# NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY, GREATER NOIDA, GAUTAM BUDDH NAGAR (AN AUTONOMOUS INSTITUTE)



#### Affiliated to

#### DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY, LUCKNOW



**Evaluation Scheme & Syllabus**For

Bachelor of Technology
Computer Science and Engineering (Cyber Security)

Third Year

(Effective from the Session: 2025-26)

# NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY, GREATER NOIDA, GAUTAM BUDDH NAGAR (AN AUTONOMOUS INSTITUTE)

## Bachelor of Technology Computer Science and Engineering (Cyber Security)

## **Evaluation Scheme**

#### SEMESTER-V

Sl.	Subject	Subject	Types of	Per			Evalu	ation	Schemes		En Seme		Total	Credit
No.	Codes		Subjects	L	T	P	CT	TA	TOTAL	PS	TE	PE		
1	BCSCY0502	Network Security and Cryptography	Mandatory	3	1	0	30	20	50		100		150	4
2	BCSCC0501	Design Thinking-II	Mandatory	2	1	0	30	20	50		100		150	3
3		Departmental Elective-I	Departmental Elective	3	0	0	30	20	50		100		150	3
4		Departmental Elective-II	Departmental Elective	3	0	0	30	20	50		100		150	3
5	BCSCY0551	Ethical Hacking	Mandatory	0	0	6				50		100	150	3
6	BCSE0555	Web Technologies	Mandatory	0	0	6				50		100	150	3
7	BCSCY0552	Network Security and Cryptography Lab	Mandatory	0	0	4				50		50	100	2
8	BCSE0559	Internship Assessment-II	Mandatory	0	0	2				50			50	1
9	BNC0501/ BNC0502	Constitution of India, Law and Engineering / Essence of Indian Traditional Knowledge	Compulsory Audit	2	0	0	30	20	50		50		100	NA
10		*Massive Open Online Courses (For B.Tech. Hons. Degree)	MOOCs											
		TOTAL		13	2	18	120	80	200	200	400	250	1050	22

#### \* List of MOOCs Based Recommended Courses for Third year (Semester-V) B. Tech Students

Sr. No.	Subject Code	Course Name	University / Industry Partner Name	No of Hours	Credits
1	BMC0067	AWS Certified Security Specialty 2024 [NEW]	Infosys Wingspan (Infosys Springboard)	38 hrs.	3
2	BMC0061	Database Management System - Science Graduates	Infosys Wingspan (Infosys Springboard)	55h 23m	4

#### PLEASE NOTE: -

- A 3-4-week Internship shall be conducted during summer break after semester-IV and will be assessed during semester-V.
- Compulsory Audit (CA) Courses (Non-Credit BNC0501/BNC0502)
  - All Compulsory Audit Courses (a qualifying exam) do not require any credit.
  - The total and obtained marks are not added to the grand total.

#### **Abbreviation Used:**

L: Lecture, T: Tutorial, P: Practical, CT: Class Test, TA: Teacher Assessment, PS: Practical Sessional, TE: Theory End Semester Exam., CE: Core Elective, OE: Open Elective, DE: Departmental Elective, PE: Practical End Semester Exam, CA: Compulsory Audit, MOOCs: Massive Open Online Courses.

## **DEPARTMENTAL ELECTIVES**

Subject Code	Subject Name	Types of subjects	Bucket Name	Branch	Semester
BCSCY0511	Cyber Threat Intelligence	Departmental Elective- I	Cyber Security-II	CSE (CYS)	5
BCSCY0512	Malware Analysis and Reverse Engineering	Departmental Elective- II	, ,	CSE (CYS)	5
BCSDS0511	Data Analytics	Departmental Elective- I		CSE (CYS)	5
BCSAI0519	Business Intelligence and Data Visualization	Departmental Elective- II	Data Analytics	CSE (CYS)	5
BCSE0512	Python Web Development with Django	Departmental Elective- I	Full Stack	CSE (CYS)	5
BCSE0514	Design Patterns	Departmental Elective- II	Development	CSE (CYS)	5

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## Bachelor of Technology Computer Science and Engineering (Cyber Security)

## **Evaluation Scheme**

#### **SEMESTER-VI**

Sl.	Subject	Subject	Types of	P	eriod	ds	E	valuat	ion Schem	es	Er Seme		Total	Credit
No.	Codes		Subjects	L	T	P	CT	TA	TOTAL	PS	TE	PE		
1	BCSCY0601	Digital Forensic	Mandatory	3	1	0	30	20	50		100		150	4
2		Departmental Elective-III	Departmental Elective	3	0	0	30	20	50		100		150	3
3		Departmental Elective-IV	Departmental Elective	3	0	0	30	20	50		100		150	3
4		Open Elective- I	Open Elective	3	0	0	30	20	50		100		150	3
5	BCSCY0652	Penetration Testing	Mandatory	0	0	6				50		100	150	3
6	BCSML0653	Machine Learning and It's Application	Mandatory	0	0	6				50		100	150	3
7	BCSCY0651	Digital Forensic Lab	Mandatory	0	0	2				25		25	50	1
8		Mini Project	Mandatory	0	0	6				50		100	150	3
9		Constitution of India, Law and Engineering / Essence of Indian Traditional Knowledge	Compulsory Audit	2	0	0	30	20	50		50		100	NA
10		MOOCs (For B.Tech. Hons. Degree)	MOOCs											
		TOTAL		14	1	20	120	80	200	175	400	325	1100	23

#### \* List of MOOCs Based Recommended Courses for Third year (Semester-VI) B. Tech Students

S. No.	Subject Code	Course Name	University / Industry Partner Name	No of Hours	Credits
1	BMC0073	Cyber Security and Applied Ethical Hacking	Infosys Wingspan (Infosys Springboard)	12h 59m	0.5
2	BMC0095	ReactJS	Infosys Wingspan (Infosys Springboard)	61h 2m	4

#### PLEASE NOTE: -

- Compulsory Audit (CA) Courses (Non-Credit BNC0601/BNC0602)
  - All Compulsory Audit Courses (a qualifying exam) do not require any credit.
  - The total and obtained marks are not added to the grand total.

#### **Abbreviation Used:**

L: Lecture, T: Tutorial, P: Practical, CT: Class Test, TA: Teacher Assessment, PS: Practical Sessional, TE: Theory End Semester Exam., CE: Core Elective, OE: Open Elective, DE: Departmental Elective, PE: Practical End Semester Exam, CA: Compulsory Audit, MOOCs: Massive Open Online Courses.

## **DEPARTMENTAL ELECTIVES**

Subject Code	Subject Name	Types of subjects	Bucket Name	Branch	Semester
BCSCY0611	IoT Security and Forensic	Departmental Elective- III	Cyber Security-II	CYS	6
BCSCY0612	Blockchain and Cryptocurrency Security	Departmental Elective- IV	Systa 20001115 11	CYS	6
BCSAI0617	Programming for Data Analytics	Departmental Elective- III	Data Analytica	CYS	6
BCSAI0622	Social Media Analytics	Departmental Elective- IV	Data Analytics	CYS	6
BCSAI0612	Advanced Java Programming	Departmental Elective- III		CYS	6
BCSE0614	Web Development using MEAN Stack	Departmental Elective- IV	Full Stack Development	CYS	6

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A student will be eligible to get Under Graduate degree with Honours only, if he/she completes the additional MOOCs courses such as Coursera certifications, or any other online courses recommended by the Institute (Equivalent to 20 credits). During Complete B.Tech. Program Guidelines for credit calculations are as follows.

- 1. For 6 to 12 Hours =0.5 Credit
- 2. For 13 to 18 = 1 Credit
- 3. For 19 to 24 = 1.5 Credit
- 4. For 25 to 30 = 2 Credit
- 5. For 31 to 35 = 2.5 Credit
- 6. For 36 to 41 = 3 Credit
- 7. For 42 to 47 = 3.5 Credit
- 8. For 48 and above =4 Credit

For registration to MOOCs Courses, the students shall follow Coursera registration details as per the assigned login and password by the Institute these courses may be cleared during the B. Tech degree program (as per the list provided). After successful completion of these MOOCs courses, the students shall provide their successful completion status/certificates to the Controller of Examination (COE) of the Institute through their coordinators/Mentors only.

The students shall be awarded Honours Degree as per following criterion.

- i. If he / she secures 7.50 as above CGPA.
- ii. Passed each subject of that degree program in the single attempt without any grace.
- iii. Successful completion of MOOCs based 20 credits



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Course	Code	: BCSC	CY0502	,		Cou	rse Na	me: Ne	twork	Securit	v and C	ryptogra	aphy		L	Т	P	С
Course					v						<u> </u>	71 - 8	T		3	1	0	4
Pre-requ					•	etworki	ng Ter	ms (e.g	., IP, I	LAN, R	Couter),	Awarene	ss of Di	igital [	Tools	(Ema	il, C	loud,
Antivirus																`		
Course (	-								-	-		-		•			graph	y,
provide i	_								bilities	and dev	elop the	ability to	o design	secure	netw	ork		
architect				•••				•										
Course (	Outc	ome: A	fter con	npletion	n of the	course,	the stu	dent wi	ll be ab	le to						om's K		ledge
															Lev	el (KL		
CO1						•••			•		etwork s	security.				K		
CO2		alyse dit														K		
CO3												networks	•			K		
CO4											igate the	m.				K		
CO5		olement						ryptogr	aphic te	echniqu	es.					K	[4	
СО-РО	Map	ping (S	cale 1:	Low, 2	: Medi	um, 3:	High)	1	1		Т	ı	1	ı	-		1	
CO-PO Mappir		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO	l P	SO2	PS	503
CO1		3	3	2	1	1	1	1	2	1	1	1	1	2		2		2
CO2		3	3	2	-	-	2	1	2	2	2	2	1	2		2		2
CO3		3	3	3	-	-	3	1	1	2	-	1	1	2		3		3
CO4		3	3	3	-	-	3	-	-	2	-	1	1	2		3		3
CO5		3	3	3	3	3	3	-	-	2	2	3	2	2		3		3
Course	Cont	ents / S	yllabus	1														
Module	1			In	troduct	ion to N	Vetwork	Securi	ty							0	)9 ho	urs
Overviev																		
Malware					nd Med	chanism	s (e.g.,	Access	Contro	ol, Firev	walls), R	isk Man	agement	and A	ssess	ment	(e.g.,	Risk
Analysis <b>Module</b>		igation	Strategi		ryptogr	onhio T	aahniau	105									)9 ho	
Introduct		to Cryn	tograph		••	•			mas (C	oosor C	Sinhar N	Monoolph	abatia C	'inhar)	Mo			
Encrypti																		
Signature										8	()			- J F		-J F	/,	-8
Module	3			Se	ecure C	ommun	ication	Protoco	ols							1	l0 ho	urs
Secure S																		
Security																		
Wireless access V		arity Pro	otocois	(WPA,	WPA2	– PSK.	, EAP a	iutnenti	cation)	, virtua	i Private	Network	KS (VPN	s – site	e-to-s	ite v P	n, re	mote
Module				N	etwork	Attacks	and De	éfense l	Mechan	isms						1	2 ho	urs
Types of		twork A	Attacks								rusion D	Detection	and Pre	ventio	n Sy			
Signature															•			
Access C										,				<b>O</b> / ·				
OSSEC																		ction
(Decoder		d Rules)	, Log <i>P</i>		ecure N						Time Ale	erting (A	ctive Re	sponse	s, No		10ns) <b>3 hou</b>	
		1.144	- D.						1		- C ·	. D (1.	Charte	. ( 1	1.			
Network redundar	ncy),	Secure ?	Routing	Protoc	cols (BC	3P secu	rity, OS	PF autl	henticat	ion), Se	ecurity B	est Pract	ices for l	LANs,				
Network	s (ell	стуриог	i, acces	s contro	<i>71)</i> , Sect	iiiy AS	sessine	iit allu i	Audiuili	g (vuille	LIAUIIIIY	scamming	Total L		Hor	ırs 4	18 ho	urs
Textboo	k:																	



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1	Network Security with OpenSSL: Cryptography for Secure Communications	John Viega, Matt Messier, Pravir Chandra
2	Cryptography and Network Security: Principles and Practice	William Stallings

#### **Reference Books:**

S.No	Book Title	Author(s)
1.	GNU Privacy Guard (GPG) for Beginners	David W. Boles
2.	Public-Key Cryptography: Theory and Practice	Douglas Stinson
3.	OSSEC Host-Based Intrusion Detection Guide	Rory Bray, Daniel Cid, Andrew Hay
4.	Nginx HTTP Server - Third Edition	Clement Nedelcu
5.	Mastering OpenVPN	Eric F Crist
6.	StrongSwan: The Open Source VPN	Andreas Steffen
7.	Nmap Network Scanning: The Official Nmap Project Guide to Network	Gordon Fyodor Lyon
7.	Discovery and Security Scanning	Gordon Lyon
8.	Kali Linux Revealed: Mastering the Penetration Testing Distribution	Raphael Hertzog, Jim O'Gorman, Mati
о.	Kan Linux Revealed. Wastering the Penetration Testing Distribution	Aharoni

#### NPTEL/ Youtube/ Faculty Video Link:

- 1. https://www.youtube.com/watch?v=Q-HugPvA7GQ&list=PL71FE85723FD414D7
- 2. https://onlinecourses.nptel.ac.in/noc22 cs90/preview

OpenSSL / AES Cryptography Library /GnuPG /

RSA Cryptography Library / OSSEC / OpenVPN /

StrongSwan / Nmap / Kali Linux /

#### **Mode of Evaluation**

			CIE				ESE	Total
ST1	ST2	ST3	TA1	TA2	TA3	Attendance		
			5	5	5	5		
	30			2	20		100	150



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B.TECH	THIRD YEAR		
Subject	Code: BCSCC0501	<b>L T P</b> 2-1-0	
Subject	Name: DESIGN THINKING –II	Credits 3	
Pre- rec	uisites: Student must complete Design Thinking-I course.		
Course C	ontents/Syllabus		
Unit-1	Design thinking & Innovation, Design Thinking Mindset and Prof Design Thinking, Design Approaches, additional in-deapproaches. Simon Sinek's – Start with Why, The Golden Cireach example (an in-class activity of asking 5-WHYS), The Infor LDO & sharing insights  Visualization and its importance in design thinking, reflections for visualization & Wheel of Life), Linking it with Balancing For Singapore and Bank of Americas' Keep the Change Campaig Care Examples, understanding practical application of design to study on McDonald's Milkshake / Amazon India's Rural Econ Working on 1-hour Design problem, Applying RCA and Brain Main project allocation and expectations from the project.	epth examples of each design rele, Asking the "Why" behind Higher Purpose, in-class activity on wheel of life (in-class activity Priorities (in class activity), DBS n. Litter of Light & Arvind Eye thinking tools and concepts, case merce & Gillette astorm on innovative solutions.	8 hours
Unit-2	Refine and narrow down to the best idea, 10-100-1000gm, QBL – SWOT Analysis for 1000gm discussion. In-class activity for 1  Prototyping (Convergence): Prototyping mindset, tools for production of garnering user feedback for revisiting Brainstorme Napkin Pitch, Usability, Minimum Viable Prototype, Connecti Testing, Learning Launch. Decision Making Tools and Approximately, Up, Right, Value Proposition, Case study: Careerbude Learning Launch.  In-class activities on prototyping- paper-pen / physical prototyping- paper idea.	o-100-1000gm & QBL  prototyping — Sketching, paper ryboards, acting/role-playing etc, ed ideas.  In Prototype with 3 Laws, A/B baches — Vroom Yetton Matrix, dy, You-Me-Health Story & IBM	8 hours
Unit-3	Storytelling: Elements of storytelling, Mapping personas with Elevator Pitch, Successful Campaigns of well-known examples, Testing of design with people, conducting usability test, testing a observation and shadowing methods, Guerrilla  Interviews, validation workshops, user feedback, record results, e Software validation tools, design parameters, alpha β testin random sampling.	in-class activity on storytelling. s hypothesis, testing as empathy, enhance, retest, and refine design,	8 hours



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	Final Project Presentation and assessing the impact of using design thinking	
Unit-4	Innovation: Need & Importance, Principles of innovations, Asking the Right Questions for innovation, Rationale for innovation, Quality: Principles & Philosophies, Customer perception or quality, Kaizen, 6 Sigma. FinTech case study of Design Thinking application – CANVAS Leadership, types, qualities and traits of leaders and leadership styles, Leaders vs Manager Personas of Leaders & Managers, Connecting Leaders-Managers with 13 Musical Notes, Traitheory, LSM (Leadership Situational Model), Team Building Models: Tuckman's and Belbin's Importance of Spatial elements for innovation.	, 8 hours
U <b>nit-5</b>	Comprehensive human goal: the five dimensions of human endeavour (Manaviya - Vyavstha) are Education- Right living (Sikhsa- Sanskar), Health – Self-regulation (Swasthya - Sanyam), Justice – Preservation (Nyaya- Suraksha), Production – Work (Utpadan – Karya), Exchange – Storage (Vinimya – Kosh), Darshan-Gyan-Charitra (Shifting the Thinking)  Interconnectedness and mutual fulfilment among the four orders of nature recyclability and self regulation in nature, Thinking expansion for harmony: Self-exploration (Johari's window), group behaviour, interpersonal behaviour and skills, Myers-Briggs personality types (MBTI), FIRO-Etest to repair relationships.	8 hours
Course C	<b>Dutcomes</b> – After completion of this course students will be able to:	,
CO1	Learn sophisticated design tools to sharpen their problem-solving skills	K2
C <b>O2</b>	Construct innovate ideas using design thinking tools and converge to feasible idea breakthrough solution	forK6
C <b>O3</b>	Implement storytelling for persuasive articulation	К3
CO4	Understanding the nature of leadership empowerment	K2
		K2

#### **Text Books:**

- 1. Arun Jain, UnMukt: Science & Art of Design Thinking, 2020, Polaris
- 2. Gavin Ambrose and Paul Harris, Basics Design 08: Design Thinking, 2010, AVA Publishing SA
- 3. R R Gaur, R Sangal, G P Bagaria, A Foundation Course in Human Values and Professional Ethics, First Edition, 2009, Excel Books: New Delhi

#### **Reference Books:**

- 1. Jeanne Liedta, Andrew King and Kevin Benett, Solving Problems with Design Thinking Ten Stories of What Works, 2013, Columbia Business School Publishing.
- 2. Dr Ritu Soryan, Universal Human Values and Professional Ethics, 2022, Katson Books.
- 3. Vijay Kumar, 101 Design Methods: A Structured Approach for Driving Innovation in Your Organization, 2013, John Wiley and Sons Inc, New Jersey.
- 4. Roger L. Martin, Design of Business: Why Design Thinking is the Next Competitive Advantage, 2009, Harvard Business Press, Boston MA.
- 5. Tim Brown, Change by Design, 2009, Harper Collins.
- 6. Pavan Soni, Design your Thinking: The Mindsets, Toolsets and Skill Sets for Creative Problem-Solving, 2020, Penguin Books.



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Links: NPTEL/You Tube/Web Link

https://www.youtube.com/watch?v=6\_mHCOAAEI8 https://nptel.ac.in/courses/110106124

https://designthinking.ideo.com/

https://blog.experiencepoint.com/how-mcdonalds-evolved-with-design-thinking

https://www.coursera.org/lecture/uva-darden-design-thinking-innovation/the-ibm-story-iq0kE

https://www.coursera.org/lecture/uva-darden-design-thinking-innovation/the-meyouhealth-story-part-i-what-is-W6tTs

https://onlinecourses.nptel.ac.in/noc19\_mg60/preview

https://www.youtube.com/watch?v=HTSCbxSxsg&list=PL1xHD4vteKYVpaIiy295pg6 SY5qznc77&index=5

https://www.youtube.com/watch?v=NnlS2BzXvyM

https://www.youtube.com/watch?v=7enWesSofhg

https://youtu.be/rthuFS5LSOo

https://www.youtube.com/watch?v=kho6oANGu\_A

https://www.youtube.com/watch?v=9vMpHk44XXo&list=PL1xHD4vteKYVpaIiy295pg6 SY5qznc77&index=6

Reinforcement Learning Tutorial | Reinforcement Learning Example Using Python | Edureka - YouTube

Association Rule Mining – Solved Numerical Question on Apriori Algorithm(Hindi) - YouTube

Q Learning Explained | Reinforcement Learning Using Python | Q Learning

in AI | Edureka - YouTube



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Course Code: BCSCY0551 Course Name: ETHICAL HACKING L					T P	C										
Course Offered in: CYBERSECURITY					0	0 6	_									
-	<b>Pre-requisite:</b> Basic understanding of computer networks and operating systems. Familiarity with programming concepts (preferably															
	in languages like Python, C, or Java). Knowledge of cybersecurity fundamentals. <b>Course Objective</b> : To equip students with the skills and knowledge to identify, exploit vulnerabilities in computer systems ethically,															
•		•						_	to ide	ntify, ex	ploit vu	lnerabilit	ies in co	omputer	systems e	thically,
and to unders													-	31 1		
Course Outo	come:	After c	omplet	ion of t	the cou	rse, the	studei	nt will	be able	to				Bloom's (KL)	Knowled	ge Level
CO1										ated acti					K2	
CO2			_							rints, po er sec		ing, and			K3	
CO3	Iden	tify, an	alyze, a	and mit	tigate s	ecurity	vulner	abilitie	s in we	eb applic	ations u	sing tool			К3	
CO4		_	-			_			_			identify penVAS			K4	
CO5	Exec		d defen	d agair	ıst syst	em hac	king te	chniqu	es, incl	luding g		nauthoriz			K4	
CO-PO Map								1		•						
CO PO	PO1		PO3		PO5			PO8	PO9	PO10	PO11	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	1	2	1	3	2			2	2	1	2	3	3
CO2	3	3			3	1	2	1			2	2	1	3	3	2
CO3	3	3			3	1	2	1	1	1	2	2	2	1	2	3
CO4	3	3	2	3	3			1	1	1	2	2	1	1	2	3
CO5	3	3	2	3	3			2	1	1	2	2	2	3	2	3
<b>Course Cont</b>																
Module 1		Introdu													14 h	
Understandin																
Cybersecurity Module 2		al and E Footpri					hical H	lacking	, Comi	non Ter	minolog	ies and T	ools Us	sed in Et	14 h	
Introduction Sandbox wit Information ( Vulnerability Module 3	to Cuch Sector Sather Scann	ckoo Sa urity O ing thro	andbox Operation Ough Send Analy	, Basic ons, Fo earch E ysis	Usage otprint Engines	e of Cuing Co	oncepts	and I	Method	ologies,	Passive	e and A	ctive R	econnais	ntegratin sance Te	g Cuckoo echniques, echniques,
Introduction							n Wal	<b>V</b> 11	orobilit	ios (SO	I Iniaa	ion VC	מ כמת	E ata		
Reconnaissan Hardening																
Module 4	]	Networ	k Attac	ks and	Défen	se Mec	hanisn	ıs							15 h	ours
Port Scanning Analysis, Usi										Detection	n, OS F	ingerprin	ting, Vı	ılnerabil	ty Asses	sment and
Module 5		System	Hackii	ng											15 h	ours
Wi-Fi Passwo Malware Ana		_		-		_	_		-				-		m Vulne	rabilities,
														ıre Houi	s 72 h	ours
Textbook:				-	-	•			-							



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1	The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made Easy	Patrick Engebretson.
2	CEH Certified Ethical Hacker All-in-One Exam Guide	Matt Walker.
3	Web Application Hacker's Handbook: Finding and Exploiting Security Flaws	Dafydd Stuttard and Marcus Pinto.

#### **Reference Books:**

S.No	Book Title	Author(s)
9.	Penetration Testing: A Hands-On Introduction to Hacking	Georgia Weidman.
10.	Metasploit: The Penetration Tester's Guide	David Kennedy, Jim O'Gorman, Devon Kearns, and Mati Aharoni.
11.	Hacking: The Art of Exploitation	Jon Erickson
12.	OWASP Testing Guide	OWASP Foundation.
13.	Nmap Network Scanning: The Official Nmap Project Guide to Network Discovery and Security Scanning	Gordon Fyodor Lyon.

#### NPTEL/ Youtube/ Faculty Video Link:

- 1. https://www.youtube.com/watch?v=aFpI0VIkRKg
- 2. https://www.youtube.com/watch?v=lzhJGS2alvM
- 3. https://nptel.ac.in/courses/106105217

#### **Mode of Evaluation**

CIE	ESE	Total
PS		
50	100	150

# List Of Practical's (Indicative & Not Limited To) 1. Introduction to virtualized environments and setup 2. Familiarization with Linux command line interface 3. Demonstration of basic ethical hacking tools and their usage 4. Ethical hacking scenarios and role-playing exercises 5. Discussion and analysis of legal and ethical case studies related to hacking 6. Setting up a virtualized environment for reconnaissance activities 7. Demonstration of passive reconnaissance techniques using OSINT tools 8. Hands-on practice with active reconnaissance techniques such as DNS interrogation and ping sweeps 9. Conducting information gathering through search engines, social media, and WHOIS lookup 10. Performing network scanning and enumeration using tools like Nmap 11. Setup of virtualized lab environment for practical exercises.



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12.	Guided practice sessions on using web application security tools such as Burp Suite, OWASP ZAP, and Nikto.
13.	Hands-on exercises allowing students to exploit and patch common web vulnerabilities.
14.	Discussion and analysis of lab results to reinforce learning outcomes and address any questions or concerns.
15.	Setting up a virtualized environment for scanning and enumeration activities
16.	Hands-on practice with different port scanning techniques using Nmap
17.	Service enumeration exercises using Nmap and Netcat
18.	OS fingerprinting demonstration using Nmap or Xprobe2
19.	Vulnerability assessment lab using Nessus or OpenVAS, analysing scan results, and prioritizing vulnerabilities
20.	Setup of virtualized lab environment for practical exercises.
21.	Step-by-step guidance on using password cracking tools, privilege escalation techniques, and exploit frameworks.
22.	Supervised practice sessions allowing students to perform password cracking, privilege escalation, vulnerability exploitation, malware analysis, and reverse engineering tasks.

23. Discussion and analysis of lab results to reinforce learning outcomes and address any questions or concerns.



#### **GREATER NOIDA-201306**

	B.TECH THIRD YEAR		
Subject	Code: BCSE0555	LTP 0-0-6	
Subject	Subject Name: Web Technologies Credits 3		
_	<b>quisites:</b> Basic Knowledge of any programming language like accepts of Internet.	C/C++/Python/Java. Familia	rity with
	Course Contents/Syllabus		
Unit-1	Introduction to HTML & CSS: Introduction: Introduction to Web Technology, History of Web to Internet, Introduction to Internet services and tools, Protocols Governing Web, Basic principles involved in developrocess, Types of Websites, Web Standards and W3C recommed Web Hosting: Web Hosting Basics, Types of Hosting Pack Defining Name Servers, Using Control Panel, Creating Em Client, Maintaining a Website.	Client-Server Computing, cloping a web site, Planning mendations. tages, Registering domains,	10 hours
Unit-2	Responsive Websites with Bootstrap:  HTML: What is HTML, DOM- Introduction to Document O of an HTML document, Mark up Tags, Heading-Paragraphs the structure of HTML tables. Lists, Working with Hy Understanding Frames and their needs, HTML forms for Elements- date, number, range, email, search and data list, and article tags.  XML: Introduction, Tree, Syntax, Elements, Attributes, Norequest, Parser, DOM, XPath, XSLT, XQuerry, XLink, Valid	s, Line Breaks, Understand perlinks, Image Handling, or User inputs. New form Understanding audio, video amespaces, Display, HTTP	14 hours
Unit-3	Introduction to JavaScript and ES6:  Concept of CSS 3: Creating Style Sheet, CSS Properties, CS  Format, Controlling Fonts), Working with block elements and and Tables, CSS Id and Class, Box Model(Introduction, Properties, Margin properties) CSS Advanced(Grouping, Dime Floating, Align, Pseudo class, Navigation Bar, Image Sprites, A Creating page Layout and Site.  Bootstrap: Introduction, Bootstrap grid system, Bootstrap Co	objects, Working with Lists Border properties, Padding ension, Display, Positioning, Attribute sector), CSS Color,	16 hours
Unit-4	Introduction to XML and JSON:  JavaScript Essentials: Introduction to Java Script, Javascript Keywords, Operators in JS, Conditions Statements, Java Sc., JS Events, JS Arrays, Working with Arrays, JS Objects, JS Fin Real time, Validation of Forms, Arrow functions and de Strings, Strings methods, Callback functions, Object de-str	ript Loops, JS Popup Boxes Functions, Using Java Script efault arguments, Template	16 hours



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	Operator, Typescript fundamentals, Typescript OOPs- Classes, Interfaces, Constructor				
etc. Decorator and Spread Operator					
	Difference == & ===, Asynchronous Programming in ES6, Promise Constructor,				
	Promise with Chain, Promise Race.				
	Introduction to PHP:				
	Introduction to PHP, Basic Syntax, Variables & Constants, Data Type, Operator &				
	Expressions, Control flow and Decision making statements, Functions, Strings, Arrays.				
	Working with files and directories: Understanding file& directory, Opening and				
Unit-5	closing, a file, Coping, renaming and deleting a file, working with directories, Creating	16 hours			
	and deleting folder, File Uploading & Downloading.				
	Session & Cookies: Introduction to Session Control, Session Functionality What is a				
	Cookie, Setting Cookies with PHP. Using Cookies with Sessions, Deleting Cookies,				
	Registering Session variables, Destroying the variables and Session.				

Sr. No.	Program Title	
		Mapping
1	A.Overview and Installation of various code editors.	CO1
2	B. Overview and Installation of various servers	CO1
3	Implementing HTML program that represent in the document as a start tag, which gives the name and attributes	CO2
4	Implementing HTML program that represents a document	CO2
5	Implementing HTML program to display your simple CV	CO2
6	Creating html document that represents document object model	CO2
7	To Create a table to show your class time table.	CO2
8	Apply various colors to suitably distinguish keywords, also apply font styling like italics, underline and two other fonts to words you find appropriate, also use header tags.	CO2
9	Create a webpage with HTML describing your department use paragraph and list tags	CO2
10	Implementing HTML program that for Heading	CO2
11	Implementing program that implement paragraph and line-break	CO2
12	Use tables to provide layout to your HTML page describing your college infrastructure.	CO2
13	Use <span> and <div> tags to provide a layout to the above page instead of a table layout</div></span>	CO2



#### **GREATER NOIDA-201306**

14	Create links on the words e.g. —Wi-Fi and —LAN to link them to Wikipedia pages	CO2
15	Insert an image and create a link such that clicking on image takes user to other page	CO2
16	Change the background color of the page; At the bottom create a link to take user to the top of the page.	CO2
17	Creating HTML program to implement three articles with independent, self-contained content.	CO2
18	Creating a XML document that defines the self-descriptive tags	CO2
19	Designing XML document that store various book data such as: book category, title, author, year and price	CO2
20	To Describe the various types of XML key components	CO2
21	Design XML DTD to define the structure and legal element and attribute of XML document	CO2
22	To implement internal and external DTD	CO2
23	Use frames such that page is divided into 3 frames 20% on left to show contents of pages, 60% in center to show body of page, remaining on right to show remarks.	CO2
24	Design a HTML registration form that takes user name, user password and mobile number with submit button control	CO2
25	Design a HTML5 document that implement of date, number, range, email, search and data list.	CO3
26	Implementation in HTML5 that include native audio and video support without the need for Flash.	CO3
27	Create a simple form to submit user input like his name, age, address and favourite subject, movie and singer.	CO3
28	Add few form elements such as radio buttons, check boxes and password field. Add a submit button at last.	CO3
29	Add CSS property assign a style or behavior to an HTML element such as: color, border, margin and font-style.	CO3
30	Add To Style Text Elements with Font, Size, and Color in CSS	CO3
31	Applying a block element in CSS acquires up the full width available for that content.	CO3



#### **GREATER NOIDA-201306**

32	Demonstrating the CSS Box model with consists of: borders, padding, margins, and the actual content.	CO3
33	Design a web page by applying CSS grouping and dimensions property.	CO3
34	Design a XML Schema that describes the structure of an XML document.	CO3
35	Design a XML document that describe the well-formed XML document	CO3
36	Design a XML document of CD Catalog through each <cd> element, and displays the values of the <artist> and the <title> elements in an HTML table&lt;/td&gt;&lt;td&gt;CO3&lt;/td&gt;&lt;/tr&gt;&lt;tr&gt;&lt;td&gt;37&lt;/td&gt;&lt;td&gt;Create a XSL document for and taken xml document by you.&lt;/td&gt;&lt;td&gt;CO3&lt;/td&gt;&lt;/tr&gt;&lt;tr&gt;&lt;td&gt;38&lt;/td&gt;&lt;td&gt;Create a XSLT document for and taken xml document by you with all steps&lt;/td&gt;&lt;td&gt;CO3&lt;/td&gt;&lt;/tr&gt;&lt;tr&gt;&lt;td&gt;39&lt;/td&gt;&lt;td&gt;Design a web page by applying CSS Display and Positioning property.&lt;/td&gt;&lt;td&gt;CO3&lt;/td&gt;&lt;/tr&gt;&lt;tr&gt;&lt;td&gt;40&lt;/td&gt;&lt;td&gt;Design a web page by applying CSS Display and Positioning property .&lt;/td&gt;&lt;td&gt;CO3&lt;/td&gt;&lt;/tr&gt;&lt;tr&gt;&lt;td&gt;41&lt;/td&gt;&lt;td&gt;Design a web page by applying CSS pseudo classes.&lt;/td&gt;&lt;td&gt;CO3&lt;/td&gt;&lt;/tr&gt;&lt;tr&gt;&lt;td&gt;42&lt;/td&gt;&lt;td&gt;Creating a Java Script code to implement all data types.&lt;/td&gt;&lt;td&gt;CO4&lt;/td&gt;&lt;/tr&gt;&lt;tr&gt;&lt;td&gt;43&lt;/td&gt;&lt;td&gt;Design a basic structure of Bootstrap Grid system.&lt;/td&gt;&lt;td&gt;CO4&lt;/td&gt;&lt;/tr&gt;&lt;tr&gt;&lt;td&gt;44&lt;/td&gt;&lt;td&gt;Design All Bootstrap Components with example.&lt;/td&gt;&lt;td&gt;CO4&lt;/td&gt;&lt;/tr&gt;&lt;tr&gt;&lt;td&gt;45&lt;/td&gt;&lt;td&gt;Implementing a program in Java script to implement augmented function.&lt;/td&gt;&lt;td&gt;CO4&lt;/td&gt;&lt;/tr&gt;&lt;tr&gt;&lt;td&gt;46&lt;/td&gt;&lt;td&gt;Implementing a program to implement calculator application as real time.&lt;/td&gt;&lt;td&gt;CO4&lt;/td&gt;&lt;/tr&gt;&lt;tr&gt;&lt;td&gt;47&lt;/td&gt;&lt;td&gt;Design a HTML form validation using Java Script.&lt;/td&gt;&lt;td&gt;CO4&lt;/td&gt;&lt;/tr&gt;&lt;tr&gt;&lt;td&gt;48&lt;/td&gt;&lt;td&gt;Write a program to implement Arrow function with default argument in ES6&lt;/td&gt;&lt;td&gt;CO4&lt;/td&gt;&lt;/tr&gt;&lt;tr&gt;&lt;td&gt;49&lt;/td&gt;&lt;td&gt;Implementing a program in ES6 to implement Template string concepts&lt;/td&gt;&lt;td&gt;CO4&lt;/td&gt;&lt;/tr&gt;&lt;tr&gt;&lt;td&gt;50&lt;/td&gt;&lt;td&gt;Implementing a program in ES6 to implement all string methods.&lt;/td&gt;&lt;td&gt;CO4&lt;/td&gt;&lt;/tr&gt;&lt;tr&gt;&lt;td&gt;51&lt;/td&gt;&lt;td&gt;Creating a Java Script program to implement Dialog, Confirm and Message Popup Boxes.&lt;/td&gt;&lt;td&gt;CO4&lt;/td&gt;&lt;/tr&gt;&lt;tr&gt;&lt;td&gt;52&lt;/td&gt;&lt;td&gt;Implementing a Java Script program to implement onClick and onSubmit event&lt;/td&gt;&lt;td&gt;CO4&lt;/td&gt;&lt;/tr&gt;&lt;tr&gt;&lt;td&gt;53&lt;/td&gt;&lt;td&gt;Creating a java script code to implement 'let' keyword&lt;/td&gt;&lt;td&gt;CO4&lt;/td&gt;&lt;/tr&gt;&lt;tr&gt;&lt;td&gt;54&lt;/td&gt;&lt;td&gt;Creating a java script code to implement 'const' keyword&lt;/td&gt;&lt;td&gt;CO4&lt;/td&gt;&lt;/tr&gt;&lt;tr&gt;&lt;td&gt;55&lt;/td&gt;&lt;td&gt;Implementing a program to implement call back functions in ES6.&lt;/td&gt;&lt;td&gt;CO4&lt;/td&gt;&lt;/tr&gt;&lt;/tbody&gt;&lt;/table&gt;</title></artist></cd>	



#### **GREATER NOIDA-201306**

56	Implementing a program for de-structuring of an array in ES6	CO4
57	Javascript code to implement object and class concepts in Typescript.	CO4
58	Write a Typescript program that implement interface and constructor	CO4
59	Write a code in typescript that implement decorator and spread operator	CO4
60	Create a constant by using define() function with its proper syntax	CO4
61	Creating PHP script that return any data types whatever you use.	CO4
62	Implementing a code in Java Script to implement Spread and rest operator	CO4
63	Javascript code that should compile by Typescript compiler as'tsc'	CO4
64	Write a code in typescript that implement Asynchronous Programming concepts.	CO4
65	Write a program in Typescript that implement promise constructor	CO4
66	Implementing promise and chain concepts in Typescript	CO4
67	Write a code in typescript that implement Promise.race() static method.	CO4
68	Crating a program that implement control flow and decision making statement.	CO4
69	Creating PHP to implements parameterized function	CO5
70	Creating program in PHP to store multiple string and concatenate these string and print it.	CO5
71	Write a PHP script to create and delete directory structure	CO5
72	Program to upload and download a file in PHP	CO5
73	Implements single dimension array in PHP	CO5
74	Write a PHP code to open and close a file in a proper manner	CO5
75	Write a PHP script to copying, renaming and deleting a file.	CO5
76	PHP program to create and destroy a session.	CO5
77	PHP program to set and delete a cookie.	CO5
78	PHP program to manually register the session variable	CO5
79	PHP program to manually destroy the session variable	CO5



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0.0	PHP program to store the session data on one page and would be available on	CO5
80	second page.	

Course O	utcomes – After completion of this course students will be able to:	
CO1	Identify the basic facts and explaining the basic ideas of Web technology and internet.	K1, K2
CO2	Applying and creating various HTML5 semantic elements and application with working on HTML forms for user input.	K3, K6
CO3	Understanding and applyingtheconceptsofCreatingStyleSheetCSS3 and bootstrap.	K2, K3
CO4	Analysing and implementing concept of JavaScript and its applications.	K4, K6
CO5	Creating and evaluating dynamic web pages using the concept of PHP.	K5, K6

#### **Text Books:**

- 1. C Xavier, "Web Technology and Design", 1nd Edition 2003, New Age International.
- 2. Raj Kamal, "Internet and Web Technologies", 2nd Edition 2017, Mc Graw Hill Education.
- 3. Oluwafemi Alofe, "Beginning PHP Laravel",2nd Edition 2020, kindle Publication.

#### **Reference Books:**

- 1. Burdman, Jessica, "Collaborative Web Development" 5th Edition 1999, Addison Wesley Publication.
- 2. Randy Connolly, "Fundamentals of Web Development", 3rd Edition 2016,
- 3. Ivan Bayross," HTML, DHTML, Java Script, Perl & CGI", 4th Edition 2010 BPB Publication

#### Links: NPTEL/You Tube/Web Link

Unit 1 https://youtu.be/96xF9phMsWA

https://youtu.be/Zopo5C79m2k

https://youtu.be/ZliIs7jHi1s

https://youtu.be/htbY9-yggB0

Unit 2 https://youtu.be/vHmUVOKXIVo

https://youtu.be/qz0aGYrrlhU

https://youtu.be/BsDoLVMnmZs

https://youtu.be/a8W952NBZUE

Unit 3 <a href="https://youtu.be/1Rs2ND1ryYc">https://youtu.be/1Rs2ND1ryYc</a>

https://youtu.be/vpAJ0s5S2t0

https://youtu.be/GBOK1-nvdU4

https://youtu.be/Eu7G0jV0ImY



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Unit 4 https://youtu.be/-qfEOE4vtxE

https://youtu.be/PkZNo7MFNFg

https://youtu.be/W6NZfCO5SIk

https://youtu.be/DqaTKBU9TZk

Unit 5 <a href="https://youtu.be/\_GMEqhUyyFM">https://youtu.be/\_GMEqhUyyFM</a>

https://youtu.be/ImtZ5yENzgE

https://youtu.be/xIApzP4mWyA

https://youtu.be/qKR5V9rdht0



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100

LAB Co	urse	Code: B	CSCY	0552	LA	B Cou	rse Nar	ne: Ne	twork S	Security	y and Cry	vntogran	hv Lab	L	Т	P	С
		red in: C			1 22.5	2 000	1001141	1101110	· · · · · · ·	, ccurre	, una er	prograp	ny Luo	0	0	4	2
		: Data St			lgorithn	ns, Pyth	non / C	/ Java S	Syntax,	Discrete	e Mathem	atics					
	ourse Objectives:																
The cour	ne course objectives for the practicals are to provide students with hands-on experience and skills in various aspects of																
cybersec	bersecurity using the mentioned tools. The practicals aim to equip students with the knowledge and skills necessary to address																
cybersec	curity	challeng	es and o	contribu	ite effec	tively t	o the in	dustry.									
Course	Course Outcome: After completion of the course, the student will be able to  Bloom's Knowledge																
	Level (KL)																
CO1	Dei	monstrate	secure	e key e	exchange	e techn	iques li	ike AE	ES,DES,	RSA,	Diffie-H	ellman a	nd digital	1	K	[3	
CO1	sign	natures.															
CO2	_	nfigure ar										Ns.				4	
CO3	Eva	aluate the	concep	t of per	fect sec	recy thi	ough o	ne-time	pad im	plemen	tation.				K	.5	
CO BO	3.6	• (0	1 1 7	2	3.6 11	2 11	• 1 \										
		ping (Sca	aie 1: L	20w, 2:	Mealur	n, 3: H	ign)								1		1
CO-PO Mappin		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PS	03	
CO1		3	3	3	3	3	3	2	3	-	-	3	3	3	3		
CO2		3	3	-	-	3	3	2	3	3	2	-	3	3	3		
CO3		3	3	-	-	3	3	2	3	3	3	-	3	3	3		
																	•
List Of	Prac	tical's (Ir	ndicativ	ve & No	ot Limit	ted To)											
1.	Impl	lementing	g shift c	ipher.													
2.	Impl	lementing	g Mono	alphabe	etic subs	stitution	cipher										
3.	Impl	lementing	one tir	ne pad	and perf	ect sec	recy.										
4.	Impl	lementing	Messa	ge auth	entication	on code	s.										
5.	Impl	lementing	g crypto	graphic	hash fu	nctions	and ap	plicatio	ons.								
6.	Impl	lementatio	on of Sy	ymmetr	ic Encry	ption A	Algorith	ms AE	S (Adva	anced E	ncryption	Standard	d).				
7.	Impl	lementatio	on of Sy	ymmetr	ic Encry	ption a	lgorithr	n DES	(Data E	ncrypti	on Standa	ard) using	Python.				
8.	Impl	lementatio	on of Pu	ublic K	ey Cryp	tograph	y RSA	(Rivest	t-Shami	r-Adler	nan).						
9.	Impl	lementation	on of Pu	ublic Ke	ey Cryp	tograph	y-ECC	(Ellipti	ic Curve	e Crypto	ography).						
		lementing															
		lementing															
		figuration															
		ng up IPs							n.								
		work Secu	ırity As	sessme	nt and P	enetrat	ion Test	ting.									
Total H																	
Mode of	Eva	luation				OIF							DE	-	/III	. 4 - 1	
.		PS1				CIE PS2	)	T		PS3	<u> </u>	-	PE		10	otal	
.]		10				20	•			20							
<b> </b>		10		I						20		-					

50



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Course	Code	e: BCs	SCY05	<del></del> 511			Co	ourse Na	ame: Cyl	oer Thr	eat Inte	lligence	· L	Т	P	С
Course					s depa	rtment							3	0	0	3
Pre-reau	ıisite	e: Bas	sic com	nputer l	iteracy	. Funda	mental i	network	ing, Intro	duction	to cybe:	rsecurity	v. Proble	m-solving	and Logi	 cal
analysis				-	,	,			υ,		,	•	,	J	υ	
Course	Obje	ectives	) <b>:</b>													
Understa	nd T	Threat	Lands	capes a	nd eme	erging ri	sks to n	naster in	telligenc	e threat	analysis	skills a	nd enhan	ce defensi	ve strateg	ies to
improve																
Course (	Outo	come:	After	comple	tion of	the cou	rse, the	student	will be al	ole to					Bloom's Knowled (KL)	ge Level
CO1				Threat I threat s			ΓI) and	its role i	in proacti	ve cybe	rsecurity	and ap	ply CTI	analysis	K1	,K2
CO2	Un	dersta	nd and	l apply	the int	rusions	model to	o demor	nstrate th	reat shar	ring and	framew	orks.		K2,	K3
CO3		_		evalua able in			gence so	ources, s	elect opti	mal coll	lection n	nethods,	and proc	cess raw	K3,	K4
CO4	ad	versar	y TTPs	s (Tacti	cs, Tec	hniques	, Proce	dures) u	ise) and l sing fram	eworks				,	K4	, K5
CO5	pla	tform	s and n	neasure	e threat	intel R	OI (Retu	ırn on Iı	Threat l		), evalu	ate inte	elligence	-sharing	K4, K5	
CO-PO	Map	pping	(Scale	1: Lov	v, 2: M	ledium,	3: High	1)								
CO-PO Mappir		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2	2	3	2	3	2	-	3	1	2	1	2	-	2	1
CO2		2	3	3	3	3	2	-	3	1	2	1	2	2	3	2
CO3		2	2	3	3	3	1	-	3	2	1	1	1	3	3	3
CO4		3	2	3	3	3	1	-	2	2	1	2	1	-	3	3
CO5		3	3	3	2	3	1	-	3	2	1	2	1	-	2	3
Course	Cont	tents /	Syllab	ous					•					•	•	
Module	1					Intro	duction	to Cyb	er Threa	at Intell	igence (	CTI)		10 hours		
		-							-			_	_	e, The interest	_	•
Module	2					Thre	at Intel	ligence	Framew	orks &	Models			10 hours		
	cture	e, Capa	ability,	Victin	ı), Cyb	er Kill C	Chain (L	ockheed						rusion Ar structured		
Module	Module 3 Collection & Processing of Threat Data 10 hours															
														ds (Logs, 'SP, Threat		
Module	4					Thre	at Anal	ysis & A	Attributi	on				10 hours		
Analyzin	g IC	OCs (Ir	ndicato	rs of C	ompro	mise) ar	nd IOAs	(Indica	tors of A	ttack), E	Behavior	al analy	sis (TTP	s of threat	actors)	



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Threat actor pro	filing (APT g	groups, cyber	criminals, hackt	ivists), Cas	se studies	(e.g., SolarWinds,	WannaCry, Emo	otet).
Module 5			Operationalizi	ng Threat	Intellige	nce	8 hours	
Integrating CTI	into SOC, IR	, and threat h	unting, Sharing i	intelligence	e (ISACs,	ISAOs, and vendor	platforms), Mea	suring effectiveness
(ROI of threat in	ntelligence),	Future trends	(AI in CTI, auto	omation, de	eception t	echnologies).		
						Total Lecture H	ours 48 hours	S
Textbook:							<u>.</u>	
S.No 1.	Book T	itle : Cyber '	Threat	Auho	r : Marti	n Lee		
	Intellig	ence						
Reference E	Books:			•				
S.No 2.	Book T	itle : Threat	Intelligence:	Auth	or : Rec	orded Future (Edi	ted by Robert N	I. Lee & others)
	L L	Data to Actio						
NPTEL/ You	tube/ Facu	lty Video L	Link:					
Youtube		https://w	ww.youtube.	com/wate	ch?v=Bz	XICnDoFSU&	ab_channel= <i>A</i>	Archer
Youtube		https://w	ww.youtube.	com/wate	ch?v=kC	COa5Pebdg8&al	_channel=SK	ILLOGIC
Youtube		https://w	ww.youtube.	com/wate	ch?v=p7	by_uWzdEg&a	b_channel=Pr	abhNair
Mode of Evalua	ation							
			CIE		T		ESE	Total
ST1	ST2	ST3	TA1	TA2	TA3	Attendance		
	30		5	5	5	5	100	150
	30			4	20		100	150



Course Code: BCSCY0512

#### NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY

#### **GREATER NOIDA-201306**

#### (An Autonomous Institute) **School of Computer Science in Emerging Technologies**

Course Name: Malware Analysis and Reverse Engineering

Course	Code:	DCSC	10512			C	ourse r	vame: N	viaiware	Anaiys	is and K	everse En	gineering	1		I	r	C
Course	Offere	d in: B	. Tech	. (as d	epartn	nent el	ective,	offered	by CSE	(CYS)	)			3	3	0	0	3
Pre-req	uisite:	Compu	ıter Ne	tworks	, Oper	ating S	ystems	s, C/C++	or Pytho	n Prog	rammin	g		•				
Course	Object	ives: T	his cou	ırse int	roduce	es techi	niques	for ana	lyzing an	d unde	rstandin	g malware	e behavior	and re	vers	se eng	ginee	ring
maliciou	ıs softw	are. It	equips	stude	nts wit	h skills	to diss	ect mal	ware thr	ough st	atic and	l dynamic	analysis ar	nd unde	ersta	and		
counter	measur	es and	detect	tion te	chniqu	es.												
Course	Outcor	me: Af	ter con	npletio	n of the	e cours	e, the s	tudent v	will be ab	le to				Bl	loon	m's K	now!	edge
														Le	evel	(KL)	,	
CO1	Demo	onstrat	e an u	ndersta	anding	of mal	ware, i	ts types	, lifecycle	e, and b	ehavior	al charact	eristics.			K1,	K2	
CO2	Apply	y static	analys	is tech	niques	to exa	mine fi	le struc	tures, me	etadata	, and sig	gnatures c	of malware	<b>!.</b>		K2,	К3	
CO3		-	namic ⁄ironm	-	is to c	bserve	runtii	me beh	navior an	d syste	em inter	raction of	malware	in		КЗ,	K4	
CO4	Dete	ct evas	ion and	d obfus	cation	techni	ques e	mploye	d by malv	ware to	bypass	security r	nechanism	ıs.		K4	1	
CO5		•	mpreho lations		malwa	re ana	lysis re	eports i	ncluding	IOCs, a	attack v	ectors, an	nd mitigati	on		K5	5	
CO-PO	Mapp	ing (Sc	ale 1:	Low, 2	2: Med	ium, 3	: High	)										
CO-PO		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	]	PSO2	P	SO3
CO1		2	2	3	2	3	2	-	3	1	2	1	2	-		2		1
CO2		2	3	3	3	3	2	-	3	1	2	1	2	2		3		2
CO3		2	2	3	3	3	1	-	3	2	1	1	1	3		3		3
CO4		3	2	3	3	3	1	-	2	2	1	2	1	-		3		3
CO5		3	3	3	2	3	1	-	3	2	1	2	1	-		2		3
Course	Conte	nts / Sy	llabus															
Module	1			Ir	ntrodu	ction to	Malw	are								1/	0 ho	urs
Definitio	on and	classifi	cation	of mal	ware: ۱	iruses,	worm	s, Troja	ns, ranso	mware	, spywa	re, adwar	e, bots. Ma	alware	atta	ick ve	ctors	and
•				-		-			rol, exfilt of malwa			tion behir	nd malware	e: cyber	crin	ne, ha	ackti <sup>,</sup>	vism,
Module	2			S	tatic A	nalysis	s Tech	niques								1	0 ho	urs
 Analyzin	ng execi	utable	file for	mats (f	PE for \	Vindov	vs, ELF	for Linu	ux), Analy	ze exe	cutable	file heade	rs and attr	ibutes	usin	ng too	ls su	ch as
-	-												OCC A			_		

PEStudio, PEID, and Detect It Easy. Extracting and analyzing strings using tools like Strings and FLOSS, Apply hashing algorithms (e.g., MD5, SHA-256) and use VirusTotal to perform file integrity and reputation analysis, Detecting and unpacking packed binaries, Introduction to YARA rule writing for malware identification.

#### Module 3

#### **Dynamic Analysis Techniques**

10 hours

| L | T | P | C |

Setting up isolated environments for analysis using VirtualBox/VMware, Monitoring process behaviour with Process Explorer and Process Monitor, Observing network activity with Wireshark, TCPView, and Fakenet-NG, Identifying system changes: file system, registry, services, etc, Introduction to automated malware analysis platforms like Cuckoo Sandbox. Behavioural indicators and basic evasion techniques observed in malware.

#### Module 4

#### **Reverse Engineering Essentials**

x86 architecture overview and instruction set, Understanding control flow (loops, branches, function calls), Using IDA Pro and Ghidra to disassemble and analyze binary code, Recognizing common library functions and reconstructing logic, Debugging with x64dbg/OllyDbg: breakpoints, stepping, memory inspection, Identifying obfuscation and anti-disassembly techniques.

#### Module 5

#### **Advanced Topics & Reporting**

8 hours

Code injection and hooking techniques (DLL injection, API hooking), Memory forensics with Volatility: scanning processes, dumped modules, Anti-analysis techniques: anti-debugging, anti-VM, code obfuscation, IOC (Indicators of Compromise)



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extraction: IPs, domains, file paths, hashes, Creating professional malware analysis reports with attack summary and mitigation steps. Case studies of real-world malware (e.g., WannaCry, Emotet, Zeus).

							Total Lecture <b>F</b>	Hours 48 hours
Textboo	k:							
S.No	<b>Book Title</b>					Autl	nor	
Prac	tical Malware Analy	sis* - Michael S	Sikorski, Andr	ew Honig,				
The	IDA Pro Book* - Chr	s Eagle,						
The	Art of Memory Fore	nsics* - Micha	el Hale Ligh et	: al.				
S.No	<b>Book Title</b>					Autl	or	
	Malware U	ityTraining.i nicorn – http aar.abuse.cl	os://www.r			org/		
Mode of	Evaluation	441.4543€.61						
			CIE		1		ESE	Total
	ST2	ST3	TA1 5	TA2 5	TA3 5	Attendance 5		
ST					_			



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	B.TECH THIRD YEAR							
Subject	Code: BCSDS0511	LTP 3-0-0						
Subject	Name: DATA ANALYTICS	Credits: 3						
	uisites: Basic Knowledge of Statistics and Probability.							
Course Contents/Syllabus								
Unit-1	Introduction to Data Science: Big Data, the 5 V's, Evolution of Data Science, Datafication, Skillsets needed, Data Science Lifecycle, types of Data Analysis, Data Science Tools and technologies, Need for Data Science, Analysis Vs Analytics Vs Reporting, Big Data Ecosystem, Future of Data Science, Applications of Data Science in various fields, Use cases of Data science-Facebook, Netflix, Amazon, Uber, AirBnB.							
Unit-2	<b>Data Handling:</b> Types of Data: structured, semi-structured, Categorical, Graphical, High Dimensional Data, Transaction Network Data, standard datasets, Data Classification, Source in various formats, for example, CSV file, pdf file, XML file, image files etc. import and export data in R/Python.	al Data, Spatial Data, Social s of Data, Data manipulation	8 hours					
Unit-3	<b>Data Pre-processing:</b> Form of Data Pre-processing, data Attribute and its types, understanding and extracting useful variables, KDD process, Data Cleaning: Missing							
Unit-4	Exploratory Data Analysis: Handling Missing data, Removariable Selection, identifying outliers, Removing Outliers, Transformation and dimensionality reduction techniques such Analysis (PCA), Factor Analysis (FA) and Linear Discrimin Univariate and Multivariate Exploratory Data Analysis. Data Wrangling- APIs and other tools for scrapping data from the R/Python.	Time series Analysis, Data n as Principal Component ant Analysis (LDA), a Munging, Data	8 hours					
Unit-5	Data Visualization: Introductions and overview, Debug and configuration of the Tableau. Creating Your First visual Tableau Software, Using Data file formats, connecting your I charts (line, bar charts, Tree maps), Using the Show me pane Tableau Calculations: Overview of SUM, AVR, and Aggree calculations and fields, Applying new data calculations to you Data in Tableau: Cleaning-up the data with the Data Intersorting, and filtering Tableau data, Pivoting Tableau data.  Advanced Visualization Tools: Using Filters, Using the I panels, customizing filters, Using and Customizing tooltips colours, Creating Dashboards & Stories, Distributing & Pub	ization: Getting started with Data to Tableau, creating basic el.  gate features Creating custom ur visualization. Manipulating preter, structuring your data,  Detail panel Using the Size is, Formatting your data with	8 hours					



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	List of Practical	
Sr. No.	Program Title	CO Mapping
1	<ul> <li>Installation of MySQL, Anaconda, and Tableau</li> <li>To perform data import/export (.CSV, .XLS, .TXT) operations using data frames in R/Python</li> <li>To perform data pre-processing operations i) Handling Missing data ii) Min-Max normalization</li> <li>To perform dimensionality reduction operation using PCA Houses Data Set</li> <li>To perform statistical operations (Mean, Median, Mode and Standard deviation) using</li> </ul>	CO1
2	<ul> <li>Tableau – getting started</li> <li>User interface</li> <li>Methodology for working with the interface</li> <li>Connecting to different types of data sources (Excel, csv, Access, MySQL, Tableau Server)</li> <li>Editing Data Connections and Data Sources; Live mode vs. Extract mode</li> <li>Date interpreter / Pivot</li> <li>Joining multiple datasets</li> <li>Union / Join</li> <li>Cross database joins</li> <li>Data Blending – integrating different data source</li> </ul>	CO2
3	Basic functionalities  Filtering Sorting Grouping Hierarchies Creating sets Pivot tables Types of dates – Continuous vs. Discreet  Calculations Syntax Table calculations LOD expressions Aggregate Date, Logic, String, Number, Type calculations Built-in chart types/visualisations: Line chart Dot chart Bar chart	CO3



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	Other types of visualisation (bullet graph, Heat map, Tree map, etc.).	
	Combo charts – dual axis	
	Custom chart types:	
	KPI matrix	
	• Waterfall	
4	• Gantt	CO4
	• Dot plot	
	• Pareto	
	Analytics' options: trend lines, forecasting, clustering	
5	<ul> <li>CREATE AND FORMAT REPORTS USING THE TABLEAU DESKTOP</li> <li>Describe the use of Page Backgrounds and Templates</li> <li>Create visualizations to display the data • Apply drill through and drill down</li> <li>Create and manage slicers with the use of filters</li> <li>Explore visual interactions</li> <li>Review Bookmarks</li> <li>Publish the report to the Tableau online</li> <li>Dashboards and stories</li> <li>Building dashboards</li> <li>Dashboard objects</li> <li>Dashboard formatting</li> </ul>	CO5

Course Outcomes – After completion of this course students will be able to:									
CO1	Understand the fundamental concepts of data analytics in the areas that plays major role within the realm of data science.	K1							
CO2	Explain and exemplify the most common forms of data and its representations.	K2							
CO3	Understand and apply data pre-processing techniques.	K3							
CO4	Analyse data using exploratory data analysis.	K4							
CO5	Illustrate various visualization methods for different types of data sets and application scenarios.	К3							

#### **Text Books:**

- 1. Glenn J. Myatt, Making sense of Data: A practical Guide to Exploratory Data Analysis and Data Mining, John Wiley Publishers, 2007.
- 2. Data Analysis and Data Mining, 2nd Edition, John Wiley & Sons Publication, 2014

#### **Reference Books:**



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- 1. Open Data for Sustainable Community: Glocalized Sustainable Development Goals, Neha Sharma, Santanu Ghosh, Monodeep Saha, Springer, 2021.
- 2. The Data Science Handbook, Field Cady, John Wiley & Sons, Inc, 2017
- 3. Data Mining Concepts and Techniques, Third Edition, Jiawei Han, Micheline Kamber, Jian Pei, Morgan Kaufmann, 2012.

Links: NPTEL/You Tube/Web Link

https://www.youtube.com/playlist?list=PL15FRvx6P0OWTlNBS\_93NHG2hIn9cynVT

https://www.youtube.com/playlist?list=PLLy\_2iUCG87DxxkLX4Pc3wCvsF1yAvz0T

https://www.youtube.com/watch?v=lhO3fBiMDag

https://www.youtube.com/watch?v=q4pyaVZjqk0

https://www.youtube.com/playlist?list=PLWPirh4EWFpGXTBu8ldLZGJCUeTMBpJFK



#### **GREATER NOIDA-201306**

	B. TECH THIRD YEAR		
Subject	Code: BCSAI0519	<b>LTP</b> 3-0-0	
Subject	Name: BUSINESS INTELLIGENCE AND DATA	Credits	
	LIZATION	3	
Pre- req	uisites: Basic Knowledge of Business intelligence.		
	Course Contents/Syllabus		
	Introduction To Business Intelligence: Business Intelligence	ce (BI), Scope of BI	
	solutions and their fitting into existing infrastructure, BI Cor	nponents and architecture,	
	BI Components, Future of Business Intelligence, Functional	areas of BI tools, End user	
Unit-1	assumptions, setting up data for BI, Data warehouse, OLAP	and advanced analytics,	8 hours
	Supporting the requirements of senior executives including I	performance management,	
	Glossary of terms and their definitions specific to the field o	f BI and BI systems.	
	Elements Of Business Intelligence Solutions: Business Qua	ery and Reporting,	
	Reporting, Dashboards and Scorecards Development, Development,	opment, Scorecards,	
	Metadata models, Automated Tasks and Events, Mobile Bus	siness Intelligence, Software	
Unit-2	development kit (SDK). Stages of Business Intelligence Proj	jects, Project Tasks, Risk	8 hours
C 1110 2	Management and Mitigation, Cost justifying BI solutions an	d measuring success, BI	0 110 615
	Design and Development, Building Reports, Building a Rep	ort, Drill-up, Drill- down	
	Capabilities.		
	Introductions and overview: What Tableau can and o	cannot do well, Debug and	
	troubleshoot installation and configuration of the software.		
	Creating Your First visualization: Getting started with T	ableau Software, Using Data	
	file formats, connecting your Data to Tableau, creating basic	c charts (line, bar charts, Tree	
Unit-3	maps), Using the Show me panel		8 hours
	Tableau Calculations: Overview of SUM, AVR, and Aggre	gate features Creating custom	
	calculations and fields, Applying new data calculations to yo	our visualization.	
	Formatting Visualizations: Formatting Tools and Menus,	formatting specific parts of	
	the view, Editing and Formatting Axes		
	Manipulating Data in Tableau: Cleaning-up the data	<u> </u>	
	structuring your data, Sorting, and filtering Tableau data, Piv	C	
	Advanced Visualization Tools: Using Filters, Using the	_	
Unit-4	panels, customizing filters, Using and Customizing tooltip colours.	s, romaning your data with	8 hours
	Creating Dashboards & Stories: Using Storytelling, creat	ting your first dashboard and	
	Story, Design for different displays, Adding interactivity to		
	1 J, J = 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	e types, Publishing to Tableau	



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	Online, sharing your visualization, Printing, and exporting.	
	Given a case study: Perform Interactive Data Visualization with Tableau	
	Introduction to power BI :Describe the Power BI ecosystem, Define Power BI and its	
	relationship with Excel, Discuss the Power BI suite of products, Describe how the Power	
	BI products integrate, Explain the typical analytics process flow, Differentiate between the	
Unit-5	various data sources, Connect Power BI to a data source, Clean and transform data to	0 1,
Umt-5	ensure data quality, Load the data to the Power BI Data Model, Describe the Power BI	8 hours
	ecosystem, Define Power BI and its relationship with Excel, Discuss the Power BI suite	
	of products, Describe how the Power BI products integrate,	
	Explain the typical analytics process flow.	



#### **GREATER NOIDA-201306**

	B.TECH THIRD YEAR		
Subject Code: BCSE0512		<b>LTP</b> 3-0-0	
Subject Name: Python Web Development With Django  Credits 3		_	
Pre- req	uisites: Students should have good knowledge of Python Proce.	gramming and Python coding	
•	Course Contents/Syllabus		
Unit-1	Collections-Container datatypes, Tkinter-GUI applications, Requests-HTTP requests, BeautifulSoup4-web scraping, Scrapy, Zappa, Dash, CherryPy, Turbo Gears, Flask, Web2Py, Bottle, Falcon, Cubic Web, Quixote, Pyramid.		8 hours
Unit-2	Understanding Django environment, Features of Django and Django architecture, MVC and MTV, Urls and Views, Mapping the views to URLs, Django Template, Template inheritance Django Models, Creating model for site, Converting the model into a table, Fields in Models, Integrating Bootstrap into Django, Creating tables, Creating grids, Creating carousels.		8 hours
Unit-3	Introduction to Django Authentication System, Security Problem & Solution with Django Creating Registration Form using Django, Adding Email Field in Forms, Configuring email settings, Sending emails with Django, Adding Grid Layout On Registration Page, Adding Page Restrictions, Login Functionality Test and Logout.		8 hours
Unit-4	Database Migrations, Fetch Data From Database, Displaying Data On Templates, Adding Condition On Data, Sending data from url to view, Sending data from view to template, Saving objects into database, Sorting objects, Filtering objects, Deleting objects, Difference between session and cookie, Creating sessions and cookies in Django.		8 hours
Unit-5	Creating a functional website in Django, Four Important Pillars to Deploy, registering on Heroku and GitHub, Push project from Local System to GitHub, Working with Django Heroku, Working with Static Root, Handling WSGI with gunicorn, Setting up Database & adding users.		8 hours
Course O	utcomes – After completion of this course students will be at	ole to:	
CO1	Apply the knowledge of python programing that are vital in understanding Django K3,K6 application and analyze the concepts, principles and methods in current client-side technology to implement Django application over the web.		
CO2	Demonstrate web application framework i.e. Django to design and implement typical K3, K6 dynamic web pages and interactive web based applications.		K3, K6
CO3	Implementing and analyzing the concept of Integrating Accounts & Authentication on K3, K4 Django.		
CO4	Understand the impact of web designing by database connectivity with SQLite in the current market place where everyone uses to prefer electronic medium for shoping, commerce, and even social life also.		



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CO<sub>5</sub>

Analyzing and creating a functional website in Django and deploy Django Web K3, K6 Application on Cloud.

#### **Text Books:**

- 1. Martin C. Brown, "Python: The Complete Reference Paperback", 4<sup>th</sup> Edition 2018, McGraw Hill Education Publication.
- 2. Reema Thareja, "Python Programming: Using Problem Solving Approach", 3<sup>rd</sup> Edition 2017, Oxford University Press Publication.
- 3. Janiel Rubio, Apress," Beginning Django Web Application Development and Deployment with Python", 2<sup>nd</sup> Edition 2017, Apress Publication.
- 4. William Jordon, "Python Django Web Development: The Ultimate Django web framework guide for Beginners", 2<sup>nd</sup> Edition 2019, Kindle Edition.

#### **Reference Books:**

- 1. Tom Aratyn, "Building Django 2.0 Web Applications: Create enterprise-grade, scalable Python web applications easily with Django 2.0", 2nd Edition 2018, and Packt Publishing.
- 2. Nigel George, "Build a website with Django", 1st Edition 2019, GNW Independent Publishing Edition.
- 3. Ray Yao," Django in 8 Hours: For Beginners, Learn Coding Fast! 2nd Edition 2020, independently published Edition.
- 4. Harry Percival, "Test-Driven Development with Python: Obey the Testing Goat: Using Django, Selenium, and JavaScript", 2nd Edition 2019, Kindle Edition.

#### Links: NPTEL/You Tube/Web Link

https://youtu.be/eoPsX7MKfe8?list=PLIdgECt554OVFKXRpo\_kuI0XpUQKk0ycO

https://youtu.be/tA42nHmmEKw?list=PLh2mXjKcTPSACrQxPM2\_1Ojus5HX88ht7

https://youtu.be/8ndsDXohLMQ?list=PLDsnL5pk7-N 9oy2RN4A65Z-PEnvtc7rf

https://youtu.be/QXeEoD0pB3E?list=PLsyeobzWxl7poL9JTVyndKe62ieoN-MZ3

https://youtu.be/9MmC\_uGjBsM?list=PL3pGy4HtqwD02GVgM96-V0sq4\_DSinqyf

https://youtu.be/F5mRW0jo-U4

https://youtu.be/yD0\_1DPmfKM?list=PLQVvvaa0QuDe9nqlirjacLkBYdgc2inh3

https://youtu.be/rHux0gMZ3Eg

https://youtu.be/jBzwzrDvZ18 https://youtu.be/RiMRJMbLZmg

https://youtu.be/8DF1zJA7cfc

https://youtu.be/CTrVDi3tt8o https://youtu.be/FzGTpnI5tpo

https://youtu.be/z4lfVsb 7MA https://youtu.be/WuyKxdLcw3w

https://youtu.be/UxTwFMZ4r5k https://youtu.be/2Oe55iXjZQI

https://youtu.be/zV8GOI5Zd6E https://youtu.be/uf2tdzh7Bq4

https://youtu.be/RzkVbz7Ie44

https://youtu.be/kBwhtEIXGII https://youtu.be/Q YOYNiSVDY

https://youtu.be/ 3AKAdHUY1M

https://youtu.be/6DI 7Zja8Zc https://youtu.be/UkokhawLKDU



## **GREATER NOIDA-201306**

	B.TECH THIRD YEAR						
Subject code: BC	CSE0514	LTP 3-0-0					
Subject I	Name: Design Pattern	Credits -3					
_	uisites: Object Oriented Analysis and Design. Data structures e (C++ or Java).	s and algorithms. Programmin	g				
88	Course Contents/Syllabus						
	Describing Design Patterns, Design Patterns in Smalltalk M	IVC, The Catalog of Design					
Unit-1	Patterns, Organizing the Catalogue, Design Patterns for Sol		8 hours				
	Selection and Use of Design patterns. Principle of least know	wledge.					
Unit-2	Creational Patterns: Abstract Factory, Builder, Factory Singleton pattern.	Pattern, Prototype Pattern,	8 hours				
Unit-3	Structural Pattern Part-I, Adapter, Bridge, Composite. Structural Pattern Part-II, Decorator Pattern, Façade Patter Pattern.	n, Flyweight Pattern, Proxy	8 hours				
Unit-4	Behavioural Patterns Part: I, Chain of Responsibility Pattern, Command Pattern, Interpreter Pattern, Iterator Pattern. Behavioural Patterns Part: II, Mediator, Memento, Observer Pattern.						
Unit-5	Unit-5  Behavioural Patterns Part: III, State Patterns, Strategy, Template Patterns, Visitor, Expectation from Design Patterns.						
Course O	utcomes – After completion of this course students will be ab	ole to:					
CO1	Construct a design consisting of a collection of modules.		K2, K6				
CO2	Exploit well-known design patterns (such as Iterator, Obser	rver, Factory and Visitor)	K4, K5				
CO3	Distinguish between different categories of design patterns		K4				
CO4	Ability to understand and apply common design patt Development	erns to incremental/iterative	K2, K6				
CO5	Ability to identify appropriate patterns for design of give software using Pattern Oriented Architectures	ven problem and Design the	K1, K2, K6				
Text Boo	ks:						
1. Eric Freeman, Elisabeth Freeman, Kathy Sierra, Bert Bates Head First Design Patterns, 2004, O'Reilly							
	ch Gamma, Richard Helm, Ralph Johnson, John Vlissides De ject- oriented Software Addison-Wesley, 1995	esign Patterns: Elements of Re	usable				
Referen	ce Books:						
1. Des	sign Pattern s By Erich Gamma, Pearson Education						
2. Pat	terns in JAVA Volume -I By Mark Grand, Wiley Dream						



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Links: NPTEL/You Tube/Web Link				
https://youtu.be/C_oPLDaSy-8				
https://youtu.be/NU_1StN5Tkk				



## **GREATER NOIDA-201306**

B.TECH THIRD YEAR						
Subject Code: BNC0501  L T P  3-0-0						
Subject	Name: Constitution Of India, Law And Engineering					
	uisites: To acquaint the students with legacies of constitutional deve diversified legal document of India and philosophy behind it.	lopment in India and help them to	understand			
Course C	ontents/Syllabus					
Unit-1	Meaning of the constitution law and constitutionalism, Historical Assembly, Government of India Act of 1935 and Indian Independ of the Constitution, Indian Constitution and its Salient Features, The Fundamental Rights, Fundamental Duties, Directive Principles System, Federal System, Centre-State Relations, Amendment of Procedure, The historical perspectives of the constitutional ame Provisions: National Emergency, President Rule, Financial Government —  Constitutional Scheme in India.	dence Act of 1947,Enforcement ne Preamble of the Constitution, of State Policy, Parliamentary the Constitutional Powers and endments in India, Emergency Emergency, and Local Self	8 hours			
Unit-2	Powers of Indian Parliament Functions of Rajya Sabha, Function Functions of the President, Comparison of powers of Indian Proposers and Functions of Vice- President, Powers and Functions of The Independence of the Supreme Court, Appointment of Julian Interest Litigation, Judicial Activism, LokPal, Lok Ayukta, The 2013, State Executives – Powers and Functions of the Governor Chief Minister, Functions of State Cabinet, Functions of State Court and Subordinate Courts.	esident with the United States, of the Prime Minister, Judiciary adges, Judicial Review, Public e Lokpal and Lok ayuktas Act r, Powers and Functions of the	8 hours			
Unit-3	The Legal System: Sources of Law and the Court Structure: Enactor of primary legislation, Common Law or Case law, Principles to constitute binding legal rules. The Court System in India and For District Consumer Forum, Tribunals, High Courts, Supreme Court to resolving disputes in the normal courts, parties who are in disput be referred to arbitration. Contract law, Tort, Law at workplace.	aken from decisions of judges reign Courtiers (District Court, t). Arbitration: As an alternative	8 hours			
Unit-4	Intellectual Property Laws: Introduction, Legal Aspects of Patents Rights from Patents, Infringement of Patents, Copyright and in Copyright, Civil Remedies for Infringement, Regulation to Info Information Act, 2005, Information Technology Act, 2000, Electronic Records and Digital Signatures, Digital Signature Cappellate Tribunal, Offences, Limitations of the Information Technology	ts Ownership, Infringement of rmation, Introduction, Right to Electronic Governance, Secure Certificates, Cyber Regulations	8 hours			



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	Sole Traders, Partnerships: Companies: The ompany's Act: Introduction, Formation of a Company,
	Memorandum of Association, Articles of Association, Prospectus, Shares, Directors, General
ĺ	Meetings and
Unit-5	Proceedings, Auditor, Winding up. E-Governance and role of engineers in E-Governance, Need hours
	for reformed engineering serving at the Union and State level, Role of I.T. professionals in
	Judiciary, Problem of Alienation
	and Secessionism in few states creating hurdles in Industrial development.
Course O	utcomes – After completion of this course students will be able to:
Course o	attendes There completion of this course students will be able to.
CO1	Identify and explore the basic features and modalities about Indian constitution. K1
CO2	Differentiate and relate the functioning of Indian parliamentary system at the center and state level. K2
CO3	Differentiate different aspects of Indian Legal System and its related bodies. K4
CO4	Discover and apply different laws and regulations related to engineering practices. K4
CO5	Correlate role of engineers with different organizations and governance models K4
Text Bo	
1. M	Laxmikanth: Indian Polity for civil services and other State Examination,6th Edition, Mc Graw Hill
2. B	rij Kishore Sharma: Introduction to the Indian Constitution, 8th Edition, PHI Learning Pvt. Ltd.
3. G	ranville Austin: The Indian Constitution: Cornerstone of a Nation (Classic Reissue), Oxford University Pres
Refere	nce Books:
1. M	ladhav Khosla: The Indian Constitution, Oxford University Press.
2. Pi	M Bakshi: The Constitution of India, Latest Edition, Universal Law Publishing.
3. V	.K. Ahuja: Law Relating to Intellectual Property Rights (2007)



## **GREATER NOIDA-201306**

Subject	Code: BNC0502 L T P					
5-0-0						
Subject	Name: ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE					
Pre- rec	uisites: Computer Organization and Architecture					
Course C	ontents/Syllabus					
	State in Ancient India: Evolutionary Theory, Force Theory, Mystical Theory Contract Theory,					
	Stages of State Formation in Ancient India, Kingship, Council of Ministers Administration					
	Political Ideals in Ancient India Conditions' of the Welfare of Societies, The Seven Limbs of the					
Jnit-1	State, Society in Ancient India, Purusārtha, Varnāshrama System, Āshrama or the Stages of Life,	X hours				
	Marriage, Understanding Gender as a social category, The representation of Women in Historical					
	traditions, Challenges faced by Women.					
	Evolution of script and languages in India: Harappan Script and Brahmi Script. The Vedas, the	+				
	Upanishads, the Ramayana and the Mahabharata, Puranas, Buddhist And Jain Literature in					
J <b>nit-2</b>	Pali, Prakrit And Sanskrit, Sikh Literature, Kautilya's Arthashastra, Famous Sanskrit Authors,	Q hours				
)111t-2	Telugu Literature, Kannada Literature, Malayalam Literature ,Sangama Literature Northern	o nours				
	Indian Languages & Literature, Persian And Urdu ,Hindi Literature					
	Pre-Vedic and Vedic Religion, Buddhism, Jainism, Six System Indian Philosophy,					
Jnit-3	Shankaracharya, Various Philosophical Doctrines, Other Heterodox Sects, Bhakti Movement,	8 hours				
int 5	Sufi movement, Socio religious reform movement of 19th century, Modern religious practices.	o nours				
	Astronomy in India Chemistry in India Mathematics in India Physics in India Agriculture in					
J <b>nit-4</b>	India, Medicine in India, Metallurgy in India, Geography, Biology, Harappan Technologies,	O house				
)IIIL-4	Water Management in India, Textile Technology in India ,Writing Technology in India	8 Hours				
	Pyrotechnics in India Trade in Ancient India/,India's Dominance up to Pre-colonial Times					
	Indian Architect, Engineering and Architecture in Ancient India, Sculptures, Pottery, Painting,					
	Indian Handicraft, UNESCO'S List of World Heritage sites in India, Seals, coins, Puppetry,					
J <b>nit-5</b>	Dance, Music, Theatre, drama, Martial Arts Traditions, Fairs and Festivals, UNESCO'S List					
	of Intangible Cultural Heritage, Calenders, Current developments in Arts and Cultural, Indian's					
	Cultural Contribution to the World. Indian Cinema.					
Course O	<b>Outcomes</b> – After completion of this course students will be able to:					
CO 1	Understand the basics of past Indian politics and state polity.	K2				
O 2	Understand the Vedas, Upanishads, languages & literature of Indian society.	K2				
O 3	Know the different religions and religious movements in India.	K4				
O 4	Identify and explore the basic knowledge about the ancient history of Indian agriculture, scien	iceK4				
10. 7	& technology, and ayurveda.	***				
CO 5	Identify Indian dances, fairs & festivals, and cinema.	K1				
Text Bo	oke.					
	ehrouz Forouzan, "Data Communication and Networking" Fourth Edition-2006, Tata McGraw Hill					
т. В	Circuz 1 orouzum, Data Communication and retworking 1 outti Edition-2000, 1 ata WCOI aw IIII					



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2.	Andrew Tanenbaum	"Computer Networks"	'. Fifth Edition-201	1. Prentice Hall.

3. William Stallings, "Data and Computer Communication", Eighth Edition-2008, Pearson.

#### **Reference Books:**

- 1. Kurose and Ross, "Computer Networking- A Top-Down Approach", Eighth Edition-2021, Pearson.
- 2. Peterson and Davie, "Computer Networks: A Systems Approach", Fourth Edition-1996, Morgan Kaufmann

Links: NPTEL/You Tube/Web Link

https://www.youtube.com/watch?v=LX b2M3IzN8

https://www.youtube.com/watch?v=LnbvhoxHn8M

 $\underline{https://www.youtube.com/watch?v=ddM9AcreVqY}$ 

https://www.youtube.com/watch?v=uwoD5YsGACg

 $\underline{https://www.youtube.com/watch?v=bTwYSA478eA\&list=PLJ5C\_6qdAvBH01tVf0V4PQsCxGE3hSqEr\_https://www.youtube.com/watch?v=tSodBEAJz9Y}$ 



## **GREATER NOIDA-201306**

Course								me: Di	gital Fo	orensic					L	T	P	C
Course															3	1	0	4
Pre-requisite: Fundamental knowledge of computer networks, operating systems, and cybersecurity principles																		
	•			•				_		•	_	devices a						
						•	-			_	tal media	a. The co	urse cov	ers met	hods	for de	etectii	ng
cybercri									•									
Course Outcome: After completion of the course, the student will be able to														(now	ledge			
	T														Leve	el (KL	.)	
CO1					-	-	_		sics, inc	cluding	the legal	and ethi	cal			K	(2	
					n handli				1.4.	1 1		. 1						
CO2		torm to: iprehen		-		iputer s	ystems,	, recove	er data,	and doc	cument fi	indings i	n a			K	(3	
	COII	іргенен	isive ioi	ensic re	eport.													
CO3	Ana	lyze the	e data f	from mo	obile de	vices u	sing inc	lustry-s	standard	l tools a	and techn	iques.				K	(4	
CO4	Ana	llyze ne	twork t	raffic to	identif	y and i	nvestig	ate netv	vork-ba	ised atta	acks and	anomali	es.			K	(4	
ac -	Con	iduct fo	rensic	investic	rations i	in cloud	d envir	onment	s and a	pply fo	rensic te	chniques	to eme	rging		-	7.0	
CO5					and big									55		_ K	(3	
CO-PO	Map	ping (S	cale 1:	Low, 2	: Medi	um, 3:	High)											
CO-PC	)		204	200			701		200	700	-010	-011	5014	2001		a o •		
Mappi		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	.   P	SO2	PS	<b>SO3</b>
CO1		3	3	2	1	1	1	1	2	1	1	1	2	2		2		2
CO2		3	3	2	3	3	2	1	2	_	-	2	2	2		2		2
CO3		3	3	_	-	3	3	1	1	_	-	3	2	1		3		3
CO4		3	3	_	_	3	3	1	1	2	2	3	2	2		3		3
CO5		3	3	3	3	3	3	1	1	2	2	_	2	2		3		3
Course	Cont					J		•	•									
Module		cites / D	ymabas		troduct	ion to I	Digital I	Forensi	CS.							- 1	09 ho	urs
		l Scone	of Digit							al and F	thical Is	sues, Dig	rital Fyid	ence ar	nd Ch			
		-	_				_		_			nd Incide						,,
Module					ompute												09 ho	urs
Fundam	ental	s of Cor	nputer	Forens	ics, File	Systen	ns and I	Data Sti	ructure	s, Forer	nsic Imag	ing and	Acquisiti	on,② D	elete	d Dat	a	
			-			-					_	ser activ	-					and
Docume	entatio	on, Ope	enVAS: I	nstallat	tion, Sca	anning,	Report	ing.										
Module 3 Mobile Forensics											10 ho	urs						
Mobile	Device	e Archit	ecture,	Mobile	Data S	ources,	, Acquis	ition Te	echniqu	es (Log	ical, Phy	sical, Clo	ud), Mol	bile For	ensic	Tools	s, Dat	a
Analysis	and A	Artifact	Extract	ion, An	ti-Forer	nsics an	d Encry	ption C	Challeng	ges Leg	gal Proto	cols for I	Mobile D	evice S	eizur	9		
Module	4			N	etwork	Forens	ics										12 ho	urs
Network	k Fore	nsics Fu	undame	entals, N	Network	Archit	ecture	and Pro	otocols,	Traffic	Capture	and Ana	lysis, Log	g Analys	sis an	d Cor	relati	on,
Network Forensics Fundamentals, Network Architecture and Protocols, Traffic Capture and Analysis, Log Analysis and Correlation, Attack Detection and Investigation, Advanced Techniques (DPI, Flow Analysis), Encrypted Traffic Analysis, Case Studies and Practical									low An	alysis),	Encrypt	ed Traffio	: Analysi	s, Case	Studi	es an	d Pra	ctical
Attack L																		
Labs																		
	5			С	loud an	d Emer	ging Te	chnolo	gies Fo	rensics							8 hou	rs



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Forensics and Deepfake Detection, Cryptocurrency and Blockchain Forensics, Future Trends in Digital Forensics, Research Areas and Emerging Technologies.

		Total Lecture Hours 48 hours
Textboo	ok:	
1	Computer Forensics: Computer Crime Scene Investigation	John Vacca ,2015 [only one edition
2	Practical Digital Forensics: Forensic Lab Setup, Evidence Analysis, and Structured Investigation Across Windows, Mobile, Browser, HDD, and	Akashdeep Bhardwaj, Keshav Kaushik, 2023
	Memory	

#### **Reference Books:**

S.No	Book Title	Author(s)		
14.	Mastering Network Forensics: A practical approach to investigating and defending against network attacks	Nipun Jaswal, 2024		
15.	Ethical Hacking and Network Analysis with Wireshark: Exploration of network packets for detecting exploits and malware	Manish Sharma , 2024		
16.	OSSEC Host-Based Intrusion Detection Guide	Rory Bray, Daniel Cid, Andrew Hay		
17.	Nginx HTTP Server - Third Edition	Clement Nedelcu		
18.	Mastering OpenVPN	Eric F Crist		
19.	StrongSwan: The Open Source VPN	Andreas Steffen		
20.	Nmap Network Scanning: The Official Nmap Project Guide to Network Discovery and Security Scanning	Gordon Fyodor Lyon		
21.	Kali Linux Revealed: Mastering the Penetration Testing Distribution	Raphael Hertzog, Jim O'Gorman, Mati Aharoni		

#### NPTEL/ Youtube/ Faculty Video Link:

 $\underline{https://www.youtube.com/watch?v=5e5KdbY-xzE}$ 

https://www.youtube.com/playlist?list=PLa2xctTiNSCiTGuejkc05zsr-G5t9AuH8

https://www.youtube.com/playlist?list=PLJu2iQtpGvv-2LtysuTTka7dHt9GKUbxD

https://www.youtube.com/watch?v=uCqeNnH1EpQ

https://www.youtube.com/watch?v=MnzHF jygws

#### **Mode of Evaluation**

		ESE	Total					
ST1	ST2	ST3	TA1	TA2	TA3	Attendance		
			5	5	5	5		
30				2	0	100	150	



#### **GREATER NOIDA-201306**

# (An Autonomous Institute) School of Computer Science in Emerging Technologies

LAB Course Code: BCSCY0651	LAB Course Name: Digital Forensic Lab	L	T	P	C				
Course Offered in: CSE (Cyber Security)	0	0	2	1					
Pre-requisite: Operating systems, Computer Networks, and Cybersecurity principles									

Course Objectives: To provide hands-on experience in investigating and analyzing digital and mobile devices. Students will learn to use various forensic tools and techniques to recover, analyze, and report digital evidence. The practical cover disk imaging, file carving, OS artifact analysis, mobile data extraction, network traffic analysis, and cloud forensics.

Course (	Bloom's Knowledge		
		Level (KL)	
CO1	Apply digital evidence collection techniques and forensic tool usage by and utilizing OpenVAS for vulnerability scanning.	K3	
CO2	Analyze digital evidence in mobile devices ,network forensics investigations, applying forensic techniques to extract valuable insights.	K4	
CO3	Analyze digital evidence in cloud and emerging technology environments, applying forensic techniques to conduct investigations and ensure compliance with legal and ethical standards.	K5	

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	2	3	3	2	3	3	3	3
CO2	3	3	3	3	3	3	2	3	3	2	3	3	3	3
CO3	3	3	3	3	3	3	2	3	3	3	3	3	3	3

#### **List Of Practical's (Indicative & Not Limited To)**

- 1. Using tools to identify and collect digital evidence
- 2. Installation and basic usage of forensic tools
- 3. Analyzing case studies related to legal and ethical issues
- 4. Research and documentation on a historical case
- 5. Creating and verifying disk images
- 6. Recovering files and data from disk images
- 7. Analyzing system artifacts from different OS
- 8. Installing OpenVAS, performing scans, and generating reports
- 9. Extracting data logically from various mobile devices
- 10. Extracting data physically from various mobile devices
- 11. Analyzing extracted data from mobile devices
- 12. Identifying and reporting on challenges in mobile forensics
- 13. Capturing and analyzing network packets
- 14. Using tools like tcpdump to capture network traffic
- 15. Detecting and analyzing network-based attacks
- 16. Performing deep packet inspection and correlating events
- 17. Extracting and analyzing data from cloud platforms
- 18. Performing forensic analysis on various IoT devices
- 19. Research and document emerging trends in forensics

#### Total Hours: 48 hrs.

#### Mode of Evaluation

Note of Evaluation	PE	Total		
PS1 10	PS2 20	PS3 20	(If mentioned in curriculum)	
	50		50	100



## **GREATER NOIDA-201306**

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Apply JDBC to integrate Java applications with relational databases for dynamic data handling and managing server-side programming using Servlets for handling web requests and responses.  CO2 Analyze the use of JSP scripting elements, expression language, and directives to determine their effectiveness in dynamic web page rendering and maintainability.  CO3 Implement modular, maintainable Java applications using advanced dependency injection techniques within the Spring Ecosystem.  CO4 Design modular, loosely coupled web applications by implementing the MVC architecture using Spring MVC and Spring Boot.  CO5 Deploy JPA to map, store, retrieve, and update data from java objects to relational databases and vice versa with RESTful APIs to enable scalable and maintainable services.  CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)  CO-PO Mapping PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PSO1 PSO2 PSO2  CO1 3 3 2 3 2 2 2 2 1 1 1 1 1 2 3 2  CO2 3 2 3 2 3 2 2 2 1 1 1 1 1 2 3 2  CO3 3 3 3 3 3 2 3 2 1 1 1 1 1 1 2 3 3 2	s such a dynam loom's nowled KL)  3 4 3	as nic web
Pre-requisite: Basic knowledge of Core Java (OOP, exception handling, collections), multithreading, and fundament SQL/database operations.  Course Objectives: To equip students with in-depth knowledge of server-side programming using Java technologies Servlets, JSP, JDBC, and frameworks like Spring and Hibernate. The aim of this course is to enable students to build applications and enterprise-level solutions with real world project exposure.  Course Outcome: After completion of the course, the student will be able to  BI  Kr  CO1  Apply JDBC to integrate Java applications with relational databases for dynamic data handling and managing server-side programming using Servlets for handling web requests and responses.  Kr  CO2  Analyze the use of JSP scripting elements, expression language, and directives to determine their effectiveness in dynamic web page rendering and maintainability.  CO3  Implement modular, maintainable Java applications using advanced dependency injection techniques within the Spring Ecosystem.  CO4  Design modular, loosely coupled web applications by implementing the MVC architecture using Spring MVC and Spring Boot.  CO5  Deploy JPA to map, store, retrieve, and update data from java objects to relational databases and vice versa with RESTful APIs to enable scalable and maintainable services.  CO6-PO Mapping (Scale 1: Low, 2: Medium, 3: High)  CO6-PO Mapping (Scale 1: Low, 2: Medium, 3: High)  CO6-PO Mapping (Scale 1: Low, 2: Medium, 3: High)  CO7-PO Mapping (Scale 1: Low, 2: Medium, 3: High)  CO6-PO Mapping (Scale 1: Low, 2: Medium, 3: High)  CO6-PO Mapping (Scale 3: Low, 2: Medium, 3: High)  CO7-PO Mapping (Scale 3: Low, 2: Medium, 3: High)  CO8-PO Mapping (Scale 3: Low, 2: Medium, 3: High)  CO9-PO Mapping (Scale 3: Low, 2: Medium, 3: High)  CO9-PO Mapping (Scale 3: Low, 2: Medium, 3: High)	s such a dynam loom's nowled KL)  3 4 3	as nic web
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Spring MVC and Spring Boot.   Record		
Versa with RESTful APIs to enable scalable and maintainable services.   RCCO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)   CO-PO Mapping   PO1	6	
CO-PO Mapping         PO1         PO2         PO3         PO4         PO5         PO6         PO7         PO8         PO9         PO10         PO11         PSO1         PSO2         PSO2         PSO2           CO1         3         3         2         2         2         1         1         1         1         2         3         2           CO2         3         2         3         2         2         2         1         1         1         1         2         3         2           CO3         3         3         3         2         3         2         1         1         1         1         2         3         2		
Mapping         PO1         PO2         PO3         PO4         PO5         PO6         PO7         PO8         PO9         PO10         PO11         PSO1         PSO2         PSO2         PSO2         PSO2         PSO2         PSO3         PSO2         PSO3         PSO3         PSO3         PSO3         PSO3         PSO4         PSO3         PSO4         PSO4         PSO4         PSO5         PSO4         PSO5         PSO5<	i	
CO2         3         2         3         2         2         2         1         1         1         1         2         3         2           CO3         3         3         3         2         3         2         1         1         1         1         2         3         2	SO3	PSO
CO3 3 3 3 2 3 2 1 1 1 1 2 3 2	1	1
	1	1
	1	1
CO4         3         3         2         3         3         1         2         2         2         1         2         2         1	1	1
CO5         3         3         3         3         1         2         2         2         2         3         3         2	1	1
Course Contents / Syllabus		
Module 1 JDBC & Servlets 18 hours  IDBC: Introduction IDBC Driver DB Connectivity Connection Statement Besult Set Proposed Statement Transcent	otics.	
<b>IDBC:</b> Introduction, JDBC Driver, DB Connectivity, Connection, Statement, Result Set, Prepared Statement, Transaction, Stored Procedures.	icu0fi	
Servlet: Servlet Overview, Servlet Life Cycle, Servlet API, Generic Servlet, HTTP Servlet, Redirect requests to other	r resoui	rces us
RequestDispatcher, sendRedirect, Session Tracking: Using cookies, URL rewriting, and HttpSession.		
Module 2 JSP 14 hours		
SP: Introduction, Life Cycle of JSP, JSP to Servlet Conversion, JSP Scripting Elements, JSP Implicit Objects, JSP Direct		xpress
Anguage, Exception Handling in JSP, Servlet-JSP-JDBC Integration, Login and registration system using JSP and Servlet Module 3  Spring Framework  16 hours	iet.	
Spring: Overview of Spring Ecosystem, Spring Modules, IOC container, Types of Dependency Injection (DI): Const	structor	r Inject

Injection, component scanning, and annotation-based configuration within a Maven-based setup

Spring MVC & Spring Boot

16 hours

Module 4



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**Spring MVC:** Overview of Spring MVC architecture, Controllers in Spring MVC, Passing Data Between Controller and View, JSP in Spring MVC, Integration with Spring JDBC.

Spring Boot: Introduction, Creating a Spring Boot project using Spring Initializer, Spring Boot Annotations & Auto Configuration, Spring Data JPA and H2 setup, Serving HTML pages and static content, Handling HTTP methods, Project Lombok. Module 5 **JPA** 16 hours JPA: Introduction to ORM & JPA, JPA Annotations, JPA Relationships, RESTful API, CRUD with Spring Data JPA, Repository Interfaces: JpaRepository, CrudRepository, JSON/XML handling, Postman testing and deployment, Introduction to spring Al, Case Study 2: Build A Netflix-like system to manage users, content, and viewing behavior using JPA. **Total Lecture Hours** 80 hours **Textbook: Book Title** S.No Author 1. Bryan Basham, Kathy Head First Servlets and JSP, O'Reilly Media, 2nd Edition (2008). 2. Sierra, Bert Bates Java Server Pages, O'Reilly Media, 3rd Edition (2003). 3. Hans Bergsten Spring in Action, Manning, 6th Edition (2022). 4. Craig Walls Spring Boot in Action, Manning, 1st Edition (2016). Craig Walls Spring Data: Modern Data Access for Enterprise Java, O'Reilly Media, 1st Edition 5. (2012)Mark Pollack, Oliver Gierke **Reference Books:** S.No **Book Title** Author Marty Hall and Larry 1. Core Servlets and JavaServer Pages, Volume 1: Core Technologies, Prentice Hall, 2nd Edition Brown 2. Core Servlets and JavaServer Pages, Volume 2: Advanced Technologies, Prentice Hall, 2nd Marty Hall and Larry Edition (2004). 3. Brown Pro Spring 6, Apress, 1st Edition (2023) 4. Clarence Ho, Rob Pro JPA 2 in Java EE 8, Apress, 3rd Edition (2018). Harrop, Chris Schaefer Mike Keith, Merrick Schincariol NPTEL/ Youtube/ Faculty Video Link: Unit 1 https://www.youtube.com/playlist?list=PLlhM4lkb2sEjVsbbZ\_kiixY5CcR84IQUg https://www.youtube.com/playlist?list=PL-XjHn7CHrmQhMkVC6KCfmsPHdklvUlQr Unit 2 https://www.youtube.com/playlist?list=PL9ooVrP1hQOEfi91PCFQMawtBJrPpir7y Unit 3 https://www.youtube.com/playlist?list=PL-XjHn7CHrmQhMkVC6KCfmsPHdklvUlQrUnit 4 https://www.youtube.com/playlist?list=PLGRDMO4rOGcNSBOJOlrgQqGpIgo6\_VZgR Unit 5 **Mode of Evaluation** 

		ESE	Total					
ST1	ST2	ST3	TA1	TA2	TA3	Attendance		
			5	5	5	5		
	30 20			100	150			



#### **GREATER NOIDA-201306**

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<b>Course Code:</b>	Course Name: Blockchain And Cryptocurrency Security	L	T	P	C					
BCSCY0612										
Course Offered in	: B. Tech in CSE and emerging branches as department elective, offered by	3	0	0	3					
CSE(CYS)										
Pre-requisite: Con	Pre-requisite: Computer Networks, Cryptography and Network Security, Operating Systems,									
Programming skil	Programming skills									
_	Course Objectives: To explore the foundational concepts of blockchain technology and its architecture to develop secure blockchain-based applications and assess their resilience to cyber threats.									
<b>Course Outcome:</b>	Bloom's Knowledge Level (KL)									
CO1: Understand to	he core architecture, types, and applications of blockchain technology.	K1,K2								
CO2: Apply crypto systems.	ographic techniques to ensure security and integrity in blockchain	K3, K4								
CO3: Analyze and	implement consensus mechanisms and secure smart contracts.	K3, K4								
CO4: Evaluate the	working, risks, and attacks associated with cryptocurrency platforms.	K3, K4								
CO5: Assess real-v	world applications, privacy solutions, and legal implications of ogy.	K5								

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

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CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	3	3	3	2	-	3	1	-	-	2	2	-
CO2	3	3	2	2	2	2	1	3	1	1	-	2	2	2
CO3	3	3	3	2	3	2	1	3	2	1	-	3	2	2
CO4	3	2	2	2	2	2	1	3	2	2	-	2	2	3
CO5	2	2	2	1	2	2	2	3	2	2	-	3	2	3

#### **Course Contents / Syllabus**

Unit 1	Introduction to Blockchain Technology	09 hours
--------	---------------------------------------	----------

Evolution and history of blockchain, Structure and components of a blockchain (blocks, chain, nodes), Types of blockchains: Public, Private, Consortium, Distributed ledger technology (DLT) vs. traditional databases, Use cases beyond cryptocurrency: supply chain, identity management, healthcare

Unit 2	Cryptographic Foundations	09 hours
Heat franctions and Moulel	a trace Digital signatures and explications are traced by Countermentic of	

Hash functions and Merkle trees, Digital signatures and public-key cryptography, Cryptographic puzzles and Proof-of-Work (PoW), Wallets: types and key management, Blockchain addresses and transactions

Ī	Unit 3	Consensus Mechanisms and Cryptocurrency Basics	09 hours



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Need for consensus in distributed systems, Proof-of-Work (PoW), Proof-of-Stake (PoS), Delegated PoS, Practical Byzantine Fault Tolerance (PBFT), Mining and its role in blockchain security, Introduction to cryptocurrencies: Bitcoin, Ethereum, and altcoins, Transaction lifecycle and UTXO model vs. account-based model

Unit 4 Smart Contracts and Blockchain Security 09 hours

What are smart contracts and how they work, Smart contract development (e.g., using Solidity), Common vulnerabilities: reentrancy, overflow/underflow, denial of service, Tools for auditing smart contracts (Mythril, Slither, Oyente), Attacks on blockchain systems: 51% attack, Sybil attack, double-spending, Eclipse attack

Unit 5 Applications, Privacy, and Legal Aspects 09 hours

Blockchain in cybersecurity, IoT, and identity verification, Privacy-enhancing technologies: Zero-Knowledge Proofs, Ring Signatures, zk-SNARKs, Regulatory and legal frameworks for cryptocurrencies (global and national perspectives), Blockchain compliance and governance challenges, Emerging trends: Layer 2 solutions, cross-chain interoperability, quantum threats to blockchain

**Total Lecture Hours** | 45 hours

#### **Textbook:**

- 1. Mastering Bitcoin: Unlocking Digital Cryptocurrencies by Andreas M. Antonopoulos
- 2."Blockchain Basics: A Non-Technical Introduction in 25 Steps" by Daniel Drescher
- 3. Mastering Ethereum: Building Smart Contracts and Dapps by Andreas M. Antonopoulos, Gavin Wood

#### **Reference Books:**

- 1. Blockchain Technology and Applications by Pethuru Raj, Anupama C. Raman
- 2. The Basics of Bitcoins and Blockchains by Antony Lewis
- 3. Bitcoin and Cryptocurrency Technologies by Arvind Narayanan, Joseph Bonneau

#### NPTEL/ Youtube/ Faculty Video Link

Unit 1	Blockchain and its Applications - Course,
Unit 2	: Introduction to Blockchain Technology and Applications - Course
Unit 3	Cryptography and Network Security - Course
Unit 4	Introduction to Blockchain – I (Basics)
Unit 5	(1851) NPTEL Blockchain and its Applications Week 9 Assignment Solution January - April 2025 IIT Kharagpur - YouTube

#### **Mode of Evaluation**

	CIE						Total
ST1	ST2	ST3	TA1	TA2	Attendance		
			5	5	5		
	30			20		100	150
<u> </u>					<u> </u>		



## **GREATER NOIDA-201306**

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LAB Course Code:	LAB Course Name: Blockchain and	L	T	P	C
	Cryptocurrency Security Lab				
Course Offered in: All CS Emergin	0	0	2	1	

#### **Pre-requisite: NA**

#### **Course Objectives:**

1. To provide hands-on experience in setting up blockchain environments and understanding their structure. And expose students to real-world blockchain applications and privacy-enhancing technologies.

#### **Course Outcome:** After completion of the course, the student will be able to

- 1. CO1: Set up and configure a basic blockchain environment using tools like Ethereum or Hyperledger.
- 2. CO2: Apply cryptographic techniques such as hashing and digital signatures in blockchain applications.
- 3. CO3: Simulate and evaluate consensus mechanisms like Proof-of-Work and analyze cryptocurrency transactions.
- 4. CO4: Design, deploy, and test smart contracts for security vulnerabilities using appropriate tools.
- 5. CO5: Demonstrate the use of blockchain in practical scenarios such as secure voting, digital identity, and document verification.
- 6. CO6: Analyze and compare blockchain platforms with respect to performance, scalability, and security.

CO-PO Mapping (Scale 1: Low, 2: Medium, 3: High)

CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	3	2	3	1	-	2	1	1	-	3	3	3
CO2	3	2	3	2	2	2	-	2	1	1	-	3	3	2
CO3	3	2	3	2	3	2	-	2	1	1	-	3	2	2
CO4	3	2	3	3	3	1	-	2	2	1	1	2	2	3
CO5	3	2	3	3	3	1	-	2	2	1	1	3	2	3
CO6	3	3	3	3	2	1		2	2	2	1	3	3	3

#### **List Of Practical's (Indicative & Not Limited To)**

- a. Lab 1: Set up a private Ethereum or Hyperledger Fabric blockchain network.
- b. Lab 2: Create and inspect a basic blockchain using Python or JavaScript.
- c. Lab 3: Simulate peer-to-peer communication and transaction broadcasting in a blockchain.
- d. Lab 4: Implement SHA-256 hashing and demonstrate Merkle Tree construction.
- e. Lab 5: Generate and verify digital signatures using RSA/ECDSA in Python.
- f. Lab 6: Create a simple wallet system using public-private key pairs.
- g. Lab 7: Simulate Proof-of-Work (PoW) consensus using Python.
- h. Lab 8: Analyze Bitcoin transactions using a blockchain explorer (e.g., Blockchair).
- i. Lab 9: Use a cryptocurrency wallet (e.g., MetaMask) to perform test transactions on the Ethereum testnet.
- j. Lab 10: Write and deploy a simple smart contract using Solidity on Remix IDE.
- k. Lab 11: Identify and exploit a reentrancy vulnerability in a sample smart contract.



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- 1. Lab 12: Perform static analysis of smart contracts using tools like Mythril or Slither.
- m. Lab 13: Demonstrate a blockchain use case (e.g., document verification or voting system).
- n. Lab 14: Simulate a privacy transaction using Monero or Zcash testnet.
- o. Lab 15: Conduct a comparative analysis of blockchain platforms (Ethereum vs. Hyperledger vs. Solana) on parameters like security, scalability, and governance.

N	Mode of Evaluation									
		CIE		PE	Total					
	PS1	PS2	PS3	(If mentioned						
	10	20	20	in curriculum)						
		50	100							



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	B. TECH THIRD YEAR				
Subject	Code: BCSE0614	LTP 3-0-0			
Subject 1	Name: WEB DEVELOPMENT USING MEAN STACK	Credits 3			
Pre- req	uisites: Basic knowledge of HTML, CSS and ES6 required.				
	Course Contents/Syllabus				
Unit-1	DELETE UPDATE), GraphQL, Promises, Promise Chaining, Introduction to template engine (EJS).				
Unit-2	Unit-2 Express Framework: Configuring Express, Postman configuration, Environment Variables, Routing, Defining pug templates, HTTP method of Express, URL binding, middleware function, Serving static files, Express sessions, REST full API's, FORM data in Express, document				
Unit-3	<ul> <li>modeling with Mongoose.</li> <li>Basics of Angular js: Typescript, Setup and installation, Power of Types, Functions, Function as types Optional and default parameters, Arrow functions, Function overloading, Access modifiers, Getters and setters, Read-only &amp; static, Abstract classes,</li> <li>Interfaces, Extending and Implementing Interface, Import and Export modules.</li> </ul>				
Unit-4	Building Single Page App with Angular js: MVC Architecture, One-way and Two-way data				
Unit-5	Connecting Angular js with MongoDB: Environment Setup of current SQL/NoSQL landscape, Create collection in Mongodb, CRUD Operations in MongoDB. Mongo's feature set, Introduction mongoose schemas and datatypes, Connecting Angular with morgonse schemas and datatypes, Connecting Angular with morgonse schemas and datatypes, Connecting Angular with morgonse schemas and datatypes.	of Mongodb, data modeling, The on to Mongoose, understanding	8 hours		

Course Outo	Course Outcomes – After completion of this course students will be able to:							
CO 1	Explain, analyze and apply the role of server-side scripting language like Nodejs in the workings of the web and web applications.	K2, K3						
CO2	Demonstrate web application framework i.e., Express is to design and implement typical dynamic web pages and interactive web based applications.	K3, K6						
CO3	Apply the knowledge of Typescript that are vital in understanding angular is, and analyze the concepts, principles and methods in current client-side technology to implement angular application over the web.	K3, K6						



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CO4	Analyze, build and develop single page application using client-side programming i.e. angular js and also develop a static web application.	K3, K4
CO5	Understand the impact of web designing by database connectivity with Mongodb in the current market place where everyone use to prefer electronic medium for shoping, commerce, and even social life also.	K2, K3

#### **Text Books:**

- 1. Amos Q. Haviv (Author), Adrian Mejia (Author), Robert Onodi (Author), "Web Application Development with MEAN", 3<sup>rd</sup>Illustrated Edition 2017, Packt Publications.
- 2. Simon Holmes (Author), Clive Herber (Author), "Getting MEAN with Mongo, Express, Angular, and Node", 2<sup>nd</sup> Edition 2016, Addison Wesley Publication.
- 3. Dhruti Shah, "Comprehensive guide to learn Node.js", 1st Edition, 2018 BPB Publications.
- 4. Christoffer Noring, Pablo Deeleman, "Learning Angular", 3<sup>rd</sup> Edition, 2017 Packt publications.

#### **Reference Books:**

- 1. Anthony Accomazzo, Ari Lerner, and Nate Murray, "Fullstack Angular: The Complete Guide to AngularJS and Friends",4th edition, 2020 International Publishing.
- 2. David Cho, "Full-Stack Angular, Type Script, and Node: Build cloud-ready web applications using Angular 10 with Hooks and GraphQL",2nd edition, 2017 Packt Publishing Limited.
- 3. Richard Haltman & Shubham Vernekar, "Complete node.js: The fast guide: Learn complete backend development with node.js"5th edition, 2017 SMV publication.
- 4. Glenn Geenen, Sandro Pasquali, Kevin Faaborg, "Mastering Node.js: Build robust and scalable real-time server-side web applications efficiently" 2nd edition Packt Publishing Limited.
- 5. Greg Lim,"Beginning Node.js, Express & MongoDB Development, kindle edition, international publishing.
- 6. Daniel Perkins, "AngularJS Master Angular.js with simple steps, guide and instructions" 3rd edition, 2015 SMV publication.
- 7. Peter Membrey, David Hows, Eelco Plugge, "MongoDB Basics", 2nd edition, 2018 International Publication.

#### Links: NPTEL/You Tube/Web Link

https://youtu.be/BL132FvcdVM

https://youtu.be/fCACk9ziarQ

https://youtu.be/YSyFSnisip0

https://youtu.be/mGVFltBxLKU

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https://youtu.be/SQJkj0WYWOE?list=PLvQjNLQMdagP3OzoBMfBT48uJ-SPfSsWj

https://youtu.be/0eWrpsCLMJQ?list=PLC3y8-rFHvwhBRAgFinJR8KHIrCdTkZcZ

https://youtu.be/ZSB4JcLLrIo

https://youtu.be/0LhBvp8qpro

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https://youtu.be/ZSB4JcLLrIo

https://youtu.be/Kvb0cHWFkdc

https://youtu.be/pQcV5CMara8

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https://youtu.be/Mfp94RjugWQ

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## **GREATER NOIDA-201306**

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Course Code	: BCSCY	70652			Course	e Name	: Penet	ration 7	Testing				L	T P	· C
Course Offer			5)		Course		. 1 01100		coung				0	0 6	_
Pre-requisite		•		CP/IP.	OSI mo	odel). O	peratir	ng syste	ms (Lir	nux & W	indows)	. Progra	Ů	0	_
(Python, Bas		_				//		<i>6 7</i>			,	,			0
Course Obje			•												
The course ai	ms to pro	vide stu	dents w	ith a co	mprehe	nsive ur	nderstan	ding of	penetra	tion testi	ng in cyl	bersecuri	ty with l	nands-or	1
practical exer	cises to u	nderstar	nd the m	nethodol	logies a	ssociate	d with p	penetrat	ion testi	ing.					
Course Outcome: After completion of the course, the student will be able to									Bloom	's Know	ledge				
													Level (	(KL)	
CO1: Unders	tand the in	nportan	ce and	ethical c	consider	ations o	of penet	ration te	esting in	cyberse	curity.			K2	
CO2: Demon	strate pro	ficiency	in cond	lucting	network	reconn	aissanc	e.						К3	
CO3: Identify	, assess, a	and expl	loit vulr	erabilit	ies in w	eb appli	ications	•						K4	
CO4: Acquire	e the skills	s to perf	orm mo	bile apı	olication	n reconn	naissanc	e ensuri	ng secu	ıre mobil	e develo	pment		K4	
practices.												-			
CO5: Analyze		inced pe	enetratio	n testin	g metho	odologie	es to dev	velop co	mprehe	ensive pe	netration	ļ		K5	
co-po Map		Jo 1. I	orr. 2. 1		2. 11:	-h)									
	ping (Sca	ue 1: Lo	0w, 2: 1	realum	i, 5: Hi	gn)				1					
CO-PO Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	-	1	1	2	-	3	-	2	-	2	-	2	1
CO2	3	3	2	2	3	-	-	2	1	2	1	1	2	3	2
CO3	3	3	3	2	3	-	-	2	1	2	1	1	3	3	3
CO4	3	3	2	2	3	1	-	2	1	2	1	1	-	3	3
CO5	3	3	3	2	3	2	-	2	2	3	2	1	-	2	3
<b>Course Cont</b>															
Unit 1	Introdu													14 1	Hours
Overview of	Penetratio	n Testir	ng, Imp	ortance	and Sco	pe, Leg	al and l	Ethical (	Conside	rations					
Unit 2	Networ	k Pene	tration	Testing	ţ									14 I	Hours
Network Rec	onnaissan	ce, Scar	nning ar	nd Enun	neration	, Exploi	itation T	Γechniq	ues						
Unit 3	Web A	pplicati	on Pen	etration	1 Testin	ıg								14 1	Hours
OWASP Top							XSS, C	SRF							
Unit 4	Mobile													15 l	Hours
Android and							ig, Seci	ure Cod	ing Prac	ctices					
							15 1	Hours							
Advanced Exploitation Techniques, Reporting and Documentation, Post-Exploitation Techniques  Total Lecture Hours							rs 72 l	nours							
Textbook:															
1."Kali Linux	Revealed	l: Maste	ering the	Penetr	ation Te	esting D	istribut	ion" by	Raphae	l Hertzog	g				
2."Metasploit										0. 1. 0		T 0	. 11		

3."Wireshark Network Analysis: The Official Wireshark Certified Network Analyst Study Guide" by Laura Chappell



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#### **Reference Books:**

- 4. "The Web Application Hacker's Handbook: Finding and Exploiting Security Flaws" by Dafydd Stuttard et al
- "Nmap Network Scanning: The Official Nmap Project Guide to Network Discovery and Security Scanning" by Gordon Fyodor Lyon

Lyon							
NPTEL/ Y	outube/ Faculty Video Link:						
Unit 1	Kali Linux Official Website						
Unit 2	Metasploit Framework GitHub Repository						
Unit 3	Wireshark Official Website						
Unit 4	Burp Suite Official Website						
Unit 5	Nmap Official Website						
Mode of E	valuation						
	CIE	ESE	Total				
	PS						
	50 100 150						



#### **GREATER NOIDA-201306**

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Subject Name: Machine Learning and It's Applications LTP: 0 0 6

**Subject Code:** 

**Applicable in Department: CSE (IoT)** 

**Pre-Understanding/Requirement of Subject:** Python libraries (Numpy, Pandas, Matplotlib, Seaborn)

1. Course Objective: The course objective is to apply foundational machine learning concepts, including data preprocessing, supervised and unsupervised learning algorithms (regression, classification, clustering), and ensemble methods, to address real-world problems, evaluate model performance critically, and implement practical solutions, particularly in areas like IoT applications.

#### 2. Course Outcomes:

	Course Outcomes (CO)							
Course outcome	Bloom's Knowledge Level(KL)							
CO 1	Apply the fundamental concepts, types, and applications of Machine Learning, particularly within the context of IoT and various data preprocessing and dimensionality reduction techniques to prepare datasets for Machine Learning models.	K2						
CO2	<b>Evaluate</b> linear regression models, optimizing them with Gradient Descent and improving their robustness using regularization techniques.	К4						
CO3	Explore and utilize various classification algorithms, including Logistic Regression, Decision Trees, Support Vector Machines, and K-Nearest Neighbors, to solve binary and multiclass classification problems.							
CO4	Apply probabilistic methods (Naive Bayes) and advanced ensemble techniques (Random Forest, AdaBoost, Gradient Boosting, XGBoost) to build robust classification models.							
CO5	Implement diverse unsupervised learning techniques, including K-Means, hierarchical, and DBSCAN clustering along with anomaly detection systems.							



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# 3. Syllabus:

Unit	Module	Topic covered	Pedagogy		No of Hours Required	CO Mapping
Unit-I	Introduction to Machine Learning and Feature Engineering	Introduction to Machine Learning: Motivation, Definition, Applications of Machine Learning focusing on IoT  Types of Machine Learning: Supervised, Unsupervised and Reinforcement Learning  Datasets and Features: Features and their types, handing missing data, Dealing with categorical features, Feature Scaling, Feature selection, outlier detection and removal  Dimensionality reduction: Curse of Dimensionality, Principal Component Analysis (PCA) Algorithm.	LCC Mode (Lab Classroom) Smart Board	6	Lab experiments (1.1-1.3)	CO1
Unit-II	Regression and Regularizatio n	Introduction to Regression: Regression Problem, Linear regression model (Simple, Multiple and Polynomial)  Errors: Mean Squared Error (MSE), Root Mean Squared Error (RMSE),	LCC Mode (Lab Classroom) Smart Board	8	Lab experiments (2.1-2.6)	CO2



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Unit	Module	Topic covered	Pedagogy	Pedagogy No of Hours Required		CO Mapping
Unit III	Classification Algorithms	Mean Absolute Error (MAE)  Cost function: formula, intuition and visualization  Gradient Descent: Algorithm, intuition, learning rate and Gradient Descent for linear regression.  Evaluating the Accuracy of Linear Regression Model: R² and Adjusted R²  Regularization: Bias and Variance, Overfitting and Underfitting, L1 and L2 Regularization, Regularize cost function, Regularized Linear Regression  Classification: Classification: Classification problem, Binary and Multiclass Classification, Decision Boundary  Logistic regression model for binary classification, Cost function of logistic regression model, Regularized logistic regression, One Vs. All strategy for multiclass classification using logistic regression.	LCC Mode (Lab Classroom) Smart Board	1 2	7 Lab experiments (3.1-3.7)	CO3



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Unit	Module	Topic covered	Pedagogy	No of Hours Required		CO Mapping
		Performance of Classification Model: Accuracy, Precision, Recall, F1-Score, ROC- AUC curve, Confusion matrix  Decision Trees: Decision Tree Classification Algorithm, Attribute Selection Measures, Variants of Decision Trees (ID3, C4.5, CART) Large Margin Classifier: Support Vector Machines Instance Based Learning: K Nearest Neighbor Algorithm	LCCM-1			
Unit IV	Probabilistic Models and Ensembles	Probabilistic Methods for Classification: Bayesian Learning, Naive Bayes Classifier, Bayesian belief networks Tree Ensembles: Using multiple decision trees, Bagging Vs. Boosting, Sampling with replacement, Random Forest Algorithm, Adda boost, Gradient Boosting, Xgboost Algorithm.	LCC Mode (Lab Classroom) Smart Board	6	Lab experiments (4.1-4.4)	CO4
Unit V	Clustering Algorithms and Anomaly Detection	Unsupervised Learning &Clustering: The problem of clustering, Distance measures  Partition Based Methods:	LCC Mode (Lab Classroom) Smart Board	1 0	6 Lab experiments (5.1-5.6)	CO5



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Unit	Module	Topic covered	Pedagogy	No of Hours Required	CO Mapping
		K-Means Clustering (Intuition, Algorithm, Optimization objective, Initializing K-Means, Choosing number of clusters)			
		K-Medoids and K-Mode clustering algorithms.			
		Hierarchical Clustering (Single Linkage, Complete Linkage, AGNES (Agglomerative Nesting), DIANA			
		(Divisive Analysis).  Density-based Clustering: DBSCAN Algorithm			
		Anomaly Detection: Finding unusual events, Gaussian Distribution and Gaussian Mixture Model, Anomaly Detection Algorithm, Developing and evaluating anomaly detection system.			
		Total		28	70

## **4.List of Practical:**



## **GREATER NOIDA-201306**

Lab No.	Unit	Topic		CO Mapping
1	1		Introduction to Anaconda and Jupyter Notebooks, Sklearn library, Datasets available in Sklearn library, Kaggle Datasets to develop basic understanding of features and applications of Machine Learning.  2 Perform the following on an IoT based dataset:	CO1
			2. Perform the following on an IoT based dataset:  a) Basic data exploration, Check for missing values, Remove rows with missing values, Fill missing numerical values with mean or median, Fill in categorical values with mode or a specific value, Handling duplicate rows, Removing outliers.	
			<ul> <li>b) Dealing with categorical Variables: one-hot encoding, label encoding, ordinal encoding, and target encoding</li> <li>c) Feature Scaling: MinMaxScaler, StandardScaler, MaxAbsScaler, RobustScaler, Normalizer</li> </ul>	
			d) Correlation Analysis 3. Implement Principal Component Analysis (PCA) algorithm for dimensionality reduction.	
2	2		1. Implementing a class having functions for Mean Absolute Error, Root Mean Square Error, Log loss, R-square and Adjusted R Square	CO2
			1. Fit a linear regression model to predict housing prices based on the size of the house.	
			2. Implement linear regression model to predict PM2.5 concentrations based on various air quality features using Air Quality Index (AQI) dataset.	
			3. Forecasting Stock Closing Prices with Polynomial Regression and Bias-Variance Trade-off Analysis.	
			4. Implement Gradient Descent algorithm and analyse the effect of learning rate and derivatives.	
			5. Demonstrate effect of underfitting and overfitting and hyper parameters in already implemented regression algorithms along with Hyper-parameter tuning.	



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		6. Implementation of regularized linear regression: Lasso and Ridge regression	
3	3	<ol> <li>Implement logistic regression for binary classification on IoT-23: A l dataset with malicious and benign IoT network traffic</li> <li>Implement logistic regression model for Handwritten digit classification.</li> <li>Sentiment Analysis of Product Reviews Using One-Hot Encoding and Logistic Regression</li> <li>Implement K-Nearest Neighbor regression from scratch for classification.</li> <li>Credit Card Fraud Detection Using KNN and ROC-AUC Evaluation</li> <li>Use the ID3 algorithm to build a decision tree to predict whether a customer will purchase a product based on their browsing behaviour on an e-commerce website.</li> <li>Use a support vector machine (SVM) to classify images into different categories using the CIFAR-10 dataset.</li> </ol>	CO3
4	4	<ol> <li>Implement Email Spam Classifier using Naïve Bayes Algorithm.</li> <li>Implementation of Naïve Bayes Classifier for Titanic Dataset.</li> <li>Implement Random Forest algorithm and Xgboost algorithm for Telco Customer Churn Prediction and compare the performance of both the algorithms.</li> <li>Implement Random Forest algorithm and Xgboost algorithm for Credit Card Fraud Detection and compare the performance of both the algorithms.</li> </ol>	CO4
5	5	1. Customer Segmentation for a Retail Store Using K-Means Clustering.	CO5



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2. Grouping News Articles by Topics Using K-Medoids Clustering.
3. Document Clustering Using Hierarchical Clustering and Dendrograms.
4. Fraud Pattern Detection in Transactions Using DBSCAN Clustering.
5. Clustering City Temperature Patterns Using Gaussian Mixture Models.
6. Implementation of anomaly detection system.

# 5. Required software and Tools

- i. Anaconda
- ii. Jupyter Notebook
- iii. Google Colab
- iv. Kaggle

#### 6. Textbooks:

S.No	Book Title
1	Marco Gori , Machine Learning: A Constraint-Based Approach, Morgan Kaufmann. 2017
2	Ethem Alpaydin, Machine Learning: The New AI, MIT Press-2016

#### 7. Reference Books:

S.No	Book Title	
1	Ryszard, S., Michalski, J. G. Carbonell and Tom M. Mitchell, Machine Learning: An	
	Artificial Intelligence Approach, Volume 1, Elsevier. 2014	
2	Stephen Marsland, Taylor & Francis 2009. Machine Learning: An Algorithmic Perspective.	