critical approach.</li> <li>Types of research: Pure and applied research. Descriptive and explanatory research. Qualitative an quantitative approaches.</li> <li>Research procedure: Formulating the Research Problem, Literature Review, Developing the objective Preparing the research design including sample. Design, Sample size.</li> <li>Considerations in selecting research problem: Relevance, interest, available data, choice of data, Analys of data, Generalization and interpretation of analysis.</li> <li>Outcome of research: Significance of report writing – Layouts of the research report – Types of reports Oral presentation – Mechanics of writing research report – Precautions for writing research reports Plagiarism and copy right violation – Patent writing and filing.</li> <li>Total contact hours: - Total tutorials: - Total practical classes:15 Total hours: 15</li> <li>Reference books:         <ul> <li>Dawson, Catherine, Practical Research Methods, UBS Publishers and Distributors, New Delhi, 2002</li> <li>Kothari, C.R., Research Methodology, A Step-by-Step Guide for Beginners, (2nd.ed), Pearson Education, Jugation, 2nd.</li> </ul> </li> </ul>	Outcomes	<ul><li>the requireme</li><li>Students will research effect</li><li>Students will</li></ul>	ents of industria exhibit the dor ctively	l and globanain skill	al requ to cho	uirements oose suita	able resea	rch meth	ods to e	execut
<ol> <li>Reference books:</li> <li>1. Dawson, Catherine, Practical Research Methods, UBS Publishers and Distributors, New Delhi, 2002</li> <li>2. Kothari, C.R., Research Methodology-Methods and Techniques, Wiley Eastern Limited, New Delhi, 1985.</li> <li>3. Kumar, Ranjit, Research Methodology, A Step-by-Step Guide for Beginners, (2nd.ed), Pearson Education,</li> </ol>	<ul> <li>Philoso</li> <li>Charact valid, ve</li> <li>Types of quantita</li> <li>Researc Preparit</li> <li>Conside of data,</li> <li>Outcom Oral propriation</li> </ul>	by and validity of resea eristics of research: Va erifiable, empirical and of f research: Pure and ative approaches. h procedure: Formula ing the research design i erations in selecting res Generalization and inte the of research: Signification esentation – Mechanic sm and copy right violation	arch. Objective of rious functions critical approach applied resear ting the Resear ncluding sample earch problem erpretation of an ince of report w s of writing res cion – Patent wr	of research that descr n. ch. Descrip ch Problen e. Design, S : Relevance nalysis. vriting – La search rep iting and f	n. ibe ch otive a m, Lite Sample e, inte youts ort – iling.	aracterist and expla erature R e size. rest, avai of the re Precautio	tics of rese anatory re eview, De lable data search rep ons for wr	earch such esearch. C eveloping , choice o , choice o port – Typ iting rese	n as syst Qualitati the obj f data, <i>A</i> pes of re earch re	ematio ve an ectives Analysi eports ports
<ol> <li>Dawson, Catherine, Practical Research Methods, UBS Publishers and Distributors, New Delhi, 2002</li> <li>Kothari, C.R., Research Methodology-Methods and Techniques, Wiley Eastern Limited, New Delhi, 1985.</li> <li>Kumar, Ranjit, Research Methodology, A Step-by-Step Guide for Beginners, (2nd.ed), Pearson Education,</li> </ol>			utorials: -	Total pra	ctical	classes:1	5	Total ho	ours: 15	
<ol> <li>Kothari, C.R., Research Methodology-Methods and Techniques, Wiley Eastern Limited, New Delhi, 1985.</li> <li>Kumar, Ranjit, Research Methodology, A Step-by-Step Guide for Beginners, (2nd.ed), Pearson Education,</li> </ol>										
3. Kumar, Ranjit, Research Methodology, A Step-by-Step Guide for Beginners, (2nd.ed), Pearson Education,										~~-
					•	•				
			dology, A Step-	by-Step Gi	lide to	r Beginne	ers, (2nd.e	a), Pearsc	on Educa	ition,

Department : Co	mputer Science and En	gineering	Progra	amme :	M.Tec	h. (Informatio	on Securi	ty)	
Semester : Th	ree		Catego	ory :	PR				
Subject Code	Subject		Ηοι	ırs / W	eek	Credit	Max	imum N	/larks
Subject Code	Subject		L	Т	Р	С	CA	SE	тм
CS170	Project Work (Phase I	)	-	-	-	9	150	150	300
Prerequisite	-								
Objectives	<ul><li>technologies</li><li>To understand</li></ul>	students with p d the Product Dev rious activities of	velopme	ent Cyc		. ,	cle usin	g state	e-of-art
Outcome	<ul><li> Prepare SRS f</li><li> Exposure to</li></ul>	tion of the course problem definitio or projects and de Learning and kno articipation in rese	on clearl evelop o owledge	y design e access	s techn		Conferen	ices, Joi	urnal
PHASE – I	· · · ·	•							
<ol> <li>Select a I</li> <li>Conduct</li> <li>Perform</li> <li>Study the</li> <li>Define th</li> <li>Choose t</li> <li>Finalize t</li> <li>Choose t</li> <li>Impleme</li> </ol>	quired to do the follow Research Problem. a Survey in the chosen a feasibility study. e limitations of the Exist re Problem Statement a he Research Methodolo he Experimental Enviro he evaluation paramete nt the Existing System. at the outcome of Phas	area. ting System. and Objectives. ogy. nment. ers.							
Total contact Ho		utorials: -	Total	Practica	al Class	es: -	Total Ho	ours: -	

Department : Co	mputer Science and Engineering	Progra	mme :	M.Tec	h. (Informatio	n Securit	:y)	
Semester : Fou	ır	Catego	ory :	PR				
Subject Code	Subject	Hours / Week			Credit	Maximum M		/larks
Subject Code	Subject	L	Т	Р	С	CA	SE	ТМ
CS171	Project Work (Phase II)	-	-	-	14	200	200	400
Prerequisite	-							
Objectives	<ul> <li>To encourage and expose stupresentation activities</li> <li>Acquire in depth working know</li> </ul>			•			ational	paper
Outcomes	<ul> <li>On successful completion of the course</li> <li>Acquire knowledge and skills n</li> <li>Enhance the technical presenta</li> <li>Inculcate the practice of publis</li> </ul>	eeded f ation sk	or the o ills	constru	ction of highly	y softwar	e proje	ct
PHASE – II								
<ol> <li>High leve</li> <li>Detailed</li> <li>Impleme</li> <li>Comparis</li> </ol>	quired to do the following: I Design of the Proposed Solution. Design of the Proposed Solution. ntation of the Proposed Solution. son of the performance with the existing at the results in the Project Report.	system						
Total contact Ho	urs: - Total Tutorials: -	Total	Practica	al Class	es: -	Total Ho	urs: -	

**SYLLABUS (Elective Subjects)** 

Department : Co	omputer Science and Engineering	Progra	amme	. w. rec	h. (Informati	on securi	ty)	
Semester :		Categ	ory :	: TY				
		Ηοι	urs / W	'eek	Credit	Max	imum N	Marks
Subject Code	Subject	L	T	Р	С	CA	SE	TM
CSE67	Internals of Operating System	3	1	-	4	40	60	100
Prerequisite	-							
	To identify the necessity of value		•		•			
Objectives	To analyze the mechanism	•				the diffe	rences	in the
	organization of Unix and Wine	•	-	•				
	To design various data structu					g system		
	On successful completion of the cours							
	Explain the components in Ur			•	ting system			
Outcomes	Use the system calls wheneve			•				
	Know the storage of informa		-	-		ormation	in Win	dows
	system and develop the algor	ithms to	perfor	m kern	el functions			
UNIT – I	Buffer cache and File sub-system							rs: 09
	Kernel - Architecture of the UNIX op	-	•		•			
	eader, Structure of Buffer pool, Reading	and writi	ng disk	blocks	. Files INODE	S, Structu	ire of a	regula
	Super block, Inode assignment.							
UNIT – II	System Calls and Process sub-system							rs: 09
•	PEN, Read, Close, Write, Create, CHM			•	-		-	
	m memory, Context, Process control, pr	ocess cre	eation,	signals	, Process sch	eduling, t		
UNIT – III	Inter-Process Communications							rs: 09
Inter-Process C	communications - Process tracing, S				•	•	ores. N	letwork
Inter-Process C Communication	communications - Process tracing, S s - Socket programming: Sockets, d				•	•	ores. N	letwork
Inter-Process C Communications Datagram Socke	communications - Process tracing, S s - Socket programming: Sockets, d ts.				•	•	ores. N , Strea	letwork m and
Inter-Process C Communications Datagram Socke UNIT – IV	communications - Process tracing, S s - Socket programming: Sockets, d ts. Windows System Components	escriptor	rs, Coi	nnectio	ns, Socket	elements	ores. N , Strea <b>Hou</b>	letwork m and rs: 09
Inter-Process C Communication: Datagram Socke UNIT – IV Windows Opera	communications - Process tracing, S s - Socket programming: Sockets, d ts. Windows System Components ting system - versions, Concepts and too	escriptor	rs, Cor ows in	nnectio ternals	ns, Socket	elements nitecture,	ores. N , Strea <b>Hou</b> Requir	letwork m and rs: 09 ements
Inter-Process C Communications Datagram Socke <b>UNIT – IV</b> Windows Opera and design goals	communications - Process tracing, S s - Socket programming: Sockets, d ts. Windows System Components ting system - versions, Concepts and too s, Operating system model, Architecture	escriptor ols, Wind	ows in w, Key	nnectio ternals system	ns, Socket , System Arcl a component	elements nitecture, s. System	ores. N , Strea Hou Requir mecha	letwork m and rs: 09 ements nisms
Inter-Process C Communications Datagram Socke UNIT – IV Windows Opera and design goals Trap dispatching	communications - Process tracing, S s - Socket programming: Sockets, d ts. Windows System Components ting system - versions, Concepts and too s, Operating system model, Architecture g, object manager, Synchronization, Syst	escriptor ols, Wind	ows in w, Key	nnectio ternals system	ns, Socket , System Arcl a component	elements nitecture, s. System	ores. N , Strea Hou Requir mecha	letwork m and rs: 09 ements nisms
Inter-Process C Communication: Datagram Socke UNIT – IV Windows Opera and design goals Trap dispatching calls, Kernel eve	communications - Process tracing, S s - Socket programming: Sockets, d ts. Windows System Components ting system - versions, Concepts and too s, Operating system model, Architecture g, object manager, Synchronization, Syst nt tracing.	escriptor ols, Wind	ows in w, Key	nnectio ternals system	ns, Socket , System Arcl a component	elements nitecture, s. System	ores. N , Strea Hou Requir mecha ocal pro	letwork m and rs: 09 ements nisms cedura
Inter-Process C Communications Datagram Socke UNIT – IV Windows Opera and design goals Trap dispatching calls, Kernel eve UNIT – V	Communications - Process tracing, S s - Socket programming: Sockets, d ts. Windows System Components ting system - versions, Concepts and too s, Operating system model, Architecture g, object manager, Synchronization, Syst nt tracing. Registry and Process Management	ols, Wind overvie em work	ows in w, Key er thre	ternals system ads, W	ns, Socket , System Arcl a component indows globa	elements nitecture, s. System Il flags, Lo	res. N , Strea Requir mecha ocal pro	letwork m and rs: 09 ements nisms cedura rs: 09
Inter-Process C Communications Datagram Socke UNIT – IV Windows Opera and design goals Trap dispatching calls, Kernel eve UNIT – V Windows Mana	Communications - Process tracing, S s - Socket programming: Sockets, d ts. Windows System Components ting system - versions, Concepts and too s, Operating system model, Architecture g, object manager, Synchronization, Syst nt tracing. Registry and Process Management gement Mechanisms - The registry, Re	ols, Wind overvie em work gistry us	ows in w, Key er thre age, Re	ternals system ads, W	ns, Socket , System Arcl a component indows globa data types, I	elements nitecture, s. System Il flags, Lo Local stru	Pres. N , Strea Requir mecha pocal pro Hou cture,	letwork m and rs: 09 ements nisms cedura rs: 09 Trouble
Inter-Process C Communication: Datagram Socke UNIT – IV Windows Opera and design goals Trap dispatching calls, Kernel eve UNIT – V Windows Mana shooting Regist	Communications - Process tracing, S communications - Process tracing, S s - Socket programming: Sockets, d ts. Windows System Components ting system - versions, Concepts and too s, Operating system model, Architecture g, object manager, Synchronization, Syst nt tracing. Registry and Process Management gement Mechanisms - The registry, Re rry problems, Registry Internals, Serv	escriptor ols, Wind e overvie em work gistry us vices, Ap	ows in w, Key er thre age, Re	ternals system ads, W egistry ons, A	ns, Socket , System Arcl component indows globa data types, I ccounts, Ser	elements nitecture, s. System al flags, Lo Local stru vice con	res. N , Strea <b>Hou</b> Requir mecha cal pro <b>Hou</b> cture, <sup>-</sup> trol Ma	letwork m and rs: 09 ements nisms cedura rs: 09 Trouble anager
Inter-Process C Communication: Datagram Socke UNIT – IV Windows Opera and design goals Trap dispatching calls, Kernel eve UNIT – V Windows Mana shooting Regist Windows Mana	communications - Process tracing, S s - Socket programming: Sockets, d ts. Windows System Components ting system - versions, Concepts and too s, Operating system model, Architecture g, object manager, Synchronization, Syst nt tracing. Registry and Process Management gement Mechanisms - The registry, Re sry problems, Registry Internals, Serv gement Instrumentation, Processes, Th	escriptor ols, Wind e overvie em work gistry us rices, Ap reads, ar	ows in w, Key er thre age, Re plication	ternals system ads, W egistry ons, A : Proce	ns, Socket , System Arcl component indows globa data types, I ccounts, Ser	elements nitecture, s. System al flags, Lo Local stru vice con	res. N , Strea <b>Hou</b> Requir mecha cal pro <b>Hou</b> cture, <sup>-</sup> trol Ma	letwork m and rs: 09 ements nisms cedura rs: 09 Trouble anager
Inter-Process C Communications Datagram Socke UNIT – IV Windows Opera and design goals Trap dispatching calls, Kernel eve UNIT – V Windows Mana shooting Regist Windows Mana	Communications - Process tracing, S s - Socket programming: Sockets, d ts. Windows System Components ting system - versions, Concepts and too s, Operating system model, Architecture g, object manager, Synchronization, Syst nt tracing. Registry and Process Management gement Mechanisms - The registry, Re cry problems, Registry Internals, Serv gement Instrumentation, Processes, Th s, Examining Thread creation, Thread Sch	escriptor ols, Wind e overvie em work gistry us vices, Ap reads, ar neduling,	rs, Con lows in w, Key er thre age, Ro pplication Job Ob	ternals system ads, W egistry ons, A : Proce ojects.	ns, Socket , System Arch n component indows globa data types, I ccounts, Ser ss Internals,	elements nitecture, s. System Il flags, Lo Local stru vice con Flow of c	reate p	letwork m and rs: 09 ements nisms cedura rs: 09 Trouble anager process
Inter-Process C Communication: Datagram Socke UNIT – IV Windows Opera and design goals Trap dispatching calls, Kernel eve UNIT – V Windows Mana shooting Regist Windows Mana fhread Internals Total contact Ho	Communications - Process tracing, S s - Socket programming: Sockets, d ts. Windows System Components ting system - versions, Concepts and too s, Operating system model, Architecture g, object manager, Synchronization, Syst nt tracing. Registry and Process Management gement Mechanisms - The registry, Re cry problems, Registry Internals, Serv gement Instrumentation, Processes, Th s, Examining Thread creation, Thread Sch	escriptor ols, Wind e overvie em work gistry us vices, Ap reads, ar neduling,	rs, Con lows in w, Key er thre age, Ro pplication Job Ob	ternals system ads, W egistry ons, A : Proce	ns, Socket , System Arch n component indows globa data types, I ccounts, Ser ss Internals,	elements nitecture, s. System al flags, Lo Local stru vice con	reate p	letwork m and rs: 09 ements nisms cedura rs: 09 Trouble anager process
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UNIT – IV Host-Level Solut – Antimalware. Solutions. Applie UNIT – V Service-Level Sol Architectures for Compliance - So Financial Applica Appliances – Use Total contact Ho Text Books: 1. Abhijit Padman Wiley Pu Reference Books 1. Yang Xia 2. Rachid G 2010.	ions: Sandboxing Infrastructure- cation-Level Solu lutions: Services or SOA Security DX Security Solu ation - Security I ercentric Identity ours: 45 Belapurkar, An abhuni and Srika ibilications, First s: o and Yi Pan, Sec	g – Virtualization - Resource Level Solutions: Network Itions: Application-Level Security Policy - SOA Secu - Managing Service-Lev Itions - Multilevel Policy- Requirements Analysis. F Management - Identity-B Total Tutorials: 15	ce Mana -Level ecurity Sta rel Thre Driven uture D ased Er Total P gopal ted Syst	t Profile agement Solution Solution andards eats - C Solutior Direction ncryptior ractical ( Ponnapa cems Sec	s - Proc s - Gri s. Stack - Complia n Archi s - Clo n (IBE) Classes alli, N curity: I	- Standards ance in Fin itecture - C ud Comput - Virtualizat : - To iranjan Va ssues, Proce	Code -Me utions - ancial S ase Stud ion in Hc otal Hour radaraja esses and	Hour emory F Storag Hour - Deplo ervices dy: Gric rity – S ost Secu rs: 60	rs: 09 Firewall e-Level oyment - SOX d - The fecurity rity.
UNIT – IV Host-Level Solut – Antimalware. Solutions. Applie UNIT – V Service-Level Sol Architectures for Compliance - So Financial Applica Appliances – Use Total contact Ho Text Books: 1. Abhijit Padman Wiley Pu Reference Books 1. Yang Xia 2. Rachid G 2010.	ions: Sandboxing Infrastructure- cation-Level Solu- lutions: Services or SOA Security DX Security Solu- ation - Security I ercentric Identity ours: 45 Belapurkar, An abhuni and Srika ibilications, First s: o and Yi Pan, Sec Guerraoui and Fr	g – Virtualization - Resource Level Solutions: Network Itions: Application-Level Security Policy - SOA Secu - Managing Service-Lev Itions - Multilevel Policy- Requirements Analysis. F Management - Identity-B Total Tutorials: 15	ce Mana -Level ecurity Sta rel Thre Driven uture D ased Er Total P gopal ted Syst etwork afety, a	t Profile agement Solution Solution andards eats - C Solutior Direction ncryptior ractical ( Ponnapa cems Sec	s - Proc s - Gri s. Stack - Complia n Archi s - Clo n (IBE) Classes alli, N curity: I	- Standards ance in Fin itecture - C ud Comput - Virtualizat : - To iranjan Va ssues, Proce	Code -Me utions - ancial S ase Stud ion in Hc otal Hour radaraja esses and	Hour emory F Storag Hour - Deplo ervices dy: Gric rity – S ost Secu rs: 60	rs: 09 Firewall e-Level rs: 09 Dyment - SOX d - The fecurity rity.

-	omputer Science	e and Engineering				h. (Informati	on Securi	ty)	
Semester :	1		Catego	,	ΤY	[			
Subject Code	Subject		Hou	rs / W	eek	Credit	Max	imum N	Aarks
Subject code	Jubject		L	Т	Р	С	CA	SE	TM
CSE69	Ethical Hackir	g	3	1	-	4	40	60	100
Prerequisite	-								
Objectives	to sca • To giv secur	merse the students into a n, test, hack and secure t re students in-depth know ity systems arn how intruders escala m	heir ow: wledge a	n syste Ind pra	ms ctical e	xperience w	ith the cu	rrent es	sentia
Outcomes	On successful Defer numb Defer	completion of the course ad a computer against a per of hands-on technique ad a LAN against a variety s-on techniques Practice a	variety es of diffe	of dif rent ty	ferent pes of s	types of sec	cks using	a numb	-
UNIT – I	Introduction	to Ethical Hacking						Hou	rs: 12
Introduction-Im	portance of Secu	urity-Elements of Security	/-Phase	of an A	ttack- I	Hacker Attac	ks –Hackt	ivism –	Ethica
Hackers – Comp	uter Crimes and	Implication.							
UNIT – II	Footprints							Hou	rs: 12
Introduction – I	nformation gat	hering methodology – F	ootprint	ing too	ols – W	HOIS Tool- I	DNS Infor	mation	tool -
Locating the net	work range – E-	mail spiders – Locating ne	etwork a	ctivity	– Meta	Search Engi	nes.		
UNIT – III	Scanning and	Enumeration						Hou	rs: 12
Scanning: Introd Techniques – Pro	•	ives of scanning – Scann s.	ing met	hodolo	gies – 1	Fools – Enum	neration:	Introdu	ction -
UNIT – IV	Social Engine	ering						Hou	rs: 12
-	ng – Threats ar	- Human weakness –Typ nd Defense – Counterme				-	-		
UNIT – V	System Hacki	ng						Hou	rs: 12
		ord – Password cracking e – Escalating Privileges-	-				-		
Total contact Ho	ours: 45	Total Tutorials: 15	Total I	Practica	al Class	es: -	Total Ho	ours: 60	
Text Books:									
2. EC- Cou 2009.	ncil, Ethical Hac	king and Countermeasure king and Countermeasur						gage Le	arning
Reference Book			• • •						
	T. Simpson, Hai	nds-On Ethical Hacking ar	d Netwo	ork Def	ense, C	engage Lear	ning, 201	2.	
Websites:		<u> </u>					. ,		
1	www.udomy.co	m ligarn the hadies of atk	inal haa			the stars the stars			
•	•	m/learn-the-basics-of-eth .cysecurity.org/	iicai-nac	king-ar	na-pene	etration-test	ing/		

	inputer science	e and Engineering				n. (Informat	tion Secul	ity)	
Semester :	1		Categ		: TY				
Subject Code	Subject		Hou	urs / W T	/eek P	Credit C	Ma CA	ximum I SE	
CSE70	Embedded Sy	stems	3	1	<u>Р</u>	<u> </u>	40	60	<b>TM</b> 100
Prerequisite	Embedded Sy	3101113	5				40	00	100
Objectives	Archi • To int	rovide a clear un tecture roduce on Embedd udy on Basic of Proc	ed Process de	evelopr	nent En	vironment	ARM p	rocessoi	r and
Outcomes	On successful Have	completion of the o skills in the Embedo n Embedded System	course, the st ded C Progran	udents nming	will be				
UNIT – I								Hou	rs: 09
Embedded Syste Architecture: AR Vector Table - Ar	m – Other Har M Design Philo	nges of Embedded dware Units in the sophy - Registers - sion - ARM Processo	Embedded S Program Stat	ystem	- Softwa	are Embedo	ded into a	System Interru	- ARM pts and
UNIT – II		cessing Instruction							rs: 09
Processing Instru Instructions. ARM allocation – Fund	uctions - Single VI Programming ction calls – Po	rctions. Thumb Inst -Register and Mult gusing C: Simple C inter aliasing – Stru	ti Register Loa Programs usii	ad-Stor ng Fun	e Instruction Ca	ictions - St IIs – C-loop	ack - Sof Ding struc	tware In tures – F	terrupt Register
and inline assem	bly– Portability	issues.							
UNIT – III									rs: 09
Optimizing Asser	•	filing and cycle cou	-					on – con	ditiona
Optimizing Asser execution – loo Operating syste	ping constructs ms - Multiple	filing and cycle cour – bit manipulatio tasks and process	on – efficient ses – Context	switcl t switc	nes – o hing –	ptimized p Scheduling	rimitives.	on – con Process	ditiona ses and
Optimizing Asser execution – loo Operating syster communication	ping constructs ms - Multiple	filing and cycle cour – bit manipulatio	on – efficient ses – Context	switcl t switc	nes – o hing –	ptimized p Scheduling	rimitives.	on – con Process – Inter	ditiona ses and process
Optimizing Asser execution – loo Operating syster communication r UNIT – IV Introduction to Characteristics of Synchronization Message Queue UNIT – V	ping constructs ms - Multiple mechanisms – E RTOS- Meeting of RTOS - Def - Communicat - States – Conte	filing and cycle cours – bit manipulatio tasks and process exception and interr g real time constra ining a Task - Tas tion and Concurrent ent – Storage - Oper	on – efficient ses – Context rupt handling aints –Definin sks States ar ncy. Defining rations and Us	switch t switc - Perfo ng RTO nd Sch g Sema se.	nes – o hing – rmance S - The eduling phores	ptimized p Scheduling issues. Scheduler - Task O - Operatio	rimitives. policies - Objectorations ons and	on – con Process – Inter Hou tts – Ser – Struc Use - E	ditiona ses and process rs: 09 rvices cture - Defining rs: 09
Optimizing Asser execution – loo Operating syster communication r <b>UNIT – IV</b> Introduction to Characteristics of Synchronization Message Queue <b>UNIT – V</b> Embedded Syste tools – Emulator	ping constructs ms - Multiple mechanisms – E RTOS- Meeting of RTOS - Def - Communicat - States – Conte m Developments and debugge	filing and cycle cours – bit manipulatio tasks and process exception and interr g real time constra- ining a Task - Tas- tion and Concurrer ent – Storage - Oper- t - Multi-state syste- rs. Design methodo	on – efficient tes – Context rupt handling aints –Defining sks States ar ncy. Defining rations and Us ems and funct ologies – Case	switch t switc - Perfo ng RTO nd Sch g Sema se. tion se studie	nes – o hing – rmance S - The eduling phores quences s – Win	ptimized p Scheduling issues. Scheduler - Task O - Operation . Embedde dows CE –	rimitives. policies - Objectorations ons and d softwar Linux 2.6	on – con Process – Inter Hou ts – Ser – Struc Use - E Hou re develo	ditiona ses and process rs: 09 rvices cture - Defining rs: 09 ppment Linux -
Optimizing Asser execution – loo Operating syster communication r <b>UNIT – IV</b> Introduction to Characteristics of Synchronization Message Queue <b>UNIT – V</b> Embedded Syster tools – Emulator Coding and send	ping constructs ms - Multiple mechanisms – E RTOS- Meeting of RTOS - Def - Communicat - States – Conte m Developments and debugge	filing and cycle court – bit manipulation tasks and process exception and interring g real time constra- tining a Task - Task cion and Concurrent ent – Storage - Oper- t - Multi-state system	on – efficient tes – Context rupt handling aints –Defining sks States ar ncy. Defining rations and Us ems and funct ologies – Case	switch t switc - Perfo ng RTO nd Sch g Sema se. tion se studie	nes – o hing – rmance S - The eduling phores quences s – Win	ptimized p Scheduling issues. Scheduler - Task O - Operation . Embedde dows CE –	rimitives. policies - Objectorations ons and d softwar Linux 2.6	on – con Process – Inter Hou ts – Ser – Struc Use - E Hou re develo	ditiona ses and process rs: 09 rvices cture - Defining rs: 09 ppment Linux -
Optimizing Asser execution – loo Operating syste communication r <b>UNIT – IV</b> Introduction to Characteristics of Synchronization Message Queue <b>UNIT – V</b> Embedded Syste tools – Emulator Coding and sence for a smart card.	ping constructs ms - Multiple mechanisms – E RTOS- Meeting of RTOS - Def - Communicat - States – Conte m Developmen s and debugge ling application	filing and cycle cours – bit manipulatio tasks and process exception and interr g real time constra- tining a Task - Task cion and Concurren- ent – Storage - Oper ent – Storage - Oper t - Multi-state system rs. Design methodo layer byte stream	on – efficient tes – Context rupt handling aints –Defining sks States ar ncy. Defining rations and Us ems and func- ologies – Case on a TCP/IP r	switch t switc - Perfo ng RTO nd Sch g Sema se. tion se studie networ	nes – o hing – rmance S - The eduling phores quences s – Win k using	ptimized p Scheduling issues. Scheduler - Task O - Operatio . Embedde dows CE – RTOS Vxwo	rimitives. policies - Objectorerations ons and d softwar Linux 2.6 orks – Em	n – con Process – Inter Hou ts – Seu - Struc Use - E Hou re develo c and RT bedded	ditiona ses and process rs: 09 rvices cture - Defining rs: 09 opment Linux - system
Optimizing Asser execution – loo Operating system communication in <b>UNIT – IV</b> Introduction to Characteristics of Synchronization Message Queue <b>UNIT – V</b> Embedded System tools – Emulator Coding and sence for a smart card. <b>Total contact Ho</b>	ping constructs ms - Multiple mechanisms – E RTOS- Meeting of RTOS - Def - Communicat - States – Conte m Developmen s and debugge ling application	filing and cycle cours – bit manipulatio tasks and process exception and interr g real time constra- ining a Task - Tas- tion and Concurrer ent – Storage - Oper- t - Multi-state syste- rs. Design methodo	on – efficient tes – Context rupt handling aints –Defining sks States ar ncy. Defining rations and Us ems and func- ologies – Case on a TCP/IP r	switch t switc - Perfo ng RTO nd Sch g Sema se. tion se studie networ	nes – o hing – rmance S - The eduling phores quences s – Win	ptimized p Scheduling issues. Scheduler - Task O - Operatio . Embedde dows CE – RTOS Vxwo	rimitives. policies - Objectorerations ons and d softwar Linux 2.6 orks – Em	on – con Process – Inter Hou ts – Ser – Struc Use - E Hou re develo	ditiona ses and process rs: 09 rvices cture - Defining rs: 09 opment Linux - system
Optimizing Asser execution – loo Operating syste communication r UNIT – IV Introduction to Characteristics of Synchronization Message Queue UNIT – V Embedded Syste tools – Emulator Coding and sence for a smart card. Total contact Ho Text Books: 1. Andrew 2006. 2. Raj Kam compani	ping constructs ms - Multiple mechanisms – E RTOS- Meeting of RTOS - Def - Communicat - States – Conte m Developmer s and debugge ling application <b>purs: 45</b> N Sloss, D. Syr nal, Embedded es, 2008.	filing and cycle cours – bit manipulatio tasks and process exception and interr g real time constra- ining a Task - Tas- tion and Concurren- ent – Storage - Oper- t - Multi-state system- rs. Design methodo layer byte stream Total Tutorials: 15 mes and C. Wright, Systems – Archite	on – efficient ies – Context rupt handling aints –Defining rations and Us rations and funct logies – Case on a TCP/IP r <b>5 Total</b> ARM System recture, Progr	switch t switc- - Perfo ng RTO nd Sch g Sema se. tion se studie networ <b>Practic</b> Devel	nes – o hing – rmance S - The eduling phores quences s – Win k using <b>al Classe</b> opers G	ptimized p Scheduling issues. Scheduler - Task O - Operatio . Embedde dows CE – RTOS Vxwo es: -	rimitives. policies - Objections corrations ons and d softwar Linux 2.6 orks – Em Total H gan Kaufn	n – con Process – Inter Hou ets – Seu Use - D Hou re develo c and RT bedded ours: 60	ditiona ses and process rs: 09 rvices cture - Defining rs: 09 opment Linux - system
Optimizing Asser execution – loo Operating syste communication r UNIT – IV Introduction to Characteristics of Synchronization Message Queue UNIT – V Embedded Syste tools – Emulator Coding and sence for a smart card. Total contact Ho Text Books: 1. Andrew 2006. 2. Raj Kam compani 3. Qing Li, F	ping constructs ms - Multiple mechanisms – E RTOS- Meeting of RTOS - Def - Communicat - States – Conte m Development s and debugge ling application ours: 45 N Sloss, D. Syn mal, Embedded es, 2008. Real Time Conce	filing and cycle cours – bit manipulatio tasks and process exception and interr g real time constra- ining a Task - Task cion and Concurren- ent – Storage - Oper- ent – Multi-state system rs. Design methodo layer byte stream Total Tutorials: 15 mes and C. Wright,	on – efficient ies – Context rupt handling aints –Defining rations and Us rations and funct logies – Case on a TCP/IP r <b>5 Total</b> ARM System recture, Progr	switch t switc- - Perfo ng RTO nd Sch g Sema se. tion se studie networ <b>Practic</b> Devel	nes – o hing – rmance S - The eduling phores quences s – Win k using <b>al Classe</b> opers G	ptimized p Scheduling issues. Scheduler - Task O - Operatio . Embedde dows CE – RTOS Vxwo es: -	rimitives. policies - Objections corrations ons and d softwar Linux 2.6 orks – Em Total H gan Kaufn	n – con Process – Inter Hou ets – Seu Use - D Hou re develo c and RT bedded ours: 60	ditiona ses and process rs: 09 rvices cture - Defining rs: 09 opmen Linux - system
Optimizing Asser execution – loo Operating system communication in UNIT – IV Introduction to Characteristics of Synchronization Message Queue UNIT – V Embedded Syste tools – Emulator Coding and sence for a smart card. Total contact Ho Text Books: 1. Andrew 2006. 2. Raj Kam compani 3. Qing Li, F Reference Books 1. Michael 2. Wayne V 2008.	ping constructs ms - Multiple mechanisms – E RTOS- Meeting of RTOS - Def - Communicat - States – Conte m Developmen s and debugge ling application <b>Durs: 45</b> N Sloss, D. Syn hal, Embedded es, 2008. Real Time Conce s: J. Pont, Embedded Wolf, Computer	filing and cycle cours – bit manipulatio tasks and process exception and interr g real time constra- ining a Task - Tas- tion and Concurren- ent – Storage - Oper- t - Multi-state system- rs. Design methodo layer byte stream Total Tutorials: 15 mes and C. Wright, Systems – Archite	on – efficient ies – Context rupt handling aints –Defining rations and Us ems and funct ologies – Case on a TCP/IP r 5 Total ARM System recture, Progr Systems, Else cation, 2007. Principles of E	switch t switch - Perfo ng RTO nd Sch g Sema se. tion se studie networ <b>Practic</b> Practic rammin vier, 20	nes – o hing – rmance S - The eduling phores quences s – Win k using al Classe opers G ng and 011.	ptimized p Scheduling issues. Scheduler - Task O - Operation - Operation - Operation - Embedded dows CE – RTOS Vxwo es: - uide, Morg Design, 21	rimitives. policies - Objectorations ons and d softwar Linux 2.6 orks – Em Total H gan Kaufn nd Editio	n – con Process – Inter Hou ts – Seu - Struc Use - E Hou re develo c and RT bedded hours: 60	ditiona ses and process rs: 09 rvices cture - Defining rs: 09 opmen Linux - systen clisevier raw-Hil

-	omputer Science	e and Engineering				n. (Informati	on Securi	ty)	
Semester :			Categ		: TY				
Subject Code	Subject			irs / W T		Credit C		imum M SE	1
CSE71	Information T	heory and Coding	<b>L</b> 3	1	P -	4	<b>CA</b> 40	<b>5</b> E 60	<b>TM</b> 100
Prerequisite	-		5	-			40	00	100
Objectives	syster	upport the analysis matically and comprehe rengthen the fundam g.	ensively.						
Outcomes	• under	completion of the cour rstand how error contro vze the information ar	ol coding t	echniq	ues are	applied in c	ommunic	ation sy	vstems
UNIT – I	Information 1	Theory						Hou	rs: <b>0</b> 9
information, Av Average informa in long depende	erage condition ation content of ent sequences –	eory- Uncertainty and al self information, Me symbols in long indepe Markoff statistical moc easure for continuous r	easures o ndent seo lel for info	f infori quence ormatic	mation- s – Aver on sourc	Information age informa	content	of a ment of s mation	essage- ymbols rate of
UNIT – II		d Channel Capacity rete communication c							rs: <b>09</b>
implications. Ch channel and the	annel models- ir capacities-Info	memoryless channel channel capacity –BSC ormation capacity theor	BEC-cas,	cade c	hannels	s-symmetric	channel	–unsyn IO syste	nmetric em.
UNIT – III	Source Codin	<b>g</b> cipherable codes ,Shanr	• •						rs: <b>09</b>
-Huffman codin	g – Shannon fai	no-Elias coding, Arithme tion-optimum quantize	etic codin	g –Len	npel-Ziv	algorithm-R	un length	encod compre	ing and
Matrix descripti error detection codes, Optimal block codes. Me	on of linear blo and error corre linear codes, Ma ethod fee gener orrection quasi	codes-Galois fields, Ve ocks codes-Equivalent c ection capability perfec aximum distance separa ating cyclic codes- Mat cyclic codes and short des BS codes	odes-pari t codes, l able (MDS rix descri	ty cheo Hammi 5) code ption c	ck matri ng code s-Bound of cyclic	ix, Decoding es, Low dens ds on minim codes, sync	; of linear sity parity um distar frome cal	block check nce-spa culation	, codes (LDPC) ce time n, Error
UNIT – V		ng - Convolution Codes	;					Hou	rs: 09
		odes-Tree codes and T		es, polv	nomial	description	of convol		
Viterbi decodin Interleaver des	g of convolutio ign concept of	nal codes distance bo coded modulation, U I, Space Time Trellis Coo	unds-per ngerboec	forman	ice bou	nds, Turbo	codes-Tu	rbo de	coding
Total contact He	ours: 45	Total Tutorials: 15	Total	Practic	al Classe	es: -	Total Ho	ours: 60	
<ol> <li>Ranjan I</li> <li>Reference Book</li> <li>K. Sam S</li> <li>Simon H</li> </ol>	Bose, Informatic <b>s:</b> Shanmugam, Dig	Chatterjee, Principles on Theory Coding and Co gital and Analog Commu pommunications, John W	ryptograp	hy, Tat System	a McGra s, John <sup>v</sup>	aw Hill, New	Delhi, 20	10.	8.
Websites:									
1. http://w	/ww.nptel.ac.in /ww/aparallel.co								

Department : Co	, , , ,	-			n. (Informatio	II Securi	LY)	
Semester :	1	Catego	-	TY				
Subject Code	Subject	Ηοι	irs / W	eek P	Credit C	-	imum N	1
CSE72	Digital and Cyber Forensics	3	<b>T</b>	Р -	4	<b>CA</b> 40	<b>SE</b> 60	<b>TM</b> 100
Prerequisite	-	3	-		•	10		100
Objectives	<ul> <li>To introduce the fundamental</li> <li>To familiarize with Cyber forei</li> <li>To know the concepts of Evide</li> </ul>	nsics and	Comp	uter For	ensics Techno		cepts	
Outcomes	<ul> <li>On successful completion of the cours</li> <li>Analyze digital forensics and u</li> <li>Design the new ideas of detect</li> <li>Design applications related to</li> </ul>	ise them ting the	to infe key fra	erence f ud selec	or security ba tion process	ised prot	olems	
UNIT – I							Hou	rs: 09
threat – Strateg	of Computer Fraud – Threat concepts – nic Planning Process. Architecture strate n detection system – NIDS, HIDS – F nic.	egies for	compu	uter frau	ud prevention	n – Prote	ection o	of Web
UNIT – II							Нол	rs: 09
Forensics – Com	ator selection process customized taxon aputer Forensics – Journaling and it requiner and requiner and the second se	uirement	s –Star	ndardize				
UNIT – III								~ 00
Introduction to Types of Militar	Cyber forensics: Computer Forensics f ry Computer Forensic Technology, Typ ss Computer Forensic Technology, Speci	es of La	w Enfo	orcemer	nt: Computer	Forensi	c Tech	nology nology
Introduction to Types of Militar Types of Busines It, Spyware and Internet Tracing Systems.		es of La alized Fo ulnerabil	w Enfo prensics ities, F	orcemer Techni Protectii	nt: Computer ques, Hidden ng Data from	Forensi Data an Being	s Techi c Techi d How Comprenents netric S	nology nology to Finc omisec ecurity
Introduction to Types of Militar Types of Busines It, Spyware and Internet Tracing Systems. UNIT – IV	ry Computer Forensic Technology, Typ ss Computer Forensic Technology, Speci d Adware, Encryption Methods and V Methods, Security and Wireless Techn	es of La alized Fo ulnerabil ologies,	w Enfo prensics ities, F Avoidin	rcemer Techni Protectin ng Pitfal	nt: Computer ques, Hidden ng Data from Is with Firew	Forensi Data an Being alls Bion	cs Techi c Techi d How Compro- netric S	nology nology to Finc omisec ecurity <b>rs: 09</b>
Introduction to Types of Militar Types of Busines It, Spyware and Internet Tracing Systems. <b>UNIT – IV</b> Types of Compu Systems, Storag Systems, Wirele	ry Computer Forensic Technology, Typ ss Computer Forensic Technology, Speci d Adware, Encryption Methods and V	es of La alized Fo ulnerabil ologies, ty Systen vork Disa	w Enfo rensics ities, F Avoidin ns, Intr aster R ption	rusion D ecovery Security	nt: Computer ques, Hidden ng Data from Is with Firew etection Syst Systems, Pu Systems, In	Forensi Data an Being alls Bion cems, Fir blic Key stant M	rewall S Infrasti Iessagir	nology nology to Finc omisec ecurity rs: 09 ecurity ructure og (IM
Introduction to Types of Militar Types of Busines It, Spyware and Internet Tracing Systems. <b>UNIT – IV</b> Types of Compu Systems, Storag Systems, Wirele Security System Systems.	ry Computer Forensic Technology, Typ ss Computer Forensic Technology, Speci d Adware, Encryption Methods and V Methods, Security and Wireless Techn uter Forensics Systems: Internet Securit e Area Network Security Systems, Netw ess Network Security Systems, Satellit	es of La alized Fo ulnerabil ologies, ty Systen vork Disa	w Enfo rensics ities, F Avoidin ns, Intr aster R ption	rusion D ecovery Security	nt: Computer ques, Hidden ng Data from Is with Firew etection Syst Systems, Pu Systems, In	Forensi Data an Being alls Bion cems, Fir blic Key stant M	ss Techi ic Techi id How Compre- netric S Hou rewall S Infrasti lessagir netric S	nology nology to Finc omisec ecurity rs: 09 ecurity ructure ng (IM
Introduction to Types of Militar Types of Busines It, Spyware and Internet Tracing Systems. <b>UNIT – IV</b> Types of Compu Systems, Storag Systems, Wirele Security System Systems. <b>UNIT – V</b> Evidence Collect Rules of Evidence Collection Steps scene, Investig Reconstructing F	ry Computer Forensic Technology, Typ ss Computer Forensic Technology, Speci d Adware, Encryption Methods and V Methods, Security and Wireless Techn uter Forensics Systems: Internet Securit e Area Network Security Systems, Netw ess Network Security Systems, Satellit s, Net Privacy Systems, Identity Manage cion and Data Seizure: Why Collect Evide e, Volatile Evidence, General Procedure , Controlling Contamination: The Chain ating Cybercrime, Duties Support I Past Events.	es of La alized Fo ulnerabil ologies, ty Systen work Disa te Encry ement Se ence, Col collection function	w Enfo rensics ities, F Avoidin ns, Intr aster R ption S ecurity lection on and ody, Ro s and	System Archivi Protection Protect	nt: Computer ques, Hidden ng Data from Is with Firew etection Syst Systems, Pu Systems, In s, Identity Th s Obstacles, ng, Methods acting the At etencies. Id	Forensi Data an Data an Being alls Bion ems, Fir blic Key Istant M eft, Bion Types of of Collec tack, The entificati	revall S Infrasti Evidence Evidence ion of	nology nology to Finc omisec ecurity recurity ructure og (IM ecurity rs: 09 ce, The tifacts I crime
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Introduction to Types of Militar Types of Busines It, Spyware and Internet Tracing Systems. <b>UNIT – IV</b> Types of Compu Systems, Storag Systems, Wirele Security System Systems. <b>UNIT – V</b> Evidence Collect Rules of Evidence Collection Steps scene, Investig Reconstructing F Total contact Ho Text Books: 1. Kenneth	ry Computer Forensic Technology, Typ ss Computer Forensic Technology, Speci d Adware, Encryption Methods and V Methods, Security and Wireless Techn uter Forensics Systems: Internet Securit e Area Network Security Systems, Netw ess Network Security Systems, Satellit s, Net Privacy Systems, Identity Manage cion and Data Seizure: Why Collect Evide e, Volatile Evidence, General Procedure , Controlling Contamination: The Chain ating Cybercrime, Duties Support I Past Events. Durs: 45 Total Tutorials: 15	es of La alized Fo ulnerabil ologies, ty Systen work Disa te Encry ement Se ence, Col collection functions <b>Total I</b>	w Enfo rensics ities, F Avoidin ns, Intr aster R ption S ecurity lection on and ody, Ro s and Practic	Techni Protectiin Prot	nt: Computer ques, Hidden ng Data from Is with Firew etection Syst Systems, Pu Systems, In s, Identity Th s Obstacles, ng, Methods ucting the At etencies. Id es: - To or & Francis (	Forensi Data an Data an Being alls Bion cems, Fir blic Key Istant M eft, Bion Types of of Collec tack, The entificati <b>Dtal Hou</b> Group, 2	s Techi c Techi d How Compre- netric S Hou ewall S Infrasti lessagir netric S Eviden- tion, Ar e digita ion of rs: 60	nology nology to Find omised ecurity rs: 09 ecurity ructure rg (IM ecurity rs: 09 ce, The tifacts I crime Data
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Introduction to Types of Militar Types of Busines It, Spyware and Internet Tracing Systems. UNIT – IV Types of Compu Systems, Storag Systems, Wirele Security System Systems. UNIT – V Evidence Collect Rules of Evidence Collection Steps scene, Investig Reconstructing F Total contact Ho Text Books: 1. Kenneth 2. John R. Reference Book 1. Christof edition,	ry Computer Forensic Technology, Typ ss Computer Forensic Technology, Speci d Adware, Encryption Methods and V Methods, Security and Wireless Techn uter Forensics Systems: Internet Securit e Area Network Security Systems, Netw ess Network Security Systems, Satellit s, Net Privacy Systems, Identity Manage cion and Data Seizure: Why Collect Evide e, Volatile Evidence, General Procedure , Controlling Contamination: The Chain ating Cybercrime, Duties Support I Past Events. Durs: 45 Total Tutorials: 15 A C.Brancik, Insider Computer Fraud, Aue Vacca, Computer Forensics: Computer C s: Paar, Jan Pelzl, Understanding Crypto	es of La alized Fo ulnerabil ologies, ty Systen work Disa te Encry ement Se ence, Col collection functions <b>Total I</b> erbach Pu rime Sce	w Enfo rensics ities, F Avoidin ns, Intr aster R ption S ecurity lection on and ody, Ro s and Practic iblicati ne Inve A Tex	al Classe ons Tayles tbook f	at: Computer ques, Hidden ng Data from Is with Firew etection Syst Systems, Pu Systems, In s, Identity Th s Obstacles, In s, Identity Th s Obstacles, In s, Identity Th s Obstacles, Id es: - To or & Francis on n, Charles Riv or Students	Forensi Data an Data an Being alls Bion Eems, Fir blic Key Istant M eft, Bion Types of of Collec tack, The entificati otal Hou Group, 2 ver Media and Pra	s Techi ic Techi d How Compre- netric S Hou ewall S Infrasti lessagir netric S Hou Eviden- tion, Ar e digita ion of rs: 60 008. a, 2005	nology nology to Find omised ecuriti rs: 09 ecuriti rs: 09 (IM ecuriti rs: 09 ce, The tifacts I crim Data

Department : Co	omputer Science and Engineering	Progra	mme	: M.Tech	n. (Informatio	on Securit	ty)	
Semester :		Catego	ory :	: TY				
Subject Code	Subject		ırs / W	1	Credit		imum N	1
CSE73	Mobile Wireless Security	L 3	<b>T</b>	Р	<b>C</b> 4	<b>CA</b> 40	<b>SE</b> 60	100
Prerequisite		3	L	-	4	40	60	100
Objectives	<ul> <li>To focus security issues in the</li> <li>To differentiate between the i</li> <li>To educate the students about</li> </ul>	issues in v	wired a	and wire			asures.	
Outcomes	<ul> <li>On successful completion of the cours</li> <li>Map the mathematical more environment</li> <li>Understand the specific vulne</li> <li>Design robust systems against</li> </ul>	dels of rabilities	securit in wid	ty algo le range	rithms onto of wireless		and	mobile
UNIT – I							Но	urs: 09
802.11, WPAN I Networks – Mae Vulnerabilities c	Mobile and Wireless Networks: Cellula EEE 802.15, WMAN IEEE 802.16, IEEE 80 cro and Micro mobility – Personal mobi of Wireless Networks – Review of securi ctronic signatures – MAC – PKI and el	2.20, MIH ility – SIP ity basics	H IEEE P – Idei – sym	802.21, ntity ba metric a	WRAN IEEE & sed mobility, and asymme	302.22, N , NEMO a tric crypt	lobile II and MA ograph	nternet NETs – y, Hash
UNIT – II							Ца	
	Architectures		Dogu		ataction I			urs: 09
	Architectures – Hot Spot architecture -		-				-	
•	oneypots – Passive and Active attacks –			•		•		
•	ocol architecture – Radio physical layer			essing -	- SCO and A	CL logica	al trans	ports –
•	Authentication and pairing – Attacks – I	BlueSmac	ck.					
UNIT – III	<u>I</u>							urs: 09
•	802.11 - WEP - WEP2 - IV collisions -							
•	policy negotiation – radio security polici PKMv2-RSA – Security Association – 3 wa							- KEK —
UNIT – IV	Kivivz-KSA – Security Association – S wa	iy nanusi						urs: 09
	Hoc Networks – Attacks to routing prot	tocols -	Socurit	ty moch	anisms - Au	ita confia		
•						-		
-	Self-managed PKI – Resurrecting Ducklin	-		-				
	ntive mechanisms – Intrusion tolerance -	- SNEP - J	LIELSA	-100	ес – кеу mar	nagemen		
UNIT – V						•		urs: 09
security – H.323	ile Telecommunication Networks – SS7 · - SIP – Megaco – VoIP security flaws an ction of interception – Security issues in	nd counte	rmeas	ure – IN	1S architectu			
Total contact He				al Classe		Total Ho	ours: 60	
Text Books:								
1. Hakima basics, S	Chaouchi and Maryline Laurent-Makna Security in On-the-shelf and Emerging Te Venkataram and Sathish Babu, Wireles 0.	chnologi	es, 2 <sup>nd</sup>	Edition,	John Wiley 8	& Sons, 2	009.	
Reference Book								
1. Lei Chei	n, Jiahuang Ji, and Zihong Zhang, Wirel Education Press, 2013.	ess Netw	ork Se	curity: <sup>-</sup>	Theories and	Applicat	ions, S	pringer
2. Amitabl	n Mishra, Security and Quality of Service	e in Ad H	oc and	l Wirele	ss Networks,	1 <sup>st</sup> Editio	on, Can	nbridge
Universi	ity Press, 2008.							
	Makki, Peter Reiher, Kia Makki, Niki Pi Springer Science, 2007.	issinou, S	Shamila	a Makki	, Mobile and	l Wireles	s Secur	ity and
Websites:								
	vww.wi-fi.org/discover-wi-fi/security							
• • • •	vww.netsec.ethz.ch/Publication							
		<u> </u>						

3. http://www.radio-electronics.com/info/wireless/wimax/security-encryption-authentication.php

Department : (	Computer Scien	ce and Engineering	Progra	mme :	M.Tech	. (Informatio	on Security	)	
Semester :			Catego		TY				
Subject Code	Cubicat		Но	urs / W	eek	Credit	Max	kimum N	Marks
Subject Code	Subject		L	Т	Р	С	CA	SE	ТМ
CSE74	Security Asses	sment and Verification	3	1	-	4	40	60	100
Prerequisite	-								
Objectives	busine <ul> <li>To intr and co</li> </ul>	derstand the core busing ess processes roduce the methods avai ontrols to mitigate those i roduce the key standards	ilable to risks	perform	n risk ar	nalysis to ide	entify proc	ess-rela	ted risks
Outcomes	On successful Gain a and ot positic	completion of the course in in-depth understanding ther factors required for a pined to commission a s ty service and address the	, the stud g of the p a security ecurity ri	ents wi rocess, risk ass sk asse	ll be ab compor essmen essment	le to: nents, skills, nt process for any or	and experi	ence re	quired
UNIT – I								Но	urs: 09
Role of Securit	ty assessment i	n an Information securit	y Progra	n, Nee	d for Se	ecurity asses	ssment, Re	lated A	ctivities
Information Se	curity Risk Asse	ssment Basics, Security P	roject Def	inition,	Securit	y Risk Asses	sment Prep	paration	
UNIT – II								Но	urs: 09
Data Gathering	, Sampling, RIIC	OT Method, Administrativ	e, Techni	cal and	Physica	al Data Gath	ering, Anal	ysis of g	gathered
information.									
UNIT – III								Но	urs: 09
Meeting with (	Client, Status Ba	Critical Business Proces ased on Project Plan, Dis nds-On Testing, Manual	cussion o	f Critica	al Techr	nologies, Teo	chnology e	valuatio	n, Meet
UNIT – IV								Но	urs: 09
Safeguards, Es	tablishing Risk	c, Creating Risk Statemen Parameters, Risk Assess proaches, Qualitative and	ment Re	porting	, Repoi	rt Structure,	Risk Asse	essment	-
UNIT – V								Но	urs: 09
	•	s, GAISP, COBIT, ISO177						urity Leg	gislation
		formation Security Mana	-				1		
Total contact H	lours: 45	Total Tutorials: 15	Total I	Practica	l Classe	s: -	Total Ho	urs: 60	
Text Books:									
Assess	ments, Second E	Security Risk Assessmen Edition, CRC Press, 2011. ractical Guide to Security			•		r Performi	ng Secu	rity Risl
Reference Boo		,							
1. Thoma	s S. Coleman, A	Practical Guide to Risk M	lanageme	nt, Res	earch Fo	oundation, 2	011.		
Websites:	2					,			
	/studentaid.ed.	gov/sites/default/files/IV	V_Handb	ook.do	СХ				

Semester         :         Category         : IY           Subject Code         Subject         Hours / Week         Credit         Mammuni           CSE75         Internet Security Protocols         3         1         -         4         40         60           Prerequisite         -         -         4         40         60           Objectives         -         To introduce some of the known security problems related to the protocols and app of the internet         -         4         40         60           Objectives         -         To introduce some of the known security problems related to the protocols and app of the internet         -         To overview the contemporary security solutions on architectures and protocols.         -         To understand concepts and terminology associated System level security.         -         0         -         0 evelop a clear understanding of Internet Security protocols         -         -         -         0 evelop a clear understanding of Internet Security protocols         -         -         -         0 evelop a clear understanding of Internet Security protocols         -         Understand teary MAC, IP and Transport level protocols         -         -         -         -         -         -         -         -         -         -         -         -         -         - <t< th=""><th></th><th>omputer Science and Engineering</th><th></th><th></th><th></th><th>. (Informatio</th><th>n Security)</th><th></th><th></th></t<>		omputer Science and Engineering				. (Informatio	n Security)		
Subject Code         Subject         L         T         P         C         CA         SE           CSE75         Internet Security Protocols         3         1         -         4         40         60           Prerequisite         -         -         4         40         60           Objectives         -         To introduce some of the known security problems related to the protocols and app of the Internet         -         4         40         60           Objectives         -         To everview the contemporary security solutions on architectures and protocols.         -         To overview the contemporary security protocols         -         0         -         0         -         Develop a clear understanding of Internet security protocols         -         -         -         0         -         Develop a clear understanding of Internet security protocols         -         -         -         Interduction         Hot           Overview of ISO OSI model and TCP/IP model, Key Management, X:509 certificates, Public-Key Infrastructure         Hot         -         Hot         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         - <t< th=""><th>emester :</th><th></th><th>Catego</th><th>ory :</th><th>TY</th><th></th><th></th><th></th><th></th></t<>	emester :		Catego	ory :	TY				
L         I         P         L         L         I         P         L         L         I         P         L         I         P         L         I	ubject Code	Subject	Но	urs / W	eek	Credit	Max	imum N	larks
Prerequisite         -           Objectives         -           Objectives         -           Outcomes         -           Outcomes         -           Outcomes         -           Outcomes         -           Outcomes         -           Outderstand clearly MAC, IP and Transport level protocols         -           -         -           Outderstand clearly MAC, IP and Transport level protocols         -           -         -           Outderstand clearly MAC, IP and Transport level protocols         -           -         -         -           Outderstand clearly MAC, IP and Transport level protocols         -           -         -         -           Outderstand the general system level security         Hot           Overview of ISO OSI model and TCP/IP model, Key Management, X:509 certificates, Public-Key Infrastructu sing asystexe encryption Federated Identity management, Biometrics. Intruders, Intrusion detection, Password mana, malicious software, Viruses and related threats, Virus counterneasures, Distributed denial of service Firewalls: Firewall esign principles, trusted systems.           UNIT - II         Wireless Network Security         Hot           Operation, Discovery Phase, Authentication Phase, Key Management Phase, Protect Transfer Phase, The IEEE 802.111 Services, IEEE 802.111 Wireless Application Enw	ubject code	Subject	L	Т	Р	С	CA	SE	ТМ
To introduce some of the known security problems related to the protocols and app of the Internet     To overview the contemporary security solutions on architectures and protocols.     To understand concepts and terminology associated System level security.     On successful completion of the course, the students will be able to:         Develop a clear understanding of Internet security protocols         Understand the general system level security the protocol security content of ISO OSI model and TCP/IP model, Key Management, X.509 certificates, Public-Key Infrastructus Remote user authentication using symmetric key encryption, Kerberos, Remote user authentication using asyn analicous software, Viruses and related threats, Virus countermeasures, Distributed denial of service Firewalls: Firewall design principles, trusted systems.         UNIT - II Wreless LAN Overview - The Wi-Fi Alliance, IEEE 802 Protocol Architecture, IEEE 802.111 Components and Architectural Model JEEE 802.11 Services, IEEE 802.111 Wireless LAN Security         Hoo Vireless Application Protocol Overview: Operational Overview, WAP Architecture, Wireless Application Envirn WAP Protocol Architecture, Wireless Transport Layer Security: WILS Sessions and Connections, WILS I Architecture, Cryptographic Algorithms, WAP End-to-End Security.         UNIT - II         WP Security Public-Key Main Extensions, S/MIME Functionality, S/MIME Messages,         S/MIME: RFC 5322, Multipurpose Internet Mail Extensions, S/MIME Functionality, S/MIME Messages,         Security Payload, Combining security associations, Key management. E-commerce security:         other ecash and micro	SE75	Internet Security Protocols	3	1	-	4	40	60	100
Objectives         of the Internet           To overview the contemporary security solutions on architectures and protocols.         To ouderstand concepts and terminology associated System level security.           Outcomes         On successful completion of the course, the students will be able to:         Develop a clear understanding of Internet security protocols           Understand clearly MAC, IP and Transport level protocols         Understand the general system level security         Hoo           Overview of ISO OSI model and TCP/IP model, Key Management, X.509 certificates, Public-Key Infrastructu Remote user authentication using symmetric key encryption, Kerberos, Remote user authentication using asy key encryption Federated Identity management, Biometrics. Intruders, Intrusion detection, Password mana malicious software, Viruses and related threats, Virus countermeasures, Distributed denial of service Firewalls: Firewalls: Firewalle Stign principles, trusted systems.         Hoo           UNIT – II         Wireless Network Security         Hoo           IEEE 802.111 Wireless LAN Overview - The Wi-Fi Alliance, IEEE 802.111 Wireless LAN Security:         Hoo           WIRT = II         Wireless Network Security         Hoo           WIRT = Names of Operation, Discovery Phase, Authentication Phase, Key Management Phase, Protect Transfer Phase, The IEEE 802.111 Pseudorandom Function.         WIRT           WIRT = II         WAP Security         Moo           Wareless Application Protocol Overview: Operational Description, Cryptographic Keys and Key Rings, Public-Key Mana S/MIME: RFC 5322, M	rerequisite	-							
Outcomes <ul> <li>Develop a clear understanding of Internet security protocols</li> <li>Understand clearly MAC, IP and Transport level protocols</li> <li>Understand the general system level security</li> </ul> UNIT - I       Introduction       Hot         Overview of ISO OSI model and TCP/IP model, Key Management, X.509 certificates, Public-Key Infrastructu Remote user authentication using symmetric key encryption, Kerberos, Remote user authentication using asy key encryption Federated Identity management, Biometrics. Intruders, Intrusion detection, Password mana malicious software, Viruses and related threats, Virus countermeasures, Distributed denial of service Firewalls: Firewall design principles, trusted systems.       Hot         UNIT - II       Wireless LAN Overview - The Wi-Fi Alliance, IEEE 802. Protocol Architecture, IEEE 802.11 Gomponents and Architectural Model JEEE 802.11 Services, IEEE 802.111 Wireless LAN Security: IEEE 802.11 Pases of Operation, Discovery Phase, Authentication Phase, Key Management Phase, Protect Transfer Phase, The IEEE 802.111 Pseudorandom Function.       Hot         Wireless Application Protocol Overview: Operational Overview, WAP Architecture, Wireless Application Rovirus       Hot         VMP Protocol Architecture, Wireless Transport Layer Security: WTLS Sessions and Connections, WTLS I Architecture, Cryptographic Algorithms, WAP End-to-End Security.       Hot         UNIT - IV       Electronic Mail Security       Hot         VMP Protocol Architecture, Wireless Transport Layer Security: WTLS Sessions and Connections, WTLS I Architecture, Cryptographic Algorithms, WAP End-to-End Security.       Hot	bjectives	<ul><li>of the Internet</li><li>To overview the contemporary s</li></ul>	security s	olutions	s on arc	hitectures ar	nd protocol		cation
UNIT - I       Introduction       Hot         Overview of ISO OSI model and TCP/IP model, Key Management, X.509 certificates, Public-Key Infrastructure       Remote user authentication using symmetric key encryption, Kerberos, Remote user authentication using asy         Rew otce user authentication using symmetric key encryption, Kerberos, Remote user authentication using asy       Reverence of the system of the system of the system of the system.         UNIT - II       Wireless Network Security       Hot         EEE 802.111 Wireless LAN Overview - The Wi-Fi Alliance, IEEE 802 Protocol Architecture, IEEE 802.111 Formers and Architectural Model JEEE 802.111 Services, IEEE 802.111 Wireless LAN Security: IEEE 802.111 Pases of Operation, Discovery Phase, Authentication Phase, Key Management Phase, Protect Transfer Phase, The IEEE 802.111 Pseudorandom Function.       Hot         UNIT - III       WAP Security       Hot         Wireless Application Protocol Overview: Operational Overview, WAP Architecture, Wireless Application Envir       WID         WAP Protocol Architecture, Wireless Transport Layer Security: WTLS Sessions and Connections, WTLS I       Hot         VIIT - IV       Electronic Mail Security       Hot         VIIT - V       Electronic Mail Security       Hot         VIIT - V       Veb and IP Security Security Security: WTLS Sessions and Connections, WTLS I       Hot         VIIT - V       Electronic Mail Security Services, Domain Keys Identified Mail: Internet Mail Architecture       Threats, DKIM Ensto Security Secure Soc	utcomes	<ul> <li>Develop a clear understanding of</li> <li>Understand clearly MAC, IP and</li> </ul>	of Interne I Transpor	t securi t level p	ty proto	ocols			
Overview of ISO OSI model and TCP/IP model, Key Management, X.509 certificates, Public-Key Infrastructu         Remote user authentication using symmetric key encryption, Kerberos, Remote user authentication using asy         key encryption Federated Identity management, Biometrics. Intruders, Intrusion detection, Password mana         malicious software, Viruses and related threats, Virus countermeasures, Distributed denial of service         Firewalls: Firewall design principles, trusted systems.         UNIT – II       Wireless Network Security         IEEE 802.11 Wireless Network Security       Hot         Components and Architectural Model JEEE 802.11 Services, IEEE 802.11 Wireless LAN Security: IEEE 802.111         IEEE 802.111 Phases of Operation, Discovery Phase, Authentication Phase, Key Management Phase, Protect         Transfer Phase, The IEEE 802.111 Pseudorandom Function.         UNIT – III       WAP Security         Wireless Application Protocol Overview: Operational Overview, WAP Architecture, Wireless Application Envire         WAP Protocol Architecture, Wireless Transport Layer Security: WTLS Sessions and Connections, WTLS I         Architecture, Cryptographic Algorithms, WAP End-to-End Security.       Hot         Pretty Good Privacy: Notation, Operational Description, Cryptographic Keys and Key Rings, Public-Key Mana         MUIT – V       Electronic Mail Security       Hot         Web security: Web security requirements, Secure Sockets Layer (SL), Transport Layer Security (TLS), and       Ele	NIT – I			,				Hour	s: 09
Remote user authentication using symmetric key encryption, Kerberos, Remote user authentication using asynkey encryption Federated Identity management, Biometrics. Intruders, Intrusion detection, Password mana, malicious software, Viruses and related threats, Virus countermeasures, Distributed denial of service Firewalls: Firewa			anagemer	t X 509	) certifi	cates Public	-Key Infra		
UNIT - II       Wireless Network Security       Hou         IEEE 802.11       Wireless LAN Overview - The Wi-Fi Alliance, IEEE 802 Protocol Architecture, IEEE 802.11 for Components and Architectural Model IEEE 802.11 Services, IEEE 802.111 Wireless LAN Security: IEEE 802.11 is       IEEE 802.111 Wireless LAN Security: IEEE 802.11 Services, IEEE 802.111 Wireless LAN Security: IEEE 802.111 Services, IEEE 802.111 Wireless LAN Security: IEEE 802.111 Seudorandom Function.         UNIT - III       WAP Security       Hou         Wireless Application Protocol Overview: Operational Overview, WAP Architecture, Wireless Application Enviro       WAP Protocol Architecture, Wireless Transport Layer Security: WTLS Sessions and Connections, WTLS I Architecture, Cryptographic Algorithms, WAP End-to-End Security.       Hou         WIT - IV       Electronic Mail Security       Hou         Pretty Good Privacy: Notation, Operational Description, Cryptographic Keys and Key Rings, Public-Key Mana       S/MIME: RFC 5322, Multipurpose Internet Mail Extensions, S/MIME Functionality, S/MIME Messages, Certificate Processing, Enhanced Security Services, Domain Keys Identified Mail: Internet Mail Architecture       Hou         Web security: Web security requirements, Secure Sockets Layer (SSL), Transport Layer Security (TLS), and Electronic Transaction (SET), HTTPS, Secure Shell (SSH), IP Security: P Security overview, Architecture, Authen Encapsulating security payload, Combining security associations, Key management. E-commerce security: other e-cash and micropayment schemes.       Total Hours: 60         Total contact Hours: 45       Total Tutorials: 15       Total Practical Classes: -	ey encryption alicious softv	Federated Identity management, Biome vare, Viruses and related threats, Viru	etrics. Inti	ruders,	Intrusio	on detection,	, Password	manage	ement
IEEE 802.11 Wireless LAN Overview - The Wi-Fi Alliance, IEEE 802 Protocol Architecture, IEEE 802.11 f         Components and Architectural Model ,IEEE 802.11 Services, IEEE 802.11i Wireless LAN Security: IEEE 802.11i Services, IEEE 802.11i Wireless LAN Security: IEEE 802.11i Services, IEEE 802.11i Wireless Application, Discovery Phase, Authentication Phase, Key Management Phase, Protect         Transfer Phase, The IEEE 802.11i Pseudorandom Function.       Hot         UNIT – III       WAP Security       Hot         Wireless Application Protocol Overview: Operational Overview, WAP Architecture, Wireless Application Enviro       WAP         WAP Protocol Architecture, Wireless Transport Layer Security: WTLS Sessions and Connections, WTLS I Architecture, Cryptographic Algorithms, WAP End-to-End Security.       Hot         VINT – IV       Electronic Mail Security       Hot         Pretty Good Privacy: Notation, Operational Description, Cryptographic Keys and Key Rings, Public-Key Manag       S/MIME: RFC 5322, Multipurpose Internet Mail Extensions, S/MIME Functionality, S/MIME Messages,         Certificate Processing, Enhanced Security Services, Domain Keys Identified Mail: Internet Mail Architecture       Hot         UNIT – V       Web and IP Security       Hot         Web security: Web security requirements, Secure Sockets Layer (SSL), Transport Layer Security (TLS), and       Electronic Transaction (SET), HTTPS, Secure Shell (SSH), IP Security: IP Security overview, Architecture, Authen         Encapsulating security payload, Combining security associations, Key management. E-commerce security: <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Hour</td> <td>s. UO</td>								Hour	s. UO
Components and Architectural Model ,IEEE 802.11 Services, IEEE 802.11i Wireless LAN Security: IEEE 802.11i Set 802.11i Security IEEE 802.11i Phases of Operation, Discovery Phase, Authentication Phase, Key Management Phase, Protect Transfer Phase, The IEEE 802.11i Pseudorandom Function. UNIT – III WAP Security Hoto Overview: Operational Overview, WAP Architecture, Wireless Application Environ WAP Protocol Architecture, Wireless Transport Layer Security: WTLS Sessions and Connections, WTLS I Architecture, Cryptographic Algorithms, WAP End-to-End Security. UNIT – IV Electronic Mail Security Hoto-End Security. UNIT – IV Electronic Mail Security Hoto-End Security. UNIT – IV Electronic Mail Security Hoto-End Security. UNIT – IV Web and IP Security Fervices, Domain Keys Identified Mail: Internet Mail Architecture Threats, DKIM Strategy, DKIM Functional Flow. UNIT – V Web and IP Security Pervices, Secure Sockets Layer (SSL), Transport Layer Security (TLS), and Electronic Transaction (SET), HTTPS, Secure Shell (SSH), IP Security: IP Security overview, Architecture, Authen Encapsulating security payload, Combining security associations, Key management. E-commerce security: other e-cash and micropayment schemes. Total Contact Hours: 45 Total Tutorials: 15 Total Practical Classes: - Total Hours: 60 Text Books: 1. William Stallings, Cryptography and Network Security: Principles and Practice, 5 <sup>th</sup> Edition, Pearson Ed 2006. 2. Behrouz A. Forouzan, Cryptography and Network Security, Tata McGraw-Hill, 2011. Reference Books: 1. R. Oppliger, Internet and Intranet Security, second edition, Artech House, 2002. 2. A. Rubin, D. Geer and M. Ranum, Web Security Sourcebook, Wiley, 1997. 3. W. Cheswick and S. Bellovin, Firewalls and Internet Security, Addison-Wesley, 1994.				: <u>8</u> 07 г	Protocol	Architactur			
UNIT - III       WAP Security       Hot         Wireless Application Protocol Overview: Operational Overview, WAP Architecture, Wireless Application Enviro       WAP Protocol Architecture, Wireless Transport Layer Security: WTLS Sessions and Connections, WTLS I         Architecture, Cryptographic Algorithms, WAP End-to-End Security.       WTLS Sessions and Connections, WTLS I         Architecture, Cryptographic Algorithms, WAP End-to-End Security.       Hot         Pretty Good Privacy: Notation, Operational Description, Cryptographic Keys and Key Rings, Public-Key Mana       S/MIME: RFC 5322, Multipurpose Internet Mail Extensions, S/MIME Functionality, S/MIME Messages,         Certificate Processing, Enhanced Security Services, Domain Keys Identified Mail: Internet Mail Architecture       Hot         WINT - V       Web and IP Security       Hot         Wull - V       Web and IP Security       Hot         Web security: Web security requirements, Secure Sockets Layer (SSL), Transport Layer Security (TLS), and       Electronic Transaction (SET), HTTPS, Secure Shell (SSH), IP Security: IP Security overview, Architecture, Authen         Encapsulating security payload, Combining security associations, Key management. E-commerce security:       other e-cash and micropayment schemes.         Total Contact Hours: 45       Total Tutorials: 15       Total Practical Classes: -       Total Hours: 60         Text Books:       1.       William Stallings, Cryptography and Network Security: Principles and Practice, 5 <sup>th</sup> Edition, Pearson Ed 2006.	omponents an EE 802.11i Ph	d Architectural Model ,IEEE 802.11 Servi ases of Operation, Discovery Phase, Au	ices, IEEE Ithenticati	802.11i	Wireles	ss LAN Secur	ity: IEEE 80	2.11i Se	ervices
<ul> <li>Wireless Application Protocol Overview: Operational Overview, WAP Architecture, Wireless Application Enviru</li> <li>WAP Protocol Architecture, Wireless Transport Layer Security: WTLS Sessions and Connections, WTLS I Architecture, Cryptographic Algorithms, WAP End-to-End Security.</li> <li>UNIT – IV</li> <li>Electronic Mail Security</li> <li>Hot Pretty Good Privacy: Notation, Operational Description, Cryptographic Keys and Key Rings, Public-Key Mana, S/MIME: RFC 5322, Multipurpose Internet Mail Extensions, S/MIME Functionality, S/MIME Messages, Certificate Processing, Enhanced Security Services, Domain Keys Identified Mail: Internet Mail Architecture Threats, DKIM Strategy, DKIM Functional Flow.</li> <li>UNIT – V</li> <li>Web and IP Security</li> <li>Hot Web security: requirements, Secure Sockets Layer (SSL), Transport Layer Security (TLS), and Electronic Transaction (SET), HTTPS, Secure Shell (SSH), IP Security: IP Security overview, Architecture, Authen Encapsulating security payload, Combining security associations, Key management. E-commerce security: other e-cash and micropayment schemes.</li> <li>Total Contact Hours: 45</li> <li>Total Tutorials: 15</li> <li>Total Practical Classes: -</li> <li>Total Hours: 60</li> <li>Text Books:         <ul> <li>William Stallings, Cryptography and Network Security: Principles and Practice, 5<sup>th</sup> Edition, Pearson Ed 2006.</li> <li>Behrouz A. Forouzan, Cryptography and Network Security, Tata McGraw-Hill, 2011.</li> </ul> </li> <li>Reference Books:         <ul> <li>R. Oppliger, Internet and Intranet Security, Sourcebook, Wiley, 1997.</li> <li>W. Cheswick and S. Bellovin, Firewalls and Internet Security, Addison-Wesley, 1994.</li> </ul> </li> </ul>								Hour	c· 09
<ul> <li>WAP Protocol Architecture, Wireless Transport Layer Security: WTLS Sessions and Connections, WTLS I Architecture, Cryptographic Algorithms, WAP End-to-End Security.</li> <li>UNIT – IV Electronic Mail Security Hou Pretty Good Privacy: Notation, Operational Description, Cryptographic Keys and Key Rings, Public-Key Mana, S/MIME: RFC 5322, Multipurpose Internet Mail Extensions, S/MIME Functionality, S/MIME Messages, Certificate Processing, Enhanced Security Services, Domain Keys Identified Mail: Internet Mail Architecture Threats, DKIM Strategy, DKIM Functional Flow.</li> <li>UNIT – V Web and IP Security (TLS), and Electronic Transaction (SET), HTTPS, Secure Sockets Layer (SSL), Transport Layer Security (TLS), and Electronic Transaction (SET), HTTPS, Secure Sockets Layer (SSL), Transport Layer Security (TLS), and Electronic Transaction (SET), HTTPS, Secure Sockets Layer (SSL), Transport Layer Security (TLS), and Electronic Transaction (SET), HTTPS, Secure Sockets Layer (SSL), Transport Layer Security: other e-cash and micropayment schemes.</li> <li>Total Tutorials: 15 Total Practical Classes: - Total Hours: 60 Text Books:         <ul> <li>William Stallings, Cryptography and Network Security: Principles and Practice, 5<sup>th</sup> Edition, Pearson Ed 2006.</li> <li>Behrouz A. Forouzan, Cryptography and Network Security, Tata McGraw-Hill, 2011.</li> </ul> </li> <li>Reference Books:         <ul> <li>R. Oppliger, Internet and Intranet Security, second edition, Artech House, 2002.</li> <li>A. Rubin, D. Geer and M. Ranum, Web Security Sourcebook, Wiley, 1997.</li> <li>W. Cheswick and S. Bellovin, Firewalls and Internet Security, Addison-Wesley, 1994.</li> </ul> </li></ul>		-	verview. V	AP Arc	hitectu	re. Wireless	Application		
UNIT - IV       Electronic Mail Security       Hou         Pretty Good Privacy: Notation, Operational Description, Cryptographic Keys and Key Rings, Public-Key Mana       S/MIME: RFC 5322, Multipurpose Internet Mail Extensions, S/MIME Functionality, S/MIME Messages,         Certificate Processing, Enhanced Security Services, Domain Keys Identified Mail: Internet Mail Architecture       Threats, DKIM Strategy, DKIM Functional Flow.         UNIT - V       Web and IP Security       Hou         Web security: Web security requirements, Secure Sockets Layer (SSL), Transport Layer Security (TLS), and       Electronic Transaction (SET), HTTPS, Secure Shell (SSH), IP Security: IP Security overview, Architecture, Authen         Encapsulating security payload, Combining security associations, Key management. E-commerce security:       other e-cash and micropayment schemes.         Total contact Hours: 45       Total Tutorials: 15       Total Practical Classes: -       Total Hours: 60         2006.       2. Behrouz A. Forouzan, Cryptography and Network Security: Principles and Practice, 5 <sup>th</sup> Edition, Pearson Ed 2006.       2.         2. Behrouz A. Forouzan, Cryptography and Network Security, Tata McGraw-Hill, 2011.       Reference Books:       1.         1. R. Oppliger, Internet and Intranet Security, second edition, Artech House, 2002.       2.       A. Rubin, D. Geer and M. Ranum, Web Security Sourcebook, Wiley, 1997.       3.         3. W. Cheswick and S. Bellovin, Firewalls and Internet Security, Addison-Wesley, 1994.       Websites:       Websites:	AP Protocol	Architecture, Wireless Transport Layer	Security	: WTLS					
Pretty Good Privacy: Notation, Operational Description, Cryptographic Keys and Key Rings, Public-Key Mana, S/MIME: RFC 5322, Multipurpose Internet Mail Extensions, S/MIME Functionality, S/MIME Messages, Certificate Processing, Enhanced Security Services, Domain Keys Identified Mail: Internet Mail Architecture Threats, DKIM Strategy, DKIM Functional Flow. UNIT – V Web and IP Security requirements, Secure Sockets Layer (SSL), Transport Layer Security (TLS), and Electronic Transaction (SET), HTTPS, Secure Shell (SSH), IP Security: IP Security overview, Architecture, Authen Encapsulating security payload, Combining security associations, Key management. E-commerce security: other e-cash and micropayment schemes. Total contact Hours: 45 Total Tutorials: 15 Total Practical Classes: - Total Hours: 60 Text Books: 1. William Stallings, Cryptography and Network Security: Principles and Practice, 5 <sup>th</sup> Edition, Pearson Ed 2006. 2. Behrouz A. Forouzan, Cryptography and Network Security, Tata McGraw-Hill, 2011. Reference Books: 1. R. Oppliger, Internet and Intranet Security, second edition, Artech House, 2002. 2. A. Rubin, D. Geer and M. Ranum, Web Security Sourcebook, Wiley, 1997. 3. W. Cheswick and S. Bellovin, Firewalls and Internet Security, Addison-Wesley, 1994. Websites:			u Security	•				Hour	c· 00
<ul> <li>S/MIME: RFC 5322, Multipurpose Internet Mail Extensions, S/MIME Functionality, S/MIME Messages, Certificate Processing, Enhanced Security Services, Domain Keys Identified Mail: Internet Mail Architecture Threats, DKIM Strategy, DKIM Functional Flow.</li> <li>UNIT - V Web and IP Security Hourige Secure Sockets Layer (SSL), Transport Layer Security (TLS), and Electronic Transaction (SET), HTTPS, Secure Shell (SSH), IP Security: IP Security overview, Architecture, Authen Encapsulating security payload, Combining security associations, Key management. E-commerce security: other e-cash and micropayment schemes.</li> <li>Total contact Hours: 45 Total Tutorials: 15 Total Practical Classes: - Total Hours: 60 Text Books:         <ul> <li>William Stallings, Cryptography and Network Security: Principles and Practice, 5<sup>th</sup> Edition, Pearson Ed 2006.</li> <li>Behrouz A. Forouzan, Cryptography and Network Security, Tata McGraw-Hill, 2011.</li> </ul> </li> <li>Reference Books:         <ul> <li>R. Oppliger, Internet and Intranet Security, second edition, Artech House, 2002.</li> <li>A. Rubin, D. Geer and M. Ranum, Web Security Sourcebook, Wiley, 1997.</li> <li>W. Cheswick and S. Bellovin, Firewalls and Internet Security, Addison-Wesley, 1994.</li> </ul> </li> </ul>			Cruntor	anhic k	(aug 20)	Koy Dinge	Dublic Kov		
UNIT - V       Web and IP Security       Hou         Web security: Web security requirements, Secure Sockets Layer (SSL), Transport Layer Security (TLS), and         Electronic Transaction (SET), HTTPS, Secure Shell (SSH), IP Security: IP Security overview, Architecture, Authen         Encapsulating security payload, Combining security associations, Key management. E-commerce security:         other e-cash and micropayment schemes.         Total contact Hours: 45       Total Tutorials: 15         Total contact Hours: 45       Total Network Security: Principles and Practice, 5 <sup>th</sup> Edition, Pearson Ed 2006.         2.       Behrouz A. Forouzan, Cryptography and Network Security, Tata McGraw-Hill, 2011.         Reference Books:       1         1.       R. Oppliger, Internet and Intranet Security, second edition, Artech House, 2002.         2.       A. Rubin, D. Geer and M. Ranum, Web Security Sourcebook, Wiley, 1997.         3.       W. Cheswick and S. Bellovin, Firewalls and Internet Security, Addison-Wesley, 1994.         Websites:       Method Security Security, Addison-Wesley, 1994.	MIME: RFC ! ertificate Proc	5322, Multipurpose Internet Mail Exte essing, Enhanced Security Services, Dor	ensions, S	/MIME	Function	onality, S/M	IIME Mess	ages, S,	/MIM
<ul> <li>Web security: Web security requirements, Secure Sockets Layer (SSL), Transport Layer Security (TLS), and Electronic Transaction (SET), HTTPS, Secure Shell (SSH), IP Security: IP Security overview, Architecture, Authen Encapsulating security payload, Combining security associations, Key management. E-commerce security: other e-cash and micropayment schemes.</li> <li>Total contact Hours: 45 Total Tutorials: 15 Total Practical Classes: - Total Hours: 60 Text Books:         <ul> <li>William Stallings, Cryptography and Network Security: Principles and Practice, 5<sup>th</sup> Edition, Pearson Ed 2006.</li> <li>Behrouz A. Forouzan, Cryptography and Network Security, Tata McGraw-Hill, 2011.</li> </ul> </li> <li>Reference Books:         <ul> <li>R. Oppliger, Internet and Intranet Security, second edition, Artech House, 2002.</li> <li>A. Rubin, D. Geer and M. Ranum, Web Security Sourcebook, Wiley, 1997.</li> <li>W. Cheswick and S. Bellovin, Firewalls and Internet Security, Addison-Wesley, 1994.</li> </ul> </li> </ul>								Hour	c· 00
Electronic Transaction (SET), HTTPS, Secure Shell (SSH), IP Security: IP Security overview, Architecture, Authen Encapsulating security payload, Combining security associations, Key management. E-commerce security: other e-cash and micropayment schemes. Total contact Hours: 45 Total Tutorials: 15 Total Practical Classes: - Total Hours: 60 Text Books: 1. William Stallings, Cryptography and Network Security: Principles and Practice, 5 <sup>th</sup> Edition, Pearson Ed 2006. 2. Behrouz A. Forouzan, Cryptography and Network Security, Tata McGraw-Hill, 2011. Reference Books: 1. R. Oppliger, Internet and Intranet Security, second edition, Artech House, 2002. 2. A. Rubin, D. Geer and M. Ranum, Web Security Sourcebook, Wiley, 1997. 3. W. Cheswick and S. Bellovin, Firewalls and Internet Security, Addison-Wesley, 1994. Websites:			kota Lava	~ (SSI)	Tranco	ort Lover Se	ocurity (TI)		
<ol> <li>Text Books:         <ol> <li>William Stallings, Cryptography and Network Security: Principles and Practice, 5<sup>th</sup> Edition, Pearson Ed 2006.</li> <li>Behrouz A. Forouzan, Cryptography and Network Security, Tata McGraw-Hill, 2011.</li> </ol> </li> <li>Reference Books:         <ol> <li>R. Oppliger, Internet and Intranet Security, second edition, Artech House, 2002.</li> <li>A. Rubin, D. Geer and M. Ranum, Web Security Sourcebook, Wiley, 1997.</li> <li>W. Cheswick and S. Bellovin, Firewalls and Internet Security, Addison-Wesley, 1994.</li> </ol> </li> </ol>	ectronic Trans	action (SET), HTTPS, Secure Shell (SSH), I ecurity payload, Combining security as	IP Security	y: IP Sec	curity o	verview, Arcł	hitecture, A	Authenti	catior
<ol> <li>William Stallings, Cryptography and Network Security: Principles and Practice, 5<sup>th</sup> Edition, Pearson Ed 2006.</li> <li>Behrouz A. Forouzan, Cryptography and Network Security, Tata McGraw-Hill, 2011.</li> <li>Reference Books:         <ol> <li>R. Oppliger, Internet and Intranet Security, second edition, Artech House, 2002.</li> <li>A. Rubin, D. Geer and M. Ranum, Web Security Sourcebook, Wiley, 1997.</li> <li>W. Cheswick and S. Bellovin, Firewalls and Internet Security, Addison-Wesley, 1994.</li> </ol> </li> </ol>	otal contact H	ours: 45 Total Tutorials: 15	Total F	ractica	l Classe	s: -	Total Ho	urs: 60	
<ol> <li>R. Oppliger, Internet and Intranet Security, second edition, Artech House, 2002.</li> <li>A. Rubin, D. Geer and M. Ranum, Web Security Sourcebook, Wiley, 1997.</li> <li>W. Cheswick and S. Bellovin, Firewalls and Internet Security, Addison-Wesley, 1994.</li> </ol> Websites:	<ol> <li>William</li> <li>2006.</li> <li>Behrout</li> </ol>	z A. Forouzan, Cryptography and Networ					lition, Pear	son Edu	cation
<ol> <li>A. Rubin, D. Geer and M. Ranum, Web Security Sourcebook, Wiley, 1997.</li> <li>W. Cheswick and S. Bellovin, Firewalls and Internet Security, Addison-Wesley, 1994.</li> </ol> Websites:									
Websites:									
	3. W. Che	swick and S. Bellovin, Firewalls and Interr	<u>net Se</u> curi	ty <u>, A</u> dd	ison-We	esley, 1994.			
1. http://www.cert.org/	/ebsites:								
<ol> <li>http://www.ietf.org/</li> <li>http://www.setco.org/set_specifications.html</li> </ol>	2. http://v	vww.ietf.org/							

- 4. http://www.drizzle.com/~aboba/IEEE/
- 5. http://www.cerias.purdue.edu/coast/firewalls/
- 6. http://www.cerias.purdue.edu/coast/intrusion-detection/welcome.html

Separation . (	Computer Science and Engineering	Progra	nine .	VI. Lech.	(informatio	n Security)		
Semester :		Catego	ory : <sup>-</sup>	ΓY				
Subject Code	Subject	Но	urs / We	eek	Credit	Max	imum N	larks
Subject Code	Subject	L	Т	Р	С	CA	SE	ТМ
CSE76	Network Security Essentials	3	1	-	4	40	60	100
Prerequisite	-							
	<ul> <li>To introduce the security prol</li> </ul>	blems assoc	iated w	th malio	cious softwa	re and intr	uders	
Objectives	<ul> <li>To familiarize the network s</li> </ul>	security cor	ntrols tl	nat help	o to protect	t the usab	oility, in	tegrity,
	reliability and safety of the ne					travels thr	ough it	
	On successful completion of the cours	se, the stude	ents wil	be able	e to:			
Outcomes	<ul> <li>Identify the attacks against ne</li> </ul>							
Outcomes	<ul> <li>Identify the various types of s</li> </ul>	•			•			icture
	<ul> <li>Implement appropriate securi</li> </ul>	ity controls	to safeg	uard th	e network ir	nfrastructu		
UNIT – I	Introduction							s: 09
	of Networks, Need for network	•						
	, wiretapping, impersonation, traffic a	•			nt, DOS, act	ive code c	or mobil	e code
	curity Architecture, Security Services, N	lodel for Ne	twork S	ecurity.				
UNIT – II	Cryptography and Key Distribution						Hour	
	otion Techniques, Symmetric Encryption	•						
-	Cipher Modes of Operation, Public Key		-	-	-		-	
	Distribution using Symmetric and Asyn	nmetric Enc	ryption	, Kerber	ros, X.509, F	Public Key	Infrastr	ucture
	evocation, directories.						1	
UNIT – III	Message Authentication and Digital S	-						s: 09
•	of Authentication Functions, Message					-		
	MAC, CMAC, Whirlpool, Address ba		tication	, passw	vord based	authentic	ation,	rusted
	, digital Signatures, Digital Signature Sta	indard.						
UNIT – IV	IP Security, Transport Layer Security	Devile e d. 11/1						s: 09
	tication header, Encapsulating Security							
Shell.	Transport Layer Security, Negotiating	cipiter suite	s, com	JIESSION	methous,	encoung,	ппрэ,	Secure
UNIT – V	Network Security Applications						Hour	c· 00
							пош	
Electropic Mail	Socurity Drivocy onboncod mail DCD		uthoriza	tion an	d Accoss co	ntrol Eiro		trucion
	Security, Privacy enhanced mail, PGP						walls, In	
Detection and	Prevention Systems, Honeypots, hone						walls, In	
Detection and Private Networ	Prevention Systems, Honeypots, hone k.	etnets, scar	ning ar	d analy	vsis tools, A	ntivirus So	valls, In ftware,	
Detection and Private Networ Total contact H	Prevention Systems, Honeypots, hone k.	etnets, scar	ning ar		vsis tools, A		valls, In ftware,	
Detection and Private Networ Total contact H Text Books:	Prevention Systems, Honeypots, hone k. Hours: 45 Total Tutorials: 15	etnets, scan	ning ar Practica	d analy Classes	rsis tools, A	ntivirus So	walls, In ftware, <b>urs: 60</b>	Virtua
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Department :	Computer Sciend	ce and Engineering	Progra	amme :	M.Teo	ch. (Informa	tion Sec	urity)	
Semester :	•		Categ	ory :	ΤY		-		
Subject Code	Subject		Ηοι	irs / W	eek	Credit	Max	imum N	/larks
-	-		L	Т	Р	C	CA	SE	TM
CSE77	Human Aspect	s in Information Security	3	1	-	4	40	60	100
Prerequisite	-								
		rn and understand the hu	•	and soc	io cultı	ural aspects	of secur	ity	
Objectives		lerstand usable security a							
		lerstand security from the			-				
		completion of the course,		will be	able to	):			
		stand the motivations for							
Outcomes	Recog	nize the importance of use	er acceptance	of secu	urity po	plicies and t	echnolog	gies	
	Realize	e the need for Non-intrus	ive security a	nd org	anizatio	onal goverr	nance for	inform	ation
	securi	1						•	
UNIT – I		sychological Aspects							rs: 09
	•	Password Authentication-			•				
		nk- Impact of the Huma							
		Why Users Make Poor			Trust	ing Compu	iters Thi	ough 1	rusting
	1	in a Safety-Critical Inform	ation Society.						
UNIT – II	Social and Cu								rs: 09
	•	s a Social System: Some N				•	-		
	•	national Perspective- Socia					•		
-	-	on Social Engineering Att	ack Channels	- A Soc	cial On	tology for I	ntegratir	ng Secur	ity and
Software Engir	-								
UNIT – III	Usability Issue								rs: 09
•	-	on-Experts: A Case Stud	•			-			•
		PTCHAs: Differentiating b	etween Hum	an and	Bots-	Privacy Co	ncerns v	vhen M	odeling
	-	Recommender Systems.							
UNIT – IV	Organizationa	•							rs: 09
•		lity Model and the Ecor					•		• •
	-	tection- Aligning IT Tear		-			-		-
		genda for Acquisition of I	Human Factor	rs - Do	Inform	ation Secu	rity Polic	ies Red	uce the
		: An Exploratory Analysis.							
UNIT – V	Organizationa	-							rs: 09
•		with respect to catastroph	•					•	
		xt Detection of Keystroke	•			•	-	•	
-		nmerce Security and Hon	-				-		
		ecentralized Security Adn	ninistration-E	nterpris	se Info	rmation Sy	stem Se	curity;	A Life-
Cycle Approac									
Total contact I	10urs: 45	Total Tutorials: 15	Total Pract	ical Cla	sses: -	•	Total Ho	urs: 60	
Text Books:							<b>F</b>	<b>.</b>	
		ish Gupta, Social and Hu	man Element	s of Inf	ormati	on Security	: Emergi	ng Trer	ids and
	ermeasures, IGI			مناما مس	d	ni-ational I	::+:	:	
		Sharman, Handbook of r	esearch on so	ocial an	d orga	nizational I	labilities	in infor	mation
	y, IGI Global, 20	08.							
Reference Boo		howahhu lizzale / f	unantin A.		Car	the second D. 1			
-		hambhu Upadhyaya, Info	ormation Assu	irance,	Secur	ity and Pri	vacy Ser	vices, E	merald
•	Publishing, 2009		and Driver	Devel	00000	o. Tronde			nta ici
		sive Information Security	anu Privacy	Develo	prnent	s. rrends a		inceme	iits, IGI
Global	, 2011.								
Websites: -									

Department : (	Computer Science and Engineering	TTOBIU			(Information			
Semester :		Catego	ory :	ΓY				
Subject Code	Subject	Но	urs / Wo	eek	Credit	Maxi	imum N	1arks
-	-	L	Т	Р	С	CA	SE	TM
CSE78	Game Theory	3	1	-	4	40	60	100
Prerequisite	-							
Objectives	<ul> <li>To train students in the logic and</li> <li>To learn the classification of g concepts of game theory and te agents in non-cooperative scena</li> <li>To analyze and solve both sim familiarized with different sol strategy equilibrium, Subgame p</li> </ul>	ames the ach stude ario. nultaneou ution co	e course ents to s is-move ncepts	e will m solve str s and s like min	ove onto imp ategic games equential-mo	oortant o between ves game	lefinition two and es and	ns and d more will be
Outcomes	<ul> <li>On successful completion of the course,</li> <li>Have knowledge to mixed strate</li> <li>Apply game theory in voting and</li> <li>Recognize and understand game</li> <li>Apply the concepts, ideas that capply them to the problems at h</li> </ul>	the stude egy equili d bargaini e theory i constitute	ents wil bria, and ing n the w	l be able d to repe orld aro	eated games und them	d their so	olutions,	, and
UNIT – I	Introduction on Game theory						Но	urs: 09
	olutions – Theory of competitive Equil		-			e interpi	retation	
Correlated Equ	xistence and properties of Nash Equili ilibrium	ibrium- I	nterrela	ted stri	ct dominance	e and Ra	ationaliz	ability-
-			nterrela	ted stri	ct dominance	e and Ra		ability-
Correlated Equ UNIT – II	ilibrium Dynamic games of complete informatic	on					Но	urs: 09
Correlated Equ UNIT – II Extensive form – Backward ind	ilibrium <b>Dynamic games of complete informatic</b> games –Commitment and perfection in r duction and Subgame perfection – Critics	on multistage of backv	e games vard inc	s – Strate	egies and Equi and Subgame	ilibria in e perfectio	<b>Ho</b> extensiv	urs: 09 ve form
Correlated Equ UNIT – II Extensive form – Backward ind of Multistage g	ilibrium <b>Dynamic games of complete informatic</b> games –Commitment and perfection in r duction and Subgame perfection – Critics ames with observed Actions – Open and o	on multistage of backv closed Loo	e games vard inc	s – Strate	egies and Equi and Subgame	ilibria in e perfectio	Ho extensiv on- Appl	ve form lication
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Correlated Equi UNIT – II Extensive form – Backward ind of Multistage g UNIT – III Incomplete Infi strategies – Di feasible allocat UNIT – IV Dynamic game refinements – stability- Coalit UNIT – V Routing game network functi selection – Auc Total contact H Text Books: 1. Drew F Reference Boo	Ilibrium         Dynamic games of complete information         games –Commitment and perfection in reduction and Subgame perfection – Critics         ames with observed Actions – Open and or         Static games of Incomplete information         ormation- The notations of Type and Strats         stributed Approach – Bayseian game and         ion –Optimization         Dynamic games of incomplete information:         Perfect I         Strategic form refinements – Reputation         ional games.         Application of game theory in Network         basics – Cooperation enforcement and         on game – Auction theory – Basics of or         tion theory for resource allocation - Coop         Jours: 45         Total Tutorials: 15         udenberg and Jean Triole, Game theory, I	nultistage of backv closed Loo tegy – Ba d mecha d mecha effects – ing learning cooperati perative g Total F	e games vard inc op Horiz ayseian nism de equilibu - signali ; using on tran games fo <b>Practica</b> Univer	s – Strate duction a cons – Re Equilibri esign: F rium in ng gami repeate smissior or transr I Classes sity pres	egies and Equi and Subgame epeated Game ium – Deletion evelation Prin multistage ga ng – Robust p d games – H n – Non coop nission :: -	ilibria in o perfections of Strict nciple – S ames – E prediction ierarchal	Ho extensiv on- Appl Ho tlty dom Single A Ho Extensive n under Fouting game fo	ve form lication <b>ours: 09</b> ninated ogent – <b>ours: 09</b> e form payoff <b>ours: 09</b> g using
Correlated Equ UNIT – II Extensive form – Backward ind of Multistage g UNIT – III Incomplete Inf strategies – Di feasible allocat UNIT – IV Dynamic game refinements – stability- Coalit UNIT – V Routing game network functi selection – Auc Total contact H Text Books: 1. Drew F Reference Boo	Ilibrium         Dynamic games of complete information         games –Commitment and perfection in reduction and Subgame perfection – Critics         ames with observed Actions – Open and or         Static games of Incomplete information         ormation- The notations of Type and Strats         stributed Approach – Bayseian game and         ion –Optimization         Dynamic games of incomplete information         of incomplete information: Perfect I         Strategic form refinements – Reputation         ional games.         Application of game theory in Network         basics – Cooperation enforcement and         on game – Auction theory – Basics of or         tion theory for resource allocation - Coop         Jours: 45         Total Tutorials: 15	nultistage of backv closed Loo ntegy – Ba d mecha d mecha Bayseian effects – ing learning cooperati perative g Total F Princeton	e games vard inc op Horiz ayseian nism de equilibu - signali ; using on tran games fo <b>Practica</b> Univer theory,	s – Strate luction a cons – R Equilibri esign: F rium in ng gami repeate smission or transr I Classes sity pres	egies and Equi and Subgame epeated Game fum – Deletion Revelation Prin multistage ga ng – Robust p d games – H n – Non coop nission :: -	ilibria in o perfections n of Strict nciple – S ames – E prediction ierarchal perative g <b>Total Ho</b>	Ho extensive on- Appl Ity dom Single A Ho Extensive n under Ho routing game fo urs: 60	ve form lication <b>ours: 09</b> hinated ogent – <b>ours: 09</b> e form payoff <b>ours: 09</b> g using
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Correlated Equi UNIT – II Extensive form – Backward ind of Multistage g UNIT – III Incomplete Infi strategies – Di feasible allocat UNIT – IV Dynamic game refinements – stability- Coalit UNIT – V Routing game network functi selection – Auc Total contact H Text Books: 1. Drew F Reference Boo 1. Martin 2. Zhu Ha Websites: 1. https:/	ilibrium Dynamic games of complete information games –Commitment and perfection in re- duction and Subgame perfection – Critics ames with observed Actions – Open and or Static games of Incomplete information ormation- The notations of Type and Stra- stributed Approach – Bayseian game and ion –Optimization Dynamic games of incomplete information strategic form refinements – Reputation ional games. Application of game theory in Network basics – Cooperation enforcement and on game – Auction theory – Basics of or tion theory for resource allocation - Coop fours: 45 Total Tutorials: 15 udenberg and Jean Triole, Game theory, I ks: J. Osborne and Ariel Rubinstein, A Course	nultistage of backv closed Loo ntegy – Ba d mecha d mecha Bayseian effects – ing learning cooperati perative g Total F Princeton	e games vard inc op Horiz ayseian nism de equilibu - signali ; using on tran games fo <b>Practica</b> Univer theory,	s – Strate luction a cons – R Equilibri esign: F rium in ng gami repeate smission or transr I Classes sity pres	egies and Equi and Subgame epeated Game fum – Deletion Revelation Prin multistage ga ng – Robust p d games – H n – Non coop nission :: -	ilibria in o perfections n of Strict nciple – S ames – E prediction ierarchal perative g <b>Total Ho</b>	Ho extensive on- Appl Ity dom Single A Ho Extensive n under Ho routing game fo urs: 60	ve form lication <b>ours: 09</b> ninated ogent – <b>ours: 09</b> e form payoff <b>ours: 09</b> g using

Department : (	Computer Science and Engineering	Progra	mme : I	M.Tech.	(Information S	Security)		
Semester :		Catego	ry :⊺	ΓY				
Subject Code	Subject	Ηοι	ırs / We	eek	Credit	Maxi	mum M	arks
Subject Code		L	Т	Р	С	CA	SE	ТМ
CSE79	Database Security and Auditing	3	1	-	4	40	60	100
Prerequisite	-							
	<ul> <li>To understand the need to secure</li> </ul>							
Objectives	<ul> <li>To get the knowledge of different</li> </ul>			curing D	atabases			
	<ul> <li>To know how to do auditing with</li> </ul>							
	On successful completion of the course, t				e to:			
Outcomes	<ul> <li>Develop the applications with sec</li> </ul>	cured Da	tabases	5				
	<ul> <li>Auditing the Databases</li> </ul>							
UNIT – I	Security Architecture and Operating Syst						Hour	
	Security – Information Systems – Database	-		•				
	ecture – Database Security – Asset Type				•	•	-	-
	mentals: Introduction – Operating System							
•	f an Operating System Security Environ				n Method –	User Ad	ministra	tion –
	ies – Vulnerabilities of Operating Systems -			-				
UNIT – II	Administration of Users, Profiles, Passwo						Hour	
	Documentation of User Administration – C	•				-		-
	ser – Removing Users – Modifying Users							
	ote Servers – Practices for Administrators		-				-	
	ction – Defining and Using Profiles – Des		•	iementi	ng Password i	- oncies	Grantii	ng and
UNIT – III	Privileges – Creating, Assigning and Revokin Database Application Security Models			\\/ithin	the Conoral	Socurity	Hour	c: 00
	Landscape	anu se	curity	vvitiiii	the General	Security	nour	5.05
Introduction –	Types of Users – Security Models – Applica	ation Typ	oes – Ap	plicatio	n Security Mo	dels – Da	ita Encry	ption.
Security Within	n the General Security Landscape: Defe	nse-in-D	epth –	Securit	ty Software L	andscape	e – Per	imeter
Security, Firew	all, Intrusion Detections and Intrusion Pre-	ventions	– Secu	ring the	e Core – Applio	cation Se	curity –	Public
Key Infrastruct	ure (PKI) – Vulnerability Management – Pat		-	it and In	icident Manag	ement.	1	
UNIT – IV	Auditing Categories and Auditing Databa						Hour	
	pries. Auditing Database Activity: Introduct		-		•		-	
	Auditing Database Activity with Oracle –	-	g Servei	r Activit	y with Micros	oft SQL	Server 2	2000 –
	SQL Profiler – Security Auditing with SQL Se	erver.						
UNIT – V	Security and Auditing Case Studies	6.5					Hour	
	Developing an Online Database – Taking Ca	are of Pa	yroll –	Tracking	g Town Contrac	cts – Trac	king Da	tabase
	eloping a Secure Authorization Repository.	<b>T</b>				<b>-</b>		
Total contact H	ours: 45 Total Tutorials: 15	lotal P	ractica	Classes	5: -	Total Ho	urs: 60	
Text Books:	A Afrouni Database Security and Auditia	a Thomas	on Corr		halogy 2000			
	A. Afyouni, Database Security and Auditing n Natan, Implementing Database Security a	-						
Reference Boo			iting, El		igitai F1835, 20			
	🔊. Basta, Melissa Zgoca, Dana Bullaboy, Thom	as I_W/h	itlocksr	Dataha	ise Security 20	)11		
	Piattini, Auditing Information System,Idea (				•	/		
Websites: -	,			.,				

Department : (	Computer Science and Engineering	Progra	mme :	M.Tech.	. (Informatio	on Securi	ty)	
Semester :		Catego	ory :	TY				
Subject Code	Subject	Но	urs / Wo	eek	Credit	M	laximum N	Marks
Subject Code		L	Т	Р	С	CA	SE	ТМ
CSE80	Intelligent Systems	3	1	-	4	40	60	100
Prerequisite	-							
Objectives	<ul> <li>To provide the ideas of fuzzy experience</li> <li>To understand different Knowled</li> <li>To introduce soft computing tech</li> </ul>	lge repre	esentati	on sche	mes for typ			uman
Outcomes	<ul> <li>On successful completion of the course, s</li> <li>Construct intelligent and use the</li> <li>Design fuzzy logic and implement</li> <li>Analyze uses of intelligent contro</li> <li>Design applications related to op</li> </ul>	m for inf t the fuz ol proble	erencin zy sets a ms	ig soluti and ope	on to real w	•		
UNIT – I	Artificial Intelligence						Но	ours: 09
Introduction ,In	ntelligent Agents, Problem-solving: Solving	Problem	is by Se	arching	, Informed	Search a	nd Explora	ition,
Constraint Sati	sfaction Problems, Adversarial Search							
UNIT – II	Knowledge and reasoning						Но	ours: 09
Logical Agents,	First-Order Logic, Inference in First-Order	Logic, Kr	nowledg	ge Repre	esentation,	Planning	: Planning	and
Acting in the R	eal World , Uncertain knowledge and reasc	oning						
UNIT – III	Intelligent Modeling							ours: 09
Introduction of	soft computing techniques, Fuzzy logic sys	stems; fu	izzy sets	s, infere	ncing, fuzzy	relation	models, T	agaki-
Sugeno models	s, Neural networks, Neuro-fuzzy systems, N	1odeling	of dyna	amical s	ystems			
UNIT – IV	Optimization						Но	urs: 09
Model building	, Fuzzy inverse model development, Mode	I-based	forward	l optimi	zation, App	lication o	f model-b	ased
optimization to	numerical examples, Application of mode	I-based	optimiz	ation sc	heme to pr	actical pr	oblems	
UNIT – V	Intelligent Control						Но	urs: 09
Neural control,	Rule-based fuzzy control, Model-based fu	zzy conti	ol, Stat	oility and	alysis, Fuzzy	control	for SISO	
nonlinear syste	ems, Fuzzy control application to practical p	problems	5					
Total contact H	Hours: 45 Total Tutorials: 15	Total F	ractica	I Classe	s: -	Total Ho	ours: 60	
Text Books:								
1. Stuart	Russel, Peter Norvig, AI – A Modern Appro	ach, 2 <sup>nd</sup> (	edition,	Pearso	n Education	2007.		
-	. Shin and Chengying Xu, Intelligent System	ns - Mod	eling, O	ptimiza	tion and Co	ntrol, CR	C Press, Ta	aylor &
	Group, 1 <sup>st</sup> edition, 2009.							
Reference Boo								
	Night, Elaine Rich, Nair B., Artificial Intellige					,2008.		
	. Patterson, Introduction to AI and ES, Pear							
	Henry Winston, Artificial Intelligence, 3 <sup>rd</sup> e	edition, F	earson	Edition	, 1992.			
Websites:								
•	www.cs.utexas.edu/users/novak/cs381kcc							
	cs.uci.edu/~smyth/courses/cs271/topic0_i		ion.ppt	:				
3. www.c	s.utexas.edu/users/novak/cs381kcontents	.html						

Department : (	Computer Science and Engineering	Progra	mme :	w.rech	. (Information	Security)		
Semester :		Catego	ory :	ΤY				
Subject Code	Subject	Но	urs / Wo	eek	Credit	Max	imum N	larks
Subject Code		L	Т	Р	С	CA	SE	ТМ
CSE81	Cloud and Big Data Security	3	1	-	4	40	60	100
Prerequisite	-							
	To introduce the basics of Cloud	and Big	data					
Objectives	To explore the fundamental conc	epts of l	oig data	analyt	ics			
	<ul> <li>To learn to analyze the big data u</li> </ul>	-	-					
	On successful completion of the course, t	he stude	ents wil	l be abl	e to:			
	<ul> <li>Understand the basics concepts of</li> </ul>		•	-		•		
Outcomes	<ul> <li>Analyze the big data analytic tech</li> </ul>	•			••	ns.		
	<ul> <li>Design efficient algorithms for m</li> </ul>	-			-			
	Analyze the HADOOP and Map Re	educe te	chnolo	gies ass	ociated with bi	g data ar		
UNIT – I	Security Concepts							rs: 09
•	<ul> <li>privacy – integrity – authentication – authentication</li></ul>	•			•			
• •	rivilege – application in cloud – Security	•						
• • •	otography – stream ciphers – block ciphers		•		• •		ohy – ha	shing –
	es – public-key infrastructures – key mana	gement ·	– X.509	certific	ates – OpenSSI			
UNIT – II	Multi-Tenancy Issues							rs: 09
	ers/VMs – Virtualization System Security				•			•
-	derations – backup and recovery – Vi					-		
vulnerabilities	<ul> <li>management server vulnerabilities – ad</li> </ul>	ministra	tive VI	/I vulne	rabilities – gue	est vivi v	ulnerab	ilities –
1	en en la 1997 de la completa de la completa de la completa de la 1999	•	· · · · · ·		-			
	nerabilities – hypervisor escape vulnerabilit	ties –con	figurati		-			
UNIT – III	Introduction to BigData			on issu	es – malware.		Hour	rs: 09
<b>UNIT – III</b> Introduction to	Introduction to BigData BigData Platform – Challenges of Conver	ntional S	ystems	on issu - Intell	es – malware. igent data ana	lysis – Na	Hour ature of	Data -
UNIT – III Introduction to Analytic Proces	Introduction to BigData BigData Platform – Challenges of Conver sses and Tools - Analysis vs Reporting - N	ntional S Aodern	ystems Data Ar	on issu - Intell	es – malware. igent data ana	lysis – Na	Hour ature of	Data -
UNIT – III Introduction to Analytic Proces Distributions -	Introduction to BigData BigData Platform – Challenges of Conver sses and Tools - Analysis vs Reporting - N Re-Sampling - Statistical Inference - Predict	ntional S Aodern	ystems Data Ar	on issu - Intell	es – malware. igent data ana	lysis – Na	Hour ature of epts: Sa	<sup>:</sup> Data - Impling
UNIT – III Introduction to Analytic Proces Distributions - UNIT – IV	Introduction to BigData DesigData Platform – Challenges of Conver sses and Tools - Analysis vs Reporting - N Re-Sampling - Statistical Inference - Predict HADOOP	ntional S Aodern tion Erro	ystems Data Ar r.	on issu - Intell nalytic	es – malware. igent data ana Tools - Statisti	lysis – Na cal Conce	Hour ature of epts: Sa	Data - Impling
UNIT – III Introduction to Analytic Proces Distributions - UNIT – IV History of Hade	Introduction to BigData BigData Platform – Challenges of Conver sses and Tools - Analysis vs Reporting - N Re-Sampling - Statistical Inference - Predict HADOOP Dop- The Hadoop Distributed File System -	ntional S Modern tion Erro - Compo	ystems Data Ar r. nents o	on issu - Intell nalytic f Hado	es – malware. igent data ana Tools - Statisti op – Analyzing	lysis – Na cal Conco the Data	Hour ature of epts: Sa Hour with H	Data - Impling r <b>s: 09</b> adoop-
UNIT – III Introduction to Analytic Proces Distributions - UNIT – IV History of Hade Scaling Out- H	Introduction to BigData DisgData Platform – Challenges of Converses and Tools - Analysis vs Reporting - M Re-Sampling - Statistical Inference - Predict HADOOP Dop- The Hadoop Distributed File System - Hadoop Streaming- Design of HDFS-Java	ntional S Aodern tion Erro - Compo a interfa	ystems Data Ar r. nents o aces to	on issu - Intell nalytic f Hado HDFS	es – malware. igent data ana Tools - Statisti op – Analyzing Basics- Deve	lysis – Na cal Conce the Data loping a	Hour ature of epts: Sa Hour with H Map	Data - Impling rs: 09 adoop- Reduce
UNIT – III Introduction to Analytic Proces Distributions - UNIT – IV History of Hado Scaling Out- H Application-Ho	Introduction to BigData Description BigData Platform – Challenges of Converses Sees and Tools - Analysis vs Reporting - N Re-Sampling - Statistical Inference - Predict HADOOP Dop- The Hadoop Distributed File System - Hadoop Streaming- Design of HDFS-Java w Map Reduce Works-Anatomy of a Map	ntional S Aodern tion Erro - Compo a interfa o Reduce	ystems Data Ar r. nents o aces to 2 Job ru	on issu - Intell nalytic f Hado HDFS	es – malware. igent data ana Tools - Statisti op – Analyzing Basics- Deve	lysis – Na cal Conce the Data loping a	Hour ature of epts: Sa Hour with H Map	Data - Impling rs: 09 adoop- Reduce
UNIT – III Introduction to Analytic Proces Distributions - UNIT – IV History of Hade Scaling Out- H Application-Ho Task execution	Introduction to BigData Description BigData Platform – Challenges of Conver- sses and Tools - Analysis vs Reporting - N Re-Sampling - Statistical Inference - Predict HADOOP Dop- The Hadoop Distributed File System - Hadoop Streaming- Design of HDFS-Java w Map Reduce Works-Anatomy of a Map - Map Reduce Types and Formats- Map Reduce Types Adva Typ	ntional S Aodern tion Erro - Compo a interfa o Reduce	ystems Data Ar r. nents o aces to 2 Job ru	on issu - Intell nalytic f Hado HDFS	es – malware. igent data ana Tools - Statisti op – Analyzing Basics- Deve	lysis – Na cal Conce the Data loping a	Hour ature of epts: Sa Hour with H Map f ffle and	Data - mpling <b>rs: 09</b> adoop- Reduce Sort –
UNIT – III Introduction to Analytic Proces Distributions - UNIT – IV History of Hade Scaling Out- H Application-Ho Task execution UNIT – V	Introduction to BigData Description BigData Platform – Challenges of Converses Sees and Tools - Analysis vs Reporting - M Re-Sampling - Statistical Inference - Predicted HADOOP Doop- The Hadoop Distributed File System - Hadoop Streaming- Design of HDFS-Java w Map Reduce Works-Anatomy of a Map - Map Reduce Types and Formats- Map Rec HADOOP Environment	ntional S Aodern tion Erro - Compo a interfa Reduce educe Fe	ystems Data Ar r. nents o aces to gob ru atures.	on issu - Intell nalytic f Hado HDFS n-Failu	es – malware. igent data ana Tools - Statisti op – Analyzing Basics- Deve res-Job Schedu	lysis – Na cal Conce the Data loping a ıling-Shu	Hour ature of epts: Sa Hour with H Map 1 ffle and Hour	Data - Impling rs: 09 adoop- Reduce Sort –
UNIT – III Introduction to Analytic Proces Distributions - UNIT – IV History of Hado Scaling Out- H Application-Ho Task execution UNIT – V Setting up a Ha	Introduction to BigData DebigData Platform – Challenges of Converses Sees and Tools - Analysis vs Reporting - N Re-Sampling - Statistical Inference - Predict HADOOP Doop- The Hadoop Distributed File System - Hadoop Streaming- Design of HDFS-Java w Map Reduce Works-Anatomy of a Map - Map Reduce Types and Formats- Map Reduce HADOOP Environment adoop Cluster - Cluster specification - Cluster	ntional S Modern tion Erro - Compo a interfa o Reduce educe Fe	ystems Data Ar r. nents o aces to good ru atures.	on issu - Intell nalytic f Hado HDFS n-Failu stallatio	es – malware. igent data ana Tools - Statisti op – Analyzing Basics- Deve res-Job Schedu on – Hadoop C	lysis – Na cal Conce the Data loping a iling-Shu onfigurat	Hour ature of epts: Sa Hour with H Map f ffle and Hour tion-Sec	Data - Impling rs: 09 adoop- Reduce Sort –
UNIT – III Introduction to Analytic Proces Distributions - UNIT – IV History of Hade Scaling Out- H Application-Ho Task execution UNIT – V Setting up a Ha Hadoop - Admi	Introduction to BigData D BigData Platform – Challenges of Converses Sees and Tools - Analysis vs Reporting - N Re-Sampling - Statistical Inference - Predict HADOOP Dop- The Hadoop Distributed File System - Hadoop Streaming- Design of HDFS-Java w Map Reduce Works-Anatomy of a Map - Map Reduce Types and Formats- Map Reduce HADOOP Environment adoop Cluster - Cluster specification - Clust nistering Hadoop – HDFS – Monitoring Ma	ntional S Aodern tion Erro - Compo a interfa o Reduce educe Fe educe Fe ter Setup intenand	ystems Data Ar r. nents o aces to aces to atures. o and In ce-Hado	on issu - Intell nalytic f Hado HDFS n-Failu stallatio	es – malware. igent data ana Tools - Statisti op – Analyzing Basics- Deve res-Job Schedu on – Hadoop C ochmarks- Hado	lysis – Na cal Conce the Data loping a lling-Shu onfigurat	Hour ature of epts: Sa Hour with H Map I ffle and Hour tion-Sec e cloud.	Data - Impling rs: 09 adoop- Reduce Sort –
UNIT – III Introduction to Analytic Proces Distributions - UNIT – IV History of Hade Scaling Out- H Application-Ho Task execution UNIT – V Setting up a Ha Hadoop - Admi Total contact H	Introduction to BigData D BigData Platform – Challenges of Converses Sees and Tools - Analysis vs Reporting - M Re-Sampling - Statistical Inference - Predict HADOOP Dop- The Hadoop Distributed File System – Hadoop Streaming- Design of HDFS-Java w Map Reduce Works-Anatomy of a Map - Map Reduce Types and Formats- Map Reduce HADOOP Environment adoop Cluster - Cluster specification - Clust nistering Hadoop – HDFS – Monitoring Ma	ntional S Aodern tion Erro - Compo a interfa o Reduce educe Fe educe Fe ter Setup intenand	ystems Data Ar r. nents o aces to good ru atures.	on issu - Intell nalytic f Hado HDFS n-Failu stallatio	es – malware. igent data ana Tools - Statisti op – Analyzing Basics- Deve res-Job Schedu on – Hadoop C ochmarks- Hado	lysis – Na cal Conce the Data loping a iling-Shu onfigurat	Hour ature of epts: Sa Hour with H Map I ffle and Hour tion-Sec e cloud.	Data - Impling rs: 09 adoop- Reduce Sort –
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Semester :		Catego	ory :	TY				
Subject Code	Subject	Но	urs / W	eek	Credit	Max	imum N	/larks
Subject Code	Subject	L	Т	Р	С	СА	SE	ТМ
CSE82	Data Hiding and Biometric Security	3	1	-	4	40	60	100
Prerequisite	-							
	<ul> <li>To understand existing security</li> </ul>	y methods						
Objectives	<ul> <li>To understand how biometrics</li> </ul>	systems ar	e imple	mented				
	To understand the intricacies in	nvolved						
	On successful completion of the course	e, the stude	ents wil	l be able	to:			
Outcomes	<ul> <li>design new/existing security m</li> </ul>	nethods						
	<ul> <li>compare and appreciate new/e</li> </ul>	existing bio	ometric	systems	, hiding tec	nniques		
UNIT – I	Introduction to Information hiding							rs: 09
	and applications of information hidin	-	•	-				
	n – Security of Steganography system			-	•	•		
	ithms – Using cover models – Active a	nd malicic	ous atta	ckers –	Informatio	n hiding in	writter	text -
	visible communications.							
UNIT – II	Steganography and Steganalysis							rs: 09
	anographic techniques – Substitution s	•	•					•
	anography – Distortion and code genera		iques –	Stegana	ilysis – Dete	ecting hidd	en infor	matior
	dden information - Disabling hidden info	rmation.						
UNIT – III	Watermarking techniques							
	Watermarking techniques							rs: 09
History – Basic	Principles – Applications – Algorithmic	-				-	fwaterr	narking
History – Basic systems – Sur	Principles – Applications – Algorithmic vey of current watermarking technique	es – Crypt	ograph	ic and p	osycho visu	al aspects	f waterr – Choie	narking ce of a
History – Basic systems – Sur workspace – Fo	Principles – Applications – Algorithmic vey of current watermarking technique prmatting the watermark bets - Merging	es – Crypt the water	ograph: mark ar	ic and p nd the co	osycho visu over – Optir	al aspects nization of	f waterr – Choio the wat	narking ce of a ermarl
History – Basic systems – Sur workspace – Fo receiver – Exto	Principles – Applications – Algorithmic vey of current watermarking technique	es – Crypt the water	ograph: mark ar	ic and p nd the co	osycho visu over – Optir	al aspects nization of	f waterr – Choio the wat	narking ce of a ermark
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Semester :	Computer Science and Engineering	Progra	mme :	wi. rech.	(Information	Security)		
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CSE83	Intellectual Property Rights	3	1	-	4	40	60	100
Prerequisite	-							
Objectives	<ul> <li>To understand the difference k</li> <li>To learn how to value intangi legal status.</li> <li>To explore the legal and busin technology</li> </ul>	ble assets,	taking	into acc	count their co	mmercia		
Outcomes	<ul> <li>On successful completion of the course</li> <li>Apply for patents in India and</li> <li>Develop a business plan that a</li> <li>Develop a strategy of mar negotiation basics.</li> <li>Explain some of the limits of t legal pitfalls</li> </ul>	Abroad dvances the keting the	e value ir inte	of their llectual	ntellectual p property an	d under	stand s	some
UNIT – I							Hour	rs: 09
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and Global level. Guide and forms for registering the designHours: 09UNIT – IIIHours: 09Trade Secrets and trademarks: Trade Secrets- Importance – Trade Secrets- Importance Elements of Trade Secrets-

what is a trade secret and what is not- Laws relating to protection of Trade Secrets-Spring Board Doctrine-Case Studies-agreement or NCA and Trade Secret Bonds or TSBs-Practical aspects of maintaining trade secrets-Maintaining Lab Notebooks as Trade Secret Documents. -Format of NDA/CDA and a Trade Secret Bond Trademarks- Importance in Engineering –

Trademarks- Importance in Engineering industry-National Trademark Filing- Practical aspects-forms, fee, timelines, procedural aspects. International Trademark Filing-Madrid System-Agreement and Madrid Protocol; Maintenance and Transfer; Dilution of ownership-likelihood of confusion; Case Study – Trademark related forms.

UNIT – IV

Hours: 09

Agreements and legislation: International Agreements and Organizations related to Intellectual Property – Important IPR related treaties and international agreements and their implications for Engineers-Conventional and Agreements -GATT, TRIPS and Establishment of WTO, GATT vs WTO. Amendments in the Indian Patents Act after TRIPS; Salient features of the Patents (Amendment) Act, 2005 of India- Indian IPR legislations- difference between statutes and rules. WIPO–Objectives and Structure-Legislations and Policy - Supermacy of societal interests as the cornerstone for legislations, policy and legal judgments. Societal impact of IPRs. Handling IPR Related Conflicts. IPR Conflict Resolution - Role of Values and Ethics-IPR Conflict Resolution - Role of Alternative Dispute Resolution or ADR mechanisms-Arbitration in Intellectual Property Disputes-Indian Position Vs WTO and Strategies- Commitments to WTO. Patent Ordinance and the Bill – Protection and Utilization of Public Funded Intellectual Property Bill, 2008- Laws on Public Funded IP in other countries- National IP Policies (NIPP) and role of WIPO; NIPP and India; NIPP of Malaysia; Key elements of an Institutional IPR policy.- Model IPR Policy Document.

UNIT – V

Hours: 09

Digital Products and Law: Digital Innovations and Developments as Knowledge Assets – Significance of IP in Content for the Internet and Tech Sector- Symbols and trademarks as Business Assets in the Information Age; Internet and the WWW; Applications of computer technology - advantages/disadvantages-Cyber Technology- e-commerce and e-governance; Electronic records and digital signatures; The Employment Relationship in the Internet and Tech Sector - role of CDAs and contracts-Trolls, landmines and other metaphors-Cyber etiquette. IP Laws, Cyber laws and Digital Content Protection - IP laws and Cyberlaws- Linkages; IPR issues vs Regulatory issues-E-commerce and Cyber Laws-Cyber Crime and Legislation- Need, Objective and Scope; UNCITRAL model law –Objectives- its relevance to India; Objects of the IT Act, 2000; Information Technology and Information Security-Case studies.

Total contact Hours: 45	Total Tutorials: 15	Total Practical Classes: -	Total Hours: 60
Text Books:			

1. Kompal Bansal and Parikshit Bansal, Fundamentals of Intellectual Property for Engineers, BS Publications/BSP Books, First Edition, 2013.

**Reference Books:** 

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•	Computer Scienc	e and Engineering				(Information	Security)		
Semester :			Catego		ΤY				
Subject Code	Subject			urs / W	1	Credit		imum N	1
CSE84	Information Se	curity Policies	L 3	<b>T</b>	Р	<b>C</b>	<b>CA</b> 40	<b>SE</b> 60	<b>TM</b> 100
Prerequisite	-	curity rolicles	5	_ <b>1</b>		4	40	00	100
Objectives	To und	oduce and understand erstand how to write t erstand how to establi	the Security	Policies			spects of	security	,
Outcomes	On successful o Mainta Have s	ompletion of the cour in the Policies in an or kill to write the Securit he Viruses and sugges	se, the stude ganization. y Policies fo	ents wil r an org	l be abl	e to: on.			
UNIT – I								Hour	's: 09
developed – H Data security c – Incident Res	ow Policy should onsideration – B sponse and Fore	curity Policies – About be developed - Polic ackups, Archival stora ensics - Management Enforcement – Securit	y needs – Ic ge and dispo Responsibil	lentify osal of o ities –	what ar data - Ir Role of	nd from whom tellectual Pro f Information	n it is beiı perty righ	ng protents and I	ected – Policies
UNIT – II			iy and cheek		<u>-6 ana 5</u>	apporti		Нош	's: 09
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- 2. http://www.computerweekly.com/feature/How-to-create-a-good-information-security-policy
- 3. http://www.lse.ac.uk/intranet/LSEServices/IMT/about/policies/home.aspx
- 4. www.csoonline.com/article/495017

	computer scienc	e and Engineering				. (Informatio	on Secur	ty)		
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CSE85	Secure Coding		3	1	-	4	40	)	60	100
Prerequisite	-									
Objectives	softwa • To exa things	roduce basic conce re systems mine the concepts like buffer overflow I with C and C++ code	that apply to	progra	mming	"in the larg	e" as we		_	
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Department : Computer Science and Engineering			<b>Programme :</b> M.Tech. (Information Security)								
Semester :			Category : TY								
Subject Code	Cubicat		Ηοι	Hours / Week			t ſ	Maximum Marks			
	Subject		L	Т	Р	С	C	A	SE	ТМ	
CSE86	Web Application	on Security	3	1	-	4	4	0	60	100	
Prerequisite	-										
Objectives	<ul> <li>To Identify various components of an web application from the security view point</li> <li>To have Knowledge of web application testing methodologies</li> </ul>										
Outcomes	<ul> <li>On successful completion of the course, the students will be able to:</li> <li>design secured web application</li> <li>build web testing tools</li> </ul>										
UNIT – I	Hours: 0								rs: 09		
		Input Validation, A rization-Access control							ion- Se	ecuring	
UNIT – II									Hou	rs: 09	
		ross-site scripting - c		•	• •				nciples	- SQL	
UNIT – III	- 111							Hours: 09			
•	- application see	rce code secret- for curity - industry standa		-						pment odels -	
UNIT – IV									Hou	rs: 09	
		ndamentals, Basic Ok ted Bulk Scanning, Auto					eb-Orient	ed [	DataEnd	coding,	
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Automating wi	th LibWWWPerl,	, Seeking Design Flaws,	Attacking A	JAX, Ma	anipulati	ng Sessio	ns, Multi	facet	ed Test	s.	
Total contact Hours: 45 T		Total Tutorials: 15	Total P	ractica	l Classes	: -	Total H	otal Hours: 60			
Text Books:											
1. Bryan S	Sullivan, Vincent	Liu Web Application Se	ecurity- A Be	ginner'	s Guide,	McGraw	Hill Comp	anie	s, 2012		
		er, Web Security Testing	g Cookbook,	O'Reill	y Media,	, 2008.					
Reference Boo	ks:										
-	a Weidman, Pen	etration Testing: A Har	nds-On Intro	duction	to Hack	ing, No St	tarch Pre	ss, 20	)14.		
Websites:											
	/www.owasp.or										