

# MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL NH-12 (Old NH-34), Simhat, Haringhata, Nadia -741249 Department of Information Technology M.Sc. in IT( Cyber Security

SEMESTER I						
Code	Course Title	Hours per week		er	Credits	
		L T P		Р		
MITCS101	<ul> <li>Program Core I</li> <li>Discrete Mathematics of Computer Science</li> </ul>	3	0	0	3	
MITCS102	<ul> <li>Program Core II</li> <li>Advanced Data Structures and Algorithms</li> </ul>	3	0	0	3	
MITCS103	Program Core III • Cryptology	3	0	0	3	
MITCS104	<ul><li>Program Core IV</li><li>Advanced Web Technology</li></ul>	3	0	0	3	
MITCS 105	Research Methodology and IPR	2	0	0	2	
MITCS106 A/B/C/D/E /F	<ul> <li>Elective I</li> <li>A. Advanced Operating Systems</li> <li>B. Advanced DBMS</li> <li>C. Machine Learning</li> <li>D. Computer Graphics and Image Processing</li> <li>E. Sensor Networks and Internet of Things</li> <li>F. Cloud Computing</li> </ul>	3	0	0	3	
MITCS192	<ul> <li>Laboratory 1</li> <li>Advanced Data Structures and Algorithms</li> </ul>	0	0	4	2	
MITCS194	Laboratory 2 • Advanced Web Technology Lab	0	0	4	2	
MITCS196 A/B/C/D/E /F	Laboratory 3 • Based on Elective I Total Credita: 23	0	0	4	2	
	I otal Credits: 23					

Name of the Course:M.Sc in IT ( Cyber Security )						
Subject:	Subject: Discrete Mathematics of Computer Science					
Course C	ode: MITCS101	Semester: I				
Duration	: 40 Hours	Maximum Marks: 100				
Teaching	Scheme	Examination Scheme				
Theory:3		End Semester Exam:70				
Tutorial:0		Attendance: 5				
Practical:	)	Continuous Assessment:25				
Credit: 3		Practical Sessional internal continuous evaluation:NA				
		Practical Sessional external examination:NA				
Aim:						
Sl. No.						
1.	To determine multiplicativ	ve inverses, modulo n and use to solve linear congruences				
	graph theory.					
2.	To solve different enginee	ring problems using counting techniques.				



Objective			
Sl. No.			
1.	To express a given logic sentence in terms of predicates, quantified connectives and derive the solution for a given a problem using de prove the solution based on logical inference.	ers, and lo eductive	ogical logic and
2.	To classify the algebraic structure for a given mathematical prob Boolean functions and simplify expressions using the properties of	lem and e of Boolea	evaluate n algebra.
3.	To develop the given problem as graph networks and solve with theory.	technique	es of grap
4.	To accrue knowledge in fuzzy Set		
Pre-Requ	isite:		
Sl. No.			
1.	Knowledge of basic mathematics.		
2.	Analytical and Logical skills		
Contents		Hrs./w	eek
Chapter	Name of the Topic	Hours	Marks
01	Theory of Numbers: Principles of Mathematical Induction, Well Ordering Principle, Divisibility theory and properties of divisibility; Fundamental theorem of Arithmetic; Euclidean Algorithm for finding G.C.D and some basic properties of G.C.D with simple examples; Congruence, Residue classes of integer modulo n (Zn) and its examples, Chinese Remainder Theorem.	6	5
02	Counting Techniques: Pigeon- hole Principle, Principles of inclusion and exclusions; Recurrence relations: Formulation & Modelling of different counting problems in terms of recurrence relations, Solution of linear recurrence relations with constant coefficients ( upto second order) by (i) The iterative method (ii) Characteristic roots method (iii) Generating functions method.	6	10
03	Propositional Logic: Syntax, Semantics, Validity and Satisfiability, Basic Connectives and Truth Tables, Logical Equivalence: The Laws of Logic, Logical Implication, Rules of Inference, The use of Quantifiers. Proof Techniques: Some Terminology, Proof Methods and Strategies, Forward Proof, Proof by Contradiction, Proof by Contraposition, Proof of Necessity and Sufficiency.	6	15
04	Algebraic Structures and Morphism: Algebraic Structures with one Binary Operation, Semi Groups, Monoids, Groups, Congruence Relation and Quotient Structures, Permutation Groups, Normal Subgroups, Quotient group, Homomorphism & Isomorphism (Elementary properties only). Algebraic Structures with two Binary Operation, Rings, Integral Domain and Fields. Boolean algebra and Boolean Ring, Identities of Boolean	6	20



	Algebra, Dua	lity, Representation of I	Boolean Function,		
0.5	Disjunctive a	nd Conjunctive Normal		10	
05	Graphs: Plana	ar and Dual Graphs. Ku	6	10	
	Homeomorph	ne graphs. Eulers formu	(n - e + r = 2) for		
	connected pla	inar graph and its generation	alisation for disconnecte	d	
	graphs. Detec	tion of planarity. Graph			
	numbers of si	is,			
	Independence	and Clique Numbers, I	Perfect Graphs-Definitio	n	
	and examples	, Chromatic polynomia	l and its determination,		
	Applications	of Graph Colouring. Si	mple applications of		
0.0	chromatic nu	mbers. Statement of fou	r and five colour theorem	ms.	10
06	Fuzzy sets: In	troduction, crispness, v	agueness, fuzziness,	. 6	10
	uncertainty. E	asic definitions and exa	amples, basic set theoret	10	
	operations $-1$	inion, intersection, com	plementation and their	1	
	simple proper	ties. $[3L]$ Soft sets: Intr	oduction, Definition wit	n	
	examples, So	It set as generalization (	of fuzzy set, complemen	t,	
	null soft set, A	Absolute soft set, definition intersection	tion of general binary	• ' ~	
	operation, un	t as ft function and as ft	properties – De Morgan		
	naw, solt point		inverse function, simple	5	
	Sub Total			36	70
	Jub Total.	assmant Examination	& Proparation of		30
	Semester Ex	amination	a rreparation of	4	50
	Total:			40	100
List of Pr	actical:				
List of Pr Assignme	ractical: nts: Based on T ooks	Theory Lecture.			
List of Pr Assignme List of Bo Text Bool	actical: nts: Based on 7 ooks ks:	Title of the Book	Ed:t:on/ICON/ICDN	Nama of	the Dublishow
List of Pr Assignme List of Bo Text Bool Name of A	actical: nts: Based on 7 ooks ks: Author ad D.P.	Theory Lecture.	Edition/ISSN/ISBN	Name of	the Publisher
List of Pr Assignme List of Bo Text Bool Name of A C L Liu an Mohapatr	ractical: nts: Based on 7 ooks ks: <u>Author</u> nd D P	Theory Lecture.          Title of the Book         Elements of Discrete         Mathematics A	Edition/ISSN/ISBN	Name of 3rd Editic McGrow	the Publisher
List of Pr Assignme List of Bo Text Bool Name of A C L Liu an Mohapatra	ractical: nts: Based on 7 ooks ks: Author nd D P a	Theory Lecture. Title of the Book Elements of Discrete Mathematics A Computer Oriented	Edition/ISSN/ISBN	Name of 3rd Editio McGraw	<b>the Publisher</b> on by, Tata – Hill.
List of Pr Assignme List of Bo Text Bool Name of A C L Liu an Mohapatra	actical: nts: Based on 7 ooks ks: Author nd D P a	Theory Lecture. Title of the Book Elements of Discrete Mathematics A Computer Oriented Approach	Edition/ISSN/ISBN	Name of 3rd Editio McGraw	<b>the Publisher</b> on by, Tata – Hill.
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List of Pr Assignme List of Bo Text Bool Name of A C L Liu an Mohapatra N. Chanda	ractical: nts: Based on 7 ooks ks: Author nd D P a rasekaran and naparyathi	Title of the Book Elements of Discrete Mathematics A Computer Oriented Approach Discrete Mathematics, PHI.	Edition/ISSN/ISBN	Name of 3rd Editio McGraw	<b>the Publisher</b> on by, Tata – Hill.
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List of Pr Assignme List of Bo Text Bool Name of A C L Liu an Mohapatra N. Chanda M. Un J.K.	ractical: nts: Based on 7 ooks ks: Author nd D P a rasekaran and naparvathi Sharma	Title of the Book Elements of Discrete Mathematics A Computer Oriented Approach Discrete Mathematics, PHI. Discrete Mathematics, Macmillan.	Edition/ISSN/ISBN	Name of 3rd Editic McGraw	<b>the Publisher</b> on by, Tata – Hill.
List of Pr Assignme List of Bo Text Bool Name of A C L Liu an Mohapatra N. Chanda M. Un J.K.	ractical: nts: Based on 7 ooks ks: Author nd D P a rasekaran and naparvathi Sharma	Title of the Book Elements of Discrete Mathematics A Computer Oriented Approach Discrete Mathematics, PHI. Discrete Mathematics, Macmillan. Fuzzy Set Theory	Edition/ISSN/ISBN	Name of 3rd Editic McGraw	<b>the Publisher</b> on by, Tata – Hill.
List of Pr Assignme List of Bo Text Bool Name of A C L Liu an Mohapatra N. Chanda M. Un J.K. Zimr Reference	ractical: nts: Based on 7 ooks ks: Author nd D P a rasekaran and naparvathi Sharma mermann e Books	Title of the Book Elements of Discrete Mathematics A Computer Oriented Approach Discrete Mathematics, PHI. Discrete Mathematics, Macmillan. Fuzzy Set Theory	Edition/ISSN/ISBN	Name of 3rd Editio McGraw	the Publisher on by, Tata – Hill.
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MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL NH-12 (Old NH-34), Simhat, Haringhata, Nadia -741249 Department of Information Technology

M.Sc. in IT( Cyber Security

Applications			S					
Douglas Bre	ent West	Introduction	n to			Pre	entice H	all
Graph Theo			ory					
Clark John, Holton A First Loo			k at			W	orld Scie	entific
Derek Allan Granh The			r ai				Shu Sen	
Derek Allan Graph Ind			ı y					
P.K.Maji et.	al. –	Soft Set The	eory			Ma	ath. App	1. 45(2003)
Compu.						55	5-562	~ /
End Semest	ter Examina	tion Scheme	. M	aximum N	larks-70.		Ti	me allotted-
3hrs.	<b>T</b> T •/						<u> </u>	
Group	Unit	Objective			Subjec	tive (	Juestion	18
		(MCO only	y with the					
		correct ans	wer)					
		No of	Total	No of	То	Ma	arks	Total Marks
		question	Marks	question	answer	per	r	
		to be set		to be set		qu	estion	
Α	1,2,3,4,5,6	10	10					
-				_		_		
В	1,2,3,4,5,6			5	3	5		(0)
С	1,2,3,4,5,6			5	3	15		60
Only	multiple cho	oice type que	stion (MCC	Q) with one	e correct ans	swer a	re to be	set in the
obje	ctive part.							
• Spec	ific instructio	on to the stud	lents to mai	intain the c	order in ansv	vering	, objecti	ve questions
shou	ld be given o	n top of the o	uestion pa	per.				
Examinatio	on Scheme fo	charter	ter examir	ation:	Orregtion 4	. <b>h</b> .	Orregt	an to he
Group		Chapter		or each	Question to be		Question to be	
Δ		ALL	<u> </u>				10	icu
B		ALL	5		5		3	
C		ALL	15		5		3	
				I			1	
Name of th	e Course: M	l.Sc in IT (	Cyber Secu	urity )				
Subject: A	dvanced Dat	a Structures	and Algorit	hms				
Course Co	de: MITCS1	02 &	Semester	r: I				
MITCS192								
Duration: 4	40 Hours		Maximu	um Marks: 100+100				
Teaching S	cheme		Examina E 10	tion Sche	me			
Tutorial 0			Attender	ester Exan	n:/U			
Practical.			Attendance: 5					
I I I AULUAL.			Continuous Assessment:25					
Credit: 3+7			Continuo Practical	us Assessi Sessional	nent:25	tinuo	is evalue	ation · <b>40</b>



Aim:						
Sl. No.						
1	To understand the data structures, their advantages and drawbacks, how to implement					
	them in C, how their drawbacks can be overcome and what the applications are and					
	where they can be used					
Objective						
Sl. No.						
1	To learn about the data structures/ methods/algorithms mentioned	in the co	urse with a			
	comparative perspective .					
2	To make use of the most appropriate data structure/ method/algor	ithm in a	program			
3	To enhance the efficiency (i.e. reduce the run-time) or for better n	nemory u	tilization			
4	To understand at least the efficiency aspects of the graph and sort	ing algori	thms			
	covered in this course.					
5	To convert an inefficient program into an efficient one using the k	knowledg	e gathered			
	from this course.					
Pre-Requ	usite:					
Sl. No.						
1	Basic Computation and Principles of C					
2	Mathematica					
2	Mainematics					
3	basics of set theory					
Contents	basies of set theory	Hrs /we	ek			
Chanter	Name of the Tonic	Hours	Marks			
01	Module - L Linear Data Structure Introduction · Why we need	8	15			
01	data structure? Concepts of data structures: a) Data and data		10			
	structure b) Abstract Data Type and Data Type. Algorithms and					
	programs, basic idea of pseudo-code. Algorithm efficiency and					
	analysis, time and space analysis of algorithms – order					
	notations. Array : Different representations – row major, column					
	major. Sparse matrix - its implementation and usage. Array					
	representation of polynomials. Linked List : Singly linked list,					
	circular linked list, doubly linked list, linked list representation					
	of polynomial and applications.					
02	Module -II: Linear Data Structure [Stack and Queue : Stack and	7	15			
	its implementations (using array, using linked list), applications.					
	Queue, circular queue, dequeue. Implementation of queue- both					
	linear and circular (using array, using linked list), applications.					
	Recursion : Principles of recursion – use of stack, differences					
	between recursion and iteration, tail recursion. Applications -					
02	Ine Tower of Hanoi, Eight Queens Puzzle.	11	20			
03	wodule - III. Nonlinear Data structures Trees : Basic	11	20			
	linked list) Dinomy troop binomy troop traversel (and in the sector					
	arder) threaded binery tree (left right full) non recursive					
	traversal algorithms using threaded hinomy trad averagion trad					
	Discussion algorithms using uncaded officially dee, expression dee.					
1	+ <b>Bingry cearen tree</b> onergitone (eregiton incertion deletion					
	Binary search tree- operations (creation, insertion, deletion, searching) Height balanced binary tree $-\Delta VI$ tree (insertion)					



MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

#### NH-12 (Old NH-34), Simhat, Haringhata, Nadia -741249

Department of Information Technology M.Sc. in IT( Cyber Security

deletion with examples only). B- Trees – operations (insertion,		
deletion with examples only). Graphs : Graph definitions and		
concepts (directed/undirected graph, weighted/un-weighted		
edges, sub-graph, degree, cutvertex/articulation point, pendant		
node, clique, complete graph, connected components – strongly		
connected component, weakly connected component, path,		
shortest path, isomorphism). Graph representations/storage		
implementations – adjacency matrix, adjacency list, adjacency		
multi-list. Graph traversal and connectivity – Depth-first search		
(DFS), Breadth-first search (BFS) – concepts of edges used in		
DFS and BFS (tree-edge, back-edge, cross-edge, forward-edge),		
applications. Minimal spanning tree – Prim's algorithm (basic		
idea of greedy methods).		
Module - IV. Searching, Sorting : Sorting Algorithms : Bubble	10	20
sort and its optimizations, insertion sort, shell sort, selection		
sort, merge sort, quick sort, heap sort (concept of max heap,		
application – priority queue), radix sort. Searching : Sequential		
search, binary search, interpolation search. Hashing : Hashing		
functions, collision resolution techniques.		
Sub Total:	36	70
Internal Assessment Examination & Preparation of	4	30
Semester Examination		
Total:	40	100
	deletion with examples only). B- Trees – operations (insertion, deletion with examples only). Graphs : Graph definitions and concepts (directed/undirected graph, weighted/un-weighted edges, sub-graph, degree, cutvertex/articulation point, pendant node, clique, complete graph, connected components – strongly connected component, weakly connected component, path, shortest path, isomorphism). Graph representations/storage implementations – adjacency matrix, adjacency list, adjacency multi-list. Graph traversal and connectivity – Depth-first search (DFS), Breadth-first search (BFS) – concepts of edges used in DFS and BFS (tree-edge, back-edge, cross-edge, forward-edge), applications. Minimal spanning tree – Prim's algorithm (basic idea of greedy methods). Module - IV. Searching, Sorting : Sorting Algorithms : Bubble sort and its optimizations, insertion sort, shell sort, selection sort, merge sort, quick sort, heap sort (concept of max heap, application – priority queue), radix sort. Searching : Sequential search, binary search, interpolation search. Hashing : Hashing functions, collision resolution techniques. <b>Sub Total:</b> Internal Assessment Examination & Preparation of Semester Examination	deletion with examples only). B- Trees – operations (insertion, deletion with examples only). Graphs : Graph definitions and concepts (directed/undirected graph, weighted/un-weighted edges, sub-graph, degree, cutvertex/articulation point, pendant node, clique, complete graph, connected components – strongly connected component, weakly connected component, path, shortest path, isomorphism). Graph representations/storage implementations – adjacency matrix, adjacency list, adjacency multi-list. Graph traversal and connectivity – Depth-first search (DFS), Breadth-first search (BFS) – concepts of edges used in DFS and BFS (tree-edge, back-edge, cross-edge, forward-edge), applications. Minimal spanning tree – Prim's algorithm (basic idea of greedy methods).10Module - IV. Searching, Sorting : Sorting Algorithms : Bubble sort and its optimizations, insertion sort, shell sort, selection sort, merge sort, quick sort, heap sort (concept of max heap, application – priority queue), radix sort. Searching : Sequential search, binary search, interpolation search. Hashing : Hashing functions, collision resolution techniques.36Sub Total:36Internal Assessment Examination & Preparation of Semester Examination40

Practical:

#### **List of Practical:**

- Implementation of array operations:
- Stacks and Queues: adding, deleting elements Circular Queue: Adding & deleting elements Merging Problem :
- Evaluation of expressions operations on Multiple stacks & queues :
- Implementation of linked lists: inserting, deleting, inverting a linked list. Implementation of stacks & queues using linked lists:
- o Polynomial addition, Polynomial multiplication
- Sparse Matrices : Multiplication, addition.
- o Recursive and Nonrecursive traversal of Trees
- o Threaded binary tree traversal. AVL tree implementation
- o Application of Trees. Application of sorting and searching algorithms
- Hash tables implementation: searching, inserting and deleting, searching & sorting techniques.

0

### List of Books

TEXT DOOKS.			
Name of Author	Title of the Book	Edition/ISSN/ISBN	Name of the Publisher
2/E by Robert L.	"Data Structures And		
Kruse, Bruce P.	Program Design In		
Leung.	C"		



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M.Sc. in IT( Cyber Security

Ellis Horow	itz, Sartaj	"Fundament	als of					
Sahni, Susar	n l	Data Structu	res of C"					
Anderson-fr	reed.		•					
Aaron M. To	enenbaum.	"Data Struct	ures in					
		C‴						
Thomas H.	Cormen,	"Introductio	n to					
Charles E. I	eiserson,	Algorithms"	,					
Ronald L. R	ivest,	-						
Clifford Ste	in.							
	<u> </u>							
Reference I	Sooks	55D-4- C4						
S. Lipschutz	2.	Data Struct	ures					
Reema Thar	reja	"Data Struct	ures					
		Using C"						
		<b>(1)</b>						
2/e by A.K.	Rath, A.	"Data Struct	ure					
K. Jagadev		Using C <sup>22</sup>						
List of equi	pment/appa	ratus for lab	oratory ex	xperimen	ts:			
Sl. No.			<b>.</b>	-				
1.								
End Semes	ter Examina	tion Scheme	. M	aximum I	Marks-7	0.	Ti	me allotted-
End Semes 3hrs.	ter Examina	tion Scheme	e. M	aximum 1	Marks-7	0.	Ti	me allotted-
End Semest 3hrs. Group	ter Examina Unit	tion Scheme Objective	. М	aximum 1	Marks-7 Sub	0. ojective Q	Ti uestion	me allotted- s
End Semest 3hrs. Group	ter Examina Unit	tion Scheme Objective Questions	•. M	aximum 1	Marks-7 Sub	0. ojective Q	Ti uestion	me allotted- s
End Semes 3hrs. Group	ter Examina Unit	tion Scheme Objective Questions (MCQ only correct and	y with the	aximum I	Marks-7 Sub	0. ojective Q	Ti uestion	me allotted- s
End Semest 3hrs. Group	ter Examina Unit	tion Scheme Objective Questions (MCQ only correct ans No of	with the wer)	aximum I	Marks-7 Sub	0. ojective Q	Ti uestion	me allotted- s
End Semes 3hrs. Group	ter Examina Unit	tion Scheme Objective Questions (MCQ only correct ans No of question	y with the wer) Total Marks	aximum I No of question	Marks-7 Sub To answ	0. pjective Q Ma er per	Ti uestion	me allotted- s Total Marks
End Semes 3hrs. Group	ter Examina Unit	tion Scheme Objective Questions (MCQ only correct ans No of question to be set	wer) Total Marks	aximum I No of question to be set	Marks-7 Sub	0. ojective Q er per que	Ti uestion urks estion	me allotted- s Total Marks
End Semes 3hrs. Group A	ter Examina Unit 1,2,3,4,5,6	tion Scheme Objective Questions (MCQ only correct ans No of question to be set 10	with the wer) Total Marks	aximum I No of question to be set	Marks-7 Sub To answ	0. ojective Q er per que	Ti uestion urks estion	me allotted- s Total Marks
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End Semes 3hrs. Group A B	ter Examina Unit 1,2,3,4,5,6 1,2,3,4,5,6	tion Scheme Objective Questions (MCQ only correct ans No of question to be set 10	with the wer) Total Marks 10	aximum I No of question to be set 5	Marks-7 Sub To answ 3	0. ojective Q er per que 5	Ti uestion urks estion	me allotted- s Total Marks
End Semes 3hrs. Group A B C	ter Examina Unit 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6	tion Scheme Objective Questions (MCQ only correct ans No of question to be set 10	y with the wer) Total Marks 10	aximum I No of question to be set 5 5	Marks-7 Sub To answ 3 3	0. ojective Q er Ma per qua 5 15	Ti uestion urks estion	me allotted- s Total Marks 60
End Semes 3hrs. Group A B C • Only	ter Examina Unit 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 y multiple cho	tion Scheme Objective Questions (MCQ only correct ans No of question to be set 10	y with the wer) Total Marks 10	aximum I No of question to be set 5 5 5 2) with or	Marks-7 Sub To answ 3 3 e correct	0. ojective Q er per qua 5 15 t answer a	Ti uestion urks estion re to be	me allotted- s Total Marks 60 set in the
End Semes 3hrs. Group A B C • Only objet	ter Examina Unit 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 y multiple cho ctive part.	tion Scheme Objective Questions (MCQ only correct ans No of question to be set 10	• M y with the wer) Total Marks 10 stion (MCC	aximum I No of question to be set 5 5 2) with or	Marks-7 Sub To answ 3 3 ie correct	0. ojective Q er Ma per qua 5 15 t answer a	Ti uestion urks estion re to be	me allotted- s Total Marks 60 set in the
End Semes 3hrs. Group A B C • Only obje • Spec	ter Examina Unit 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 y multiple cho ctive part. effic instruction	tion Scheme Objective Questions (MCQ only correct ans No of question to be set 10	y with the wer) Total Marks 10 stion (MCC	aximum I No of question to be set 5 5 2) with or intain the	Marks-7 Sub To answ 3 3 e correct order in a	0. ojective Q er Ma per qua 5 15 t answer a answering	Ti uestion urks estion re to be	me allotted- s Total Marks 60 set in the ve questions
End Semes 3hrs. Group A B C • Only obje • Spec shou	ter Examina Unit 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 y multiple cho ctive part. cfic instruction ld be given o	tion Scheme Objective Questions (MCQ only correct ans No of question to be set 10	<ul> <li>M</li> <li>wer)</li> <li>Total</li> <li>Marks</li> <li>10</li> <li>stion (MCC)</li> <li>lents to manuation participation participatio</li></ul>	aximum I No of question to be set 5 5 2) with or intain the per.	Marks-7 Sub To answ 3 3 e correct order in a	0. ojective Q er per que 5 15 t answer a answering	Ti uestion urks estion re to be	me allotted- s Total Marks 60 set in the ve questions
End Semest 3hrs. Group A B C • Only obje • Spect shout Examination	ter Examina Unit 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6	tion Scheme Objective Questions (MCQ only correct ans No of question to be set 10	<ul> <li>M</li> <li>wer)</li> <li>Total</li> <li>Marks</li> <li>10</li> <li>stion (MCG</li> <li>lents to manual store and the examination of the e</li></ul>	aximum I No of question to be set 5 5 2) with or intain the per. nation:	Marks-7 Sub To answ 3 3 a e correct order in a	0. ojective Q er Ma per qua 5 15 t answer a answering	Ti uestion urks estion re to be g objecti	me allotted- s Total Marks 60 set in the ve questions
End Semes 3hrs. Group A B C • Only obje • Spec shou Examinatio Group	ter Examina Unit 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 multiple cho ctive part. bific instruction ld be given on on Scheme for	tion Scheme Objective Questions (MCQ only correct ans No of question to be set 10 Dice type que on to the stud on top of the correct semes Chapter	<ul> <li>M</li> <li>wer)</li> <li>Total</li> <li>Marks</li> <li>10</li> <li>stion (MCC)</li> <li>lents to mater examination patter examination (Marks)</li> </ul>	aximum I No of question to be set 5 5 2) with or intain the per. nation: of each	Marks-7 Sub To answ 3 3 e correct order in a Questic	0. ojective Q er Ma per que 5 15 t answer a answering on to be	Ti uestion urks estion re to be objecti	me allotted- s Total Marks 60 set in the ve questions
End Semes 3hrs. Group A B C Only obje Spec shou Examinatio Group A	ter Examina Unit 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 7 multiple cho ctive part. 5 fific instruction ld be given on Scheme for	tion Scheme Objective Questions (MCQ only correct ans No of question to be set 10 Dice type que on to the stud on top of the corrend semes Chapter	y with the wer) Total Marks 10 stion (MC0 lents to ma question pa ter examin Marks questio	aximum I No of question to be set 5 5 2) with or intain the per. nation: of each on	Marks-7 Sub To answ 3 3 e correct order in a Questic set 10	0. ojective Q er Ma per qua 5 15 t answer a answering on to be	Ti uestion urks estion re to be cobjecti Quest answo 10	me allotted- s Total Marks 60 set in the ve questions tion to be ered
End Semest 3hrs. Group A B C • Only objec • Spect shout Examination Group A B	ter Examina Unit 1,2,3,4,5,61,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,61,2,3,4,5,6 1,2,3,4,5,61,2,3,4,5,6 1,2,3,4,5,61,2,3,4,5,6 1,2,3,4,5,61,2,3,4,5,6 1,2,3,4,5,61,2,3,4,5,6 1,2,3,4,5,61,2,3,4,5,6 1,2,3,4,5,61,2,3,4,5,6 1,2,3,4,5,61,2,3,4,5,6 1,2,3,4,5,61,2,3,4,5,6 1,2,3,4,5,61,2,3,4,5,6 1,2,3,4,5,61,2,3,4,5,6 1,3,4,5,61,2,5,7,5,7,5,7,5,7,5,7,7,7,7,7,7,7,7,7,7	tion Scheme Objective Questions (MCQ only correct ans No of question to be set 10 Dice type que on to the stude on top of the correct senses Chapter ALL ALL	<ul> <li>M</li> <li>wer)</li> <li>Total</li> <li>Marks</li> <li>10</li> <li>stion (MCC)</li> <li>lents to mater examination patter examination pat</li></ul>	aximum I No of question to be set 5 5 2) with or intain the per. nation: of each on	Marks-7 Sub To answ 3 3 ie correct order in a Questic set 10 5	0. ojective Q er Ma per qua 5 15 t answer a answering on to be	Ti uestion urks estion re to be cobjecti Quest answe 10 3	me allotted- s Total Marks 60 set in the ve questions tion to be ered



<b>Examination Scheme for Pract</b>	ical Sessional examination:	
<b>Practical Internal Sessional Co</b>	ntinuous Evaluation	
<b>Internal Examination:</b>		
Continuous evaluation		40
<b>External Examination: Examin</b>	er-	
Signed Lab Note Book	10	
On Spot Experiment(one for	40	
each group consisting 5		
students)		
Viva voce	10	60

Name of	the Course: M.Sc in IT (	Cyber Security )		
Subject:	Cryptology			
Course C	ode: MITCS103	Semester: I		
Duration	: 40 Hours	Maximum Marks: 100		
Teaching	Scheme	Examination Scheme		
Theory:3		End Semester Exam:70		
Tutorial:0		Attendance: 5		
Practical:	0	Continuous Assessment:25		
Credit: 3		Practical Sessional internal continuous	evaluation	n:NA
		Practical Sessional external examination	n:NA	
Aim:				
Sl. No.				
1.	To learn how theories, pr	inciples, and techniques based on crypto	logy can	be used
	to achieve data security.			
Objective	) ·			
Sl. No.				
	To understand the theorie	es supporting common cryptographic met	thods, suc	ch as
	different types of hash-fu	nctions, symmetric and asymmetric ciph	ers, digita	al
	signatures and random nu	umbers.		
	To analyse, use and impl	ement such methods and reflect on their	limits and	1
	applicability.			
Pre-Requ	usite:			
Sl. No.				
	Basic Concept of Crypto	graphy		
Contents			Hrs./w	eek
Chapter	Name of the Topic		Hours	Marks
01	Classical ciphers, Inform	ation Theoretic Security, Stream	12	20
	ciphers, Block ciphers, C	ryptanalysis of Block and Stream		
	Ciphers.			
02	Formal models for block	and stream ciphers: Pseudorandom	12	30
	generators, Pseudoran-			



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M.Sc. in IT( Cyber Security

					1	I
	dom functi	ons and permutations.				
	Symmetric	key encryption: Notion c	of CPA and CCA securit	у		
	with examp	ples.				
	Symmetric	key authentication.				
	Cryptograp	bhic hash functions.				
	Modern modes of operations: Authenticated Encryption,					
	Tweakable Enciphering					
	schemes.					
	Introductio	on to public key encryption	n, computational securit	У		
	and compu	itational as-				
0.2	sumptions.	TT 11 1 1			10	
03	The Diffie	Hellman key exchange.	· 1		12	20
	The RSA,	ElGamal, Rabin and Paill	er encryption schemes.			
	Digital Sig	natures.	4			
	Dublic lease	in to Elliptic Curve Crypto	osystems.			
	Public Key	inirastructures			20	70
	SUD TOLAL	account Franciscotion	9 Duan anotion of		30	/0
	Internal A	Ssessment Examination	& Preparation of		4	30
	Semester 1				40	100
	Total:				40	100
Text Book	s:		1			
Name of A	uthor	Title of the Book	Edition/ISSN/ISBN	Na Pu	me of t blisher	he
Stinson, De	ouglas R.	Cryptography : theory		Ch	apman	&
		and practice		Ha	ll/CRC	
Jonathan K	atz,	Introduction to		Ch	apman	&
Yehuda Lin	ndell	Modern Cryptography		Ha	ll/CRC	, 2007
Reference	Books	1	1			
B. S. Schne	eier	Applied		Joh	nn Wile	y and Sons
		Cryptography:				
		Protocols, Algorithms,				
		and Source Code in C				
A. Meneze	s, P. C.	Handbook of Applied		CR	C Pres	S
Van Oorscl	not and S.	Cryptog-raphy				
A. Vanston	e					
End Seme	ster Exami	ination Scheme. N	⊥ Iaximum Marks-70.		T	ime
allotted-3h	irs.		1			
Group	Unit	<b>Objective Questions</b>	Subjectiv	e Qu	estions	
		(MCQ only with the				
		correct answer)				

No of

Total

No of

То

Marks

Total



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		question to be set	Marks	question to be set	answer	per question	Marks
Α	1,2,3	10	10				
В	1,2,3			5	3	5	60
С	1,2,3			5	3	15	

- Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part.
- Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper.

Examination Scheme for end semester examination:							
Group	Chapter	Marks of each question	Question to be set	Question to be answered			
Α	ALL	1	10	10			
В	ALL	5	5	3			
С	ALL	15	5	3			

Name of the Course: M.Sc. in	Information Technology (Cyber Security)
Subject: Advance Web Techr	ıology
Course Code:	Samastan 1
MITCS104+MITCS194	Semester: 1
Duration: 36 Hrs.	Maximum Marks: 200
<b>Teaching Scheme</b>	Examination Scheme
Theory: 3	End Semester Exam: 70
Tutorial: 0	Attendance: 5
Practical:4	Continuous Assessment: 25
Credit:5	Practical Sessional internal continuous evaluation: 40
	Practical Sessional external examination: 60
Aim	

Aim:

SI. No.	
	To develop formal reasoning.
	Create habit of raising questions
	Knowledge regarding the use of markup languages in web development.
	Ability to communicate knowledge, capabilities and skills related to the computer engineer
	profession

#### **Objective:**

This Subject is useful for Making own Web page and how to host own web site on internet. Along with that Students will also learn about the protocols involve in internet technology.

Sl. No.	
	To make own web site and host their own web site on internet
	To gain knowledge about what are the technologies used in internet.
	To learn about the protocols involve in internet.



Pre-Requ	isite:		
Sl. No.			
	Basic knowledge of HTML, CSS		
Contents		4]	Hrs./week
Chapte r	Name of the Topic	Hours	Marks
1	Introduction to WWW : Protocols and programs, secure connections, application and development tools, the web browser, What is server, choices, setting up UNIX and Linux web servers, Logging users, dynamic IP Web Design: Web site design principles, planning the site and navigation,	4	13
2	<b>Introduction to HTML</b> : The development process, Html tags and simple HTML forms, web site structure <b>Introduction to</b> <b>XHTML</b> : XML, Move to XHTML, Meta tags, Character entities, frames and frame sets, inside browser.	5	17
3	<b>Style sheets</b> : Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2	5	17
4	<b>Javascript</b> : Client side scripting, What is Javascript, How to develop Javascript, simple Javascript, variables, functions, conditions, loops and repetition	3	10
5	Advance script, Javascript and objects, Javascript own objects, the DOM and web browser environments, forms and validations DHTML : Combining HTML, CSS and Javascript, events and buttons, controlling your browser, Ajax: Introduction, advantages & disadvantages ,Purpose of it ,ajax based web application, alternatives of ajax	3	10
6	XML : Introduction to XML, uses of XML, simple XML,XML key components, DTD and Schemas, Well formed,using XML with application.XML, XSL and XSLT.Introduction to XSL, XML transformed simple example, XSLelements, transforming with XSLT	3	10
7	<ul> <li>PHP : Starting to script on server side, Arrays, function and forms, advance PHP</li> <li>Databases : Basic command with PHP examples, Connection to server, creating database, selecting a database, listing database, listing table names creating a table, inserting data, altering tables, queries, deleting database, deleting data and tables, PHP myadmin and database bugs.</li> </ul>	7	23
	Sub Total:	36	70
	Internal Assessment Examination & Preparation of Semester Examination	4	30
	Total:	40	100



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#### Practical: Skills to be developed:

#### Intellectual skills:

- 1 Skill to analyze problems and to determine web based solutions.
- 2 Knowledge of advanced technology of web development.
- 3 Ability to implement queries to perform various operations on database.

#### List of Practical:

- 1 Design web pages for your college containing a description of the courses, departments, faculties, library etc, use href, list tags.
- 2 Create your class timetable using table tag.
- 3 Create user Student feedback form (use textbox, text area, checkbox, radio button, select box etc.)
- 4 Create a web page using frame. Divide the page into two parts with Navigation links on left hand side of page (width=20%) and content page on right hand side of page (width = 80%). On clicking the navigation Links corresponding content must be shown on the right hand side.
- 5 Write html code to develop a webpage having two frames that divide the webpage into two equal rows and then divide the row into equal columns fill each frame with a different background color.
- 6 Create your resume using HTML tags also experiment with colors, text, link, size and also other tags you studied.
- 7 Design a web page of your home town with an attractive background color, text color, an Image, font etc. (use internal CSS).
- 8 Use Inline CSS to format your resume that you created.
- 9 Use External CSS to format your class timetable as you created.
- 10 Use External, Internal, and Inline CSS to format college web page that you created.
- 11 Develop a JavaScript to display today's date.
- 12 Develop simple calculator for addition, subtraction, multiplication and division operation using JavaScript
- 13 Create HTML Page with JavaScript which takes Integer number as input and tells whether the number is ODD or EVEN.
- 14 Create HTML Page that contains form with fields Name, Email, Mobile No, Gender, Favorite Color and a button now write a JavaScript code to combine and display the information in textbox when the button is clicked.
- 15 Implement Validation in above Feedback Form.
- 16 Use regular expression for validation in Feedback Form.
- 17 Using ajax retrieve data from a TXT file and display it.
- 18 Create XML file to store student information like Enrollment Number, Name, Mobile Number, Email Id.
- 19 Create DTD for above XML File.
- 20 Create XML Schema for above (Practical No. 18)
- 21 Create XSL file to convert above (refer Practical No. 17) XML file into XHTML file.
- 22 Write a php program to display today's date in dd-mm-yyyy format.
- 23 Write a php program to check if number is prime or not.
- 24 Write a php program to print first 10 Fibonacci Numbers.
- 25 Create HTML page that contain textbox, submit / reset button. Write php program to display this information and also store into text file.
- 26 Write a php script to read data from txt file and display it in html table (the file contains info in format Name: Password: Email )



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- 27 Write a PHP Script for login authentication. Design an html form which takes username and password from user and validate against stored username and password in file.
- 28 Write PHP Script for storing and retrieving user information from MySql table.
  - 1. Design A HTML page which takes Name, Address, Email and Mobile No. From user (register.php)
- 29 Store this data in Mysql database / text file.
- 30 Next page display all user in html table using PHP ( display.php )
- 31 Write a PHP script for user authentication using PHP-MYSQL. Use session for storing username.
- **32** Using ajax fetch information from a database with AJAX.
- 33 Students have to create a whole Website which contains above topics in Website.

#### Assignments:

Based on the curriculum as covered by subject teacher.

#### List of Books

Text Books:								
Name of A	Name of Author Title of the Book			Edition/ISSN/ISBN Name of the Publisher				
Steven Hol	Steven Holzner, HTML Black Book					Dremtech p	press.	
Design, Knuckles, Concepts and Real World					Wiley-India	a		
Reference	Books:					-		
P.J. Deitel	& H.M. Internet and World Wide Web How to program Deitel Pearson				son			
List of againment/ann another for labourtour, and				• •				
List of equipment/apparatus for laboratory experiments:								
I Computer with modera			with moderate	e configurat	tion			
2		XAMPP an	d other softw	vare as requ	ired.			
End Semes	ter Exami	nation Sche	me. M	aximum Marks-70. Time allotted-3hrs.				
Crown	11	Objective (MCQ only correct ans	<b>Questions</b> y with the swer)	Subjective Questions				
Group Unit		No of question to be set	Total Marks	No of question to be set	To answer	Marks per question	Total Marks	
Α	1 to 11							
B	1 to 11	10	10	5	3	5	60	
C Only multi	le choice t	vne question	(MCO) with	J one correct	J t answer are	to be set in th	he objective part	
		ype question					tions should be	
specific ins	struction to	me students	to maintain t	ne order in a	answering of	bjecuve ques	uons snoula de	

given on top of the question paper.



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<b>Examination Schem</b>	e for end sem	ester examination:		
Group	Chapter	Marks of each question	Question to be set	Question to be answered
Α	All	1	10	10
В	All	5	5	3
С	All	15	5	3
<b>Examination Schem</b>	e for Practica	l Sessional examina	tion:	
Practical Internal Se	essional Conti	nuous Evaluation		
Internal Examinatio	n:			
Continuous evaluatio	n			40
<b>External Examination</b>	on: Examiner	-		
Signed Lab Note Boc	ok		10	
On Spot Experiment			40	
Viva voce			10	60

Name of the Course: M.Sc in IT ( Cyber Security )						
Subject:	ject: Research Methodology and IPR					
Course C	ode: MITCS105	Semester: I				
Duration	: 36 Hours	Maximum Marks:100				
Teaching	Scheme	Examination Scheme				
Theory:2		End Semester Exam:70				
Tutorial:	)	Attendance: 5				
Practical:		Continuous Assessment:25				
Credit:2		Practical Sessional internal continuous evaluation: NA				
		Practical Sessional external examination: NA				
Aim:						
Sl. No.						
1.	Understand research problem formulation.					
2.	Analyze research related information					
3.	Follow research ethics					
Objective						
Sl. No.						
1	Understand research problem formulation.					
2	Analyze research related	information				
3	Follow research ethics					



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4.	Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.							
5.	Understanding that when IPR would take such important place in individuals & nation, it is needless to emphasise the need of inform Intellectual Property Right to be promoted among students in gen- in particular.	growth o mation at eral & en	f oout gineering					
6.	Understand that IPR protection provides an incentive to inventors research work and investment in R & D, which leads to creation of products, and in turn brings about, economic growth and social be	for furth of new and enefits.	er d better					
Pre-Requ	isite:							
Sl. No.								
Contents		2 Hrs./v	week					
Chanter	Name of the Tonic	Hours	Marks					
	Introduction: Meaning of research problem Sources of	6	1/1					
01	research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis,	U	14					
	interpretation. Necessary instrumentations.							
02	Effective literature studies annroaches: analysis Plagiarism	6	10					
02	Research ethics	U	10					
03	<b>Effective technical writing</b> : how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee	6	14					
04	<b>Nature of Intellectual Property:</b> Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.	6	14					
05	<b>Patent Rights:</b> Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.	6	14					
06	New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.	6	4					
	Sub Total:	36	70					
	Internal Assessment Examination & Preparation of Semester Examination	4	30					
Assignments: Based on Theory Lecture.								

Text Books:



MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL NH-12 (Old NH-34), Simhat, Haringhata, Nadia -741249 Department of Information Technology

M.Sc. in IT( Cyber Security

Stuart Melville and Wayne Goddard       Research methodology: an introduction for science & engineering students       Research Methodology: A Step by Step Guide for beginners       2 <sup>nd</sup> Edition         Ranjit Kumar       Research Methodology: A Step by Step Guide for beginners       2 <sup>nd</sup> Edition         T. Ramappa, S. Chand, A. Lemley,       "Intellectual Property Rights Under WTO", Robert P. Merges, Peter S. Menell, Mark A. Lemley,       "Intellectual Property age"," Prentice Hall,       2016.         Asimov,       "Introduction to Design", Prentice Hall,       1962.       Taylor & Francis Ltd, 2007.         Mayall,       "Industrial Design", Property",       McGraw Hill, 1992.         Halbert,       "Resisting Intellectual Property",       Taylor & Francis Ltd, 2007.         Niebel,       "Product Design", Product Design",       MacGraw Hill, 1974.         End Semester Examination Scheme.       Maximum Marks-70.       Time         allotted-3hrs.       Objective Question No of question to be set       No of Marks       Total question to be set       Marks       Total Marks         A       1,2,3,4,5,6       10       10       Iso       60         C       1,2,3,4,5,6       5       3       15         Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part.       Specific instruction to the students to maintain the order in answering objective questions sh	Name of Au	uthor	Title of the H	Book	Edition/ISSN/ISBN Na			lame of the Publisher	
Ranjit Kumar       Rescarch Methodology: A Step by Step Guide for beginners       2 <sup>nd</sup> Edition         Reference Books:       **         T. Ramappa, S. Chand,       "Intellectual Property Rights Under WTO",       2008         Robert P. Merges,       ** Intellectual Property Age",       2016.         Peter S. Menell, Mark       Age",       1962.         Asimov,       "Introduction to Design", Prentice Hall,       1962.         Mayall,       "Industrial Design",       McGraw Hill, 1992.         Halbert,       "Resisting Intellectual Property",       Taylor & Francis Ltd ,2007.         Nicbel,       "Product Design",       McGraw Hill, 1974.         End Semester Examination Scheme.       Maximum Marks-70.       Time         allotted-3hrs.       Mo of question       No of question       Total question       No of question       Total Marks         A       1,2,3,4,5,6       10       10       5       3       5         60       5       3       15       60         C       1,2,3,4,5,6       5       3       15         •       Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part.       Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper. <td>Stuart Melv Wayne Goo</td> <td>ille and ldard</td> <td colspan="2">Research methodology: an introduction for science &amp; engineering</td> <td></td> <td></td> <td></td> <td></td> <td></td>	Stuart Melv Wayne Goo	ille and ldard	Research methodology: an introduction for science & engineering						
Reference Books:         T. Ramappa, S.       "Intellectual Property Rights Under WTO",       2008         Robert P. Merges,       "Intellectual Property Intellectual Property       2016.         Peter S. Menell, Mark       Age",       2016.         A. Lemley,       Age",       1962.         Asimov,       "Introduction to Design", Prentice Hall,       1962.         Mayall,       "Industrial Design", Property",       McGraw Hill, 1992.         Halbert,       "Resisting Intellectual Property",       Taylor & Francis Ltd ,2007.         Niebel,       "Product Design",       McGraw Hill, 1974.         End Semester Examination Scheme.       Maximum Marks-70.       Time         allotted-3hrs.       Objective Questions (MCQ only with the correct answer)       No of question to be set       Total question       Marks to be set       Total question         A       1,2,3,4,5,6       10       10       60       60         B       1,2,3,4,5,6       5       3       15         • Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part.       5       3       15         • Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part.       Specific instruction to the students to maintain the order in answering objective questions	Ranjit Kumar		Research Methodolog by Step Guid beginners	y: A Step de for	2 <sup>nd</sup> Editi	on			
T. Ramappa, S.       "Intellectual Property Rights Under WTO",       2008         Robert P. Merges, Peter S. Menell, Mark A. Lemley,       "Intellectual Property Age",       2016.         Asimov,       "Introduction to Design", Prentice Hall,       1962.         Mayall,       "Industrial Design",       McGraw Hill, 1992.         Halbert,       "Resisting Intellectual Property",       Taylor & Francis Ltd ,2007.         Niebel,       "Product Design",       McGraw Hill, 1974.         End Semester Examination Scheme.       Maximum Marks-70.       Time         allotted-3hrs.       Objective Questions (MCQ only with the correct answer)       Subjective Questions       Total marks         A       1,2,3,4,5,6       10       10       answer       Gouestion answer	Reference	Books:							
Robert P. Merges, Peter S. Menell, Mark A. Lemley,       "Intellectual Property in New Technological Age",       2016.         A. Lemley,       Age",       1962.         Asimov,       "Introduction to Design", Prentice Hall,       1962.         Mayall,       "Industrial Design",       McGraw Hill, 1992.         Halbert,       "Resisting Intellectual Property",       Taylor & Francis Ltd ,2007.         Niebel,       "Product Design",       McGraw Hill, 1974.         End Semester Examination Scheme.       Maximum Marks-70.       Time         allotted-3hrs.       Objective Questions (MCQ only with the correct answer)       Subjective Questions answer       Marks         No of question to be set       Total Marks       No of question to be set       Total answer       Marks         A       1,2,3,4,5,6       10       10       5       3       5         60       5       3       15       60         C       1,2,3,4,5,6       5       3       15         • Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part.       5       3       15         • Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part.       5       3       15         • Only multiple choice type question should be giv	T. Ramappa Chand,	a, S.	"Intellectual Rights Unde	Property r WTO",	2008				
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Mayall,"Industrial Design",McGraw Hill, 1992.Halbert,"Resisting Intellectual Property",Taylor & Francis Ltd ,2007.Niebel,"Product Design",McGraw Hill, 1974.End Semester Examination Scheme.Maximum Marks-70.Timeallotted-3hrs.Objective Questions (MCQ only with the correct answer)Subjective Questions answerTotal per questionNo of question to be setTotal naswerNo of question to be setTotal MarksA1,2,3,4,5,61010IoB1,2,3,4,5,6Io535C1,2,3,4,5,6Io5315•Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part.5315•Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper.Examination Scheme for end semester examination:Examination Scheme for end semester examination:	Asimov,	Asimov,		n to entice	1962.				
Halbert,       "Resisting Intellectual Property",       Taylor & Francis Ltd ,2007.         Niebel,       "Product Design",       McGraw Hill, 1974.         End Semester Examination Scheme.       Maximum Marks-70.       Time         allotted-3hrs.       Objective Questions (MCQ only with the correct answer)       Subjective Questions       Total         No of question       Total Marks       No of question       To answer       Marks       Total         B       1,2,3,4,5,6       10       10       5       3       5       60         C       1,2,3,4,5,6       5       3       15       60       60         C       1,2,3,4,5,6       5       3       15       60         C       1,2,3,4,5,6       5       3       15         Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part.       5       3       15         Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper.       Examination Scheme for end semester examination:	Mayall,		"Industrial D	Design",			Mc	Graw H	Hill, 1992.
Niebel,"Product Design",McGraw Hill, 1974.End Semester Examination Scheme.Maximum Marks-70.Timeallotted-3hrs.Objective Questions (MCQ only with the correct answer)Subjective QuestionsNo of questionTotal questionNo of answerTotal per questionA1,2,3,4,5,61010535B1,2,3,4,5,6In5315Only multiple choice type question (MCQ)531560C1,2,3,4,5,6InIn5315•Only multiple choice type question (MCQ)Sith one correct answer are to be set in the objective part.5315•Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper.Fxamination Scheme for end semester examination:In	Halbert,		"Resisting Intellectual Property",				Ta Lto	Taylor & Francis Ltd ,2007.	
End Semester Examination Scheme.Maximum Marks-70.Timeallotted-3hrs.TimeGroupUnitObjective Questions (MCQ only with the correct answer)Subjective QuestionsMo of questionTotal MarksNo of question to be setTo answerMarks per questionA1,2,3,4,5,6101053560B1,2,3,4,5,6II53560C1,2,3,4,5,6II531560C1,2,3,4,5,6II531560C1,2,3,4,5,6II531560Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part.Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper.Examination Scheme for end semester examination:	Niebel,		"Product Design",					McGraw Hill, 1974.	
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No of question to be setTotal MarksNo of question to be setTo answer per questionMarks MarksTotal MarksA1,2,3,4,5,6101053560B1,2,3,4,5,6101053560C1,2,3,4,5,610531560C1,2,3,4,5,610531560C1,2,3,4,5,6531560C1,2,3,4,5,6531560C1,2,3,4,5,6531560C1,2,3,4,5,6531560C1,2,3,4,5,65315•Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part.5315•Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper.Examination Scheme for end semester examination:	Group	Unit	Objective ( (MCQ only correct answ	Questions with the wer)		Subjec	tive Qu	estions	
A       1,2,3,4,5,6       10       10       5       3       5         B       1,2,3,4,5,6       5       3       5       60         C       1,2,3,4,5,6       5       3       15         •       Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part.       •       Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper.         Examination Scheme for end semester examination:       •			No of question to be set	Total Marks	No of question to be set	To answer	Ma per que	arks estion	Total Marks
B       1,2,3,4,5,6       5       3       5       60         C       1,2,3,4,5,6       5       3       15         • Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part.       • Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper.         Examination Scheme for end semester examination:	Α	1,2,3,4,5,6	10	10					
C       1,2,3,4,5,6       5       3       15         • Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part.       • Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper.         Examination Scheme for end semester examination:	В	1,2,3,4,5,6			5	3	5		60
<ul> <li>Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part.</li> <li>Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper.</li> <li>Examination Scheme for end semester examination:</li> </ul>	С	1,2,3,4,5,6			5	3	15		
	<ul> <li>Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part.</li> <li>Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper.</li> </ul>								
Group Chapter Marks of each Question to be Question to be	Group		Chapter	Marks	of each Question to h		to be	be Question to be	
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C ALL 15 5 3	C		ALL	15		5		3	



Name of	the Course: M.Sc in IT (	Cyber Security )					
Subject:	Advanced Operating Syste	em					
Course C	Code: MITCS106A &	Semester: I					
MITCS19	96A						
Duration	: 40 Hours	Maximum Marks: 100+100					
Teaching	Scheme	Examination Scheme					
Theory:3		End Semester Exam:70					
Tutorial:		Attendance: 5					
Practical:	4	Continuous Assessment:25					
Credit: 3-	-2	Practical Sessional internal continuous	evaluation	n: <b>40</b>			
		Practical Sessional external examinatio	n: <b>60</b>				
Aim:		1					
Sl. No.							
1	General understanding of	f structure of modern computers					
2	Purpose, structure and fu	nctions of operating systems					
3	Illustration of key OS as	pects by example					
Objective	e:						
Sl. No.							
1	To learn the fundamental	s of Operating Systems.					
2	To learn the mechanisms	of OS to handle processes and threads a	nd their				
	communication						
3	To learn the mechanisms	involved in memory management in cor	temporar	v OS			
4	To gain knowledge on di	stributed operating system concepts that	includes	2			
	architecture. Mutual exclusion algorithms, deadlock detection algorithms and						
	agreement protocols	agreement protocols					
5	To know the components	and management aspects of concurrency	y manage	ment			
Pre-Requ	isite:	······································	U				
Sl. No.							
1	Strong programming skil	ls (Knowledge of C)					
2	Computer architecture	· · · · · · · · · · · · · · · · · · ·					
Contents			Hrs./we	ek			
Chapter	Name of the Topic		Hours	Marks			
01	Operating System Introdu	uction, Structures - Simple Batch,	8	15			
	Multi programmed, time-	-shared, Personal Computer, Parallel,					
	Distributed Systems, Rea	ll-Time Systems, System components,					
	Operating System service	es, System Calls, Virtual Machines,					
	System Design and Imple	ementation. Process and CPU					
	Scheduling - Process con	cepts and scheduling, Operation on					
	processes, Cooperating						
	Processes, Threads, and I	Interposes Communication Scheduling					
	Criteria, Scheduling Algo	orithm, Multiple Processor Scheduling,					
	Real-Time Scheduling.						
02	Memory Management an	d Virtual Memory - Logical versus	7	15			
	Physical Address Space,	Swapping,					
	Contiguous Allocation, P	aging, Segmentation, Segmentation					
	with Paging. Demand Pag	ging, Performance of Demanding					
	Paging, Page Replacement	nt, Page Replacement Algorithm,					
	Allocation of Frames, Th	rashing.					



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Practical	:					
	Total:				40	100
	Semester E	ssessment Examination Examination	& Preparation of		4	30
	Sub Total:	· · · ·	8 D		36	70
	Mobile, Clo	oud and Other Operating	System Models.		<b>-</b> -	
	Oss: Paralle	el, Distributed, Embedded	l & Real Time,			
	Elementary	introduction to the termi	nologies within Modern			
05	hardware a	nd software Concepts. de	sign issues.	w111,	U	10
05	Architectur	es. n to Distributed systems:	Goals of distributed sur	tem	6	10
	Security, A	ccess Control Fundament	als, Generalized Securit	у		
	Security in	Operating Systems, Princ	ciples of Information			
04	Operating S	System Security Issues- In	ntroduction to the topic of	of	7	15
	Critical Rec	zions. Monitors.	or synchronization,			
	Critical Sec	tion Problem, Synchronit	zation Hardware,			
	Deadlock. I	Process Management and	Synchronization - The			
	Deadlock A	voidance, Deadlock Dete	ection, and Recovery fro	m		
	Methods fo	r Handling Dead locks D	eadlock Prevention,			
03	Deadlocks	- System Model, Dead lo	cks Characterization,		8	15
	Performance	ni, Directory Implementa	tion, Efficiency and			
	Allocation					
	Directory S	1				



Practical:4

Credit: **3+2** 

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL NH-12 (Old NH-34), Simhat, Haringhata, Nadia -741249

### Department of Information Technology

M.Sc. in IT( Cyber Security

		connecti	on.						
End Sem allotted-3	ester Examin hrs.	nation Scl	heme.	Maximum	Marks-70.		Time		
Group Unit Objectiv (MCQ o correct a			ive Questions only with the answer)	QuestionsSubjectivey with thewer)			ons		
		No of question to be se	Total n Marks t	No of question to be set	To answer	Marks p question	per Total n Marks		
Α	1,2,3,4,5	10	10						
В	1,2,3,4,5			5	3	5	60		
С	1,2,3,4,5			5	3	15			
ob • Sp qu Examinat	jective part. becific instructestions shoul tion Scheme	tion to the d be giver for end so	e students to n n on top of the emester exan	naintain the equestion p nination:	order in answ aper.	vering obj	ective		
Group		Chapter	· Marks questi	Marks of each Question to question set		be Question to be answered			
Α		ALL	1		10	10			
B		ALL	5		5	3			
C E	· • • •								
Examination	tion Scheme Internal See	<u>ior Pract</u>	ical Sessiona	l examinat	ion:				
Internal l	Examination	<u>sionai Cu</u>							
Continuo	us evaluation	•					40		
External	Examination	ı: Examir	ner-	•					
Signed La	ib Note Book				10				
On Spot E	Experiment(or	ne for			40				
each grou	p consisting :	>							
Viva voce	<u>`</u>				10	60			
viva voce	<b>,</b>				10		00		
Name of t Subject:	the Course: ] Advanced D	M.Sc in I BMS	T ( Cyber Se	ecurity)					
Course C	ode: MITCS	5106B &	Semeste	er: I					
MITCS19	6B								
Duration	: 40 Hours		Maximu	ım Marks:	100+100				
Teaching	Scheme		Examin	ation Sche	me				
Theory:3			End Sen	nester Exam	n: <b>70</b>				
Tutorial:0			Attendar	Attendance: 5					

Continuous Assessment:25

Practical Sessional internal continuous evaluation:40



#### Department of Information Technology M.Sc. in IT( Cyber Security

	Practical Sessional external examination	on: <b>60</b>					
Aim:							
Sl. No.							
1	To introduce the fundamental concepts and issues of managing large volume of shared data in a parallel and distributed environment, and to provide insight into related research problems.						
Objective							
Sl. No.							
1	To learn the design trends in distributed systems.						
2	To apply network virtualization.						
3	Apply remote method invocation and objects						
Pro-Roau	isito.						
SI No							
1	Concent of DBMS						
Contonts		Hrs /wo	alz				
Chantar	Name of the Tonia	Hours	Morks				
		fours					
01	Distributed data processing: What is a DDDS: A dyantages and	U	10				
	disadvantages of DDPS: Problem areas: Overview of detabase						
	and computer network concepts						
	DISTRIBUTED DATABASE MANACEMENT SVSTEM						
	ARCHITECTURE						
	Transparencies in a distributed DBMS: Distributed DBMS						
	architecture: Global directory issues						
02	DISTRIBUTED DATABASE DESIGN	6	10				
02	Alternative design strategies: Distributed design issues:	U	10				
	Fragmentation: Data						
	allocation						
	SEMANTICS DATA CONTROL						
	View management: Data security: Semantic Integrity Control						
	OUERY PROCESSING ISSUES						
	Objectives of query processing; Characterization of query						
	processors; Layers of query processing; Query decomposition;						
	Localization of distributed data						
03	DISTRIBUTED QUERY OPTIMIZATION	6	20				
	Factors governing query optimization; Centralized query						
	optimization; Ordering of fragment queries; Distributed query						
	optimization algorithms						
	TRANSACTION MANAGEMENT						
	The transaction concept; Goals of transaction management;						
	Characteristics of transactions; Taxonomy of transaction models						
	CONCURRENCY CONTROL						
	Concurrency control in centralized database systems;						
	Concurrency control in DDBSs; Distributed concurrency control						
	algorithms; Deadlock management						
04	RELIABILITY	6	10				
	Reliability issues in DDBSs; Types of failures; Reliability						

techniques; Commit protocols; Recovery protocols



05	PARALLEI	DATABAS	SE SYSTE	MS	h an a		6	10						
	ontimization: load balancing													
06	ADVANCE	NCFD TOPICS						10						
00	ADVANCE Mobile Data	ADVANCED TOPICS						10						
	databases	Jases, Distin	uleu Objec	t Manager	iiciii, Muiti-									
	Sub Total.						36	70						
	Jub Iotal. Intornal Acc	assmant Ex	mination	& Dronar	ation of		<u> </u>	30						
	Somester Fy	essment Exa		x i repar	ation of		4	50						
	Total.						40	100						
Practical	Total.						40	100						
List of Pra	nctical: Based on oks	theory class	es.											
Name of A	uthor	Title of the	Book	Edition/	ISSN/ISBN	Nar Pub	ne of tl	ne						
M T Ozsu	and P	Principles of	f			Pret	ntice-H	all						
Valduriez		Distributed 1	Database					ull						
v urdurrez		Systems	Dataoase											
Reference	Books	Systems												
D. Bell and	1 J.	Distributed ]	Database			Add	lison-W	/eslev						
Grimson		Systems						- li j						
List of equ	ipment/app	aratus for la	boratory e	xperimen	ts:	1								
Sl. No.		Computer w	ith moderat	e configu	ration and stro	ng ne	twork	connection.						
		Oracle				<u> </u>								
End Seme	ster Examina	ation Schem	e. M	aximum	Marks-70.		Ti	me						
allotted-3	nrs.			1	~									
Group	Unit	Objective	Questions		Subjective	e Que	estions							
		(MCQ only	with the											
		correct ans	wer)			1	1	T ( 1						
		No of	I otal	No of	10	Mai	<b>K</b> S	I otal						
		question	Marks	question	answer	per	ation	Marks						
•	123456	10 De sei	10	to be set		que	511011							
	1,2,3,4,3,0	10	10											
B	1,2,3,4,3,0			5	3	5								
	1,2,3,7,3,0			5	5	5		60						
C								00						
• On	ly multiple ch	oice type au	estion (MC	O) with or	ie correct answ	ver a	re to be	set in the						
obi	ective part.	one oppe qu		<b>(</b> )										
Sne	ecific instruct	ion to the stu	dents to ma	intain the	order in answ	ering	objecti	ve						
que	stions should	be given on	top of the c	uestion p	aper.	-8	5							
Examinati	ion Scheme f	or end seme	ster exami	nation:	•									
Group		Chapter	Marks	of each	Question to	be	Quest	tion to be						
		•	questio	n	set		answ	ered						
Α		ALL	1		10		10	ALL 1 10 10						



В	ALL	5	5	3	
С	ALL	15	5	3	
<b>Examination Scheme</b>	for Practical S	essional examin	ation:		
<b>Practical Internal Ses</b>	sional Continu	ous Evaluation			
Internal Examination	•				
Continuous evaluation					40
<b>External Examination</b>	n: Examiner-				
Signed Lab Note Book			10		
On Spot Experiment(or	ne for		40		
each group consisting 5	5				
students)					
Viva voce			10		60

Name of	the Course: M.Sc in IT	( Cyber Security )
Subject:	Machine Learning	
Course (	Code: MITCS106C &	Semester: I
MITCS1	96C	
Duration	n: 40 Hours	Maximum Marks: 100+100
Teaching	g Scheme	Examination Scheme
Theory:3	,	End Semester Exam:70
Tutorial:	0	Attendance: 5
Practical	:4	Continuous Assessment:25
Credit: 3	+2	Practical Sessional internal continuous evaluation:40
		Practical Sessional external examination:60
Aim:		
Sl. No.		
1		
Objectiv	'e:	
Sl. No.		
1	To learn the concept of h	now to learn patterns and concepts from data without being
	explicitly programmed.	
2	To design and analyse va	arious machine learning algorithms and techniques with a
	modern outlook focusing	g on recent advances.
3	Explore supervised and u	unsupervised learning paradigms of machine learning.
4	To explore Deep learning	g technique and various feature extraction strategies.
Pre-Req	uisite:	
Sl. No.		

1	Concept of Mathematics						
Contents		Hrs./week					
Chapter	Name of the Topic	Hours	Marks				
01	Supervised Learning (Regression/Classification)	6	10				
	Basic methods: Distance-based methods, Nearest-Neighbours,						
	Decision Trees, Naive Bayes.						
	Linear models: Linear Regression, Logistic Regression,						
	Generalized Linear Models Support Vector Machines,						
	Nonlinearity and Kernel Methods						



MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL NH-12 (Old NH-34), Simhat, Haringhata, Nadia -741249 Department of Information Technology M.Sc. in IT( Cyber Security

	Beyond Binary Classification: Multi-class/Structured Outputs,					
	Ranking				-	
02	Unsupervise	ed Learning			6	10
	Clustering:	K-means/Kernel K-mean	IS I DO I			
	Dimensiona	lity Reduction: PCA and	kernel PCA			
	Matrix Facto	orization and Matrix Cor	npletion	`		
0.2	Generative	Models (mixture models	and latent factor models	5)	6	20
03	Evaluating I	Vachine Learning algorit	thms and Model Selection	on,	0	20
	Introduction	ods				
04	(Boosting, E	agging, Random Forests	6) a dalina Campana /Tima		(	10
04	Sparse Mou	Deen Learning and East	Jure Depresentation		0	10
	Series Data,	Deep Learning and real	ure Representation			
05	Scalable Ma	chine Learning (Online	and Distributed Learnin	γ) Λ	6	10
03	selection fro	m some other advanced	topics e a Semi	g) A	U	10
	supervised I	earning	topics, e.g., Seini-			
	Active Lear	ning Reinforcement Lea	rning Inference in			
	Graphical M	odels. Introduction to B	avesian Learning and			
	Inference					
06	Recent trend	ls in various learning tec	hniques of machine		6	10
	learning and	l classification methods f	for various applications.			
	Sub Total:		11		36	70
	Internal As	sessment Examination	& Preparation of		4	30
	Semester E	xamination	L			
	Total:				40	100
Practical:						
List of Pra	actical:					
	Based of	n theory classes.				
List of Bo	oks					
lext Book	KS:			NT	6.4	•
Name of A	Author	litle of the Book	Edition/ISSIN/ISBIN		me of t	ne
V	1				Diisner	
Kevin Mui	rpny	Drohobilistic		IVII	I Press	
		Probabilistic				
		reispective				
Reference	Books					
Christophe	r Rishon	Pattern Recognition		Snr	inger	
Christophe	Dishop	and Machine Learning		p	inger	
List of eau	uinment/ann	aratus for laboratory e	vneriments:			
Sl. No.		Computer with modera	te configuration and stro	ng n	etwork	connection.
		Python 3.6. Tensorflow	2.0		IK	
			2.0			
End Seme	ster Examir	nation Scheme. N	laximum Marks-70.		T	ime
allotted-3	hrs.					
Group	Unit	Objective	Subjectiv	e Qu	estions	
		Questions				



			``````````````````````````````````````					
		correct an	iswer)	_				1
		No of	Total	No of	То	Mar	ks	Total
		question	Marks	question	answer	per		Marks
		to be set		to be set		ques	stion	
Α	1,2,3,4,5,6	10	10					
	1,2,3,4,5,6							
В	1,2,3,4,5,6			5	3	5		
								60
С				5	3	15		
On     obj     Spo	ly multiple ch jective part. ecific instruct	ioice type q	uestion (Me tudents to m	CQ) with or naintain the	ne correct ans order in answ	wer ar vering	re to be objecti	set in the ve
<u> </u>					aper.			
Examinat	ion Scheme i	or end sem	lester exam	ination:	0	1	0	• • •
Group		Chapter	Mark	s of each	Question to be		Question to be	
			questi	on	set		answered	
Α		ALL	1	10		10		
В		ALL	5		5		3	
С		ALL	15 5 3					
Examinat	ion Scheme f	or Practica	al Sessional	l examinati	on:			
Practical	Internal Sess	ional Cont	inuous Eva	luation				
Internal <b>B</b>	Examination:							
Continuou	s evaluation							40
External	Examination	: Examiner	·-	-				
Signed Lab Note Book					10	)		
On Spot E	On Spot Experiment(one for				40	)		
each group students)	consisting 5							
Viva voce					10			60
						- 1		

Name of the Course: M.Sc in IT (Cyber Security)							
Subject:	Subject: Computer Graphics and Image Processing						
Course C	ode: MITCS106D &	Semester: I					
MITCS19	6D						
Duration	: 40 Hours	Maximum Marks: 100+100					
Teaching	Scheme	Examination Scheme					
Theory:3		End Semester Exam:70					
Tutorial:0		Attendance: 5					
Practical:4	4	Continuous Assessment:25					
Credit: 3+	2	Practical Sessional internal continuous evaluation:40					
		Practical Sessional external examination:60					
Aim:							
Sl. No.							
1	To introduce the necessar	ry background, the basic algorithms, and the applications of					
computer graphics and image processing.							
Objective							
Sl. No.							



#### Department of Information Technology M.Sc. in IT( Cyber Security

1	Students are able to learn the fundamentals, advantages and limitations of computer graphics and image processing. Students have knowledge of different raster graphics algorithms.
2	Students are able to develop a program that performs 2D object creation,
	transformation visualization and image enhansment.

#### **Pre-Requisite:**

Sl. No.						
1	Concept of coordinate geometry					
Contents					Hrs./we	eek
Chapter	Name of the	e Topic			Hours	Marks
01	<b>Introductio</b> History of c to image pro	<b>Introduction to computer graphics and image processing:</b> History of computer graphics, Vision and displays, Introduction to image processing.				
02	Image proc Color and in and computa	essing and representation nage representation, Laye ational image processing.	on ering and opacity, Filter , Image enhansment.	s	6	10
03	<b>2D Graphic</b> 2D transforr ellipse, Para	es nations and projections, ] metric curves.	Drawing lines, circles ar	nd	6	20
04	<b>3D Graphic</b> 3D transform polygons an volumetric r	es nations and projections, 1 d surface representation, epresentations	Drawing triangles, Parametric surfaces and	1	6	10
05	<b>Lighting an</b> Hidden surfa Shadows an	d visibility ace removal algorithms, s d advanced shading mod	Surface shading models, els.	,	6	10
06	Animation Basic anima Dynamic sc	tion techniques, tweening	g, double buffering, ard and inverse cinemati	ics.	6	10
	Sub Total:	· · ·			36	70
	Internal As Semester E	sessment Examination a xamination	& Preparation of		4	30
	Total:				40	100
Practical List of Pr List of Bo Text Boo	actical: Based of ooks ks:	n theory classes.				
Name of A	me of Author Title of the Book Edition/ISSN/ISBN Na					2
Foley, J.D A., Feiner Hughes, J	0., van Dam, , S.K. & .F.	Computer graphics: principles and practice		Ade	dison-We	esley
Gonzalez, Woods, R	R.C. & .E.	Digital image processing		Ade	dison-We	esley
Reference	e Books					



Department of Information Technology

M.Sc. in IT( Cyber Security

Donald He	arn & M	Compute	r Graphics	C					
Pauline Ba	Pauline Baker   Version								
List of equ	List of equipment/apparatus for laboratory experiments:								
Sl. No.		Compute	r with mod	erate configu	ration and stro	ong ne	twork	connection.	
		Python 3	.6						
End Seme allotted-31	ster Examina	ation Sch	eme.	Maximum	Marks-70.		Ti	ime	
Group	Unit	Objecti	ive Questio	ons	Subjective Questions				
		(MCQ o	only with th	ie					
		Correct	answer)	N f	<b>T</b> -	M	.1	T - 4 - 1	
		NO OI	Iotal	No of	10	Mar	KS	I otal	
		question	n Marks	question	answer	per		Marks	
	122456	to be se	t 10	to be set		ques	stion		
A	1,2,3,4,5,6	10	10						
р	1,2,3,4,5,0			5	2	5			
Б	1,2,3,4,5,0			5	3	5			
C				5	3	15		00	
	 	aiaa tuma		$\frac{3}{100}$		13	to he	act in the	
obj • Spe	ective part.	on to the	students to	maintain the	order in answ	rering	object	ive	
que	stions should	be given	on top of t	he question p	aper.				
Examinati	ion Scheme f	or end se	mester exa	mination:		•	0	· · ·	
Group		Chapter	Mai ques	question set			answered		
Α		ALL	1		10		10		
В		ALL	5		5 3				
С		ALL	15		5		3		
Examinati	ion Scheme f	or Practi	cal Session	al examinat	ion:				
Practical I	Internal Sess	ional Co	ntinuous E	valuation					
Internal E	xamination:								
Continuous	s evaluation							40	
External <b>E</b>	Examination:	Examin	er-						
Signed Lab	Note Book				10				
On Spot Ex	xperiment(on	e for			40				
each group	consisting 5								
students)									
Viva voce	Viva voce 10 60							60	
Name of the	he Course: N	I.Sc in I'	Γ ( Cyber S	Security )					
Subject: S	mart Sensors	and inter		98 4 am T					
MITCS104	SE MITCS	UOE &	Semes	ier: 1					
Duration			Mavin	Maximum Marks, 100+100					
Teaching	Scheme		Evami	nation Sche	me				
Theory 3	Scheme		End Se	mester Evan	n·70				
I Incory.	End Semester Exam: 70								



Tutorial:0		Attendance: 5					
Practical:4 Continuous Assessment:25							
Credit: 3+2 Practical Sessional internal continuous evaluation:40							
		Practical Sessional external examination	on: <b>60</b>				
Aim:							
Sl. No.							
1	To understand the vision	of IoT from a global context.					
Objective	e:						
Sl. No.							
1							
2	2 Able to realize the revolution of Internet in Mobile Devices, Clou						
	Networks						
3	Able to understand buildi	ing blocks of Internet of Things and char	acteristic	s			
Pre-Requ	lisite:						
Sl. No.							
1	Concept of basic network	ting					
Contents			Hrs./we	eek			
Chapter	Name of the Topic		Hours	Marks			
01	Environmental Parameter	rs Measurement and Monitoring: Why	6	10			
	measurement and						
	monitoring are important	, effects of adverse parameters for the					
	living being for IOT						
02	Sensors: Working Princip	bles: Different types; Selection of	6	10			
	Sensors for Practical App						
	Types of Sensors such as	Capacitive, Resistive,					
	Surface, Acoustic Wave f	or Temperature, Pressure, Humidity,					
0.0	Toxic Gas etc		-	•			
03	Important Characteristics	of Sensors: Determination of the	6	20			
	Characteristics	Constant Disco Inco for a second					
	Fractional order element:	Constant Phase Impedance for sensing					
	applications such						
	Impedance Spectroscopy						
	Modelling of Sensors	. Equivalent encult of Sensors and					
	Importance and Adoption	of Smart Sensors					
04	Architecture of Smart Ser	nsors: Important components, their	6	10			
0.	features		Ŭ	10			
	Fabrication of Sensor and	l Smart Sensor: Electrode fabrication:					
	Screen printing, Photolith	nography, Electroplating Sensing film					
	deposition: Physical and						
05	Interface Electronic Circu	uit for Smart Sensors and Challenges	6	10			
	for Interfacing the Smart	Sensor, Usefulness of Silicon					
	Technology in Smart Sen	sor And Future scope of research in					
	smart sensor						
06	Recent trends in smart set	nsor for day to day life, evolving	6 10				
	sensors and their architec	ture.					
	Sub Total:		36	70			
	Internal Assessment Ex	amination & Preparation of	4	30			



	Semester Ex	amination							
	Total:						40	100	
Practical:									
List of Pr List of Bo	actical: Based on oks	theory class	ses.						
Text Bool	ks:								
Name of A	Author	Title of the	Book	Edition/ISSN/ISBN Na Pu			ame of the Iblisher		
Yasuura, I CM., Liu YL.	H., Kyung, I, Y., Lin,	Smart Senso IoT Frontier	ors at the r,	Spi Inte Pul		Spr Inte Pub	ringer ernational blishing		
Reference	Books								
Kyung, C. Yasuura, I Lin, YL.	-M., H., Liu, Y.,	Smart Senso Systems	ors and			Spr Inte Pub	inger rnationa lishing	ıl	
List of eq	uipment/app	aratus for la	aboratory e	xperimen	ts:				
Sl. No.									
End Seme allotted-3	ester Examina hrs.	ation Schem	ne. M	laximum	Marks-70.		Tiı	ne	
Group	Unit	Objective (MCQ only correct ans	<b>Questions</b> y with the swer)		Subjectiv	e Qu	estions		
		No of question to be set	Total Marks	No of question to be set	To answer	Mar per que	rks stion	Total Marks	
Α	1,2,3,4,5,6 1,2,3,4,5,6	10	10						
B	1,2,3,4,5,6			5	3	5		<b>(</b> )	
C				5	3	15		00	
	ly multiple of	l laion trima and	Lastion (MC	$\mathbf{O}$ with $\mathbf{c}$	J	13	ra ta ha	sot in the	
• 01 ob • Sp qu	jective part. ecific instructi estions should	ion to the stu be given on	idents to ma	uintain the question pa	order in answ aper.	vering	objectiv	ve	
Examinat	ion Scheme f	or end seme	ester exami	nation:	0				
Group		Chapter	Marks	of each	Question to	be	Quest	ion to be	
A			questio	n	set		answe	rea	
$\begin{array}{ c c c c c c } \hline A & ALL & I & IU & IU \\ \hline D & ALL & 5 & 5 & 2 \\ \hline \end{array}$									
C		ALL	15		5		3		
Examinat	ion Scheme f	or Practical	Sessional	examinati	on:				
Practical	Internal Sess	ional Conti	nuous Eval	uation					
Internal I	Examination:								
Continuou	s evaluation							40	



Department of Information Technology

M.Sc. in IT( Cyber Security

10	
40	
10	60
	10 40 10

Name of	the Course: M.Sc in IT	( Cyber Security )						
Subject:	Cloud Computing							
Course C	Code: MITCS106F &	Semester: I						
Duration	Maximum Marker 100   100							
Duration	: 40 ПOUIS Sahama	Framination Scheme						
Theorem 2	scheme	Examination Scheme						
Tutorial.	Attendence: 5							
Dreatical	Attendance: 5							
Cradity 2	+ ∟ĵ	Dractical Sessional internal continuous	avaluatio	m. 10				
	۲ <u>۷</u>	Practical Sessional Internal continuou	s evaluation	011. <b>4</b> 0				
<b>A</b> im.		Flactical Sessional external examination	011.00					
AIIII: SL No								
<b>51. INU.</b> 1	To explore the basic ale	ud architacture						
1	To explore the oneliasti	an need and design on infrastructure						
	To analyze the applicati	agity understanding the different loop he	100					
	To extend the cloud capacity understanding the different loop noies.							
Objective		alon of cloud services						
SI No								
<b>51. INU.</b> 1	To apply trust based so	writy model to real world security proble	<b>222</b>					
2	An averyiow of the con	curity model to real-world security proble	d to succe	acfully				
	secure information with	in Cloud infrastructures		ssiully				
3	Students will learn the k	asic Cloud types and delivery models an	d develop	an				
	understanding of the ris	k and compliance responsibilities and Ch	allenges f	an or each				
	Cloud type and service	delivery model	anenges i					
	Cloud type and service							
Pre-Requ	isite:							
Sl. No.								
1	Concept of basic networ	rking						
Contents	· •		Hrs./we	eek				
Chapter	Name of the Topic		Hours	Marks				
01			6	10				
	Introduction to Cloud	Computing						
	Online Social Networks and Applications, Cloud							
	introduction and overview, Different clouds, Risks,							
	Novel applications of cloud computing							
02			6	10				
	Cloud Computing Arc	hitecture						
	Requirements, Introduction Cloud computing architecture, On							

Demand Computing Virtualization at the infrastructure level,



	Security in	Cloud computing enviro	onments, CPU		
	Virtualizat	ion, A discussion on Hyp	pervisors Storage		
	Virtualizat	ion Cloud Computing De	efined, The SPI		
	Framework	k for Cloud Computing, '	The Traditional Software	e	
	Model, The	e Cloud Services Deliver	ry Model		
	Cloud Depl	loyment Models			
	Key Drivers	s to Adopting the Cloud,	The Impact of Cloud		
	Computing				
	Cloud Con	nputing Adoption in the	Enterprise		
03		6	20		
	Security Iss	sues in Cloud Computi	ng		
	Infrastructur	re Security, Infrastructur	e Security: The Network	- -	
	Level, The	Host Level, The Applic	ation Level, Data		
	Security an	nd Storage, Aspects of D	ata Security, Data		
	Security M	litigation Provider Data a	and Its Security		
	Identity and	d Access Management			
	Trust Bound	daries and IAM, IAM Ch	allenges, Relevant IAM		
	Standards a	and Protocols for Cloud	Services, IAM Practices	1n	
<u> </u>	the Cloud,	Cloud Authorization Ma	inagement		
04				6	10
	Security M	anagement in the Cloud			
	Security Ma	anagement Standards, Se	curity Management in		
	the Cloud,	Availability Managemen	it: SaaS, PaaS, IaaS		
	Privacy Iss	ues Dete Life Cruele, Ver	. Duires are Can a sum a in th	_	
	Cloud Dro	tes, Data Life Cycle, Key	/ Privacy Concerns in the	e	
	Cloud, Plo	neeting Flivacy, Changes	o to Filvacy KISK	ing	
	Logal and	Pagulatory Implications	US Lowe and	ing,	
	Regulation	s International Laws and	d Regulations		
05	Regulation	is, international Laws and	d Regulations	6	10
05	Audit and	Compliance		0	10
	Internal Pol	icy Compliance, Govern	ance Risk and Complia	ince	
	(GRC). Re	gulatory/External Comp	liance. Cloud Security	nee	
	Alliance. A	Auditing the Cloud for Co	ompliance. Security-as-a	i.—	
	Cloud				
06	ADVANCE	ED TOPICS		6	10
	Recent devl	opments in hybrid cloud	and cloud security.	-	
	Sub Total:	•	•	36	70
	Internal As	ssessment Examination	& Preparation of	4	30
	Semester E	xamination	•		
	Total:			40	100
Practica	l:				
List of P	ractical:				
	Based of	n theory classes.			
List of B	ooks				
Text Boo	oks:	1	1		
Name of	Author	Title of the Book	Edition/ISSN/ISBN	Name of th	ne
Publisher					



John Rhoto	n	Cloud C	omput	ting					
		Explained:							
	Implementation								
	Handbook for								
	Enterprises								
Reference	Books				I				
List of equi	ipment/appa	ratus fo	r labo	oratory e	xperimen	its:			
Sl. No.					-				
End Semes allotted-3h	ter Examina rs.	tion Scl	heme.	Μ	aximum	Marks-70.		Ti	me
Group	Unit	Object	ive Q	uestions		Subjective	e Que	estions	
-		(MCQ	only v	vith the		Ū	_		
		correct	answe	er)					
		No of	Г	Total	No of	То	Mar	ks	Total
		questio	n N	Aarks	question	answer	per		Marks
		to be se	et		to be set		ques	stion	
Α	1,2,3,4,5,6	10	1	0			•		
	1,2,3,4,5,6								
В	1,2,3,4,5,6				5	3	5		
							(		60
С					5	3	15		
Only	y multiple ch	oice type	e ques	tion (MC	Q) with or	ne correct answ	ver ar	e to be	set in the
obje	ctive part.		•						
• Spec	cific instructi	on to the	e stude	ents to ma	intain the	order in answe	ering	objecti	ve
ques	stions should	be given	n on to	p of the c	uestion p	aper.			
Examinatio	on Scheme <u>f</u>	or end s	emest	er exami	nation:				
Group		Chapter	•	Marks	of each	Question to	be	Quest	tion to be
				questio	n set			answe	ered
Α		ALL		1		10		10	
В		ALL		5		5		3	
С		ALL		15		5		3	
Examinatio	on Scheme fo	or Pract	ical S	essional e	examinati	ion:			
Practical I	nternal Sessi	onal Co	ntinu	ous Eval	uation				
Internal Ex	kamination:								
Continuous	evaluation								40
External E	xamination:	Exami	ner-						
Signed Lab	Note Book					10			
On Spot Ex	periment(one	e for				40			
each group	consisting 5								
students)									
Viva voce					10			60	



#### MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

NH-12 (Old NH-34), Simhat, Haringhata, Nadia -741249

Department of Information Technology

M.Sc. in IT( Cyber Security

SEMESTER II											
Code	Course Title	Hou	Credit								
			S								
		L	Т	Р							
MITCS201	Program Core V • Ethical Hacking	3	0	0	3						
MITCS202	Program Core VI • Network Security	3	0	0	3						
	Program Core VII										
MITCS203	Digital Forensics	3	0	0	3						
MITCS204	Program Elective II										
A/B/C/D/E	A. Security Assessment and Risk Analysis										
	B. Malware Detection	3	0	0	3						
	C. ML for Security										
	D. Image Processing and Security										
	E. Cloud Computing security										
MITCS205 A/B/C/D	Audit Course 2	2	0	0	0						
MITCS292	Laboratory 1	0	0	4	2						
	Network Security Lab										
MITCS293	Laboratory 2	0	0	4	2						
	Digital Forensics Lab										
MITCS281	Term Paper with Seminar	0	0	4	2						
	Total Credits: 18										

\*Students be encouraged to go to Industrial Training/Internship for at least 2-3 months during semester break.

Name of the Course: M.Sc. in IT(Cyber Security)								
Subject: Ethical Hacking								
Course Code: MITCS201	Semester: II							
Duration: 36 Hrs.	Maximum Marks: 100							
Teaching Scheme	Examination Scheme							
Theory: 3	End Semester Exam: 70							
Tutorial: 0	Attendance : 5							
Practical: 0	Continuous Assessment: 25							
Credit:3	Practical Sessional internal continuous evaluation: 40							
	Practical Sessional external examination: 60							
Aim:								
SI.								
No								
•								
1. To learn Network Foot p	1. To learn Network Foot printing, Collect System Information, Collect Organization's							
information								
Objective:								



SI. No											
• 1	To understand Legal aspects of penetration testing										
1.	To understand Degar aspects of penetration testing										
2.	To develop Practical hacking exercise										
Pre-	Requisite:										
SI. No											
1.	Basic knowledge of programming										
Con	tents	4 Hrs./	week								
Ch apt er	Name of the Topic	Hour s	Marks								
01	<b>Introduction</b> Key issues plaguing the information security world, incident management process, and penetration testing	2	5								
02	<b>Footprinting</b> Various types of footprinting, footprinting tools, and Countermeasures	2	5								
03	<b>Network Scanning and Enumeration</b> Network scanning techniques and scanning countermeasures. Enumeration techniques and enumeration countermeasures.	2	10								
04	Attacks System hacking methodology, steganography, steganalysis attacks, and covering tracks Different types of Trojans, Trojan analysis, and Trojan Countermeasures. Working of viruses, Virus analysis, computer worms, malware analysis procedure, and countermeasures, Packet sniffing techniques and how to defend against sniffing. Social Engineering techniques, identify theft, and social engineering countermeasures. DoS/DDoS attack techniques, botnets, DDoS attack tools, and DoS/DDoS countermeasures. Session hijacking techniques and countermeasures	10	15								
05	Web Server Attacks Different types of web server attacks, attack methodology, and Countermeasures. SQL injection attacks and injection detection tools. Various cloud computing concepts, threats, attacks, and security techniques and tools	8	15								
06	<b>Cryptography</b> Different types of cryptography ciphers, Public Key Infrastructure (PKI), cryptography attacks, and cryptanalysis	6	10								



Department of Information Technology

M.Sc. in IT( Cyber Security

	tools						
07	Penetration	Testing				6	10
	Various type	es of penetra	tion testing,	security aud	dit, vulnerabi	ility	
	assessment,	and penetrati	on testing ro	badmap	,		
		-		•			
	Sub Total:	40	70				
	Internal As Examination	ter	30				
Total:							100
Assig	nments:						100
	Based on 1	ecture					
Prac	tical:						
•	Footprintin	ng and Recon	inaissance				
•	Scanning 1	Networks					
•	Enumerati	on					
•	Vulnerabil	ity Analysis					
•	System Ha	icking					
•	Malware I	hreats					
•	Sniffing	incomina					
	Denial of	Service					
	Session Hi	iacking					
	Evading II	OS Firewalls	and Honevn	oots			
	Hacking V	Veb Servers	und moneyp	015			
	Hacking V	Veb Applicati	ions				
	8	11					
List	of Books						
Text	Books:			1			
Nam	e of	Title of the	Book	Edition/IS	SN/ISBN	Name of t	the Publisher
Auth	or						
Jon H	Erickson	Hacking: Th	ne Art of	<sup>2<sup>nd</sup></sup> Edition	L	No_Starch	n_Press
D.C		Exploitation	1				
Refe	rence Books		C II 1'			C	
		The_Basics	S.OIHack1			Syngress	
		ng.andPer	ietration. I				
Fnd	Somostor Ex	esting	ahama	Maximu	m Marks 70		Time allotted
2 Lilu 3 hrs	Semester Ex	anniation 5	cheme.		III IVIALKS-70	•	Time anotteu-
Gro	Unit	Objective	Questions		Subject	ive Questic	ns
	Omt	(MCO only	v with the		Subject	ive Questi	<b>J</b> 115
up		correct ans	wer)				
		No of	Total	No of	То	Marks	Total Marks
		question	Marks	question	answer	per	
		to be set		to be set		question	
Α	1 to 7	10	10			•	
				5	3	5	60



С

All

15

### MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL NH-12 (Old NH-34), Simhat, Haringhata, Nadia -741249

#### Department of Information Technology

#### M.Sc. in IT( Cyber Security

В	1 to 7									
				5	3	15				
С	1 to 7									
• Only multiple choice type question (MCQ) with one correct answer are to be set in the										
	objective p	art.								
•	Specific in	struction to th	e students t	o maintain t	he order in a	nswering ob	jective questions			
	should be g	given on top o	f the questi	on paper.			-			
Exami	ination Sch	eme for end s	semester ex	amination:						
Group	)	Chapter	Marks o	of each (	Question to <b>I</b>	oe Quest	ion to be			
_		_	question	ı s	et	answe	ered			
A		All	1	1	0	10				
В		All	5	5		3				

5

3

Name of the Course: M.Sc. in IT(Cyber Security)				
Subject: N	etwork Security			
Course Code: MITCS202+		Semester: II		
MITCS292				
Duration: 36 Hrs.		Maximum Marks: 200		
Teaching Scheme		Examination Scheme		
Theory: 3		End Semester Exam: 70		
Tutorial: 0		Attendance : 5		
Practical: 4		Continuous Assessment: 25		
Credit: 3+2		Practical Sessional internal continuous evaluation: 40		
		Practical Sessional external examination: 60		
Aim:				
Sl. No.				
1.	To gain knowledge of computer networks.			
2.	To gain knowledge of several layers and network architectures			
	<b>—</b> 1110			
3.	To gain knowledge of communication through networks, protocols and algorithms.			
Objective				
SL No				
<u>51. INU.</u> 1				
1.	Understand the division of network functionalities into layers.			
2.	Be familiar with the components required to build different types of networks Be			
	exposed to the required functionality at each layer			
	aposed to the required r			



3.	Learn the flow control and congestion control algorithms			
	•			
Pre-Requis				
SI. NO. 1	Ludenstending of elecuithurs			
1.				
2.	Understanding of basic computer architecture			
Contents			Hrs./week	
Chapter	Name of the Topic	Hours	Marks	
01	Security in Computing Environment Need for Security, Security Attack, Security Services, Information Security, Methods of Protection.	4	7	
02	<b>Basics of Cryptography [3L]</b> Terminologies used in Cryptography, Substitution Techniques, Transposition Techniques.	4	8	
03	<b>Encryption and Decryption</b> Characteristics of Good Encryption Technique, Properties of Trustworthy Encryption Systems, Types of Encryption Systems, Confusion and Diffusion, Cryptanalysis.	4	8	
04	Key Encryption Data Encryption Standard (DES) Algorithm, Double and Triple DES, Security of the DES, Advanced Encryption Standard (AES) Algorithm, DES and AES Comparison. Characteristics of Public Key System, RSA Technique, Key Exchange, Diffie- Hellman Scheme, Cryptographic Hash Functions, Digital Signature, Certificates, Certificate Authorities	4	8	
05	Network Security Network Concepts, Threats in Networks, Network Security Controls.	4	8	
06	<b>IP Security</b> Overview of IP Security (IPSec), IP Security Architecture, Modes of Operation, Security Associations (SA), Authentication Header (AH), Encapsulating Security Payload (ESP), Internet Key Exchange.	4	8	
07	Web Security Web Security Requirements, Secure Socket Layer (SSL), Transport Layer Security (TLS), Secure Electronic Transaction (SET).	4	7	
08	<b>Electronic Mail Security</b> Threats to E-Mail, Requirements and Solutions, Encryption for	4	8	


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**Department of Information Technology** 

### M.Sc. in IT( Cyber Security

	Secure E-Mail, Secure E-Mail System.		
			0
09	Firewalls	4	8
	Firewalls – Types, Comparison of Firewall Types, Firewall		
	Configurations		
	Sub Total:	36	70
	Sub Total.	30	/0
	Internal Assessment Examination & Preparation of		30
	Semester Examination		
	Total:		100
Duastical			

### Practical:

#### Skills to be developed:

Intellectual skills:

- 1. Identify the components required to build different types of networks
- 2. Choose the required functionality at each layer for given application
- 3. Identify solution for each functionality at each layer
- 4. Trace the flow of information from one node to another node in the network

### List of Practical: Based on theory lectures.

#### **Assignments:**

Adhered to theory curriculum as conducted by the subject teacher.

### List of Books

Text Books:									
Name of	Title of the Book	Edition/ISSN/ISBN	Name of the						
Author			Publisher						
Larry L.	Computer Networks: A	Fifth	Morgan Kaufmann						
Peterson,	Systems Approach		Publishers						
Bruce S.									
Davie									
James F.	Computer Networking –	Fifth	Pearson Education						
Kurose,	A Top-Down Approach								
Keith W.	Featuring the Internet								
Ross									
Reference Boo	ks:								
William	Cryptography and		Pearson Education						
Stallings	network security:								
	principles and practice								
Roberta	Network Security: The		ТМН						
Bragg.	Complete Reference								
Mark	1								
Rhodes-									
Ousley									
List of equipn	nent/apparatus for laborator	y experiments:	1						
Sl. No.		× •							
1.	Computer								
End Semester	Examination Scheme.	Maximum Marks-70.	Time allotted-						
3hrs.									



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### M.Sc. in IT( Cyber Security

Group	Uni	<b>Objective Que</b>	stions	Subjective Questions				
	l	correct answer)	correct answer)					
		No of	Total	No of	To answer	Marks	Total Marks	
		question to be	Marks	question		per		
		set		to be set		questio		
						n		
Α	1 to	10	10					
	9							
В				5	3	5	60	
	1 to							
С	9			5	3	15		
	1 to							
	9							

• Only multiple choice type questions (MCQ) with one correct answer are to be set in the objective part.

• Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper.

Examination Scheme for end semester examination:							
Group	Chapter	Marks of each questio n	Question to be set	Question to be answered			
Α	All	1	10	10			
В	All	5	5	3			
С	All	15	5	3			

Name of								
	Valie of the Course. M.S. in 11 Cyber Security							
Subject:	Subject: Digital Forensics							
Course (	Code: MITCS203+	Semester: II						
MITCS	293							
Duration	<b>:</b> 36 Hrs.	Maximum Marks: 200						
Teaching Scheme		Examination Scheme						
Theory: 3		End Semester Exam: 70						
Tutorial: 0		Attendance : 5						
Practical	: 4	Continuous Assessment: 25						
Credit: 3	6 + 2	Practical Sessional internal continuous evaluation: 40						
		Practical Sessional external examination: 60						
Aim:								
Sl. No.								
1.	To provide computer forensics systems							
2.	To provide an understanding Computer forensics fundamentals							



3. To analyze various computer forensics technologies								
Objective:	ective:							
Sl. No.	•							
1. To identify methods for data recovery.	To identify methods for data recovery.							
2. To apply the methods for preservation of digital evidence.								
Pre-Requisite:								
Sl. No.								
1.         Database System								
Contents	3 Hrs./	week						
Chapt Name of the Topic	Hours	Marks						
er								
01 Computer Forensics Fundamentals	12	23						
What is Computer Forensics?, Use of Computer Forensi	cs in							
Law Enforcement, Computer Forensics Assistance to Hu	uman							
Resources/Employment Proceedings, Computer Fore	nsics							
Services, Benefits of Professional Forensics Methodo	logy,							
Steps taken by Computer Forensics Specialists Type	s of							
Computer Forensics Technology: Types of Military Com	puter							
Forensic Technology, Types of Law Enforcement — Com	puter							
Forensic Technology — Types of Business Computer For	Dete							
Pacevery Defined Data Back up and Pacevery The	Data							
of Back up in Data Bacovery The Data Becovery Solution	Noie							
02 Evidence Collection and Data Solution	17	23						
Why Collect Evidence? Collection Options — Obstacle	s 12	25						
Types of Evidence — The Rules of Evidence — Vo	latile							
Evidence — General Procedure — Collection and Archivir								
Methods of Collection — Artifacts — Collection Step	s —							
Controlling Contamination: The Chain of Custody Duplic	ation							
and Preservation of Digital Evidence: Preserving the D	igital							
Crime Scene — Computer Evidence Processing Steps — I	Legal							
Aspects of Collecting and Preserving Computer For	ensic							
Evidence Computer Image Verification and Authentica	ation:							
Special Needs of Evidential Authentication — Prace	ctical							
Consideration —Practical Implementation.								
03 Computer Forensics analysis and validation	12	24						
Determining what data to collect and analyze, valid	ating							
forensic data, addressing data-hiding techniques,	and							
performing remote acquisitions Network Forensics: Net	work							
torensics overview, performing live acquisitions, develo	oping							
standard procedures for network forensics, using network for	tools,							
Scenes: Identifying digital avidence callecting avidence								
private-sector incident scenes processing law enforce	ment							
crime scenes preparing for a search securing a com	nuter							
incident or crime scene seizing digital evidence at the s	cene							
storing digital evidence. obtaining a digital hash review	ing a							
case	<b>o</b>							
Sub Total:	36	70						



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	Internal A	4	30			
	Semester 1					
	Total:			40	100	
Practical:         Skills to be developed:         Intellectual skills:         1. Understand the definition of computer forensics fundamentals         2. Describe the types of computer forensics technology.         3. Analyze various computer forensics systems.         4. Illustrate the methods for data recovery, evidence collection and data seizure.         5. Summarize duplication and preservation of digital evidence.         List of Practical:         Based on theory lectures.         Assignments:         Based on theory lectures.						
Text Boo	oks:					
Name of	Author	Title of the Book	Edition/ISSN/ISBN	Name of th	e Publisher	
John R	. Vacca	Computer Forensics, Computer Crime Investigation	2nd Edition	Firewall Delhi	Media, New	
Nelson Enfinge	, Phillips er, Steuart	Computer Forensics and Investigations		CENGAG	E Learning	
Reference	e Books:					
Keith Richard Curtis Addiso	J. Jones, d Bejtiich, W. Rose, n Wesley	Real Digital Forensics		Pearson Ed	lucation	
Tony and Jenkins	Sammes Brian	Forensic Compiling, A Tractitioneris Guide		Springer edition	International	
Christopher L.T. Brown		Computer Evidence Collection & Presentation		Firewall N	/ledia	
Jesus Mena		Homeland Security, Techniques & Technologies		Firewall M	edia	
Robert	M. Slade	Software Forensics Collecting Evidence from the Scene of a Digital Crime		TMH 2005		
List of e	quipment/a	pparatus for laboratory	experiments:			
Sl. No.						
1.		Computer with Internet	Connection			
End Sem 3hrs.	ester Exan	nination Scheme.	Maximum Marks-70.	T	ime allotted-	
Group	Unit	<b>Objective Questions</b> (MCO only with the	Subject	tive Question	s	



		correct an	iswer)					
		No of	Total	No of	То	Mark	KS [	Total Marks
		question	Marks	question	answer	per		
		to be set		to be set		ques	tion	
Α	1,2,3	10	10					
B	1,2, 3			5	3	5	(	60
C	1 0 0			_		1 -		
C	1,2,3,	1 • .		5	3	15	. 1	. • . •
• 0	nly multiple	e choice typ	e questions (N	MCQ) with	n one correct a	nswer	are to be	e set in the
ot	pjective part							
• Sp	pecific instr	uction to the	e students to r	naintain th	e order in ans	wering	g objecti	ve questions
sh	ould be giv	en on top o	f the question	paper.				
Examina	tion Schem	e for end s	emester exar	nination:				
Group		Chapter	Marks o	of each	Question to be		Question to be	
			question		set		answered	
Α		All	1		10		10	
В		All	5		5		3	
С		All	15		5		3	
Examina	tion Schem	e for Prace	tical Sessiona	l examina	tion:			
Practical	Internal S	essional Co	ontinuous Ev	aluation				
Internal	Examinatio	on:						
Continuo	Continuous					40		
evaluation								
External Examination: Examiner-								
Signed Lab Assignments		ents	10					
On Spot I	Experiment			40				
Viva voce	e		10				60	

Name of	Name of the Course: M.Sc. in IT (Cyber Security)				
Subject:	Security Assessment and	d Risk Analysis			
Course C	Code: MITCS204A	Semester: II			
Duration	: 36 Hrs.	Maximum Marks: 100			
Teaching	Scheme	Examination Scheme			
Theory: 3	3	End Semester Exam: 70			
<b>Tutorial:</b>	0	Attendance : 5			
Practical	: 0	Continuous Assessment: 25			
Credit: 3		Practical Sessional internal continuous evaluation: NA			
		Practical Sessional external examination: NA			
Aim:					
Sl. No.					
1.	It will provide a backgro	und in the many aspects of security management associated with			
	today's modern communications and networks				
2.	It includes the fundament	tals of Risk Analysis, Risk Management, Security Policy,			
	Security Operations, Legal issues, Business issues and Secure Systems Development.				
Objectiv	/e:				
Sl. No.					



1.	Understand the role of Security Management in information technology					
2.	Quantify the properties of Information Security systems					
3.	Develop project plans for secure complex systems with knowled controls	dge of S.	ANS 20 critical			
4.	Demonstrate understanding of the role of firewalls, guards, proxy servers and intrusion detection in networks on a Linux OS with traffic analysis					
5.	Evaluate the residual risk of a protected network					
Pre-Rec	uisite:					
Sl. No.						
<b>1.</b>	Application of cryptography	<b>3 II</b> /				
Content	S	3 Hrs./V	veek			
Chapt	Name of the Topic	Hours	Marks			
er 01	Distr Assessment	12	12			
	Understand the principles and terminology of risk; Probability, Likelihood, Threat, Vulnerability, Impact, Threat actor, Risk owner, Understand and describe the five key steps in risk management: Identify assets Identify threats and vulnerabilities, Assess the impact of threats and vulnerabilities on an organisation Identify ways to manage those threats and vulnerabilities, Monitor and report on risk management action, Discuss qualitative and quantitative approaches to risk assessment; Quantitative approaches (such as loss expectancy approaches (SLE/ARO)), Quantitative scalar approaches (such as High/Medium/Low), Illustrate how the results of an assessment can be presented; Financial impact, Dashboards, Heat maps, RAG.	12				
02	<b>Risk Assessment: Threat and Vulnerabilities</b> Define and state the differences between: Threat, Vulnerability, Exploit, Attack, Describe and explain the following: Categories of threats The concept of a threat lifecycle The use of threat intelligence in an organisation. The uses of attribution, Discuss vulnerabilities, especially those relating to people and staff. Apprentices will understand how they can be exploited to attack an organisation; Phishing, Social engineering, Blended attacks, Describe common methods for finding vulnerabilities; Penetration testing Phishing simulators Social engineering attacks	12	23			
03	<b>Risk Assessment: Standards</b> Explain that risk assessment can be carried out using several methodologies or frameworks, but that it is better to select one methodology or framework for consistent and comparable results, List the common risk assessment methodologies or frameworks; ISO/IEC 27005, NIST, Risk Management, Framework, OCTAVE, FAIR, Compare common risk methodologies/frameworks; highlighting similarities and differences. Demonstrate how to select and then apply a risk	12	24			



	methodolog	gy/frameworl	k in an organ	isation.				
	Sub Total:						36	70
	Internal Assessment Examination & Preparation of						4	30
	Semester l	Examination						
	Total:						40	100
List of B	ooks							
Text Bo	oks:			1				
Name of	Author	Title of the	Book	Edition/	ISSN/ISBN	Nai	ne of t	he Publisher
Mark 1	Ryan M.	Information	Security			Syn	igress, 2	2012
Talabis	and Jason	Risk .	Assessment					
L. Marti	1	Toolkit:	Practical					
		Assessment	s through					
		Data Colle	ection and					
Data Analysis								
Referen	Kelerence Books:       Density       Distribution       CDCD       2011							
Douglas	J. Landoll	The Secu	rity Risk				C Press	, 2011
		Assessment						
		Handbook:	A					
		Complete	Guide for					
		Performing	Security					
End Com		KISK Assess	sments	Marimur	- Maulea 70		r	Firme allotted
End Sen	iester Exan	nination Sch	eme.	Maximur	n Marks-70.			I me anotted-
Croup	Unit	Objective	Questions		Subion	tivo (	Juostia	ng
Group		(MCO only	Questions		Subject		Zuestio	115
		correct ans	wer)					
		No of	Total	No.of	То	Ma	rks	Total Marks
		question	Marks	question	answer	ner	IK5	Total Marks
		to be set	Truins	to be set			stion	
Α	1.2.3	10	10				buion	
	1,2,0	10	10					
В	1.2.3			5	3	5		60
C	1,2,3			5	3	15		
• C	nly multiple	e choice type	questions (N	ACQ) with	n one correct a	nswe	r are to	be set in the
0	bjective par	t.	1					
• S	• Specific instruction to the students to maintain the order in answering objective questions							
s	should be given on top of the question paper.							
Examination Scheme for end semester examination:								
Group		Chapter	Marks o	of each	Question to	be	Quest	tion to be
			questior	1	set		answ	ered
Α		All	1		10		10	
В		All	5		5		3	
C All 15				5 3				



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Subject:	Malware Detection						
Course Code: MITCS204B		Semester: II					
Duration	: 36 Hrs.	Maximum Marks: 100					
Teaching	Scheme	Examination Scheme					
Theory:	3	End Semester Exam: 70					
<b>Tutorial</b> :	0	Attendance : 5					
Practical	: 0	Continuous Assessment: 25					
Credit: 3		Practical Sessional internal continuou	s evaluat	tion: NA			
		Practical Sessional external examinati	on: NA				
Aim:							
Sl. No.							
1.	Possess the skills necess	ary to carry out independent analysis of n	nodern m	alware samples			
	using both static and dyr	namic analysis techniques.		-			
2.	Have an intimate unders	tanding of executable formats, Windows	internals	and API, and			
	analysis techniques.						
3.	Extract investigative lead	ds from host and network-based indicator	rs associa	ited with a			
	malicious program						
4.	Apply techniques and co	ncepts to unpack, extract, decrypt, or byp	ass new a	anti¬analysis			
	techniques in future mal	ware samples					
Objectiv	ve:						
Sl. No.							
1.	To understand of operation	ng system and malware.					
2.	Able to analize static and	d dynamic analysis of malware.					
Content	S	3 Hrs./week					
Chapt	Name of the Topic		Hours	Marks			
er	ΙΝΤΡΟΡΙΟΤΙΟΝ		7	14			
01	INTRODUCTION	OS accounts and ante in almost	/	14			
	introduction to malware	, OS security concepts, malware threats,					
	Troiong bots spurvers	naiware types viruses, worms, rootkits,					
	static malware analysis	dynamic malware analysis					
	static marware analysis,	dynamic marwarc analysis					
02	STATIC ANALYSIS		7	14			
°-	X86 Architecture- Mai	n Memory, Instructions, Opcodes and					
	Endianness, Operands,	Registers, Simple Instructions, The					
	Stack, Conditionals, B	Branching, Rep Instructions, C Main					
	Method and Offsets.	Antivirus Scanning, Fingerprint for					
	Malware, Portable Exec	utable File Format, The PE File Headers					
	and Sections, The Stru	acture of a Virtual Machine, Reverse					
	Engineering- x86 Archit	ecture, recognizing c code constructs in					
	assembly, c++ analysis, Analyzing Windows programs, Anti-						
	static analysis technique	es obfuscation, packing, metamorphism,					
	polymorphism.						
03	DYNAMIC ANALYSI	<b>S</b> Live malware analysis, dead malware	7	14			
	analysis, analyzing trac	es of malware- system-calls, api-calls,					
	registries, network	activities. Anti-dynamic analysis					
	techniquesanti-vm, run	time-evasion techniques, , Malware					
	Sandbox, Monitoring v	vith Process Monitor, Packet Sniffing					



	with Wires	hark, Kerne	l vs. User-N	Mode Debug	gging, OllyI	Obg,			
	Breakpoints	Breakpoints, Tracing, Exception Handling, Patching							
04	Malware F	alwara Functionality					7	14	
	Downloade	r, Backdoo	ors, Creden	ntial Steale	rs, Persiste	ence	,		
	Mechanism	s, Privilege	Escalation,	Covert mal	ware launch	ing-			
	Injection. E	Detours. APC	iniection, Pr	ocess Repl	acement, H	100K			
05	Malware D	Detection Tec	chniques &	Android M	alware	1 1	8	14	
	Signature-b	ased techn	iques: mal	lware sign	atures, pac orphic maly	cked			
	signature	Non-signatur	re based to	echniques:	similarity-b	ased			
	techniques,	machine-lea	rning metho	ds, invariant	inferences				
	Malware DroidKung	Characteriza	ition, Case Bot Smarth	e Studies	– Plank Security	cton,			
	Diolarcung	1 u, 7 msei vei	Dot, Sinartp	none (ripps)	, security				
	Sub Total:						36	70	
	Internal As	ssessment Ex Examination	xamination	& Preparat	tion of		4	30	
	Total:						40	100	
List of B	ooks								
Text Boo	oks:					<b>.</b>			
Name of Michael	Author	Title of the	Book	Edition/IS	<u>0.07</u>	Nai Mo	ne of th	e Publisher	
Sean	Bodmer.	malware &	k rootkits:	159119-5		Olaw-II			
Aaron Le	emasters	malware	& rootkits						
		security s	secrets &						
Filiol		Computer	viruses.			Eric	Sprin	ger Science &	
1 11101		from the	eory to			Bus	siness M	Iedia, 2006	
		applications							
Referen	e Books:	A 1 1 1 1 1 1	1		1 4614				
Xuxian Yajin Zh	Jiang and ou	Android Ma	llware	1SBN 978- 7393-0	1-4614-	Spr	inger		
Michael	Sikorski	Practical	malware	ISBN-10: 1	159327-				
and And	rew Honig	analysis T	he Hands-	290-1					
		Dissecting	Malicious						
		Software							
End Son	actor Evon	ination Sah	0.000.0	Mayimum	Marka 70		T	Sime allotted	
Shrs.	lester Exam	ination Sch	eme.		Marks-70.		I	ime anotted-	
Group	Unit	Objective	Questions		Subject	tive Q	Question	ns	
		(MCQ only	with the						
		correct ans	wer)	N. C	T		.1	Τ-4-1 Μ 1	
		NO OI	1 otal Marks	NO OI	10 answer	Mai	rks	i otal Marks	
		to be set	11/10115	to be set	answei		stion		



# MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL NH-12 (Old NH-34), Simhat, Haringhata, Nadia -741249 Department of Information Technology

Α	1 to 5	10	10					
D	1 to 5			5	3	5		60
D	1 10 5			3	5	5		00
С	1 to 5			5	3	15		
• C	only multiple	choice type	questions (N	MCQ) with	one correct a	inswer	are to b	be set in the
0	bjective part							
• S	pecific instru	uction to the	students to 1	naintain th	e order in ans	wering	, object	ive questions
S Examina	hould be give	en on top of t	the question	paper.				
Group	ation Schem	Chanter	Morks (	f oach	Question to	he	Questi	on to be
Group		Chapter		) cach	set		answer	·ed
Α		All	1		10		10	
В		All	5		5		3	
С		All	15		5		3	
	1		I			I		
Name of	the Course:	M.Sc. in IT	(Cyber Sec	curity)				
Subject:	ML for Secu	urity	0 (	тт				
Course C	ode: MITC	S204C	Semester:		00			
Duration	: 36 Hrs.		Maximum	<u>n Marks: 1</u>	00			
I eaching	Scheme		Examinat	ion Schem	e			
I neory: 3	<u>)</u>		End Seme	ster Exam	: /0			
l utorial:	0		Attendand	<u>e:5</u>				
Practical	: 0		Continuol	IS Assessm	ient: 25	·		4 NI A
Credit: 5			Practical S	Sessional I	nternal conti	<u>nuous</u> ainatia	evalua	tion: NA
Aim			<b>F</b> ractical s	Sessional e	xternal exam	matio		
SI No								
1	To discuss t	the relationsh	in hetween	AI/ML and	l security/priv	vacy.		
2	To identity	how AI/ML	can be used	to launch o	vber-attacks	iucy,		
3.	To identify	use cases for	· incorporati	ng AI/ML	for security a	nd trus	t:	
4.	To identify	use cases for	· defining se	curity and	trust of AI/M	L:	-,	
Objectiv	/e:		0	J		)		
Sl. No.								
1.	Identify sec	urity re	quirements a	and capabil	ities of AI/M	L enab	led app	lications and
2.	Identify sec	urity require	ments and c	apabilities	for security a	pplicati	ions an	d services
3.	Able to id	entify wave	forward fo	r SG17 to	undertake i	n its f	future	study, including
	potential ne	w work item	s.	,				<i>,</i> ,
Pre-Req	uisite:							
Sl. No.								
1.	AI and MI							
Content	8					ĺ	3 Hrs./	week
Chapt	Name of th	e Topic					Hours	Marks
1								



01	Introducti	on			12	23
	Overview	of information security,	current security landsca	ipe.		
	the case for security data mining					
	Supervised	Learning (Regress				
	methods:	Distance-based meth	ods, Nearest-Neighbor	urs,		
	Decision	Trees, Naive Bayes;	Linear models: Lin	lear		
	Regression	, Logistic Regression, C	Generalized Linear Mod	els;		
	Support V	ector Machines, Nonline	arity and Kernel Metho	ods;		
	Beyond Bi	nary Classification: Mu	lti-class/Structured Outp	uts,		
	Ranking	•	1	-		
02	Clustering	and Learning			12	24
	Unsupervis	ed Learning Clustering:	K-means/Kernel K-mea	ans;		
	Dimension	ality Reduction: PCA a	and kernel PCA; Ma	trix		
	Factorizati	on and Matrix Comple	etion; Generative Mod	lels		
	(mixture m	nodels and latent factor n	nodels);Evaluating Mach	ine		
	Learning	algorithms and Model	Selection, Introduction	to		
	Statistical	Learning Theory, Ense	emble Methods (Boosti	ng,		
	Bagging, I	Random Forests) Sparse	Modeling and Estimati	ion,		
	Modeling	Sequence/Time-Series 1	Data, Deep Learning	and		
	Feature Re	presentation Learning				
03	Advance L	earning and Security	1.51.11.11		12	23
	Scalable N	lachine Learning (Online	and Distributed Learni	ng)		
	A selection	f from some other advant	ced topics, Semi-supervi	sed		
	Learning, I	al Madala Introduction	to Devesion Learning, Intere	nce		
	In Graphic	Anomaly Detection Ex	agion Attacks Mombers	hin		
	Inference N	Allware Analysis Model	Stealing & Watermarki	inα		
	Poisoning	Network Traffic Analy	sis Generative Adversa	rial		
	Networks,	Differential Privacy, Varia	ational Auto-Encoders	1141		
	Sub Total:				36	70
	Internal A	ssessment Examination	& Preparation of		4	30
	Semester I	Examination			40	100
	l otal:				40	100
List of F	Rooks					
Text Bo	oks:					
Name of	f Author	Title of the Book	Edition/ISSN/ISBN	Na	me of the	Publisher
K.P.	Soman,	Machine Learning		PH	I Lear	ning Private
R.Logan	athan,	with SVM and other		Lin	nited,200	9.
V.Ajay	V.Ajay Kernel methods					
Shai	Shai Shalev- Understanding 1 edition Ca					University
Shwartz, Shai Ben- Machine Learning: Pre				Pre	ss;	
David From Theory to						
		Algorithms				
Referen	ce Books:					
Kevin M	lurphy	Machine Learning: A		Mľ	I Press, 2	2012
		Probabilistic				
		Perspective				



### MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL NH-12 (Old NH-34), Simhat, Haringhata, Nadia -741249 Department of Information Technology

### M.Sc. in IT( Cyber Security

Trevor Robert	Hastie, Tibshirani,	The Eler Statistical L	nents of earning			Springer 20	009
Jerome F	riedman						
Christopl	her Bishop	Pattern F	Recognition			Springer, 2	007
		and Machin	e Learning				
End Sem	lester Exam	ination Sch	eme.	Maximum 1	Maximum Marks-70. Time allotted-3hrs.		
Group	Unit	Objective	Questions		Subject	ive Question	ns
		(MCQ only	with the				
		correct ans	wer)				
		No of	Total	No of	То	Marks	Total Marks
		question	Marks	question	answer	per	
		to be set		to be set		question	
Α	1,2,3	10	10				
В	1,2,3			5	3	5	60
С	1,2,3			5	3	15	

- Only multiple choice type questions (MCQ) with one correct answer are to be set in the objective part.
- Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper.

Examination Scl	Examination Scheme for end semester examination:				
Group	Chapter	Marks of each	Question to be	Question to be	
		question	set	answered	
Α	All	1	10	10	
В	All	5	5	3	
С	All	15	5	3	

Name of tl	ne Course: M.Sc. in IT(C	Cyber Security)				
Subject: In	mage Processing and Sec	curity				
Course Co	de: MITCS204D	Semester: II				
<b>Duration:</b>	36 Hrs.	Maximum Marks: 100				
Teaching S	Scheme	Examination Scheme				
Theory: 3		End Semester Exam: 70				
Tutorial: (	)	Attendance : 5				
Practical:	0	Continuous Assessment: 25				
Credit: 3		Practical Sessional internal continuous evaluation: NA				
		Practical Sessional external examination: NA				
Aim:						
Sl. No.						
1.	To learn basic concepts	of image processing, fundamentals and mathematical models in				
	digital image and video	processing.				
2.	To study different types	of image transforms for image processing and security.				
3.	To develop time and frequency domain techniques for image enhancement.					
4.	To understand Image segmentation, restoration, and morphological signal Processing with					
	applications security.					
Objective	· · · · · · · · · · · · · · · · · · ·					



Department of Information Technology

M.Sc. in IT( Cyber Security

SI. No.							
1.	To develop any image processing application.						
2.	To understa	and the rapid advances in	Machine vision.				
3.	To learn di	fferent techniques employ	yed for the enhancement	of im	ages.		
4.	Able to lea	arn different causes for i	mage degradation and	overv	iew of i	mage restoration	
	techniques.						
Pre-Requ	isite:						
Sl. No.							
1.	Basic Math	ematics					
Contents					<u>3 Hrs./v</u>	week	
Chapter	Name of th	ie Topic			Hours	Marks	
01	Image Rep	presentation & Modeling		.	18	35	
	The Human	n Eye-Brain System As	A Model, Image Forma	tion,			
	Image Mo	odels, Basic Image F	rocessing: Sampling	and			
	Quantizatio	n, Brightness and Cold	our, Histogram, Filters	tion			
	Boundaries	and Line Extraction	Segmentation and Fea	uoii,			
	Extraction	2-D Shape Represer	tation and Matching	3-D			
	Representa	tion and Matching. Visu	al Perception – The Hu	man			
	Eye, How	It Works and Fails, Imag	e Hardware and Softwa	re –			
	Cameras,	Displays, Frame Gra	bbers, Image Proces	sing			
	Architectur	res, Image Formation -	2d Image Acquisition	and			
	Sampling Theory.						
02	Image Tra	nsforms			18	35	
	Fourier T	ransform, Application	and Use, Wavelet Ti	rans,			
	Hadamard	Cosine Transform, Imag	e Enhancement – Point	and			
	Region Op	berators, Unsharp Maski	ing, Image Compressio	n -			
	Jpeg, Mpe	g. Image Restoration -	- Direct, inverse, Psei Implementations Soft	udo-			
	and Hardw	are Image Interpretation	- Edge Detection Fea	ature			
	Extraction	Template Matching Hor	igh Transform				
		remptate Matering, not	-Gir Trailoronni				
	Sub Total:				36	70	
	Internal A	ssessment Examination	& Preparation of		4	30	
	Semester I	Examination	•				
	Total:				40	100	
List of Bo	oks						
Text Bool	ks:		Ι	1			
Name of A	Author	Title of the Book	Edition/ISSN/ISBN	Nan	ne of the	e Publisher	
Feng Liu	, Wei Qi	Visual Cryptography	2 <sup>nd</sup> edition	Spri	nger		
Y an		Ior Image Processing					
		and Security: Theory,					
		Applications					
		Applications					
Reference	Books:			1			
Bernd J	Tähne	Digital Image	7 <sup>th</sup> edition	Spri	nger		



Department of Information Technology

### M.Sc. in IT( Cyber Security

Processing and							
		Image Fo	ormation				
End Seme	ster Exami	nation Schei	me. N	laximum M	larks-70.	Ti	ime allotted-3hrs.
Group	Unit	Objective	Questions		Subject	tive Questio	ons
		(MCQ only	y with the				
		correct ans	wer)				
		No of	Total	No of	То	Marks	Total Marks
		question	Marks	question	answer	per	
		to be set		to be set		question	
Α	1,2	10	10				
В	1,2			5	3	5	60
С	1,2			5	3	15	
• On	ly multiple	choice type a	uestions (M	CO) with on	e correct ans	wer are to b	e set in the

Уþ q objective part.

Specific instruction to the students to maintain the order in answering objective questions • should be given on top of the question paper.

Examination Scheme for end semester examination:				
Group	Chapter	Marks of each	Question to be	Question to be
		question	set	answered
Α	All	1	10	10
В	All	5	5	3
С	All	15	5	3

Name of the Course: M.Sc. in IT(Cyber Security)						
Subject: Clou	Subject: Cloud Computing Security					
Course Code	: MITCS204E	Semester: II				
<b>Duration: 40</b>	Hours	Maximum Marks: 100				
Teaching Sch	ieme	Examination Scheme				
Theory:3		End Semester Exam:70				
Tutorial:0		Attendance: 5				
Practical:0		Continuous Assessment:25				
Credit: <b>3</b>		Practical Sessional internal continuous evaluation: NA				
		Practical Sessional external examination: NA				
Aim:						
Sl. No.						
1	To explore the basic cloud	d architecture.				
	To analyze the application	n need and design an infrastructure.				
	To extend the cloud capac	city understanding the different loop holes.				
	To learn the implementati	ion of cloud services				
<b>Objective:</b>						
Sl. No.						
1	To apply trust-based security model to real-world security problems.					
2	2 An overview of the concepts, processes, and best practices needed to successfully					
	secure information within Cloud infrastructures.					
3	Students will learn the ba	sic Cloud types and delivery models and develop an				



understanding of the risk and compliance responsibilities and Challenges for each
Cloud type and service delivery model.

Pre-Requisite			
Sl. No.			
1	Concept of basic networking		
Contents		Hrs./we	ek
Chapter	Name of the Topic	Hours	Marks
01		6	10
-	Introduction to Cloud Computing		-
	Online Social Networks and Applications, Cloud		
	introduction and overview, Different clouds, Risks,		
	Novel applications of cloud computing		
02		6	10
	Cloud Computing Architecture		
	Requirements, Introduction Cloud computing architecture, On		
	Demand Computing Virtualization at the infrastructure level,		
	Security in Cloud computing environments, CPU		
	Virtualization, A discussion on Hypervisors Storage		
	Virtualization Cloud Computing Defined, The SPI Framework		
	for Cloud Computing, The Traditional Software Model, The		
	Cloud Deployment Models		
	Kay Drivers to Adopting the Cloud The Impact of Cloud		
	Computing on Users, Governance in the Cloud Barriers to		
	Cloud Computing Adoption in the Enterprise		
03	Cloud Computing Adoption in the Enterprise	6	20
05	Security Issues in Cloud Computing		20
	Infrastructure Security. Infrastructure Security: The Network		
	Level, The Host Level, The Application Level, Data		
	Security and Storage, Aspects of Data Security, Data		
	Security Mitigation Provider Data and Its Security		
	Identity and Access Management		
	Trust Boundaries and IAM, IAM Challenges, Relevant IAM		
	Standards and Protocols for Cloud Services, IAM Practices in		
	the Cloud, Cloud Authorization Management		
04		6	10
	Security Management in the Cloud		
	Security Management Standards, Security Management in		
	the Cloud, Availability Management: SaaS, PaaS, IaaS		
	Privacy Issues		
	Privacy Issues, Data Life Cycle, Key Privacy Concerns in the		
	Cloud, Protecting Privacy, Changes to Privacy Risk		
	Legal and Regulatory Implications U.S. Laws and Regulations		
	International Laws and Regulations		
05	Audit and Compliance	6	10
	Internal Policy Compliance, Governance, Risk, and Compliance		10
	(GRC), Regulatory/External Compliance, Cloud Security		



	Alliance, Au							
06	ADVANCEI	) TOPICS					6	10
00	Recent devlo	pments in hy	brid cloud a	and cloud s	security.		Ũ	10
	Sub Total:				2		36	70
	<b>Internal Ass</b>	essment Exa	amination &	& Prepara	ntion of Seme	ster	4	30
	Examination	I		-				
	Total:						40	100
List of Books Text Books:								
Name of Author		Title of the	Book	Edition/	ISSN/ISBN	Nar Put	ne of th olisher	ie
John Rhoton		Cloud Comp	outing					
		Explained:						
		Implementat	tion					
		Handbook fo	or					
		Enterprises						
Defenence De								
Kelerence bo								
List of equipr	nent/annarati	is for labora	atory evner	iments ·				
Sl. No.			ttory exper	inchts.				
End Semester Examination Scheme.Maximum Marks-70.Time allotted-3brs								
End Semester 3hrs.	Examinatior	Scheme.	Maxin	num Marl	ks-70.		Time a	llotted-
End Semester 3hrs. Group	Examinatior	Scheme.	Maxin Questions	num Marl	ks-70. Subjectiv	e Qu	Time a	llotted-
End Semester 3hrs. Group	Examinatior Unit	Objective	Maxin Questions y with the	num Marl	ks-70. Subjectiv	e Qu	Time a	llotted-
End Semester 3hrs. Group	Examinatior Unit	Objective (MCQ only correct ans	Maxin Questions y with the wer)	num Marl	ks-70. Subjectiv	e Qu	Time a	llotted-
End Semester 3hrs. Group	Examination Unit	Objective (MCQ only correct ans No of	Maxin Questions y with the wer) Total	num Marl	ks-70. Subjectiv	re Qu	Time a estions	Ilotted- Total
End Semester 3hrs. Group	Examination Unit	Objective (MCQ only correct ans No of question	Maxin Questions y with the wer) Total Marks	No of question	ks-70. Subjectiv To answer	e Qu Mai que	Time a estions tks per stion	llotted- Total Marks
End Semester 3hrs. Group	Examination Unit	Scheme. Objective (MCQ only correct ans No of question to be set	Maxin Questions y with the wer) Total Marks	No of question to be set	ks-70. Subjectiv To answer	re Qu Mai que	Time a estions tks per stion	<b>llotted-</b> Total Marks
End Semester 3hrs. Group A	Examination Unit	Scheme.Objective (MCQ only correct ans No of question to be set10	Maxin Questions y with the wer) Total Marks 10	No of question to be set	ks-70. Subjectiv To answer	re Qu Man que	Time a estions tks per stion	llotted- Total Marks
End Semester 3hrs. Group A B	Examination Unit 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6	Scheme.Objective (MCQ only correct ans No of question to be set10	Maxin Questions y with the wer) Total Marks 10	No of question to be set	ks-70. Subjectiv To answer	re Qu Mai que	Time a estions tks per stion	<b>llotted-</b> Total Marks
End Semester 3hrs. Group A B	Examination Unit 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6	Scheme.Objective (MCQ only correct ans No of question to be set10	Maxin Questions y with the wer) Total Marks 10	No of question to be set	ks-70. Subjectiv To answer 3	re Qu Man que 5	Time a estions tks per stion	Ilotted- Total Marks 60
End Semester 3hrs. Group A B C	Examination Unit 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6	Scheme.Objective (MCQ only correct ans No of question to be set10	Maxin Questions y with the wer) Total Marks 10	No of question to be set 5 5	ks-70. Subjectiv To answer 3 3	re Qu Mar que 5 15	Time a estions tks per stion	Ilotted- Total Marks 60
End Semester 3hrs. Group A B C • Only m	Examination Unit 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 ultiple choice	Scheme. Objective (MCQ only correct ans No of question to be set 10	Maxin Questions y with the wer) Total Marks 10	No of question to be set 5 5 5 ith one co	ks-70. Subjectiv To answer 3 3 rrect answer a	re Qu Man que 5 15 rre to	Time a estions the per stion be set in	Ilotted- Total Marks 60 n the
End Semester 3hrs. Group A B C • Only m objective	Examination Unit 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6	Scheme.Objective (MCQ only correct ans No of question to be set10	Maxin Questions y with the wer) Total Marks 10	No of question to be set 5 5 5 ith one co	ks-70. Subjectiv To answer 3 3 rrect answer a	re Qu Mar que 5 15 ure to	Time a estions tks per stion be set in	Ilotted- Total Marks 60 n the
End Semester 3hrs. Group A B C • Only m objectiv • Specifi	Examination           Unit           1,2,3,4,5,6           1,2,3,4,5,6           1,2,3,4,5,6           1,2,3,4,5,6           ultiple choice           ve part.           c instruction to	Scheme.         Objective (MCQ only correct ans No of question to be set         10         type question         type question         type question	Maxin Questions y with the wer) Total Marks 10 on (MCQ) w s to maintai	No of question to be set 5 5 ith one co n the order	ks-70. Subjectiv To answer 3 3 rrect answer a r in answering	re Qu Man que 5 15 ure to g obje	Time a estions tks per stion be set in ctive qu	Ilotted- Total Marks 60 n the testions
End Semester 3hrs. Group A B C • Only m objectiv • Specifi should	Examination Unit 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 ultiple choice ve part. c instruction to be given on to	Scheme.         Objective (MCQ only correct ans No of question to be set         10         type question         type question         to the student         op of the question	Maxin Questions y with the wer) Total Marks 10 on (MCQ) w s to maintai stion paper.	No of question to be set 5 5 ith one co n the order	ks-70. Subjectiv To answer 3 3 rrect answer a r in answering	re Qu Mar que 5 15 are to g obje	Time a estions tks per stion be set in ctive qu	Ilotted- Total Marks 60 n the testions
End Semester 3hrs. Group A B C • Only m objectiv • Specifi should Examination	Examination Unit 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 ultiple choice ve part. c instruction to be given on to Scheme for en	Scheme.         Objective (MCQ only correct ans No of question to be set         10         type question         type of the question	Maxin Questions y with the wer) Total Marks 10 on (MCQ) w s to maintai stion paper. examinatio	No of question to be set 5 5 ith one co n the order	ks-70. Subjectiv To answer 3 3 rrect answer a r in answering	re Qu Man que 5 15 ure to g obje	Time a estions eks per stion be set in ctive qu	Ilotted- Total Marks 60 n the testions
End Semester 3hrs. Group A B C • Only m objectiv • Specifi should Examination for the second seco	Examination Unit 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 ultiple choice ve part. c instruction to be given on to Scheme for en	Scheme.         Objective (MCQ only correct ans No of question to be set         10         type question         type question         to the student         op of the question         the student         of the question         Chapter	Maxin Questions with the wer) Total Marks 10 n (MCQ) w s to maintai stion paper. examinatio Marks	No of question to be set 5 5 ith one co n the order on: of each	ks-70. Subjectiv To answer 3 3 rrect answer a r in answering Question to	<pre>ve Qu Mai que 5 15 are to g obje be</pre>	Time a estions tks per stion be set in ctive qu Quest	Ilotted- Total Marks 60 n the testions
End Semester 3hrs. Group A A B C • Only m objectiv • Specifi should Examination Group	Examination Unit 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 ultiple choice ve part. c instruction to be given on to Scheme for en	Scheme.         Objective (MCQ only correct ans No of question to be set         10         type question         type of the question         the question <td>Maxin Questions wer) Total Marks 10 n (MCQ) w s to maintai stion paper. examinatio Question 1</td> <td>No of question to be set 5 5 5 ith one co n the order of each n</td> <td>ks-70. Subjectiv To answer 3 3 rrect answer a r in answering Question to set</td> <td>re Qu Man que 5 15 ure to g obje be</td> <td>Time a estions estion eks per stion be set in ctive qu Quest answe</td> <td>Total Marks 60 n the lestions ion to be ered</td>	Maxin Questions wer) Total Marks 10 n (MCQ) w s to maintai stion paper. examinatio Question 1	No of question to be set 5 5 5 ith one co n the order of each n	ks-70. Subjectiv To answer 3 3 rrect answer a r in answering Question to set	re Qu Man que 5 15 ure to g obje be	Time a estions estion eks per stion be set in ctive qu Quest answe	Total Marks 60 n the lestions ion to be ered
End Semester 3hrs. Group A B C • Only m objectiv • Specifi should Examination 5 Group A B	Examination Unit 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 1,2,3,4,5,6 ultiple choice ve part. c instruction to be given on to Scheme for en	Scheme.         Objective (MCQ only correct ans No of question to be set         10         type question         type question         to the student         op of the question         the student         Chapter         ALL         ALL	Maxin Questions wer) Total Marks 10 Marks sto maintai stion paper. examinatio Question 1 5	No of question to be set 5 5 ith one co n the order of each n	ks-70. Subjectiv To answer 3 3 3 rrect answer a r in answering Question to set 10 5	Mai que 5 15 re to g obje be	Time a estions estion eks per stion be set in ctive qu Quest answe 10 3	Total Marks 60 n the nestions ion to be ered



Department of Information Technology

M.Sc. in IT( Cyber Security

SEMESTER III						
Code	Course Title	Hou	Hours per week Cre		Credits	
		L	Т	Р		
MITCS301	Program Core IX					
	• Cyber Law and Cyber Crime Investigation	3	0	0	03	
MITCS302	<ul> <li>Open Elective</li> <li>Business Analytics</li> <li>Project Management &amp; Entrepreneurship</li> <li>Industrial Safety</li> <li>Operations Research</li> <li>Cost Management of Engineering Projects</li> <li>Security Policy &amp; Audit</li> <li>Waste to Energy</li> </ul>	3	0	0	03	
MITCS393	Dissertation-I /Industrial Project	0	0	20	10	
	Total Credits: 16					

\*Students going for Industrial Project/Thesis will complete these courses through MOOCs.

Name of the Course: M.Sc. in IT(C	yber Security)				
Subject: Cyber Law & Cyber Crin	ne Investigation				
Course Code: MITCS301	Semester: III				
<b>Duration:</b> 36 Hrs.	Maximum Marks: 100				
Teaching Scheme	Examination Scheme				
Theory: 3	End Semester Exam: 70				
Tutorial: 0	Attendance : 5				
Practical: 0	Continuous Assessment: 25				
Credit: 3	Practical Sessional internal continuous evaluation: NA				
	Practical Sessional external examination: NA				
Aim:					
Sl. No.					
1. To provide knowledge re	elated to auditing of computer systems, managing and mitigating				
risk situations in the orga	inization and techniques for investigating financial frauds.				
2. To create awareness on	cybercrime & IT law.				
<b>3.</b> Provide the assistance to	handle cybercrime.				
<b>4.</b> To protect the girls again	ist the cybercrime.				
Objective:					



MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

NH-12 (Old NH-34), Simhat, Haringhata, Nadia -741249

Department of Information Technology M.Sc. in IT( Cyber Security

#### Sl. No. This course will look at the emerging legal, policy and regulatory issues pertaining to 1. cyberspace and cybercrimes To cover all the topics from fundamental knowledge of Information Technology and 2. Computer Architecture so that the participant can use to understand various aspects of working of a computer. 3. To enable the participants appreciate, evaluate and interpret the case laws with reference to the IT Act and other Laws associated with the cyberspace. 4. To identify the emerging Cyberlaws, Cybercrime & Cyber security trends and jurisprudence impacting cyberspace in today's scenario. Contents 4 Hrs./week Chapter Name of the Topic Hours Marks Introduction to Cyberspace, Cybercrime and Cyber Law 9 17 01 The World Wide Web, Web Centric Business, e-Business Architecture, Models of e-Business, e-Commerce, Threats to virtual world. IT Act 2000 - Objectives, Applicability, Nonapplicability, Definitions, Amendments and Limitations. Cyber Crimes- Cyber Squatting, Cyber Espionage, Cyber Warfare, Cyber Terrorism, Cyber Defamation. Social Media-Online Safety for women and children, Misuse of Private information. 02 **Regulatory Framework of Information and Technology Act** 9 17 2000 Information Technology Act 2000, Digital Signature, E-Signature, Electronic Records, Electronic Evidence and Electronic Governance. Controller, Certifying Authority and Cyber Appellate Tribunal. (Rules announced under the Act), Network and Network Security, Access and Unauthorized Access, Data Security, E Contracts and E Forms. 9 03 **Offences and Penalties** 18 Information Technology (Amendment) Act 2008 - Objective, Applicability and Jurisdiction; Various cyber-crimes under Sections 43 (a) to (j), 43A, 65, 66, 66A to 66F, 67, 67A, 67B, 70, 70A, 70B, 80 etc. along with respective penalties, punishment and fines, Penal Provisions for Phishing, Spam, Virus, Worms, Malware, Hacking, Trespass and Stalking; Human rights in cyberspace, International Co-operation in investigating cybercrimes. 9 04 **Indian Evidence Act** 18 Classification - civil, criminal cases. Essential elements of criminal law. Constitution and hierarchy of criminal courts. Criminal Procedure Code. Cognizable and non-cognizable offences. Bailable and non-bailable offences. Sentences which the court of Chief Judicial Magistrate may pass. Indian Evidence Act - Evidence and rules of relevancy in brief. Expert witness. Cross examination and re-examination of witnesses. Sections 32, 45, 46, 47, 57, 58, 60, 73, 135, 136, 137, 138, 141. Section 293 in the code of criminal procedure. Secondary EvidenceSection 65-B.



Department of Information Technology

M.Sc. in IT( Cyber Security

	Sub Total:						36	70
	Internal A	ssessment <b>E</b>	xamination	& Prepar	ation of		4	30
	Semester	Examination	l					
	Total:						40	100
List of Bo	oks							
Text Bool	KS:							
Name of Author Title of the Book		Book	Edition/	ISSN/ISBN	Na	me of th	<u>ne Publisher</u>	
Karnika S	eth	Computers,	Internet			Ley	tis Ne	x1s Buttersworth
		and New	lechnology			wa	dhwa, 2	2012
Ionathan I	Rosenoer	Cyber Laws	• The Law			Snr	inger-	Verlag New
Jonathan		of Internet	. The Law				niger- rk 1997	venag, new
Reference	Books:	Simulat		I		10	, 1777	
Sreenivası	ılu N.S	Law Re	lating to			Pat	ridge Pı	ublishing, 2013
		Intellectual Property					0	8,
Pavan Dug	ggal	Cyber Law – The				Saa	lkshar L	aw Publications
		Indian Perspective						
Harish Chander Cyber Laws and IT		vs and IT	PHI Learning Pvt. Ltd,			ng Pvt. Ltd, 2012		
		Protection						
End Seme	ester Exami	nation Scher	me. N	laximum ]	Marks-70.		Ti	me allotted-3hrs.
Group	Unit	Objective	Questions	Subjective Questions				
		(MCQ only	y with the					
		Correct ans	wer)	Naaf		Ma		Total Maulta
		INO OI	Total	INO OI	10 answor	IVIa nor	rks	Total Marks
		to be set	IVIAIKS	to be set	allswei		estion	
Δ	1234	10 00 301	10			que	50011	
	1,2,3,7	10	10					
В	1.2.3.4.			5	3	5		60
	) )- ) )				_			
С	1,2,3,4			5	3	15		
• On	ly multiple	choice type q	uestions (M	CQ) with c	one correct an	swer	are to be	e set in the
ob	jective part.							
• Sp	ecific instru	ction to the st	tudents to ma	aintain the	order in answ	vering	objecti	ve questions
sho	buld be give	n on top of th	e question p	aper.				
Examinat	ion Scheme	Chaptor	lester exami	nation:	Question to	ha	Oner	ion to bo
Group		Unapter	auestion		Question to set	be	e Question to be	
A		All	1		10		10	
B		All	5		5		3	
C		All	15		5		3	
-		1	-				-	



Name of Subject:	the Course: M.Sc. in IT( Business Analytics	Cyber Security)				
Course C	Code: MITCS 302A	Semester: III				
Duration	: 36 Hours	Maximum Marks:100				
Teaching	g Scheme	Examination Scheme				
Theory:0	3	End Semester Exam: 70				
Tutorial:(	)	Attendance : 5				
Practical:	0	Continuous Assessment: 25				
Credit: 03	3					
Aim:						
Sl. No.						
1.	Understand the role of	Understand the role of business analytics within an organization.				
2.	Analyze data using stat	istical and data mining techniques and	underst	and		
	relationships between the underlying business processes of an organization.					
3.	To gain an understanding of how managers use business analytics to formulate					
	and solve business problems and to support managerial decision making.					
4.	To become familiar with processes needed to develop, report, and analyze					
	business data.					
5.	Use decision-making tools/Operations research techniques.					
6	Mange business process using analytical and management tools.					
7.	Analyze and solve prob	lems from different industries such as	manufac	turing,		
	service, retail, software,	, banking and finance, sports, pharmac	ceutical,			
	aerospace etc.					
Objectiv	e:					
Sl. No.						
1.	Students will demonstra	ate knowledge of data analytics.				
2.	Students will demonstra	ate the ability of think critically in mak	ing decis	sions		
	based on data and deep	analytics.				
3.	Students will demonstra	ate the ability to use technical skills in <b>j</b>	predicati	ive and		
	prescriptive modelling t	to support business decision-making.				
4.	Students will demonstra	ate the ability to translate data into clea	ar, actioi	nable		
	insights.					
Pre-Requ	uisite:					
Sl. No.						
1.						
2.						
Contents			Hrs./w	eek		
Chapte	Name of the Topic		Hour	Marks		
r			S			
01	Unit1:		6	14		
	Business analytics: Ove	rview of Business analytics, Scope of				
	Business analytics, Busi	ness Analytics Process, Relationship				
	of Business Analytics P	rocess and organisation, competitive				



Department of Information Technology

M.Sc. in IT( Cyber Security

	advantages of Business Analytics.		
	Statistical Tools: Statistical Notation, Descriptive Statistical		
	methods, Review of probability distribution and data		
	modelling, sampling and estimation methods overview.		
02	Trendiness and Regression Analysis: Modelling	6	14
	<b>Relationships and Trends in Data, simple Linear Regression.</b>		
	Important Resources, Business Analytics Personnel, Data		
	and models for Business analytics, problem solving,		
	Visualizing and Exploring Data, Business Analytics		
	Technology.		
03	Organization Structures of Business analytics, Team	6	14
	management, Management Issues, Designing Information		
	Policy, Outsourcing, Ensuring Data Quality, measuring		
	contribution of Business analytics, Managing Changes.		
	Descriptive Analytics, predictive analytics, predicative		
	Modelling, Predictive analytics analysis, Data Mining, Data		
	Mining Methodologies, Prescriptive analytics and its step in		
	the business analytics Process, Prescriptive Modelling,		
	nonlinear Optimization.		
04	Forecasting Techniques: Qualitative and Judgmental	6	14
	Forecasting, Statistical Forecasting Models, Forecasting		
	Models for Stationary Time Series, Forecasting Models for		
	Time Series with a Linear Trend, Forecasting Time Series		
	with Seasonality, Regression Forecasting with Casual		
	Variables, Selecting Appropriate Forecasting Models.		
	Monte Carlo Simulation and Risk Analysis: Monte Carle		
	Simulation Using Analytic Solver Platform, New-Product		
	Development Model, Newsvendor Model, Overbooking		
	Model, Cash Budget Model.		
05	Decision Analysis: Formulating Decision Problems, Decision	6	10
	Strategies with the without		
	OutcomeProbabilities,Decision Trees, The		
	Value ofInformation, Utility and Decision Making.		
06	<b>Recent Trends in : Embedded and collaborative business</b>	6	4
	intelligence, Visual data recovery, Data Storytelling and Data		
	journalism.		
	Sub Total:	36	70
	Internal Assessment Examination & Preparation of Semester	4	30
	Examination		
	Total:	40	100
Practica	1:		
Assignm	ents: Based on theory		
List of B	ooks		

**Text Books:** 



Department of Information Technology M.Sc. in IT( Cyber Security

Name of Author		Title of the Book		Edition/	Name of the Publisher			
Dſ								
<b>Reference</b>	Books:	<b>D</b> •	1.4.			D	T	
I.Marc J.	ang	Business ar	lalytics			Pea	rson F	I Press.
Dara C	jans,	and Applies,	concepts,					
Schnieder	ians.		ations					
Christoph	er M.							
Starkey,								
2.James E	vans,	Business A	nalytics			per	sons E	ducation.
	,		<b>.</b>			1		
End Seme	ster Exami	nation Schei	me. N	laximum	Marks-70.		Ti	ime
allotted-31	irs.	-		1				
Group	Unit	Objective	Questions		Subjectiv	e Que	estions	
		(MCQ only	y with the					
		correct ans	wer)	NL C	T	N	1	T ( 1
		No of	l otal Mortra	NO OI	10	Ma	rKS	l otal Marka
		to be set	Marks	to be set	answer	per	stion	Warks
Δ	ΔΙΙ	10	10			que	Stion	
	ALL	10	10					
В	ALL			5	3	5		70
С	ALL			5	3	15		
• On	y multiple	choice type q	uestion (MC	CQ) with o	ne correct ans	wer a	re to be	e set in the
obj	ective part.							
• Spe	cific instrue	ction to the st	udents to ma	aintain the	order in answ	rering	objecti	ive
que	stions shou	ld be given o	n top of the	question p	aper.			
Examinati	on Scheme	for end sem	ester exami	ination:				
Group		Chapter	Marks o	of each	Question to	be	Ques	tion to be
			question	1	set		answ	ered
A		ALL	<u> </u>		10		10	
В		ALL	15		5		3	
C		ALL	15		5		5	

Name of the Course: M.Sc. in IT(	Cyber Security)
Subject: Industrial Safety	
<b>Course Code: MITCS 302B</b>	Semester: III
<b>Duration: 36 Hours</b>	Maximum Marks:100
Teaching Scheme	Examination Scheme
Theory:03	End Semester Exam: 70



Tutorial:0	0 Attendance : 5			
Practical:0	0 Continuous Assessment: 25			
Credit: 03				
Aim:				
Sl. No.				
1	Understand the role of	Industrial Safety in an organization.		
2	Analyze Industrial Safety	y in various aspect.		
3.				
Objective				
SI. NO.	Manga Industrial Safaty	using analytical and management to	ala	
1.	To become familiar with	using analytical and management to	015. and and	Juzo
<i>L</i> .	I o become fammar with Industrial Safaty data	processes needed to develop, report	, and ana	uyze
3	Thuistrial Safety uata.			
J.				
Pre-Reau	isite:			
Sl. No.				
1.	Basic Electrical Knowled	lge		
2.	-	0		
Contents	Contents		Hrs./week	
Chapter	Name of the Topic		Hour	Marks
			S	
01	Industrial safety: Accident	t, causes, types, results and control,	6	14
	mechanical and electrical	hazards, types, causes and preventive		
	steps/procedure, describe s	salient points of factories act 1948		
	light cleanliness fire gua	arding pressure vessels etc. Safety		
	color codes Fire preventic	on and firefighting equipment and		
	methods.	on and menghang, equipment and		
02	Fundamentals of maintena	ance engineering: Definition and aim	6	14
	of maintenance engineerin	ng, Primary and secondary functions		
	and responsibility of main	itenance department, Types of		
	maintenance, Types and ag	pplications of tools used for		
	maintenance, Maintenance	e cost & its relation with replacement		
	economy, Service life of e	equipment.		
03	Wear and Corrosion and the	heir prevention: Wear- types, causes,	6	14
	effects, wear reduction me	ethods, lubricants-types and		
	applications, Lubrication i	inethous, general sketch, working and		
	iii Splash lubrication iv (	Gravity lubrication y Wick feed		
	lubrication vi Side feed lu	brication vii Ring lubrication		
	Definition, principle and f	factors affecting the corrosion. Types		
	of corrosion, corrosion pre	evention methods.		
04	Fault tracing: Fault tracing	g-concept and importance, decision	6	14
	tree concept, need and app	blications, sequence of fault-finding		
	activities, show as decision	n tree, draw decision tree for		



### Department of Information Technology M.Sc. in IT( Cyber Security

	problems in machine tools, hydraulic, pneumatic, automotive, thermal and electrical equipment's like, I. Any one machine tool, ii. Pump iii. Air compressor, iv. Internal combustion engine, v. Boiler, vi. Electrical motors, Types of faults in machine tools and their general causes.		
05	Periodic and preventive maintenance: Periodic inspection- concept and need, degreasing, cleaning and repairing schemes, overhauling of mechanical components, overhauling of electrical motor, common troubles and remedies of electric motor, repair complexities and its use, definition, need, steps and advantages of preventive maintenance. Steps/procedure for periodic and preventive maintenance of: I. Machine tools, ii. Pumps, iii. Air compressors, iv. Diesel generating (DG) sets, Program and schedule of preventive maintenance of mechanical and electrical equipment, advantages of preventive maintenance. Repair cycle concept and importance	6	14
06			
	Sub Total:	36	70
	Internal Assessment Examination & Preparation of Semester Examination	4	30
	Total:	40	100

### **Assignments: Based on theory**

### List of Books

	<b>D</b> 1	
lext	Books:	

I CAL DOOR								
Name of A	uthor	Title of the Book	Edition/ISSN/ISBN	Name of the Publisher				
Reference	Books:							
1.Higgins	&	Maintenance		<b>Da Information</b>				
Morrow,		Engineering		Services.				
		Handbook,						
2.H. P. Ga	rg,	Maintenance		S. Chand and				
		Engineering,		Company.				
3.Audels,		Pump-hydraulic		Mcgrew Hill				
		Compressors,		Publication.				
4.Winterk	orn,	Foundation		Chapman & Hall				
Hans,		Engineering		London.				
		Handbook,						
End Semester Examination Scheme. Maximum Marks-70. Time								
allotted-3h	allotted-3hrs.							
Group	Unit	<b>Objective Questions</b>	Subjective	e Questions				



		(MCQ only	with the					
		correct ans	wer)					
		No of	Total	No of	То	Maı	rks	Total
		question	Marks	question	answer	per		Marks
		to be set		to be set		que	stion	
Α	ALL	10	10					
В	ALL			5	3	5		70
С	ALL			5	3	15		
Onl	y multiple c	hoice type qu	uestion (MO	CQ) with on	e correct ans	wer ai	re to be	set in the
obje	ective part.							
• Spe	cific instruc	tion to the st	udents to m	aintain the	order in answ	vering	objecti	ve
que	stions shoul	d be given or	n top of the	question pa	per.			
Examinati	on Scheme	for end sem	ester exam	ination:				
Group		Chapter	Marks	of each	Question to	be	Quest	ion to be
			questio	n	set		answered	
Α		ALL	1		10		10	
В		ALL	5		5		3	
С		ALL	15		5		3	
Examinati	on Scheme	for Practica	l Sessional	examinatio	on:			
Practical I	nternal Ses	sional Conti	nuous Eva	luation				
Internal E	xamination	:						
Continuous evaluation								40
External E	Examination	n: Examiner	-					
Signed Lab Assignments								
On Spot Ex	periment		40					
Vive voce			10					()

Name of the Course: M	Sc. in IT(Cyber Security)				
Subject: Operations Re	earch				
<b>Course Code: MITCS 3</b>	2C Semester: 3rd				
<b>Duration: 36 Hours</b>	Maximum Marks:100				
<b>Teaching Scheme</b>	Examination Scheme				
Theory:03	End Semester Exam: 70				
Tutorial:0	Attendance : 5				
Practical:0	Continuous Assessment: 25				
Credit: 03					
Aim:					
Sl. No.					
1. Ability to ap	bly the dynamic programming to solve problems of discreet and				
continuous v	continuous variables.				
2. Students sho	Students should able to apply the concept of non-linear programming				
Objective:					
Sl. No.					



### Department of Information Technology M.Sc. in IT( Cyber Security

	-					
1.	Students should able to apply the dynamic programming to solve problems of					
	discreet and continuous variables.					
2.	Students should able to apply the concept of non-linear program	ning				
3.	Students should able to carry out sensitivity analysis					
4.	Student should able to model the real world problem and simulat	e it.				
Pre-Requis	site:					
Sl. No.						
1.						
2.						
Contents	Hrs./week					
Chapter	Name of the Topic	Hour	Marks			
_		S				
01	Optimization Techniques, Model Formulation, models, General	7	14			
	I P Formulation Simpley Techniques Sensitivity Analysis					

01	Optimization Techniques, Model Formulation, models, General	7	14
	L.R Formulation, Simplex Techniques, Sensitivity Analysis,		
	Inventory Control Models		
02	Formulation of a LPP - Graphical solution revised simplex	8	14
	method - duality theory - dual simplex method - sensitivity		
	analysis - parametric programming		
03	Nonlinear programming problem - Kuhn-Tucker conditions	7	14
	min cost flow problem - max flow problem - CPM/PERT		
04	Scheduling and sequencing - single server and multiple server	7	14
	models - deterministic inventory models - Probabilistic		
	inventory control models - Geometric Programming.		
05	Competitive Models, Single and Multi-channel Problems,	7	14
	Sequencing Models, Dynamic Programming, Flow in		
	Networks, Elementary Graph Theory, Game TheorySimulation		
	Sub Total:	36	70
	Internal Assessment Examination & Preparation of	4	30
	Semester Examination		
	Total:	40	100

### Practical:

**Assignments: Based on theory** 

### List of Books

**Text Books:** 

I CAT DUUKS.			
Name of Author	Title of the Book	Edition/ISSN/ISBN	Name of the
			Publisher
<b>Reference Books:</b>			
1.H.A. Taha,	<b>Operations Research</b> ,		PHI, 2008
	An Introduction,		
2.H.M. Wagner,	Principles of		PHI, Delhi, 1982.



		Operations	Research,					
3.J.C. Pan	t,	Introduction to				Jai	n Broth	ners, Delhi,
		Optimisation:				200	8	
4		Operations	Research,				~ *	
4.Hitler		Libermann	D I				Graw I	Hill Pub.
5 D	1	Operations	Research			200	<u>9</u>	. 11 . 6
5.Pannerse	elvam,	Operations	Research			Ind	ntice H ia 2010	lall of
6.Harvey I	M	Principles of	of			Pre	ntice H	fall of
Wagner,		Operations	Research			Ind	ia 2010	
List of equ	ipment/ap	paratus for l	aboratory e	xperimen	its:			
End Seme	ster Exami	nation Schen	ne. N	laximum	Marks-70.		Ti	me
allotted-3h	rs.							
Group	Unit	Objective	Questions		Subjective	e Que	stions	
		(MCQ only	with the					
		correct ans	wer)				1	T ( 1
		No of	l otal	No of	10	Ma	rks	I otal
		question	Marks	question	answer	per	ation	Marks
•			10	to be set		que	stion	
A	ALL	10	10					
B	ΔΙΙ			5	3	5		70
D	<i>T</i> LL			5	5			/0
С	ALL			5	3	15		
• Onl	y multiple	choice type qu	uestion (MC	Q) with o	ne correct answ	ver a	re to be	set in the
obje	ective part.							
• Spe	cific instruc	ction to the st	udents to ma	aintain the	order in answ	ering	objecti	ve
que	stions shou	ld be given oi	n top of the o	question p	aper.	_	-	
Examinati	on Scheme	for end sem	<u>ester exami</u>	nation:				
Group		Chapter	Marks o	of each	Question to be		Quest	tion to be
			question	n set			answe	ered
Α		ALL	1		10		10	
В		ALL	5 5		5		3	
С	C   ALL		15	5			3	
Name of the Course: M.Sc. in IT(Cyber Security)								
Subject: C	ost Manag	ement of En	gineering P	rojects				
Course Co	de: MITCS	5 302D	Semester:	III				
Duration: 36 Hours			Maximum Marks:100					

<b>Teaching So</b>	cheme	Examination Scheme
Theory:03		End Semester Exam: 70
Tutorial:0		Attendance : 5
Practical:0		Continuous Assessment: 25
Credit: 03		
Aim:		
Sl. No.		
1.	Understand the role of	f Cost Management of Engineering Projects.



2.	Analyze data using statistical and data mining techniques and understand relationships between the underlying Cost Management of Engineering Projects				
3.			11050000		
<b>Objective:</b>					
Sl. No.					
1.	To gain an understanding of how managers use business analytic and solve business problems and to support Cost Management of Projects.	ics to for of Engine	mulate eering		
2.	To become familiar with processes needed to develop, report, a Management data.	nd analy:	ze Cost		
3.					
<b>Pre-Requis</b>	ite:				
Sl. No.					
1.	Basic Management knowledge				
2.					
Contents	1	Hrs./w	eek		
Chapter	Name of the Topic	Hour	Marks		
01	Introduction and Oxempions of the Strategie Cost Management	S 4	4		
01	Process	4	4		
02	Cost concepts in decision-making; Relevant cost, Differential cost, Incremental cost and Opportunity cost. Objectives of a Costing System; Inventory valuation; Creation of a Database for operational control; Provision of data for Decision- Making.	6	6		
03	Project: meaning, Different types, why to manage, cost overruns centres, various stages of project execution: conception to commissioning. Project execution as conglomeration of technical and non- technical activities.	6	10		
04	Detailed Engineering activities. Pre project execution main clearances and documents Project team: Role of each member. Importance Project site: Data required with significance. Project contracts. Types and contents. Project execution Project cost control. Bar charts and Network diagram. Project commissioning: mechanical and process Cost Behavior and Profit Planning Marginal Costing; Distinction between Marginal Costing and Absorption Costing; Break-even Analysis, Cost-Volume-Profit Analysis.	8	20		
05	Various decision-making problems. Standard Costing and Variance Analysis. Pricing strategies: Pareto Analysis.	3			
06	Target costing, Life Cycle Costing. Costing of service sector. Just-in-time approach, Material Requirement Planning, Enterprise Resource Planning, Total Quality Management and Theory of constraints. Activity-Based Cost Management, Bench Marking; Balanced Score Card and Value-Chain Analysis. Budgetary Control; Flexible Budgets; Performance	5	20		



	budgets; Zero-based budgets. Measurement of Divisional							
07	Ouantita	tive techniqu	les for cost ma	inagement,	Linear	2		10
	Program	ming, PERT	/CPM, Transp	ortation pro	oblems,			
	Assignm	ent problems	s, Simulation,	Learning C	Curve Theory	<i>.</i>		
		1				24	-	
	Sub Tot	al:	- Ewannin adia	e Duana		36	)	70
	Semeste	l Assessment r Fyaminati	. Examination	i & Prepai	ration of	4		30
	Total:		on			40	)	100
Assignmen	nts: Based	on theory						
Text Book	is:	Title of the	Dool	Edition/I	ISCNI/ISDN	Nama	of t	ha
	LUIIOF		DUUK		13311/ <b>13D</b> 11	Public	or ti her	ue
						1 40115		
D								
Reference	Books:	Cost Accor	unting A			Duanti		Iall of
1.		Cost Accol Managaria	Inting A I Emphasis			Prenti India	ce e Nov	1all 01 v Dolhi
2 Ch	arles T	Advanced	n Emphasis,			inuia,	1100	v Denn
Horngren	and	Manageme	ent					
George Fo	oster,	Accounting						
3. Ro	bert S	Manageme	ent & Cost					
Kaplan A	nthony A.	Accounting	5					
Alkinson,	• • • • •	D · · 1	0 D (*			XX71 1		1 12 1
4. Asl Bhattacha	hish K. arya,	of Cost Ac	& Practices counting A.	Wheeler			er p	oublisher
5. N.I	D. Vohra,	Quantitati	ve			Tata N	/IcG	raw Hill
	,	Technique	s in			Book (	C <b>o.</b> 1	Ltd.
		Manageme	ent,					
T : 4 P	- <b>•</b>	P	1 - 1 4	• 4				
List of equ	upment/ap	paratus for	iadoratory ex	avimum M	: [arks 70		т	mo
allotted-3	ster Exami rs.	mation Sche		aannunn 181	lai n3-70.		11	mu
Group	Unit	Objective Questions Subjective			Subjectiv	e Questi	ions	
-		(MCQ onl	y with the		<b>u</b>			
		correct and	swer)		I	1		1
		No of	Total	No of	То	Marks		Total
		question	Marks	question	answer	per		Marks
•		to be set	10	to be set		questic	on	
A	ALL	10	10					



В	ALL		5	3	5	70
С	ALL		5	3	15	

- Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part.
- Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper.

Examination Scheme for end semester examination:							
Group	Chapter	Marks of each question	Question to be set	Question to be answered			
Α	ALL	1	10	10			
В	ALL	5	5	3			
С	ALL	15	5	3			

Name of Subject:	the Course: M.Sc. in IT(C Composite Materials	Cyber Security)			
Course C	Code: MITCS 302E	Semester: III			
Duration	: 36 Hours	Maximum Marks:100			
Teaching Scheme Examination Scheme					
Theory:0.	3	End Semester Exam: 70			
Tutorial:(	atorial:0 Attendance : 5				
Practical:	0	Continuous Assessment: 25			
Credit: 03	3				
Aim:					
Sl. No.					
1.	Understand the role of	Composite Materials			
2.	Analyze various effect of Composite Materials.				
3.		· · ·			
Objective	e:				
Sl. No.					
1.	To gain an understanding Composite Materials				
2.	To become familiar with processes needed to develop, report, and analyze				
	Composite Materials data.				
3.					
Pre-Requ	iisite:				
Sl. No.					
1.	Basic chemistry.				
2.					
Contents			Hrs./we	eek	
Chapte	Name of the Topic		Hour	Marks	
r			S		
01	INTRODUCTION: Defin	nition – Classification and	7	14	
	characteristics of Composite materials. Advantages and				



### Department of Information Technology M.Sc. in IT( Cyber Security

	application of composites. Functional requirements of		
	reinforcement and matrix.		
	Effect of reinforcement (size, shape, distribution, volume		
	fraction) on overall composite performance.		
02	REINFORCEMENTS: Preparation-layup, curing, properties and applications of glass fibers, carbon fibers, Kevlar fibers and Boron fibers. Properties and applications of whiskers, particle reinforcements. Mechanical Behavior of composites: Rule of mixtures, Inverse rule of mixtures. Isostrain and Isostress conditions	7	14
03	Manufacturing of Metal Matrix Composites: Casting – Solid State diffusion technique, Cladding – Hot isostatic pressing. Properties and applications. Manufacturing of Ceramic Matrix Composites: Liquid Metal Infiltration – Liquid phase sintering. Manufacturing of Carbon – Carbon composites: Knitting, Braiding, Weaving. Properties and applications.	7	14
04	Manufacturing of Polymer Matrix Composites: Preparation of Moulding compounds and prepregs – hand layup method – Autoclave method – Filament winding method – Compression moulding – Reaction injection moulding. Properties and applications.	8	14
05	Strength: Laminar Failure Criteria-strength ratio, maximum stress criteria, maximum strain criteria, interacting failure criteria, hygrothermal failure. Laminate first play failure-insight strength; Laminate strength-ply discount truncated maximum strain criterion; strength design using caplet plots; stress concentrations.	7	14
	Sub Total:	36	70
	Internal Assessment Examination & Preparation of Semester	4	30
	Examination		
	Total:	40	100

### **Assignments: Based on theory**

List of Books

	D		
lext	ROO	KS:	

Name of Author	Title of the Book	Edition/ISSN/ISBN	Name of the
			Publisher
1. R.W.Cahn	Material Science and	Vol 13	VCH, West
	Technology		Germany.
2.WD Callister, Jr.,	Materials Science	Indian edition, 2007.	John Wiley & Sons,
Adapted by R.	and Engineering, An		NY,
Balasubramaniam,	introduction.		
<b>Reference Books:</b>			
1. Lubin.	Hand Book of		
	<b>Composite Materials</b>		



С

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Department of Information Technology

M.Sc. in IT( Cyber Security

2. K.ŀ	K.Chawla Composite Materials							
•								
3. Det	oorah	<b>Composite</b> N	Materials					
D.L. Chung Science and								
	8.	Applications	8					
4.Danial G	lay,	<b>Composite</b> N	Materials					
Suong V. I	Ioa, and	Design and						
Stephen W	<sup>7</sup> . Tasi.	Applications	8					
End Seme	ster Exami	nation Schem	ie. M	laximum	Marks-70.		Ti	me
allotted-3h	rs.							
Group	Unit	Objective Q	Questions		Subjective	Que	stions	
		(MCQ only	with the	;				
		correct answ	ver)					
		No of	Total	No of	То	Maı	ks	Total
		question	Marks	question	answer	per		Marks
		to be set		to be set		que	stion	
А	ALL	10	10					
В	ALL			5	3	5		70
С	ALL			5	3	15		
• Onl	y multiple o	choice type qu	estion (MC	Q) with or	ne correct ansv	ver ai	e to be	set in the
obje	ective part.							
• Spe	cific instruc	ction to the stu	idents to ma	aintain the	order in answe	ering	objecti	ve
questions should be given on top of the question paper.								
Examinati	on Scheme	for end seme	ester exami	nation:				
Group		Chapter	Marks o	of each	Question to l	be	Quest	ion to be
			question	l I	set		answe	ered
Α		ALL	1		10		10	
B	B ALL 5			5		3		

Name of Subject:	Name of the Course: M.Sc. in IT(Cyber Security) Subject:Waste to Energy			
Course C	Code:MITCS 302F	Semester: III		
Duration	: 36 Hours	Maximum Marks:100		
Teaching	g Scheme	Examination Scheme		
Theory:03		End Semester Exam: 70		
Tutorial: 0		Attendance : 5		
Practical: 0		Continuous Assessment: 25		
Credit: 03	3			
Aim:				
Sl. No.				
1.	Understand the role of Waste to Energy.			
2.	Analyze data how to convert Waste to Energy.			

5

3

15

ALL



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### Department of Information Technology

M.Sc. in IT( Cyber Security

3.			
Objectiv	e:		
SI. No.			
1.	To gain an understanding to solve environmental problems an Waste to Energy.	d to sup	port
2.	To become familiar with processes needed to develop, report, a Waste to Energy.	and ana	lyze
3.			
Pre-Req	uisite:		
Sl. No.			
1.	Basic Environmental studies		
2.			
<u>C</u> = = 4 = = 4	-	II	
Contents	Name of the Tonia	Hrs./W	eek Morks
Chapte r	Name of the Topic	Hour s	Marks
01	Introduction to Energy from Waste: Classification of waste as fuel – Agro based, Forest residue, Industrial waste - MSW –	7	14
02	Biomass Pyrolysis: Pyrolysis – Types, slow fast – Manufacture of charcoal – Methods - Yields and application – Manufacture of pyrolytic oils and gases yields and applications	7	14
03	Biomass Gasification: Gasifiers – Fixed bed system – Downdraft and updraft gasifiers – Fluidized bed gasifiers – Design, construction and operation – Gasifier burner arrangement for thermal heating – Gasifier engine arrangement and electrical power – Equilibrium and kinetic consideration in gasifier	7	14
04	Biomass Combustion: Biomass stoves – Improved chullahs, types, some exotic designs, Fixed bed combustors, Types, inclined grate combustors, Fluidized bed combustors, Design, construction and operation - Operation of all the above biomass combustors.	7	14
05	Biogas: Properties of biogas (Calorific value and composition) - Biogas plant technology and status - Bio energy system - Design and constructional features - Biomass resources and their classification - Biomass conversion processes - Thermo chemical conversion - Direct combustion - biomass gasification - pyrolysis and liquefaction - biochemical conversion - anaerobic digestion - Types of biogas Plants – Applications - Alcohol production from biomass - Bio diesel production - Urban waste to energy conversion - Biomass energy programme in India.	8	14
	Sub Total:	36	70
	Internal Assessment Examination & Preparation of Semester Examination	4	30
	Total:	40	100
Practica	  •	1	



Assignme	nts: Based	on theory						
List of Bo	oks							
Text Book	S:	Title of the	Pool	Edition/	ISSN/ISDN	Na	mooft	20
Name of A	Lutior		DUUK	Euition/	1991\/19D1\	Pul	blisher	le
Reference	Books							
1.Desai. A	shok V	Non-Conve	entional			Wi	lev Eas	tern Ltd
	~	Energy,				199	)0.	,
2.Khandel	wal, K.	<b>Biogas</b> Tec	hnology -	Vol. I &	II,	Tat	ta McG	raw Hill
C. and Ma	ahdi, S. S.,	A Practical	l Hand			Pul	blishing	g Co. Ltd.,
2 Challal	D S	BOOK -	and Fuel			198 191	5. 1 Duki:	shing Co
J.Chanal,	<b>D</b> . 5.,	from Biom	anu ruei ass.			Pvt	. Ltd.,	sning Co. 1991.
4.C. Y. W	ereKo-	Biomass C	onversion			Joh	n Wile	y & Sons,
Brobby an	nd E. B.	and Techn	ology,			199	1996.	
Hagan,								
List of equ	ipment/ap	paratus for	laboratory (	experimen	its:			
SI. No.								
1. 2.								
3.								
4.								
5.								
End Seme	ster Exami	nation Sche	me. N	<b>Iaximum</b>	Marks-70.		Ti	me
allotted-31	1rs. Unit	Objective	Questions		Subjectiv		stions	
Group	Unit	(MCO only	v with the		Subjective	e Que		
		correct ans	wer)					
		No of	Total	No of	То	Ma	rks	Total
		question	Marks	question	answer	per	<i>.</i> .	Marks
Δ		to be set	10	to be set		que	stion	
Λ	ALL	10	10					
В	ALL			5	3	5		70
C	ALL	1 • .		5	3	15		
• On	ly multiple	choice type q	uestion (MC	(Q) with of	ne correct ans	wer a	re to be	set in the
• Sne	cenve part.	ction to the st	tudents to m	aintain the	order in answ	erino	obiecti	ve
que	estions shou	ld be given o	n top of the	question p	aper.	ering	, 55,000	
Examinati	ion Scheme	for end sen	iester exami	ination:	-		1	
Group		Chapter	Marks	of each	Question to	be	Quest	tion to be



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		question	set	answered
Α	ALL	1	10	10
В	ALL	5	5	3
С	ALL	15	5	3

Name of the Course: M.Sc. in IT ( Cyber Security )				
Subject: Dissertation-1 /Industrial Project				
<b>Course Code: MITCS 393</b>	Semester: III			
Teaching Scheme	Examination Scheme100			
Theory:0	End Semester Exam:			
Tutorial:0	Teacher's Assessment:0			
Practical:20	Internal Assessment:0			
Credit:10	Practical Sessional internal continuous evaluation:40			
	Practical Sessional external examination:60			

### Content

The dissertation / project topic should be selected / chosen to ensure the satisfaction of the urgent need to establish a direct link between education, national development and productivity and thus reduce the gap between the world of work and the world of study. The dissertation should have the following

Relevance to social needs of society

Relevance to value addition to existing facilities in the

institute Relevance to industry need

Problems of national importance

Research and development in various domain The student should complete the following:

Literature survey Problem

Definition Motivation for study

and Objectives

Preliminary design / feasibility / modular

approaches Implementation and Verification

Report and presentation

The dissertation stage II is based on a report prepared by the students on dissertation allotted to them. It may be based on:

Experimental verification / Proof of concept.

Design, fabrication, testing of Communication System.

The viva-voce examination will be based on the above report and work.

Semester-IV					
Code	Course Title	He	ours per wee	ek	Credit
					S
		L	Т	Р	
MITCS49	Dissertation II	0	0	32	16
1					
Total Credits: 16					



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M.Sc. in IT( Cyber Security

Name of the Course: M.Sc. in IT(Cyber Security)				
Course Code: MITCS 491 Semester: IV				
Teaching Scheme	Examination Scheme100			
Theory:0	End Semester Exam:			
Tutorial:0	Teacher's Assessment:0			
Practical:32	Internal Assessment:0			
Credit:16	Practical Sessional internal continuous evaluation:40			
	Practical Sessional external examination:60			

#### **Guidelines for DissertationPhase-IandII**

As per the AICTE directives, the dissertation is a yearlong activity, to be carried out an evaluated in two phases i.e. Phase – I: July to December and Phase – II: January to June. The dissertation may be carried out preferably in-house i.e. department's laboratories and centers OR in industry allotted through department's T & P coordinator.

After multiple interactions with guide and based on comprehensive literature survey, the student shall identify the domain and define dissertation objectives. The referred

literature should preferably include IEEE/IET/IETE/Springer/Science Direct/ACM journals in the areas of Computing and Processing (Hardware and Software), Circuits-Devices and Systems, Communication-Networking and Security, Robotics and Control Systems, Signal Processing and Analysis and any other related domain. In case of Industry sponsored projects, the relevant application notes, while papers, product catalogues should be referred and reported.

Student is expected to detail out specifications, methodology, resources required, critical issues involved in design and implementation and phase wise work distribution, and submit the proposal within a month from the date of registration.

Phase – I deliverables: A document report comprising of summary of literature survey, detailed objectives, project specifications, paper and/or computer aided design, proof of concept/functionality, part results, A record of continuous progress.

Phase - I evaluation: A committee comprising of guides of respective specialization shall assess the progress/performance of the student based on report, presentation and Q & A. In case of unsatisfactory performance, committee may recommend repeating the Phase-I work.

During phase – II, student is expected to exert on design, development and testing of the proposed work as per the schedule. Accomplished results/contributions/innovations should be published in terms of research papers in reputed journals and reviewed focused conferences OR IP/Patents.

Phase – II deliverables: A dissertation report as per the specified format, developed system in the form of hardware and/or software, A record of continuous progress.

Phase – II evaluation: Guide along with appointed external examiner shall assess the progress/performance of the student based on report, presentation and Q & A. In case of unsatisfactory performance, committee may recommend for extension or repeating the work


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