

About the institution: The Hyderabad Karnataka Education (HKE) society founded by Late Shri. Mahadevappa Rampure, a great visionary and educationist. The HKE Society runs 46 educational institutions. Poojya Doddappa Appa College of Engineering, Gulbarga is the first institution established by the society in 1958. The college is celebrating its golden jubilee year, setting new standards in the field of education and achieving greater heights. The college was started with 50% central assistance and 50% state assistance, and a desire to impart quality technical education to this part of Karnataka State. The initial intake was 120 with degree offered in three branches of engineering viz, Civil, Mechanical and Electrical Engineering.Now,ithouses11undergraduatecourses,10postGraduatecoursesand12Researchcenter s,establishedin Civil Engg., Electronics & Communication Engg, Industrial & Production Engg, Mechanica lEngg, Electrical Engg., Ceramic Cement Tech., Information Science & Engg., Instrumentation Technology, Automobile Engg., Computer Sc. and Engg., Mathematics and Chemistry All the courses are affiliated to Visveswaraya Technological University, Belgaum. At present the total in take at UG level is 980 and PG level 193.

The college receives grant in aid funds from state government. A number of projects have been approved by MHRD /AICTE, Govt. of India for modernization of laboratories. KSCST, Govt. of Karnataka is providing financial assistance regularly for thes tudent's projects.

The National Board of Accreditation, New Delhi, has accredited the College in the year 2005-08for 09 UG Courses out of which 08 courses are accredited for three years and 01 course isaccreditedforfiveyears.AndsecondtimeaccreditedforSixCourseintheyear2009-2012

Our college is one among the 14 colleges selected under TEQIP, sponsored by World Bank. It has received a grant of Rs 10.454 Crores under this scheme for its development. The institution is selected for TEQIP phase II inyear2011forfouryears.Institutionis receiving agrantofRs. 12.50 Crores under TEQIP Phase -II scheme for its development and selected for TEQIP-III as mentoring Institute for BIET Jhansi(UP).

Recognizing the excellent facilities, faculty, progressive outlook, high academic standards and record performance, the VTU Belgaum reposed abundant confidence in the capabilities of the College and the College was conferred Autonomous Status from the academic year 2007-08, to update its own programme and curriculum, to devise and conduct examinations, and to evaluate student's performance based on a system of continuous assessment. The academic programmers are designed and updated by a Board of Studies at the department level and Academic Council atthecollegelevel.ThesestatutorybodiesareconstitutedaspertheguidelinesoftheVTUBelgaum. A separate examination section headed by a Controller of Examinations conducts the examinations.

At present the college has acquired the Academic autonomous status for both PG and UG courses from the academic year 2007-08 and it is one among the six colleges in the state of Karnataka to have autonomous status for both UG and PG courses.

One of the unique features of our college is, it is the first college in Karnataka State tostart the Electronics and Communication Engineering branch way back in the year 1967,to join NIT Surathkal and IISc, Bangalore. Also, it is the only college in the state and one among the three colleges across the country, offering a course in Ceramic and Cement Technology. This is the outcome of understanding by faculty and management about the basic need of this region, keeping in view of the available raw material and existing Cement Industries.

Bharatiya Vidya Bhavan National Award for an Engineering College having Best Overall Performance for the year 2017 by ISTE (Indian Society for Technical Education). In the year 2000, the college was awarded as Best College of the year by KSCST, Bangalore in the state level students projects exhibition.

The college campus is spread over 71 acres of land on either side of Mumbai-Chennai railway track and has a sprawling complex with gardens and greenery all around.

About the department: The Computer Science and Engineering department was started in the year 1984 with an intake of 40 students for UG. The department has seen phenomenal growth and now the department has increased UG intake to 120 students and offering two Post Graduation programmes: PG (Computer Science and Engineering with an intake of 25students) and PG(Computer Network and Engineering with an intakeof18students). The department is offering research program under its recognized research center. Computer Science and Design course was started from 2021 with an intake of 60 students. The department is having state- of-the-art computing facilities with high speed internet facilities and laboratories. The department library provides useful resources like books and journals. The department has well qualified and experiencedteachingfaculty.Thedepartmenthasbeenconductingseveralfacultydevelopmentprogr amsandstudenttrainingprograms.

Vision of the Institution

To be an institute of excellence in technical education and research to serve the needs of the industry and society at local and global levels.

Mission of the Institution

- To provide a high quality educational experience for students with values and ethics that enables them to become leaders in their chosen professions.
- To explore, create and develop innovations in engineering and science through research and development activities.
- To provide beneficial service to the national and multinational industries and communities through educational, technical, and professional activities

Vision of the Department

• To become a premier department in Computer education, research and to prepare highly competent IT professionals to serve industry and society at local and global levels.

Mission of the Department

- To impart high quality professional education become a leader in Computer Science and Engineering.
- To achieve excellence in Research for contributing to the development of the society.
- To inculcate professional and ethical behaviour to serve the industry.

Program Educational Objectives(PEO):

PEO1:	To prepare graduates with core competencies in mathematical and engineering
	fundamentals to solve and analyze computer science and engineering problems
PEO2:	To adapt to evolving technologies and tools for serving the society
PEO3:	To perform a steam leader, effective communicator and socially responsible
	computer professional in multi disciplinary fields following ethical values
PEO4:	To encourage students to pursue higher studies, engage in research and to
	become entrepreneurs

Program Outcomes:

01. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

02. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

03. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

04. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

05. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

06. The engineer and society: Apply reasoning informed by the contextual knowledge eto assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

07. Environment and sustainability: Understand the impact of the professional engineering solutions insocietal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

08. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

09. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one,,s own work, as a member and leader in a team, to manage projects and in multi disciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparationandabilitytoengageinindependentandlife-

long learning in the broad est context of technological change.

Program Specific Outcomes (PSOs):

PSO1:	Acquire competency in hardware and software working principles to analyze and solve computing problems.
PSO2:	Design quality software to develop scientific and business applications following Software Engineering practices.
PSO3:	Apply cutting edge technologies using modern tools to find novel solutions ethically to existing problems.

	POOJYA DODDAPPA APPA COLLEGE OF ENGINEERING, KALABURAGI										
	Scheme of Teaching and Examinations – 2024 M Tech, Computer Network, Engineering (CNE)										
Choice Based Credit System (CBCS) and Outcome Based Education(OBE)											
II SE	MESTER		1								
				Te	eachin	g Hours 둔		Examination			
SI. No	Course	Course Code	Course Title	Theory	Seminar	Tutorial/ Skill Developme Activities	Juration in hours	CIE Marks	SEE Marks	Total Marks	Credits
				L	Р	T/SDA					
1	IPCC/PCC	24PCN21	Digital Image Processing	03	02	00	03	50	50	100	4
2	PCC/PBLC	24PCN22	Web Application Security	02	00	02	03	50	50	100	3
2	PCC	24PCN23	Internet of Things	02	00	02	03	50	50	100	3
3	PEC	24PCN242	Big Data Analytics	02	00	02	03	50	50	100	3
4	PEC	24PCN251	Deep Learning	02	00	02	03	50	50	100	3
5	MPS	24MPS26	Mini Project /Technology-Based Societal Project	00	04	02		100		100	3
6	PCCL	24PCNL27	Web Application Security Lab	01	02	00	03	50	50	100	2
7	AEC/SEC	24PCN28x	Ability/Skill Enhancement Course (Offline/Online)	00	02 00		02 01	50	50	100	1
		TOTA		13	10	10	21	450	350	700	22
Note	BSC-Basic Sci	ence Courses,	PCC: Professional core. IPCC-Ir	ntegrate	ed Profe	essional Core (Course	s, NCMO	C- None	Credit	
Manc AUD/	latory Course, /AEC/SEC –Auc	PCCL-Professi lit Course / Ab	onal Core Course lab ility Enhancement Course/Skill	Enhand	cement	Course, L-Leo	ture, F	P-Practio	al, T/SI	DA-Tuto	rial
/ SKI	i Developmen P	rofessional E	Elective 1	en tacul	ty and s	Professi	onal I	Electiv	e 2	ing Cou	se,
Cour	se Code		Course title	Cour	se		C	ourse	title		
unde	er 24PCN23X			Code			•				
24PC	N241	Block chair	n	24PC	N251	Deep Lea	Deep Learning				
24PC	N242	Big Data A	nalytics	24PC		Storage A	Storage Area Networks				
24PCN243 Service Ori 24PCN244 Software E		Service Or Software E	ented Architecture	24PCN253 Web 24PCN254 Netwo		Network	Network Forensics				
	Assurance Ability / Skill Enhancement Courses										
24PCN281											
24PC	N282										
24PC	N283										
24PC	N284										

Note:

Integrated Professional Core Course (IPCC): Refers to a Professional Theory Core Course Integrated with practicals of the same course. The theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper.

Project Based Learning Course (PBLC): Project Based Learning Course is a professional core Course only Students have to complete a project out of learning from the course and SEE will be viva voce on project work

1 Mini Project/ Societal with Seminar: This may be hands-on practice, survey report, data collection and analysis, coding, mobile app development, field visit and report preparation, modeling of system, simulation, analysing and authenticating, case studies, etc. It may be Techno Societal Project, technical Project work useful for the society.

CIE marks shall be awarded by a committee comprising of HoD as Chairman, Guide/co-guide, if any, and a senior faculty of the department. Students can present the seminar based on the completed mini-project/Societal Project. Participation in the seminar by all postgraduate students of the program shall be mandatory.

The CIE marks awarded for Mini/Societal Project work and Seminar, shall be based on the evaluation of Mini/ Societal Project work and Report, Presentation skill and performance in Question-and-Answer session in the ratio 50:25:25. Mini-Project with Seminar shall be considered as a head of passing and shall be considered for vertical progression as well as for the award of degree. Those, who do not take-up/complete the Mini Project and Seminar shall be declared as fail in that course and have to complete the same during the subsequent semester. **There is no SEE for this course.**

Audit Courses /Ability Enhancement Courses Suggested by BOS (ONLINE courses): Audit Courses: These are prerequisite courses suggested by the concerned Board of Studies. Ability Enhancement Courses will be suggested by the BoS if prerequisite courses are not required for the programs. Ability Enhancement Courses:

- These courses are prescribed to help students to enhance their skills in in fields connected to the field of specialisation as well allied fields that leads to employable skills. Involving in learning such courses are impetus to lifelong learning.
- The courses under this category are online courses published in advance and approved by the concerned Board of Studies.
- Registration to Audit /Ability Enhancement Course shall be done in consultation with the mentor and is compulsory during the concerned semester.
- In case a candidate fails to appear for the proctored examination or fails to pass the selected online course, he/she can register and appear for the same course if offered during the next session or register for a new course offered during that session, in consultation with the mentor.
- The Audit Ability Enhancement Course carries no credit and is not counted for vertical progression. However, a pass in such a course is mandatory for the award of the degree.

AUTONOMOUS SYLLABUS FOR M. Tech II SEMESTER 2024-2025

Course Title: DIGITIAL IMAGE PRO	DCESSING	
Subject Code:24PCN21	Credit:4	CIE:50
Number of Lecture Hours/Week	3:0:2 Hrs	SEE:50
Total Number of Lecture Hours	52	SEE Hours:03
Prerequisites: Concepts of Digital Signa	l Processing	
 Course Objectives: To Study the Image fundar image processing Understand the image enha techniques 	nental and mathematical transformations	necessary for
MODU	JLES	Teaching Hours
Module Digital image fundamentals: Introducti- image processing, Fundamental steps in I and acquisition, A simple image fo Quantization, basic relationships between Activities: 1. Simulation and Display of an Image, N Scale)	10 Hrs	
2. Implementation of Relationships between		
Modul	le– II	
 Background on MATLAB and image MATLAB and Image processing Toold Digital image representation, Reading, classes, image types, converting betwee indexing, some important standard Programming. Activities: 1. Reading images and Writing images of 2. Show how the resolution changes can factors. 	e processing toolbox: Background on box, MATLAB working environment, displaying and writing images, data en data classes and image types, array arrays, introduction to M-function Grayscale and RGB images. n be done by using the desired Scaling	10 Hrs

Module– III	
Image Enhancement : Background, Some basic gray level transformations : Image negatives, Log transformations, Power-law transformation, piece wise linear transformation, Histogram processing: Histogram equalization and matching, Local enhancement, Use of Histogram statistics, Basics of spatial filtering: Smoothing linear filters. Order statistics filters. Sharpening Spatial	
filters: Use of Second and First derivative for enhancement. Activities:	11 Hrs
1. Computation of Mean, Standard Deviation, Correlation coefficient of the given Image	
2. Implementation of Image Smoothening Filters (Mean and Median filtering of an Image)	
3. Implementation of image sharpening filters and Edge Detection using Gradient Filters.	
4. Contrast stretching of a low contrast image, Histogram and Histogram Equalization	12
Module– IV	
 Image Restoration and Compression: A model of the Image degradation/ Restoration Process, Noise models, Restoration in the presence of noise only spatial filtering, Estimating the degradation function, inverse filtering, Minimum mean square error (wiener) filtering, geometric transformation. Image compression: Fundamentals, Image compression models, error free compression, lossy compression. Activities: 	10 Hrs
1. Implementation of image restoring techniques	
2. Implementation of Image Intensity slicing technique for image	
enhancement	
3. Canny edge detection Algorithm	
Module-V	
Image segmentation, Representation and Description : Detection of discontinuities, edge linking and boundary detection, Thresholding, Region based segmentation.	11 Hrs
Representation and description: Various schemes for representation, boundary descriptors and regional descriptors.	
Question paper pattern:	
The question paper will have ten questions.	
The students will have to answer 5 full questions selecting one full question from e	Pach module
Text Books:	
1. Rafael C. Gonzalez, Richard E wood, <i>Digital Image Processing Using MATLAB</i> Education Publisher, 2007.	8, Pearson
Reference books:	
1. Anil K Jain, <i>Fundamentals of Digital Image Processing</i> , Pearson Education/Pren Pvt. Ltd., 1997.	tice-Hall of India
2. B.Chanda, D Dutta Majumder, <i>Digital Image Processing and Analysis</i> , Prentice	-Hall,India,2002.
On completion of the course, the student will have the ability to:	

Course Code	CO#	Course Outcome(CO)
	CO1	Review the fundamental concepts of Digital Image Processing System
	CO2	Analyze Images in the Space and Frequency domain using various transformations.
24PCN21	CO3	Explain the techniques for Image enhancement in frequency domain.
	CO4	Demonstrate various image restoration and compression techniques.
	CO5	Interpret Image segmentation, representation and description techniques.

Course Title: WEB APPLICATION	SECURITY	
Subject Code:24PCN22	Credit:03	CIE:50
Number of Lecture Hours/Week	2:0:2 Hrs	SEE:50
Total Number of Lecture Hours	42 Hrs	SEEHours:03
Prerequisites: Computer Network		I
Course Objectives:		
• Gain understanding of threat surface	ce.	
• To discover security flaws in web a	applications.	
MODU	JLES	Teaching Hours
Mod	ule I	
Web Application Insecurity and Defe Application Reconnaissance, The Struct Evolution of Web Applications, Web Factors, Handling User Access, Handlin	ense Mechanism: Introduction to Web ure of a Modern Web Application, The o Application Security, Key Problem og User Input, Handling Attackers	08hrs
Modu Web application technologies: HTTP H Schemes Mapping Application: Enumerating application. Bypassing Client-side co Capturing User Data: HTML FORMS, H	Ile II Protocol, Web Functionality, Encoding Content and functionality, Analyzing ontrols: Transmitting Data via Clien Browser Extensions	09hrs
Modu Attacking Authentication: Authentic authentication, Implementation flaws in a Attacking Session Management: The generation, Weaknesses in session management.	le IIIation technologies, Design flaws in authentication, Securing authentication.e Need for state, Weaknesses in token token handling, Securing session	08hrs
Modu Attacking Access Controls: Comm controls, Securing access controls. Attacking Data Stores: Injecting into i Extracting Useful Data, Advanced Explo Reference.	le IV on vulnerabilities, Attacking access nterpreted contexts, Injecting into SQL, pitation, SQL Syntax and Error	09hrs
Modu Attacking Back-end components: In File Paths, Injecting into Back-end HTT Attacking Users: Cross-Site Scripting Action, Finding and Exploiting XSS vul	Ile V njecting OS Commands, Manipulating P Requests g: Varieties of XSS, XSS Attacks in nerabilities, Preventing XSS Attacks.	08hrs

Question paper pattern:

The question paper will have ten questions.

There will be Two questions from each module, covering all the topics from a module.

The students will have to answer Five full questions, selecting one full question from each module.

TEXTBOOK:

1. Web Applications Security by Andrew Hoffman published O'Reilly Media, March 2020. 2.Web Application Hacker's Handbook, Dafydd Stutarf, Marcus Pinto, Wiley, 2nd Edition, 2011

REFERENCEBOOKS:

- 1. Hacking Exposed Web Applications, Third Edition, 3rd Edition, by Joel Scambray, Vincent Liu, Caleb Sima. Released October 2010. Publisher(s): McGraw-Hill.
- 2. Hacking: The Art of Exploitation by Jon Erickson, 2nd Edition, Feb 2008
- 3. Penetration Testing: A Hands-On Introduction to Hacking Paperback by Georgia Weidman, June 2014.

Course outcomes: On completion of the course, the student will have the ability to:

Course Code	CO#	Course Outcome(CO)
	CO1	Describe vulnerabilities associated with web applications.
24PCN22	CO2	Analyze the application and identify authentication design flaws
	CO3	Evaluate session management and access control vulnerabilities and adopt security methods.
	CO4	Demonstrate SQL and OS injection in an ethical way.
	CO5	Explore different cross site scripting(xss) flaws and to prevent xss attacks

Course Title: INTERNET OF THINGS				
Subject Code:24PCN23	Credit:4	CIE:50		
Number of Lecture Hours/Week	2:0:2 Hrs	SEE:50		
Total Number of Lecture Hours	42Hrs	SEE Hours:03		
Pre-requisite: Computer Networking an	d Wireless Sensor Networks, Electronic	circuits		
Pre-requisite: Computer Networking an Course Objectives: • Recognize basic issues, policy and • Illustrate Mechanism and Key Tec • Clarify the Standard of the IoT, Re • To gain knowledge of theLayer ¹ / ₂ a • Identify research opportunities in I MODU Modu Internet Of Things overview Definit Examples of Applications, IPv6 I Standardization, Scope of the Present I Observation, ITU-T Views, Working De Capabilities. Internet Of Things App Metering Advanced Metering Infrastru City Automation, Automotive Applicat Tracking (Following and Monitoring Mo	I challenges in the IoT chnologies in IoT esources in the IoT and Data analytics for and 3connectivity of Mobile IPv6 technol IoT technology, applications and services ILES ILES ILES Investigation. IoT Definitions, General efinition, IoT Frameworks, Basic Nodal olication Examples: Overview, Smart cture, e-Health Body Area Networks, ions, Home Automation, Smart Cards, obile Objects).	· IoT. logies. · Teaching Hours 09Hrs		
Fundamental IoT Mechanisms and K Objects and Services, Structural A Characteristics, Traffic Characteristics, and Privacy, Open Architecture, Key I Communication Capabilities, Mobilit Technology, RFID Technology, Satellite	08Hrs			
Modu	le III			
Evolving Iot Standards: Overview a Protocol for RPL Roll, Constrained App Messaging Model, Request Response Representational State Transfer IPv6OverLowpowerWPAN(6LoWPAN) Objects (IPSO).	08Hrs			
Modu	le IV			
Layer 1/2 Connectivity: Wireless Te Technologies for IoT M2M, Zigbee Consumer Electronics (RF4CE), Bluet IEEE802.17.6WBANs,IEEE802.17WPA	echnologies For The IoT : WPAN IEEE802.17.4, Radio Frequency for tooth and its Low-Energy Profile , NTG4j MBANs, ETSITR101	08Hrs		

557 , NFC, Protocols Cor	Dedicated S	Short-Rang Communications (DSRC) and Related							
Technologies	Technologies for IoT M2M, overview and Motivations Universal Mobile								
Telecommunic	ations System	n, LTE.							
Modulo V	•								
Laver 3 Cor	nectivity [.] II	PV6 Technologies For The IoT: Overview and							
Motivations A	Individual for the second seco								
Space IPv6	Protocol Ov	verview IPv6 Tunneling IPsec in IPv6 Header							
Compression S	Compression Schemes, Quality of Service in IPv6, Migration Strategies to IPv6,09 Hrs								
Technical App	oroaches, Res	idential Broadband Services in an IPv6 Environment							
Deployment	Opportunities	. LAYER 3 CONNECTIVITY: MOBILE Ipv6							
TECHNOLOG	JES FOR TH	IE IoT:							
Overview, Pro	tocol Details	, Generic Mechanisms, New IPv6 Protocol, Message							
Types, and D	Destination O	ption, Modifications to IPv6 Neighbor Discovery,							
Requirements :	for Various II	Pv6 Nodes, Correspondent Node Operation, HA Node							
Operation, Mo	bile Node Op	eration, Relationship to IPV4 Mobile IPv4 (MIP).							
Question pap	per pattern:								
The question	paper will ha	ve ten questions.							
There will be	2 questions f	rom each module, covering all the topics from a module.							
The students	will have to a	inswer 5 fun questions, selecting one fun question from each module.							
1 "Building	the Internet o	f Things with IPv6 and MIPv6. The Evolving World of M2M							
1. Dunung	ications" Aut	or(s): Daniel Minoli							
Reference Bo	oks:	loi(5). Duniei Willon.							
1. Designing	the Internet of	of Things Adrian McEwen, Hakim CassimallyISBN:978-1-118-							
43062-0 Nov	ember 2013, ^v	Wiley.							
2. Charalamp	os Doukas,"E	Building Internet of Things with the Arduino", Createspace, April							
2002 <u>http://po</u>	stscapes.com/								
3. "Architect	ing the Intern	et of Things" Uckelmann, Dieter, Harrison, Mark,							
Michahelles,	Florian(Eds.)	2011, XXXI, Springer EBooks.							
Course outco	mes:								
On completio	on of the cour	se, the student will have the ability to:							
Code	0#	Course Outcome(CO)							
	CO1	Explain internet of Things technology and relate it ubiquitous Computing.							
CO2 Identify the Definitions of IoT, frame works and examples of applications.									
CO3 Demonstrate the fundamentals of IoT mechanism, Key									
technologies a devolving IoT Standards									
	CO4	IllustratetheLayer1/2and3connectivityofwireless technologies							
	CO5	Compare IPv4 with IPv6 technologies and determine the Mobile IPv6							
		Technologies for the IoT.							

Course Title: BLOCK CHAIN TECH	NOLOGY	
Subject Code: 24PCN241	Credit: 3	CIE:50
Number of Lecture Hours/Week	4 Hrs	SEE:50
Total Number of Lecture Hours	52	SEE Hours:03
Pre requisites: Computer Networks, C++	-,Java etc.	
Course Objectives:		
MODU	LES	Teaching Hours
Modu		
Introduction: Basic Cryptographic prime Collison-resistant hash functions, digital zero-knowledge proof systems. Need Modelling faults and adversaries, Byza algorithms and their scalability problems, chain based crypto currency?	itives used in Block chain – Secure, signature, public key cryptosystems, for Distributed Record Keeping, antine Generals problem, Consensus , Why Nakamoto Came up with Block	11 Hrs
Modul Technologies Borrowed in Block chain - Models offault tolerance, digital cash etc. - Merkley Tree - hardness of mining - forks - double spending - mathematical coin, the challenges, and solutions 200820	10 Hrs	
Module-III Abstract Models for BLOCKCHAIN - G Work (PoW) as random oracle - formal fairness - Proof of Stake (PoS) based PoS).Bitcoin scripting language and their	ARAY model - RLA Model - Proof of treatment of consistency, liveness and I Chains - Hybrid models (PoW + use.	12 Hrs
Module-IV Ethereum- Ethereum Virtual Machine(EV -Smart Contracts- The Turing Completer verification challenges, Using smart c comparing Bitcoin scripting vs. Ethereu smart contracts	VM)- Wallets for Ethereum-Solidity ness of Smart Contract Languages and contracts to enforce legal contracts, m Smart Contracts. Some attacks on	10 hrs
Module	e– V	
Hyperledger fabric, the plug and p permissionedblockchain.BeyondCrypto	blay platform and mechanisms in ocurrency–applicationsofblockchain	09 Hrs

in cyber secu	rity, integr	ity of information, E-Governance and other contract				
enforcement n	nechanisms	. Limitations of blockchain as a technology, and myths				
vs. reality of b	lockchain t	echnology				
-						
Question pap	er pattern:					
The question	paper will h	nave ten questions.				
There will be	2 questions	from each module, covering all the topics from a module.				
The students v	vill have to	answer 5 full questions, selecting one full question from each me	odule.			
Text Books /	keterence E	300KS:				
1 Blockchain	Technology	w: Crypto currency and Applications S. Shukla, M. Dhawan S. Sh	arma S			
Vonkotagan O	vford Unive	y. Crypto currency and Applications 5. Shukia, W. Dhawan, 5.5.	laima,S.			
venkatesan O	xiora Unive	eisity Piess 2019				
2. Bitcoin and	l cryptocurr	encytechnologies: a comprehensive introduction Arvind Narava	nan et. Al.			
Princeton Univ	versity Pres	s 2016				
	(01510) 1105					
Reference Bo	oks:					
1 Research n	erspectives	and challenges for Bitcoin and cryptocurrency Joseph Bonneau	et al SoK			
I. Research p	nogium on	socurity and Privocy2015	et al, bolk			
	posium on s	security and Privacy2015				
2. The bitcoin	1 backbone	protocol-analysis and applications J.A. Garavetal, EUROCRYP	TLNCS			
VOI 9057	. (VOLII).	pp 281-310 2015				
	, (· · ·),					
3. Blockchain	: The Block	chain for Beginnings, Guild to Blockchain Technology and				
Blockchain Pr	ogramming	" Josh Thompson Create Space Independent Publishing Platform	n 2017			
Course outco	omes:					
On completio	n of the co	urse, the student will have the ability to:				
Course	CO#	Course Outcome(CO)	Bloo			
Code			ms			
			Lev			
			el			
	CO1	Define and Explain the fundamentals of Block chain	C2			
	CO2	Illustrate the technologies of block chain	C/			
24PCN241	CO3	Describe the models of block chain	C5			
			~.			
CO4 Analyse and demonstrate the Ethereum C4						

Analyse and demonstrate Hyperledger fabric

CO5

C2

Course Title: BIC DATA ANALVICE		
Course Thue: BIG DATA ANALYTICS		ATT 5 0
Subject Code:24PCN242	Credit:3	CIE:50
Number of Lecture Hours/Week	2:0:2 Hrs	SEE:50
Total Number of Lecture Hours	52 Hrs	SEE Hours:03
Pre-requisite: Database Management Sys	stems	
 Course Objectives: To work with big data platform Understand HADOOP distributed To explore on Big Data application data analysis techniques To use software tools such as Range 	file system and Map Reduce technolog ns Using Pig and Hive and fundamental d Hadoop, in-database analytics	ies. Is of various big
MODU	LES	Teaching Hours
Understanding Big Data: Types of digital data–classification of data, introduction to big data –characteristics of big data, evolution of big data, definition of big data ,challenges with big data what is big data – why big data, traditional business intelligence (BI) versus big data, what is new today. big data analytics – where do we begin? ,what is big data analytics, what is big data analytics isn't ,classification of big data analytics ,greatest challenges that prevent business from capitalization on big data, top challenges facing big data why big data analytics important, data sciences, data scientist, terminologies, used in big data		10Hrs
Module-II Mining Data Streams :Introduction To Streams Concepts–Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream –Filtering Streams–Counting Distinct Elements in a Stream – Estimating Moments– Counting Oneness in a Window–Decaying Window-Real time Analytics Platform (RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions Genetic Programming.		10Hrs
Module-III Introduction To Big Data Analytics & R Programming: Analyzing, Visualization and Exploring the Data, Statistics for Model Building and Evaluation, Introduction to R and R Studio, Basic analysis in R, Intermediate R, Intermediate analysis in R, Advanced Analytics-K-means clustering, Association rules-Speedup, Linear Regression, Logistic Regression, Naïve Bayes, Decision Trees, Time Series Analysis, Text Analysis		09Hrs

		Module- IV	
 Hadoop: History of Hadoop – The Hadoop Distributed File System – Components of Hadoop Analyzing the Data with Hadoop –Scaling Out-Hadoop Streaming- Design of HDFS- Java interfaces to HDFS Basics-Developing a Map Reduce Application-How Map Reduce Works-Anatomy of a Map Reduce Job run-Failures-Job Scheduling-Shuffle and Sort – Task execution. 			12 Hrs
		Module-V	
Frame works: examples – pra – developing a HiveQL data d	: Hbase – da axis. Hadoop nd testing P lefinition – I	ata model and implementations – Hbase clients – Hbase p integration. Pig – Grunt – pig data model – Pig Latin ig Latin scripts. Hive – data types and file formats – HiveQL data manipulation – HiveQL queries.	11 Hrs
Question pap The question There will be The students	per pattern paper will 2 questions will have to	have ten questions. from each module, covering all the topics from a module. answer 5 full questions, selecting one full question from e	each module.
Text books:			
1. Big Data and Analytics- Seema Acharya And SubhashiniC –Wiley, India.			
2. Anand Ra	2. Anand Rajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", Cambridg		
3 Tom white	ess, 2012. "Hadoon T	he Definitive Guide" ^{1th} edition (R evised & undeted)O'RE	II I V 2015
5. Tom white		ne Deminitive Guide 4 edition (Revised & updated)o RE	ILLI 2013.
Reference Bo 1. Bill Fran with Adv 2. Glenn J. 3. Peter Wa 4. Jiawei H Elsevier,	ooks: iks, "Taming vanced Anal Myatt, "Ma arden, "Big an, Michelin Reprinted 2	g the Big Data Tidal Wave: Finding Opportunities im Hug ytics", John Wiley & sons, 2012. king Sense of Data",John Wiley & Sons, 2007 Data Glossary",O'Reilly,2011. ne Kamber "Data Mining Concepts and Techniques", Seco 2008.	e Data Streams
Course outco	omes:		
On completion	on of the co	urse, the student will have the ability to:	
Course	CO#	Course Outcome(CO)	Bloom
Code	<u>CO1</u>	Discuss basic concept of Pig data	
	COI	Discuss basic concept of Big data.	
	CO2	Illustrate the use of examples. mining data Streams with real times	me CO3
24PCN242	CO3	Develop code for database analytics using Rand Hadoop	o. CO5
	CO4 Analyze HADOOP and Map Reduce technologies associated CO4 with big data		
	CO5	Discuss applications of Pig, hive, zoopkeperand- Visual Analysis techniques, interaction techniques.	data CO2

Course Title: SERVICE ORIENTED	ARCHITECTURE				
Subject Code:24PCN243	Credits:3	CIE:50			
Number of Lecture Hours/Week	2:0:2 Hrs	SEE:50			
Total Number of Lecture Hours	42 Hrs	SEEHours:03			
Prerequisites: Java,XML and Web de	esigning				
 Course objectives: To understand the basic concepts o To learn Web services and messagi To learn about Service oriented An Standards. 	 Course objectives: To understand the basic concepts of SOA. To learn Web services and messaging with SOA. To learn about Service oriented Analysis and Design.NET,Java and WS Specification 				
MODU	ILES	Teaching Hours			
Modu INTRODUCTION Roots of SOA, Cha to client-server and distributed internet a components in an SOA inter relate, Princ	le–I racteristics of SOA, Comparing SOA architectures, Anatomy of SOA, How iples of service orientation	08 Hrs			
Module-II SERVICE ORIENTEDARCHITECTURE INWEB SERVICES: Web services, Service descriptions, Messaging with SOAP, Message exchange Patterns, Coordination, Atomic Transactions, Business activities, 43 Orchestration, Choreography, Service layer abstraction, Application Service Layer, Business Service Layer, Orchestration Service Layer		09 Hrs			
Module-III BUILDING SOA :Service oriented analysis, Business-centric SOA, Deriving business services, service modeling ,Service Oriented Design, WSDL basics, SOAP basics, SOA composition guidelines ,Entity-centric business service design, Application service design, Task centric business service design.		08 Hrs			
Module–IV SOA PLATFORMS: SOA platform basics, SOA supportin J2EE: Java API for XML – based web services (JAX-WS), Java architecture for XML binding (JAXB), Java API for XML Registries JAXR), Java API for XML based RPC (JAX-RPC), Web Services Inter operability Technologies(WSIT), SOA Support in.NET: Common Language Runtime, ASP.NET web forms, ASP.NET web services, Web Services Enhancements(WSE).		08 Hrs			
Module SOA DESIGN Web Service, BPEL-proc Coordination over view elements, web transaction coordination type, Busin Choreography, Web Service, Policy-eler Signature element	e-V cess, elements, functions, Web Service o service business activity & atomic ess process design Web Service, nents, Web Service Security, XML –	09 Hrs			
Question paper pattern: The question paper will have ten questio There will be 2 questions from each mode The students will have to answer 5 full qu	ns. ule, covering all the topics from a modul uestions, selecting one full question from	e. 1 each module .			

Text book:

1. Thomas Erl, "Service-Oriented Architecture: Concepts, Technology, and Design", PearsonEducation, 2009.

REFERENCE BOOK

1. New comer, Lomow, "Understanding SOA with WebServices", Pearson Education, 2005.

2. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services, An

Architect'sGuide',PearsonEducation,2005

Course outcomes:

On completion of the course, the student will have the ability to:

en tempter				
Course	Course	Course Code		
Code	Code			
	CO1	Gain the knowledge of basic concepts of SOA.		
	CO2	Explain advanced concepts of service composition, orchestration, choreography and Web Service frame-work		
24PCN243	CO3	Discuss various Service Oriented analysis techniques and service design.		
	CO4	Experiment on creation of SOA Web Service using various technologies		
	CO5	Describe Open Standards available for developing SOA compliant Web Services		

Course Title: SOFTWARE ENGINEERING AND QUALITY ASSURANCE		
Subject Code:24PCN244	Credit:3	CIE:50
Number of Lecture Hours/Week	2:0:2 Hrs	SEE:50
Total Number of Lecture Hours	42 Hrs	SEE Hours:03
Pre-requisite :Software Engineering and	d Testing.	
 Course Objectives: To understand software developm To demonstrate software testing Discuss quality assurance and matching 	nent, management, deployment of software methods anagement of software product.	
MC	DDULES	Teaching
M	odule–I	nours
Software Processes and Project Ma Process Models, Process Iteration, Proc Computer Aided Software Enginee Activities, Project Planning, Project Sch	nagement & S/W requirement: Software ess Activities, The Rational Unified Process, oring. Project Management: Management eduling, Risk Management.	08 Hrs
Requirements Engineering : Software I requirements, User Requirements, Syste software requirement Document. Requisite studies, Requirements elicitation Requirements management.		
Mo	odule-II	
Design Engineering & requiremen Architectural Design Decisions, System Control Styles. Object-oriented design oriented design process, Design Evol design, Real-time operating systems acquisition systems.	08Hrs	
Mo	dule-III	
Software Development and Management: Rapid Software Development-Agile methods, Extreme Programming, Rapid Application Development, Software Prototyping. Computer Based software engineering: Components and Component models, The CBSE process, Component composition. Managing People: Selecting Staff, Motivating People, Managing groups, The people Capability Maturity Model. Software cost estimation: Software productivity, Estimation techniques, Algorithmic Cost modeling, Project duration and staffing.		08Hrs
Mo	dule-IV	
Testing Strategies: A strategic approact Testing, Integration Testing, Validati Debugging. Testing Techniques: Software testing testing, Basis Path testing, Control Struct	ch to Software Testing, Strategic Issues, Unit ion Testing, System Testing, The art of fundamentals, Test case Design, White Box cture Testing, Black Box Testing, Testing for	09hrs
<i>b, b, c, c, c, c, c, c, c, c</i>	<i>J, i i i j j j j j j j j j j</i>	14

Specialized E	Environment	s, Architectures and Applications.			
		Module–V			
Product Me Analysis Moo Testing, Metr	t rics: Softw del, Metrics rics for Mair	are Quality, A framework for Product Metrics, Metrics for for the Design Model, Metrics for Source Code, Metrics for ntenance.	09Hrs		
Quality Ma Reviews, For Quality Assu Plan.	Quality Management : Quality Concepts, Software Quality Assurance, Software Reviews, Formal Technical Reviews, Formal approaches to SQA, Statistical Software Quality Assurance, Software Reliability, The ISO 9000 Quality Standards, The SQA Plan.				
Question pap	per pattern:				
The question	paper will h	nave ten questions.			
There will be	2 questions	from each module, covering all the topics from a module.			
The students	will have to	answer 5 full questions, selecting one full question from each	module.		
Text Books: 1. Software I 2. Software I McGraw-	Engineering, Engineering: Hill Sixth ec	Sommerville,EighthEdition,PearsonEducation,2009 A Practitioner"s Approach, Roger S Pressman, Tata lition, 2005.			
Reference B	ooks:				
1. RichardFair	rley, "Softwa	areEngineeringConcepts"–,TataMcgrawHill,2008.	7		
2. IanSommer	Ville, Sonv	VareEngineering ,SeventhEdition,PearsonEducationAsia,2007	/. 11 2003		
4. Shari Lawa	rence Pfleeg	ger, Joanne M .Atlee "Software Engineering Theory and Pract	ice",		
ThirdEditic	n,PearsonE	ducation,2006.	,		
5. Alistair Co	ckburn, "Ag	ile Software Development", First Edition, Pearson Education	Asia,2001.		
6. Hans Van V	Vliet "Softwo	are Engineering : Principles and Practices "-, Wiley; 3edition, 2	2008.		
Course outco	omes:				
On completion	on of the co	urse, the student will have the ability to:			
Code	Code	Course Code			
 	CO1	Select and implementation of different software development	t process models.		
		Extract and analyze software requirements specifications for	real time		
	problems.				
	CO2	Develop some basic level of software architecture/design and	d Defining the		
	basic concepts and importance of Software project				
management concepts like cost estimation, scheduling and			ng and		
24PCN244	CO3	Apply different testing and debugging techniques and analyz	zing their		
		effectiveness.			
	CO4	Describe the Knowledge of software risks and risk manage	gement strategies		
	CO5 Demonstrate software quality measurement metrics.				

Course Title: DEEP LEARNING		
Subject Code:24PCN251	Credits:3	CIE:50
Number of Lecture Hours/Week	2:0:2 Hrs(Theory)	SEE:50
Total Number of Lecture Hours	42 Hrs	SEE Hours:03
Pre-requisites: Machine learning, pyth	on	
 Course objectives To understand the principles of deep To acquire practical skills to design, in MODULY 	learning and its capabilities and mplement, and train practical deep lea	rning systems.
Modul	e_I	Teaching Hours
Machine Learning Basics: Learning Alg Under fitting, Hyper parameters and V Variance, Maximum Likelihood Estima Learning Algorithms, Unsupervised Gradient Decent, building a Machine Lea Motivating Deep Learning.	gorithms, Capacity, Over fitting and Validation Sets, Estimator, Bias and tion, Bayesian Statistics, Supervised Learning Algorithms, Stochastic arning Algorithm, Challenges	09 Hrs
Module	·II	
Deep Feed forward Networks: Gradient-Based Learning, Hidden Units, Architecture Design, Back-Propagation. Regularization: Parameter Norm Penalties, Norm Penalties as Constrained Optimization, Regularization and Under-Constrained Problems, Dataset Augmentation, Noise Robustness, Semi-Supervised Learning, Multi-Task Learning, Early Stopping, Parameter Tying and Parameter Sharing, Sparse Representations, Bagging, Dropout.		08 Hrs
Module	–III	
Optimization for Training Deep Models Optimization, Challenges in Neural Netw Parameter Initialization Strategies, Algor Convolutional Networks: The Convolut Convolution and Pooling as an Infinitely Convolution Function, Structured Output Convolution Algorithms, Random or Uns	s: How Learning Differs from Pure york Optimization, Basic Algorithms. ithms with Adaptive Learning Rates. ion Operation, Motivation, Pooling, y Strong Prior, Variants of the Basic s, Data Types, Efficient supervised Features.	10 Hrs
Module	–IV	
Sequence Modelling: Recurrent an Computational Graphs, Recurrent Neur Encoder-Decoder Sequence-to-Sequence Networks, Recursive Neural Networks. L	nd Recursive Nets: Unfolding ral Networks, Bidirectional RNNs, Architectures, Deep Recurrent ong short-term memory.	10 Hrs
Module-V		
Practical Methodology: Performance Determining Whether to Gather More Debugging Strategies, Example: M Applications: Vision, NLP, Speech.	Metrics, Default Baseline Models, Data, Selecting Hyper parameters, Iulti-Digit Number Recognition.	11 Hrs
Question paper pattern:		
The question paper will have ten questio There will be 2 questions from each mod	ns. ule, covering all the topics from a mod	lule.

The students will have to answer 5 fullquestions, selecting one full question from each module.

TEXT BOOKS:

1. Lan Goodfellow and Yoshua Bengio and Aaron Courville Deep Learning MITPress 2016.

REFERENCE BOOKS:

- 1. Raúl Rojas Neural Networks: A systematic Introduction 1996.
- 2. Chirstopher Bishop Pattern Recognition and machine Learning 2007.

Course ou	tcomes:			
On comple	On completion of the course, the student will have the ability to:			
Course	CO#	Course Outcome(CO)		
Code				
	CO1	Identify the deep learning algorithms which are more appropriate for		
		various types of learning tasks in various domains.		
	CO2	Implement deep learning algorithms and solve real-world problems.		
24PCN251	CO3	Execute performance metrics of Deep Learning Techniques.		
	CO4 Analyze optimization and generalization techniques of deep learn the given problem.	Analyze optimization and generalization techniques of deep learning for		
		the given problem.		
	CO5	Evaluate the given deep learning application and enhance by applying latest		
	005	techniques.		

Course Title: STORAGE AREA NETW	ORK	
Subject Code:24PCN252	Credit:3	CIE:50
Number of Lecture Hours/Week	4 Hrs	SEE:50
Total Number of Lecture Hours	42 Hrs	SEEHours:03
Pre requisites: Operating System and Com	puter Networks.	
 Course Objectives: Understand fundamentals of storage cen Learn metrics used for designing storage Describe backup and remote mirroring of MODUL 	tric and server centric systems. e area networks, RAID concepts. concepts	Tooshing Hours
MODUL		Teaching Hours
Module–I Introduction: Server Centric IT Architecture and its Limitations; Storage– Centric IT Architecture and its advantages. Case study: Replacing a server with Storage Networks The Data Storage and Data Access problem; The Battle for size and access. Intelligent Disk Subsystems: Architecture of Intelligent Disk Sub systems; Hard disks and Internal I/O Channels; JBOD, Storage virtualization using RAID and different RAID levels; Caching: Acceleration of Hard Disk Access; Intelligent disk sub systems, Availability of disk subsystems. Module-II I/O Techniques: The Physical I/O path from the CPU to the Storage System; SCSI; Fibre Channel Protocol Stack; Fibre Channel SAN; IP Storage. Network Attached Storage: The NAS Architecture, The NAS hardware Architecture, The NAS Software Architecture, Network connectivity, NAS as a storage system. File System and NAS: Local File Systems; Network file Systems and file servers; Shared Disk file systems; Comparison of fibre Channel and NAS.		09 Hrs 08 Hrs
Module-III Storage Virtualization: Definition of Storage virtualization; Implementation Considerations; Storage virtualization on Block or file level; Storage virtualization on various levels of the storage Network; Symmetric and A symmetric storage virtualization in the Network. Module-IV SAN Architecture and Hardware devices: Overview, Creating a Network for storage; SAN Hardware devices; The fibre channel switch; Host Bus Adaptors; Putting the storage in SAN; Fabric operation from a Hardware perspective. Software Components of SAN: The switch's Operating system; Device Drivers; Supporting the switch" components; Configuration options for SANs.		08 Hrs 09 Hrs

		Module-V	08Hrs		
Managemen	t of Storag	ge Network: System Management, Requirement of	**		
management	System, Sup	port by Management System, Management Interface,			
Standardized	Mechanism	s, Property Mechanisms, In-band Management, Use of			
SNMP, CIM	and WBEM	, Storage Management Initiative Specification (SMI-S),			
CMIP and D	MI, Option	al Aspects of the Management of Storage Networks,			
Summary.					
Question pa	per pattern:				
The question	paper will h	ave ten questions.			
There will be	2 questions	from each module, covering all the topics from a module.			
The students	will have to	answer 5 full questions, selecting one full question from e	each module		
Textbooks:					
1.UlfT ropper	ns, Rainer Ei	rkens and Wolfgang Muller: Storage Networks Explained	,		
WileyIndia,2	013.				
Reference Be	ooks:				
1. Robert Spa	lding: "Stor	age Networks The Complete Reference", Tata McGraw-H	Hill,2011.		
2. Marc Farl	ey: Storage	Networking Fundamentals–An Introduction to Storage			
Devices, Sub	Devices, Subsystems, Applications, Management, and File Systems, CiscoPress, 2005.				
3. Richard Barker and Paul Massiglia: "Storage Area Network Essentials A Complete Guide					
to Understand	to Understanding and Implementing SANs", WileyIndia,2006.				
Course outco	omes:				
On completi	on of the co	urse, the student will have the ability to:			
Course	Course	Course Code			
Code	Code				
	CO1	Describe sever storage- and typ	pes of		
	Centric architecture intelligent sub systems				
and their usage.					
CO2 Describe I/O techniques, NAS and Files system.					
24PCN252	24PCN252CO3Demonstrate storage virtualization on various levels of the storage				
		networks.			
	CO4	Illustrate Hardware and software components of storage	e Area		
		Network.			
	CO5	Explain various mechanism of managing SAN.			

Course Title: WEB SECURITY		
Subject Code:24PCN253	Credit: 3	CIE:50
Number of Lecture Hours/Week	4 Hrs	SEE:50
Total Number of Lecture Hours	52 Hrs	SEE Hours:03
Prerequisites:	<u> </u>	
 Course Objectives: To inspire the students with interest, excitemen To understand the fundamental concepts and im To introduce the purpose of learning important requirement of various web based threats. 	t, and urge to learn the subject o web tec plementation of web related issues and subjects in web technology for meeting	hnology. resolution. the
MODULE	S	Teaching Hours
Module-1	1	liouis
Web application security- Key Problem factors user access-handling user input-Handling attacked content Transmitting data via the client –Hidden parameters – Handling client-side data securely. flaws in authentication mechanisms – securing at controls–Common vulnerabilities- Securing access controls-identifying the database SQL injection.	11 Hrs	
Module-1	L	
SQL Injection- How It happens- Dynamic string Configuration- finding SQL injection– Exploiting Common techniquesPlatform level defenses - U application Firewalls - Using Mod Security - Inte	11 Hrs	
Module-II	I	
Web server filters – application filters –securing application data–Locking down the Database ser Blocking common attacks – HTTP finger printing site scripting.	10 Hrs	
Module-IV	V	
Cross-site request forgeries – Shell command e Source code revelation-Directory traversal attack Website defacement – Brute force attack – Direc address of an attacker.	xecution attempts – Null byte attacks– s–Blog spam– tory indexing –Detecting the real IP	11 Hrs

Module– V	
Web server Hacking - Source code disclosure – Canonicalization attacks – Denial of service-Web application hacking – Web crawling-Database Hacking – Database discovery – Database vulnerabilities.	10 Hrs

Question paper pattern:

The question paper will have ten questions.

There will be 2 questions from each module, covering all the topics from a module.

The students will have to answer 5 full questions, selecting one full question from each module **Text Books:**

1. Dafydd Stuttard, Marcus Pinto, The Web Application Hacker"sHandbook,2nd Edition,Wiley Publishing, Inc.

2. Justin Clarke, SQL Injection Attacks and Defense, 2004, SyngressPublicationInc

References:

1. Magnus Mischel, Mod Security2.5,Packt Publishing

2. Stuart McClure Joel, Scamb Ray, George Kurtz, Hacking Exposed 7: Network Security Secrets & Solutions, Seventh Edition, 2012, The McGraw-Hill Companies

Course outcomes: On completion of the course, the student will have the ability to:

Course Code	CO#	Course Outcome(CO)	Blooms Level
	CO1	Illustrate web security concepts and analyze authentication mechanisms	L3
	CO2	Demonstrate SQL injection mechanisms	L3
24PCN253	CO3	Analyze web server filters and demonstrate blocking of common attacks	L4
	CO4	Demonstrate null byte attacks and study cross site forgery methods	L4
	CO5	Demonstrate web server hacking methods	L3

Course Title: NETWORK FORENSICS			
Subject Code:24PCN254	CIE:50		
Number of Lecture Hours/Week	4 Hrs	SEE:50	
Total Number of Lecture Hours	52 Hrs	SEEHours:03	
Prerequisites:	·		
 Course Objectives: To inspire the students with intere forensics. To understand the fundamental co To introduce the purpose of learning the students of th	st, excitement, and urge to learn the sub ncepts of network forensics.	ject of network	
MODU	LES	Teaching Hours	
Modu	le_T	Teaching Hours	
 Introduction to Network Forensics : Concepts in Digital Evidence, Challenges relating to Network Evidence, Network Forensics Investigative Methodology, Technical Fundamentals, Sources of Network-Based Evidence, On the Wire, In the Air, Switches, Routers, DHCP Servers, Name Servers, Authentication Servers, Network Intrusion Detection /Prevention Systems, Firewalls, Web Proxies, Application Servers, Central Log Servers. Module-II Evidence Acquisition: Physical Interception-Cables, Radio Frequency, Hubs, Switches, Traffic Acquisition Software, libp cap and WinP cap The Berkeley Packet Filter (BPF) Language, tcp dump, Wire shark, t shark, dump cap, Active Acquisition- Common Interfaces, Inspection Without Access, Strategy. Traffic Analysis: Protocol Analysis, Protocol Analysis Tools, Protocol Analysis Techniques, Packet Analysis, Packet Analysis Tools, Packet Analysis Taghniques, Elow Analysis, Flow Analysis Tools, Flow Analysis Taghniques, Elow Analysis, Flow Analysis Tools, Elow Analysis 		11 Hrs 10 Hrs	
Module Higher-Layer Traffic Analysis, Comm Layer Analysis Tools, Higher-Layer A Analysis, Process Overview, Sensors, Se Placement, Flow Record Export Protoco and Aggregation, Wireless Traffic Capte Wireless Passive Evidence Acquisition, C Wireless Access Points, Evil Twin, WEP	12 Hrs		
Module Network Devices, Intrusion Detection Functionality, Sniffing , Higher-Layer Suspicious Bits Modes of Detection, Sign Awareness, Behavioral Analysis, Types Acquisition. Advanced Topics: Network Tunneling, Switch Link (ISL), Generic Routing H	10 hrs 22		

Module– V Comprehensive Packet Logging, Event Log Aggregation, Correlation, and Analysis, Sources of Logs - Operating System Logs, Application Logs Physical Device Logs, Network Equipment Logs, Network Log Architecture, Three Types of Logging, Architectures Remote Logging: Common Pitfalls and			
Comprehensive Packet Logging, Event Log Aggregation, Correlation, and Analysis, Sources of Logs - Operating System Logs, Application Logs Physical Device Logs, Network Equipment Logs, Network Log Architecture, Three Types of Logging, Architectures Remote Logging; Common Pitfalls and			
Strategies. Switches-Content-Addressable Memory Table, ARP, Switch Evidence, Routers-Types of Routers, Router Evidence, Firewalls -Types of Firewalls, Firewall Evidence.	09 Hrs		
Question paper pattern:			
The question paper will have ten questions.			
There will be 2 questions from each module, covering all the topics from a module.			
The students will have to answer 5 full questions, selecting one full question from each module			
Text Books: 1. Sherri Davidoff, Jonathan Ham, "Network Forensics: Tracking Hackers through Cyberspace", Pearson Education, 2012.			
References:			
1. Katzendbisser, Petitcolas, "Information Hiding Techniques for Steganography and Digital	and Digital		
Watermarking", Artech House. 42			
2. Peter Wayner, "Disappearing Cryptography: Information Hiding, Steganography and Watermarking 2 nd Edition, Elsevier			
3. Bolle,Connellet.al., "GuidetoBiometrics",Springer			
4. John Vecca, "Computer Forensics: Crime scene Investigation", Firewall Media Christopher			
L.T.Brown, "Computer Evidence: Collection and Preservation", Firewall Media.			
Course outcomes:			
On completion of the course, the student will have the ability to:			
Course Code CO# Course Outcome(CO) Bloon Level	Blooms Level		
CO1Describe the concept of network forensics and evidenceL2	e L2		
collection			
CO2 Demonstrate different network base devidence collection L3 mechanisms	on L3		
24PCN254CO3Analyze network traffic for evidence collectionL4	L4		
CO4 Demonstrate the working of intrusion detection systems and L3 analyze traffic	s and L3		
CO5Analyze network logs for evidence gatheringL4	L4		

Course Title: MINI PROJECT				
Subject Code:24MPS26			Credit:3	CIE:50
Number of Practical Hours/Week/batch		s/Week/batch	4 Hrs	SEE:50
				SEE Hours:03
Pre-requisite: Programming languages, Tools and Operating Systems				
 Course Objectives: Understand formulation of problem Design and develop simple applications using any domain of Computer Science Understand the procedure of documentation and presentation of Mini-project. 				
 Guide lines for Mini project: Student has to carry out literature survey to identify and formulate the problem Student has to design and develop a H/W or S/W model using any domains of Computer Science. Timely evaluation of the mini project will be conducted by concerned guide and reviewer for CIE assessment. At the end of the semester students has to prepare and submit a project report. 				
Course outco On completio	omes: on of the cou	irse. the studer	nt will have the ability to:	
Course Code	CO#	Course Outco	ome(CO)	
	CO1	Demonstrate s	kill to identify and formulate the given	problems.
24MPS26	CO2	Apply basic engineering knowledge learnt in developing system		
	CO3	Evaluate current research status by conducting literature survey.		
	CO4	Design and develop real time applications		
	CO5	Apply the prog model for the organized repo	gramming language for Software Develoimplementation of the Mini-project and ort.	r Software Development Life Cycle Mini-project and prepare well

Title: WEB APPLICATION SECURITY LAB			
Subject Code:24PCNL27	Credit:2	CIE:50	
Number of Practical Hours/Week	1:2:0Hrs	SEE:50	
		SEE Hours:03	
Prerequisites: Computer Networ	rks		
The objective of the course is to	study different tools in security	analysis of web applications	
and perform vulnerability analys	sis.		
List of Programs			
1. Analyze different coding(Base	e64.URL.HTML)and encryption(MD5.SHA1.	
SHA 2etc) mechanisms used	in application.		
2. Build a site map using the app	lication mentioned for analysis.		
3. Experiment to perform web ap	oplication mirroring using HTTra-	ck.	
4. Build a checklist for Authentic to analyze the outcomes.	cation and apply on the web appli	cation	
5. Build a checklist for Session n check on another application.	nanagement and use the same to j	perform manual	
6. Experiment to perform Session	n Hijacking using Web-Goat		
 List Horizontal access Control roles based functionalities 	is in the application and by pass the	he	
8. Experiment to perform SQL Ir	njection in application using mar	nual and automated tools.	
9. Experiment to perform OS Co the attack to gain web shell ac	mmand Injection in application a ccess.	und extend	
10. Build a checklist for file path	traversal attacks to access the ser-	ver internal files.	
11. Experiment to Analyse XML XML External Entities.	Parsers working in the applicatio	on using	
12. Find Business Login flaw usin	g given applications.		
13. Write a program to identify op	oen ports in the IP address		
14. Create a reverse shell for conn	ecting from the victim machine.		
15. Bypass file upload validation a	and gain web shell access to the s	erver.	
16. Execute Cross-Site Scripting in the application and using the same perform Session Hijacking.			
Note: For SEE, students will be a	asked to do similar programs		

Course outcomes: On completion of the course, the student will have the ability to:				
Course Code	CO#	Course Outcome(CO)		
	CO1	Analyze web application/protocols from security perspective.		
	CO2	Demonstrate use of tools used in security analysis.		
24PCNL27	CO3	Illustrate flaws in authentication management, session management and Vertical access control.		
	CO4	Conduct SQL and OS injection in a ethical manner		
	CO5	Demonstrate file path traversal attack and analyze XML parser.		