Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur

An Autonomous Institute Affiliated to RTM Nagpur University

Scheme of Instructions and Syllabus

Scheme of Instructions for First Year M. Tech. Programme in Computer Science & Engineering

Sr.	Course	Compacado	Course Title	т	т	р	Contact	Creadita	Exam Scheme				
No.	Category	CourseCode	Course little	L	I	P	Hrs/week	Creatts	CT - 1	CT - 2	TA / CA	ESE	TOTAL
1.	PCC	MCS1201	High Performance Computer Architecture	4	-	-	4	4	15	15	10	60	100
2.	PCC	MCS1202	TCP/IP and Network Programming	4	-	-	4	4	15	15	10	60	100
3.	PCC	MCS1203	High Performance Computer Architecture Lab	-	-	2	2	1	-	-	25	25	50
4.	PCC	MCS1204	TCP/IP and Network Programming Lab	-	-	2	2	1	-	-	25	25	50
5.	FC	MCS1205	Research Methodology#	2	-	-	2	2	-	-	25	25	50
6.	PEC	MCS1206-08	Professional Elective - III	3	-	-	3	3	-	-	10	60	100
7.	PEC	MCS1209-11	Professional Elective – IV	3	-	-	3	3	15	15	10	60	100
8.	MCC	MAU1202	Audit Course – II (Research Paper Writing)	2	-	-	2	Audit	-	-	-	-	-
			Total	18	-	04	22	18	60	60	115	315	550

Semester – II

TA/CA- Teacher Assessment / Continuous Assessment ESE-L-Lecture **T**-Tutorial **P-Practical** CT1- Class Test 1 CT2- Class Test 2 End Semester Examination (For Laboratory: End Semester Performance)

*- Professional Elective / Audit Course / Open Elective (list is provided at the end of structure)

Students are expected to complete either by attending the classes in college or by appearing online NPTEL/Swayam Certification for 03 credits (course will be consider only after submission of the certificate).





Tutskamji Gai of Engineering & Technology

Tulsiramji Gaikwad Engineerine and

Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur

An Autonomous Institute Affiliated to RTM Nagpur University

Scheme of Instructions and Syllabus

Scheme of Instructions for First Year/Second Year M. Tech. Programme in Computer Science & Engineering

	Semester – I								
	Program Elective - I	Program Elective - II							
MCS1106	Advanced Digital Image Processing	MCS1109	Advanced Operating System Design						
MCS1107	Distributed Databases	MCS1110	Statistical Machine Learning						
MCS1108	Software Architecture	MCS1111	Block Chain Technology						

List of Professional Elective Courses

	Semester – II									
P	rogram Elective - III	Program Elective - IV								
MCS1206	Bioinformatics	MCS1209	Cloud Computing							
MCS1207	Big Data Analytics	MCS1210	Deep Learning							
MCS1208	Information Security	MCS1211	Digital Forensic							

(CSE)

Deptt. (CSE) Tulsiramji Gaikwad-Patil College of Engineering & Technology Mohagaon Wardha Road, Nagpur

GNKWAD

ademics Dean Tulsiramji Gaikwad-Patil College Of Engineering Tanhadaay Maapur

Principal

Tulsiramji Gaikwad Patil College Of Engineering and Technology, Nagpu-

Tulsiramji Gaikwad-Patil College of Engineering and Technology Wardha Road, Nagpur-441 108



Tulsiramji Gaikwad-Patil College of Engineering and Technology Wardha Road, Nagpur-441 108 An Autonomous Institute Affiliated to RTM Nagpur University NAAC Accredited (A+ Grade)Image: College of Engineering and Technology University <br< th=""></br<>									
		Pr	ogram: M. Tech. Computer Science & Engi	ineeri	ng				
Sen	nester	Course Code	Name of Course	L	Т	Р	Credits		
	Ι	MCS1201	High Performance Computer Architecture	03	-	-	03		
Pre-	Requ	isites: Computer	Architecture Organisation.						
Course Objectives:									
1	Prov: techr	ide systematic and niques involved in	comprehensive treatment of the hardware and the current day computing.	softwa	are high	n perfo	rmance		
2	Intro integ	duce the fundament	itals of high performance computing with the grap beir architectures and corresponding programming	onics pi 2 envir	rocessii onmeni	ng unit	s and many		
3	Intro	duce the learner to	fundamental and advanced parallel algorithms the	rough t	he GPU	U and I	MIC		
	prog	ramming environm	ents.	C					
4	Prov	ide systematic and	comprehensive treatment of the components in the	e pipel	ine tha	t extra	ct instruction		
5	Prov	parallelism.	tion on memory hierarchy design and tradeoffs in	both 1	minroc	essor a	und		
5	multi	processors.	aton on memory merareny design and tradeons in	l bour (improc	05501 0	lind		
			Course Contents						
Un	it I	Theory of Parallelism: Parallel Computer Models, The State of Computing, Multiprocessors and Multicomputer, Multivector and SIMD Computers, PRAM and VLSI Models, Architectural Development Tracks, Principles of Scalable Performance: Performance Metrics and Measures, Speedup and Performance Laws.							
Uni	it II	data and control hazards, overview of hazard resolution technique, Dynamic instruction scheduling, branch prediction techniques, Exception handling, Pipeline optimization techniques, Compiler techniques for improving performance.							
Uni	t III	Instruction Level Parallelism: Concepts and Challenges, Basic Compiler Techniques for Exposing ILP, Reducing Branch Costs with Prediction, Overcoming Data Hazards with Dynamic Scheduling, Dynamic Scheduling: Algorithm, Data level and Thread Level Parallelism.							
Uni	t IV	Memory Hierarchies: Basic concept of hierarchical memory organization, Hierarchical memory technology, main memory, Inclusion, Coherence and locality properties, Cache memory design and implementation, Techniques for reducing cache misses, Virtual memory organization, mapping and management techniques, memory replacement policies, RAID.							
Un	it V	Parallel and Sc Interconnect, Cac Multivector and Compound Vector	alable Architecture: Multiprocessors and Mult he Coherence and Synchronization Mechanism, SIMD Computers: Vector Processing Princ r Processing.	icomp iples,	uter: M Multiv	Iultipro vector-	ocessor System Multiprocessor,		
Text	t Book		Deril A. Detterne "Connector And its from A				1.22 5 · E 1.4 · · ·		
T.	1	John. Hennessy & Morgan Kaufman	David A . Patterson, "Computer Architecture A (Publications	quantit	auve a	pproac	11, 3 th Edition,		
T.	2	Kai Hwang and A McGraw-Hill.	Briggs, "Computer Architecture and parallel I	Process	sing",	, Intern	national Edition		
Refe	erence	Books							
R.	.1	Kai Hwang and N Programmability"	aresh Jotwani, "Advanced Computer Architecture: 2 nd Edition, TMH Publications	: Paral	lelism,	Scalab	ility and		
R.	.2	David A. Kular an Publications.	d Jasvinder Pal Singh," Parallel Computer Archite	ecture"	, Morg	an Kau	ıfmann		
Use	ful Liı	nks							
1		https://onlinecou	rses.nptel.ac.in/noc20_me61/preview						
2		https://nptel.ac.in/courses/106/105/106105033/							

	Course Outcomes	PO/PSO	CL	Class Sessions
MCS1201.1	Design , formulate, solve and implement high performance versions of standard single threaded algorithms	PO1,PO2,PO3	6	9
MCS1201.2	Demonstrate the architectural features in the GPU and MIC hardware accelerators.	PO1,PO2,PO3	2	9
MCS1201.3	Design programs to extract maximum performance in a multicore, shared memory execution environment processor	PO1,PO2,PO3	6	9
MCS1201.4	Design and deploy large scale parallel programs on tightly coupled parallel systems using the message passing paradigm.	PO1,PO2,PO3	6	9
MCS1201.5	Ability to work with Multiprocessors and Multicomputer Architecture	PO1,PO2,PO3	3	9

	Tulsiramji An Au	Tulsiramji Gaikwad-Patil College of Engineering and Technology Wardha Road, Nagpur-441 108 An Autonomous Institute Affiliated to RTM Nagpur University NAAC Accredited (A+ Grade)								
Program: M. Tech Computer Science & Engineering										
Semester	Course Code	Name	Name of Course			Р	Credits			
Π	MCS1201	High Performance C	Computer Architecture	3	-	-	3			
		Summary of Rev	visions in the Contents	5						
Unit No.	Modifica	tions Proposed	Source of collection of proposed content			Reason				
	No M	Iodification	RTM Nagpur University			Strengthen PO4 Modern tool usage				

Program: M. Tech Computer Science & EngineeringIITPCreditsMCS1202TCP/IP and Network Programming4004Pre-Requisites: TCP/IP, Computer NetworkTO StUJ TECP/IP, Computer NetworkTO study Terrequisites: TCP/IP protocol suite and routing protocolsTo study the various layers of the TCP/IP protocol suite and routing protocolsTo study the various layers of the TCP/IP protocol suite and routing protocolsTo study the various security protocols, vulnerabilities, attacks and defense mechanismTo study the various security protocols, vulnerabilities, attacks and defense mechanismNetwork Design: IP addressing, Internet work Connectivity -MAU'S, Multiplexers, ebs. Repeaters, Bridges, Routers, layers switches, Hubs, Gate, VLANS, Planning A Network, Network NetworkNetwork Layer: Internet protocol(IP, Address resolution protocol(ARP), Reverse address resolution protocol(ARP), Reverse address resolution protocol(IRCP), Internet control Message protocol(ICMP), Internet protocol(IRCP), Internet protocol (RIP PP PP control protocols, RIP (Routing information protocol), OSPF (Open shortest path First), BGP(Border gateway protocol).Internet vortocols: Unicast Routing Protocols (RIP, OSPF, and BGP), Multicasting and Multicast Routing Protocols.Internet vortocols: Host Configuration: BOOTP and DHCP, Domain Name System (DNS), Hyper Text Transfer: Protocol: HTTP, File Transfer: FTP and TFTP, Electronic Mail: SMTP, POP, and MAP, Network Management: SMMP, World Wide Web: HTTPIterretore vortocol: FTP Protocol Suite", III Edition, Tata McGraw Hill, 2005. </th <th>Y</th> <th colspan="6">Tulsiramji Gaikwad-Patil College of Engineering and Technology Wardha Road, Nagpur-441 108 An autonomous institute affiliated to RTM University, Nagpur NAAC Accredited (A+ Grade)</th> <th>G</th>	Y	Tulsiramji Gaikwad-Patil College of Engineering and Technology Wardha Road, Nagpur-441 108 An autonomous institute affiliated to RTM University, Nagpur NAAC Accredited (A+ Grade)						G			
Sem esterCourse CodeName of CourseLTPCreditsMCS1202TCP/IP and Network Programming4004Pre-Requisite:TCP/IP, computer NetworkNetwork Programming4004Pre-Requisite:TCP/IP, computer NetworkNetwork design1To study traious network elements and devices and Network design2To study traious security protocols, vulnerabilities, attacks and defense mechanism <td></td> <td></td> <td>Progra</td> <th>m: M. Tech Computer Science & Engineering</th> <th></th> <th></th> <th>1</th> <th></th>			Progra	m: M. Tech Computer Science & Engineering			1				
IIMCS1202TCP/IP and Network Programming4004Pre-Requisites:TCP/IP, Computer NetworkContraction: <td< td=""><td>Sem</td><td>ester</td><td>Course Code</td><th>Name of Course</th><th>L</th><th>Т</th><th>Р</th><th>Credits</th></td<>	Sem	ester	Course Code	Name of Course	L	Т	Р	Credits			
Pre-Requisites: TCP/IP, Computer Network Course Objectives: 1 To study twarious network elements and devices and Network design 2 To study the various layers of the TCP/IP protocol suite and routing protocols 3 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism Course Contents Variable Various Recurity Protocol Suite and routing protocol(ARP), Multiplexers, cables, Repeaters, Bridges, Routers, layers switches, Hubs, Gate, VLANS, Planning A Network, Network Design. Network Design: IP addressing, Internet work Connectivity—MAU'S, Multiplexers, cables, Repeaters, Bridges, Routers, layers switches, Hubs, Gate, VLANS, Planning A Network, Network Design. Network Design: IP addressing, Internet work Connectivity—MAU'S, Multiplexers, cables, Repeaters, Bridges, Routers, Iayers switches, Hubs, Gate, VLANS, Planning A Network, Network Design. Network Design: IP addressing protocol(RP), Address resolution protocol((ARP), Reverse address resolution protocol(RAP), Internet control Message protocol(CMP), Internet group management protocol(IGMP) Real Time Traffic over the internet (RTP, RTCP), RTP), Real time transfort protocol strug protocols. RIP (Routing information protocol, OSF (Open shortest path first), BGP(Border gateway protocol) To study the various Super Protocols: Hort Configuration: BOOTP and DHCP, Domain Name System (DNS), Hyper Text Tr		II	MCS1202	TCP/IP and Network Programming	4	0	0	4			
Course Objectives: 1 To study various network elements and devices and Network design 2 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols (SCRP) 4 <td< td=""><td>Pre-</td><td>Requisi</td><td>tes: TCP/IP, Compu</td><th>ter Network</th><th></th><th></th><th></th><th></th></td<>	Pre-	Requisi	tes: TCP/IP, Compu	ter Network							
1 To study various network elements and devices and Network design 2 To study the various layers of the TCP/IP protocol suite and routing protocols 3 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 5 Init III 6 Network Layer: Internet protocol(ICMP), Address resolution protocol(ARP), Reverse address resolution protocol, (RTP) Real time transport protocol (RIP, OSPF, and BGP), Multicasting and Multicast Routing Protocols. RIP (Routing information protocol), OSPF (Open shortest path first), BGP(Border gateway	Cou	Course Objectives:									
2 To study the various layers of the TCP/IP protocol suite and routing protocols 3 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 4 To study the various security protocols, vulnerabilities, attacks and defense mechanism 5 Network Layer: Internet protocol(ICP), Address resolution protocol(ARP), Reverse address resolution protocol(ICMP), Internet group management protocol(ICMP), Real time transport protocols, RIP, OSPF, and BGP), Multicasting and Multicast Routing Protocols. RIP (Routing information protocol, OSPF (Open shortest path first), BGP(Border gateway protocol) 7 Internet vortor Transport Layer: User Datagram Protocol (U	1 '	To study	various network elemer	ts and devices and Network design							
 To study the various security protocols, vulnerabilities, attacks and defense mechanism To study the various security protocols, vulnerabilities, attacks and defense mechanism To study the network programming using Java. Course Contents Course Contents Network Design: IP addressing, Internet work Connectivity –MAU'S, Multiplexers, cables, Repeaters, Bridges, Routers, layers switches, Hubs, Gate, VLANS, Planning A Network, Network Design. Network Layer: Internet protocol(IP), Address resolution protocol(ARP), Reverse address resolution protocol(RARP), Internet control Message protocol(ICMP), Internet group management protocol(IGMP) Real Time Traffic over the internet (RTP, RTCP),(RTP)Real time transport protocol(IGMP) Real Time Traffic over the internet (RTP, RTCP),(RTP)Real time transport protocol,(RTCP) BTP control protocol etc Routing Protocols: Unicast Routing Protocols (RIP, OSPF, and BGP), Multicasting and Multicast Routing Protocols. RIP (Routing information protocol, OSPF (Open shortest path first), BGP(Border gateway protocol) Transport Layer: User Datagram Protocol (UDP), Transmission Control Protocol (TCP), Stream Control Transmission Protocol (SCTP) Application Layer Protocols: Host Configuration: BOOTP and DHCP, Domain Name System (DNS), Hyper Text Transfer Protocol: HTTP, File Transfer: FTP and TFTP, Electronic Mail: SMTP, POP, and IMAP, Network Management: SNMP, World Wide W eb: HTTP Behrouz A. Forouzan, "TCP/IP Protocol Suite", III Edition, Tata McGraw Hill, 2005. Elliote Harold "Java Network Programming "O'relly Publications E. Comer, "Internetworking with TCP/IP Vol-III", (BSD Sockets Version), second Edition, PHI. Reference Books R.1 TCP/IP Network Administration, Craig Hunt, O'Relly Publication. R.2 Internetworking with TCP-IP: Design, Implementation, and Internals, by D. E.	2 '	To study	the various layers of the	e TCP/IP protocol suite and routing protocols							
4 To study the network programming using Java. Course Contents Course Contents Network Design: IP addressing, Internet work Connectivity –MAU'S, Multiplexers, cables, Repeaters, Bridges, Routers, layers switches, Hubs, Gate, VLANS, Planning A Network, Network Design. Network Layer: Internet protocol(IP), Address resolution protocol(ARP), Reverse address resolution protocol(GMP) Real Time Traffic over the internet (RTP, RTCP),(RTP)Real time transport protocol.(RTCP) RTP control protocols (RIP, OSPF, and BGP), Multicasting and Multicast Routing Protocols. RIP (Routing Information protocol), OSPF (Open shortest path first), BGP(Border gateway protocol) Int IV Transport Layer: User Datagram Protocol (UDP), Transmission Control Protocol (TCP), Stream Control Transmission Protocol (SCTP) Mplication Layer Protocols: Host Configuration: BOOTP and DHCP, Domain Name System (DNS), Hyper Text Transfer Protocol: HTTP, File Transfer: FTP and TFTP, Electronic Mail: SMTP, POP, and IMAP, Network Management: SNMP, World Wide W eb: HTTP Text= rece Books Relicite Harol "Java Network Programming "Orelly Publications E. Comer, "Internetworking with TCP/IP Vol-III", III SD sockets Version), second Edition, PHI. Rel Colspan= Konters, But Configuration: Boot E. Comer and D. L. Stevens Vol II, Prentice Hall.	3 '	To study	the various security pro	tocols, vulnerabilities, attacks and defense mechanism							
Course Contents Course Contents Visit I Network Design: IP addressing, Internet work Connectivity –MAU'S, Multiplexers, cables, Repeaters, Bridges, Routers, layers switches, Hubs, Gate, VLANS, Planning A Network , Network Design . Network Layer: Internet protocol(IP), Address resolution protocol(ARP), Reverse address resolution protocol(IGMP) Real Time Traffic over the internet (RTP, RTCP),(RTP)Real time transport protocol,(RTCP) RTP control protocol etc Routing Protocols: Unicast Routing Protocols (RIP, OSPF, and BGP), Multicasting and Multicast Routing Protocols. RIP (Routing information protocol), OSPF (Open shortest path first), BGP(Border gateway protocol) Transport Layer: User Datagram Protocol (UDP), Transmission Control Protocol (TCP), Stream Control Transmission Protocol (SCTP) Transport Layer Protocols: Host Configuration: BOOTP and DHCP, Domain Name System (DNS), Hype Text Transfer Protocol: HTTP, File Transfer: FTP and TFTP, Electronic Mail: SMTP, POP, and IMAP, Network Management: SNMP, World Wide We b: HTTP Text Books TCP/IP Network Administration, Craig Hunt, O'Relly Publications E. Comer, "Internetworking with TCP/IP Vol-III", Stevens Vol II, Prentice Hall.	4 '	To study	the network programmi	ng using Java.							
Image: Instance Network Design: IP addressing, Internet work Connectivity -MAU'S, Multiplexers, cables, Repeaters, Bridges, Routers, layers switches, Hubs, Gate, VLANS, Planning A Network, Network Design. Image:				Course Contents							
Network Layer: Internet protocol(IP), Address resolution protocol(ARP), Reverse address resolution protocol(CMP), Internet group management protocol(IGMP) Real Time Traffic over the internet (RTP, RTCP),(RTP)Real time transport protocol(RTP) Reported PRP control protocol etc. Image: Imag		Unit I	Network Design: Bridges, Routers,	IP addressing, Internet work Connectivity –MAU'S, Mu layers switches, Hubs, Gate, VLANS, Planning A Netw	ltiple: ork , l	xers, c Netwo	ables ork De	, Repeaters, esign .			
Routing Protocols: Unicast Routing Protocols (RIP, OSPF, and BGP), Multicasting and Multicasting Routing Protocols. RIP (Routing information protocol), OSPF (Open shortest path first), BGP(Border gateway protocol) Imit IV Transport Layer: User Datagram Protocol (UDP), Transmission Control Protocol (TCP), Stream Control Transmission Protocol (SCTP) Application Layer Protocols: Host Configuration: BOOTP and DHCP, Domain Name System (DNS), Hyper Text Transfer Protocol: HTTP, File Transfer: FTP and TFTP, Electronic Mail: SMTP, POP, and IMAP, Network Management: SNMP, World Wide W eb: HTTP Text Books T.1 Behrouz A. Forouzan, "TCP/IP Protocol Suite", III Edition, Tata McGraw Hill, 2005. T.2 Elliotte Harold "Java Network Programming "O'relly Publications E. Comer, "Internetworking with TCP/IP Vol-III", (BSD Sockets Version), second Edition, PHI. Reterence Books R.1 TCP/IP Network Administration, Craig Hunt, O'Relly Publication. R.2 Internetworking with TCP-IP: Design, Implementation, and Internals, by D. E. Comer and D. L. Stevens Vol II, Prentice Hall.	I	Unit II Network Layer: Internet protocol(IP), Address resolution protocol(ARP), Reverse address resoluti protocol(RARP), Internet control Message protocol(ICMP), Internet group management protocol(IGMP) Real Time Traffic over the internet (RTP, RTCP),(RTP)Real time transport protocol (PTCP) PTP control protocol etc.						s resolution nanagement e transport			
Transport Layer: User Datagram Protocol (UDP), Transmission Control Protocol (TCP), Stream Control Transmission Protocol (SCTP) Mappication Layer Protocols: Host Configuration: BOOTP and DHCP, Domain Name System (DNS), Hyper Text Transfer Protocol: HTTP, File Transfer: FTP and TFTP, Electronic Mail: SMTP, POP, and NAP, Network Management: SNMP, World Wide Web: HTTP Text Books Text Image: Imag	τ	J nit III	Routing Protocol Routing Protocols gateway protocol)	g Protocols: Unicast Routing Protocols (RIP, OSPF, and BGP), Multicasting and Multicast g Protocols. RIP (Routing information protocol), OSPF (Open shortest path first), BGP(Border y protocol)							
Application Layer Protocols: Host Configuration: BOOTP and DHCP, Domain Name System (DNS), Hyper Text Transfer Protocol: HTTP, File Transfer: FTP and TFTP, Electronic Mail: SMTP, POP, and IMAP, Network Management: SNMP, World Wide W eb: HTTP Text Books T.1 Behrouz A. Forouzan, "TCP/IP Protocol Suite", III Edition, Tata McGraw Hill, 2005. T.2 Elliotte Harold "Java Network Programming "O'relly Publications E. Comer, "Internetworking with TCP/IP Vol-III", (BSD Sockets Version), second Edition, PHI. R.1 TCP/IP Network Administration, Craig Hunt, O'Relly Publication. R.2 Internetworking with TCP-IP: Design, Implementation, and Internals, by D. E. Comer and D. L. Stevens Vol II, Prentice Hall.	τ	U nit IV	Transport Layer Control Transmiss	Transport Layer: User Datagram Protocol (UDP), Transmission Control Protocol (TCP), Stream Control Transmission Protocol (SCTP)							
Text Books T.1 Behrouz A. Forouzan, "TCP/IP Protocol Suite", III Edition, Tata McGraw Hill, 2005. T.2 Elliotte Harold "Java Network Programming "O'relly Publications E. Comer, "Internetworking with TCP/IP Vol- III", (BSD Sockets Version), second Edition, PHI. Reterece Books R.1 TCP/IP Network Administration, Craig Hunt, O'Relly Publication. R.2 Internetworking with TCP-IP: Design, Implementation, and Internals, by D. E. Comer and D. L. Stevens Vol II, Prentice Hall.		Unit V	Application Laye Hyper Text Transf IMAP, Network M	Application Layer Protocols: Host Configuration: BOOTP and DHCP, Domain Name System (DNS), Hyper Text Transfer Protocol: HTTP, File Transfer: FTP and TFTP, Electronic Mail: SMTP, POP, and IMAP, Network Management: SNMP, World Wide W eb: HTTP							
T.1Behrouz A. Forouzan, "TCP/IP Protocol Suite", III Edition, Tata McGraw Hill, 2005.T.2Elliotte Harold "Java Network Programming "O'relly Publications E. Comer, "Internetworking with TCP/IP Vol- III", (BSD Sockets Version), second Edition, PHI.Reference BooksTCP/IP Network Administration, Craig Hunt, O'Relly Publication.R.1TCP/IP Network ing with TCP-IP: Design, Implementation, and Internals, by D. E. Comer and D. L. Stevens Vol II, Prentice Hall.	Text	t Books	·								
T.2Elliotte Harold "Java Network Programming "O'relly Publications E. Comer, "Internetworking with TCP/IP Vol- III", (BSD Sockets Version), second Edition, PHI.Reference BooksR.1TCP/IP Network Administration, Craig Hunt, O'Relly Publication.R.2Internetworking with TCP-IP: Design, Implementation, and Internals, by D. E. Comer and D. L. Stevens Vol II, Prentice Hall.	T .1	Behrouz	z A. Forouzan, "TCP/IP	Protocol Suite", III Edition, Tata McGraw Hill, 2005.							
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R.1TCP/IP Network Administration, Craig Hunt, O'Relly Publication.R.2Internetworking with TCP-IP: Design, Implementation, and Internals, by D. E. Comer and D. L. Stevens Vol II, Prentice Hall.	Refe	erence B	ooks	· · · · · · · · · · · · · · · · · · ·							
R.2 Internetworking with TCP-IP: Design, Implementation, and Internals, by D. E. Comer and D. L. Stevens Vol II, Prentice Hall.	R .1	TCP/IP	Network Administratio	n, Craig Hunt, O'Relly Publication.							
	R.2	Internet Prentice	working with TCP-IP: I Hall.	Design, Implementation, and Internals, by D. E. Comer	and D	. L. S	teven	s Vol II,			
Useful Links	Usef	Useful Links									
1 http://homepages.inf.ed.ac.uk/rbf/CVonline/Imagedbase.htm	1	1 http://homepages.inf.ed.ac.uk/rbf/CVonline/Imagedbase.htm									
2 <u>https://www.cs.cmu.edu/~cil/v-images.html</u>	2	https://v	www.cs.cmu.edu/~cil/v-	images.html							

	Course Outcomes	PO/PSO	CL	Class Sessions
MCS1201.1	Analyze the knowledge of various network devices and planning designing the network for the organization	PO1,PO2, PO3	4	9
MCS1201.2	Evalauate TCP/IP suite and different TCP/IP layers such as network layers, transport layers, application layers.	PO1,PO2, PO3	5	9
MCS1201.3	Analyze the knowledge of network security, protocol security and network attacks, defense mechanism and their vulnerabilities etc. 4	PO1,PO2, PO3	4	9
MCS1201.4	Evaluate basic knowledge of network programming.	PO1,PO2, PO3	5	9
MCS1201.5	Create the routing protocol	PO1,PO2, PO3	6	9

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Program: M. Tech Computer Science and Engineering											
Semester	Course Code	Ν	ame of Course	L	Т	Р	Credits				
II	MCS1202	TCP/IP and Net	work Programming	4	-	-	4				
		Summary of	Revisions in the Content	S							
Unit No.	Modification	s Proposed	Source of collection of propos	Reason							
			VJTI, Mumbai			New Subject					

Ľ,	3	Tulsiramji Gaikwad-Patil College of Engineering and Technology Wardha Road, Nagpur-441 108 An Autonomous Institute Affiliated to RTM Nagpur University NAAC Accredited (A+ Grade)								y	G
]	Program: M	I. Tech. Co	mputer Scie	ence Engi	neerin	ıg			
Seme	ester	Course Code	Name of C	Course				L	Т	Р	Credits
]	I	MCS1105	High Perfe	ormance Co	omputer Ar	chitectur	e	-	-	2	1
Pre-l	Requis	sites: Computer A	Architecture	Organisation	n						
Cour	se Ob	jectives:									
1.	Provide	e systematic and co	mprehensive	treatment of	the hardware	and the so	oftware	high pe	erforma	nce te	chniques
$\frac{1}{2}$	Involve Introdu	ce the fundamental	mputing. Is of high peri	formance cor	nnuting with	the granhi	rs proc	essing	inits ar	nd mar	W
2. i	integrat	ted cores using the	ir architecture	s and corresp	onding prog	ramming er	nvironi	nents.	annts an	ia mai	¹ y
3.	Introdu	ce the learner to fu	ndamental an	d advanced p	oarallel algori	thms throu	igh the	GPU a	nd MIC	C prog	ramming
	environ	iments.	· ·		.1	1	• 1•	.1 .			
4.	Provide parallel	e systematic and co	mprehensive	treatment of	the compone	nts in the p	opeline	that ex	tract in	istruct	10n level
	puration			Cours	e Contents						
-	W	nat are Linear	Pipeline Pro	ocessors an	d Nonlinea	r Pipeline	e Proc	cessors	? Cor	nsider	following
	pip	elined processor	specified by	Reservation	n Table.	-					-
			S1 1	2	3 4	5	6				
			S2 X	37		37	Х				
			S3	Х	V	Х					
			54 85		A V						
			S5 S6	Х	Λ		Х				
	•		20								
		i. List	the set of for	bidden later	ncies and the	collision	vector	ſ.			
		ii. Drav	w a state ti	ransition di	agram show	ving all p	possibl	le initi	ial sec	quence	es (cycles)
		with	out causing a	collision ir	n pipelining.						
		111. List a	all simple cy	cles and gre	x edy cycles.						
		v What	t IS MAL OI t will be may	tins pipeline	e? Johnut of th	s nineline	.?				
		vi. Wha	t will be the	throughput	if minimum	constant o	cvcle i	s used'	?		
2	De	sign Omega netv	work for $\pi =$	(0,7,6,4,2)(1)	,5)(3)with	wo swite	h setti	ng spe	cify ty	pes o	of switches
	• req	uired for designi	ng a network	Χ.							
3	• Ca	se Study on Cra	y Y-MP are	chitecture.							
4	. De	sign and implem	ent TOMAS	ULO'S ALO	GORITHM						
5	• Ca	se Study on Fuj	itsu VP200	0 series sup	percompute	r archited	cture.				
6	• Ca	se Study on Powe	erPC Archite	ecture, IBM	Power7 and	Blue Ger	ne.				
	Ve	ctorize the follow	ving code:				_	_	_		
7. Do[i]=1,N											
		A(I+1)=A(1))+3.14159								
-	0	End do	totion of - 1	no ot	1 00010						
ð T	\sim Sir	nulate implement	lation of a di	rect mapped	i cache.						
Text	BOOK	Hennessy & Day	vid A Dattara	on "Commu	or Arabitaat	re A quert	itativo	annrac	ch" 5	h Edit	ion Morgon
T1	Kau	fmann Publication	S. ratters	on, Comput	Architecti	ne A quant	mative	арргоа	un , 31	in Earth	ion, morgan
Т2	Kai	Hwang and A Bri	ggs . "Compi	iter Architec	ture and para	llel Proces	sing "	Intern	ational	Editic	on McGraw-

	Hill.							
Refere	Reference Books							
R1	Kai Hwang and Naresh Jotwani, "Advanced Computer Architecture: Parallelism, Scalability and Programmability" 2 nd Edition, TMH Publications							
R2	David A. Kular and Jasvinder Pal Singh," Parallel Computer Architecture", Morgan Kaufmann Publications.							
Usefu	l Links							
1	https://onlinecourses.nptel.ac.in/noc20_me61/preview							
2	https://nptel.ac.in/courses/106/105/106105033/							

	Course Outcomes	PO/PSO	CL	Lab Sessions
MCS1104.1	Design , formulate, solve and implement high performance versions of standard single threaded algorithms	PO1,PO2,PO3	4	9
MCS1104.2	List the architectural features in the GPU and MIC hardware accelerators.	PO1,PO2,PO3	3	9
MCS1104.3	Design programs to extract maximum performance in a multicore, shared memory execution environment processor	PO1,PO2,PO3	4	9
MCS1104.4	Design and deploy large scale parallel programs on tightly coupled parallel systems using the message passing paradigm.	PO1,PO2,PO3	6	9
MCS1104.5	Ability to work with Multiprocessors and Multicomputer Architecture	PO1,PO2,PO3	5	9

Ľ	Tulsiramji Gaikwad-Patil College of Engineering and Technology Wardha Road, Nagpur-441 108 An Autonomous Institute Affiliated to RTM Nagpur University NAAC Accredited (A+ Grade)									
	Program: M. Tech. Computer Science Engineering									
Sen	nester	Course Code	Name of Course	L	Т	Р	Credits			
	II	MCS1204	TCP IP & Networking Programming La) -	-	2	1			
Pre	-Requ	isites: TCP/IP an	d Computer Network							
Cou	irse O	bjectives:								
1.	To un	derstand Network P	rogramming Analysis and Design							
2.	To un	derstand Socket Pro	gramming Analysis and Design							
3.	To un	derstand the Electro	nic Communication media management							
			Course Contents							
	1. B	uilding Applicatio	ns in network environment							
	2. C	ient Server socket	programming.							
	3. B	uilding E-Mail sys	tems.							
	4. In	plement FTP , ch	at applications.							
	5. St	udy Linux networ	k command, network security and managem	ent						
	6. U	DP socket program	nming							
	7. M	anaging and tunin	g the TCP connection.							
	8. In	plement RMI,RPC	using JAVA							
Tex	t Bool	KS								
Т	1 "JA	VA Network Progr	amming" Wielly Publications							
Т	2 Lin	ux administration H	andbook by Evi Nemeth, Garth Snyder							
Ref	erence	Books								
R1	"T(CP/IP Essentials" a l	ab based approach by Shivendra Panwar, Shiwer	Mao, J	eong-don	g Ryo	oo, and			
Lieo	i 11 ful I i	an Ll.								
	1 httr	s://onlinecourses n	ntel ac in/noc21_cs69/preview							
	$\frac{1}{2}$ http	s://nptel ac in/course	es/106/106/106106179/							

	Course Outcomes	PO/PSO	CL	Lab Sessions
MCS1104.1	Analyze the knowledge of various network devices and planning designing the network for the organization	PO1,PO2,PO3	4	9
MCS1104.2	Evaluate TCP/IP suite and different TCP/IP layers such as network layers, transport layers, application layers.	PO1,PO2,PO3	3	9
MCS1104.3	Analyze the knowledge of network security, protocol security and network attacks, defense mechanism and their vulnerabilities etc. 4	PO1,PO2,PO3	4	9
MCS1104.4	Evaluate basic knowledge of network programming.	PO1,PO2,PO3	6	9
MCS1104.5	Create the routing protocol	PO1,PO2,PO3	5	9

Y		Tulsiramji Gaikwad-Patil College of Engineering and Technology Wardha Dood, Namur 441,100									
		An Autonomous	Institute Affiliated to RTM	Univers	ity, Nagj	our					
		N	AAC Accredited (A+ Gra	de)							
		Program: M. 7	Sech Computer Science &	Engine	ering	_					
Sen	nester	Course Code	Name of Course	L	T	Р	Credits				
II MCS1205 Research Methodology 3 3											
Pre-Re	equisites:	NIL									
Course	e Objectiv Introductiv	Ves:	ah								
1.	Introductio	on to philosophy of researce	on.	huat ana	possful r	agarah					
2.	Understan	d process of planning and	proposing testing of hypot	hasis		esearch					
$\frac{3.}{4}$	Understan	d different statistical analy	vsis methods	110515.							
5	Develop re	esearch and article writing	skills								
			Course Contents								
	Rese	arch Foundation									
TIn:4	What	t is Research, Objectives o	f Research, Types of Research	rch, Scie	entific						
Unit	I Research	arch, Research and Theo	ory, Conceptual and theore	etical M	lodels, I	Philosophy o	of research,				
	Physi	ical, psychological health	and research.								
	Revi	Review of Literature									
Unit 1	II Need	Need for Reviewing Literature, What to Review and for what purpose, Literature Search Procedure,									
	Source	Sources of Literature, Planning of Review work, Note Taking, Library and documentation									
T T •4 T	Plani	Planning of Research									
Unit I		planning process, Selection	n of a Problem for Research	n, Formu	llation of	t the Selected	Selected Problems,				
	Hype Broo	othesis, Research Design a	tical Analysis of Data	, Kesear	ch Desig	gn/Plan					
	Intro	duction to Statistical Soft	tware Statistical analysis of	of data	MINITA	B SPSS N	lessures of				
Unit I	V Relat	Introduction to Statistical Software, Statistical analysis of data MINITAB, SPSS, Measures of Relationship Simple Regression Analysis Multiple Correlation and Regression Partial Correlation									
	Ques	Questioners Preparation and Presentation Skills Application Orientation in Research									
	Repo	ort and Thesis writing	••••••••••••••••••••••••••••••••••••••	011011							
	Туре	s of Reports, Planning of I	Report Writing, Research Re	eport For	rmat, Pri	nciples of W	riting, Data				
I Init '	and I	and Data Analysis Reporting in a Thesis, Use of Endnote, Language Proficiency, Citations and									
Omt	Plagi	arism, Bibliography, API	, appendix, table, Observa	ations a	rangeme	ent, Preparat	ion of type				
	script	script and lay-out of thesis, Use of LATEX Indexing of Journals, Impact factor and social Media for									
	Rese	archers									
Text B	books			.1			D 11' 1				
T1	Kesearch	1 Niethodology: Methods a	ind Techniques by C. R. Ko	thari, Ne	ew Age	international	Publishers,				
	Statistics	-224-1322-7 I Methods for Research W	Arkers by Fisher P A Coa	smo Pub	lication	New					
T2	Delhi ISI	RN·81_307_0128_6	OIRCIS UY PISHCI R. A., COS		meanona	, INCW					
Refere	nce Book	\$									
	Design a	nd Analysis of Experimen	ts by Montogomerv D.C. (2	2001). Jo	hn Wile	v, ISBN:					
R1	0471260	088	j	,,	.,	, <u> </u>					
	Methodo	logy of Research in Socia	l Sciences by O. R. Krishna	swamy	and M.						
Rangnatham Himalaya publication House, 2005, ISBN: 8184880936											

R3	SPSS online manual
Useful	Links
1	https://nptel.ac.in/courses/127/106/127106227

	Course Outcomes	PO/PSO	CL	Class Sessions
MCS1205.1	Analyze philosophy of research.	PO1,PO2, PO3	4	9
MCS1205.2	Apply conceptual and methodological issues that will conduct successful research	PO1,PO2, PO3	3	9
MCS1205.3	Analyze process of planning and proposing, testing of hypothesis.	PO1,PO2, PO3	4	9
MCS1205.4	Analyze different statistical analysis methods.	PO1,PO2, PO3	4	9
MCS1205.5	Develop research and article writing skills.	PO1,PO2, PO3	6	9

ť	-	Tulsiramji Gaikwad-Patil College of Engineering and Technology Wardha Road, Nagpur-441 108 An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur									
				NAA	AC Accre	edited (A	+ Grade)				
		Pr	rogra	m: M. 7	Fech Con	nputer S	cience Engine	ering	1	1	
Seme	ster	Course Code	Nan	ne of Co	ourse			L	Т	P	Credits
]	II	MCS1206	Bio	o Inforn	natics			3	-	-	3
Pre-F	Pre-Requisites: Advanced Digital Image Processing										
Cou	Course Objectives:										
1.	Lea	rn various algorithm	ms for	sequence	cing and a	alignmen	ts				
2.	Imp	lement proof of con	ncepts	for the	algorithm	n studied	with some sam	ple da	ita		
3.	Eva	luate how networks	s, algo	orithms,	and mode	els are en	nployed in bioi	nform	atics		
					Course	e Conter	nts				
		Introduction, chro	onolog	gical his	story of	Bioinfor	matics, evolut	ion o	f Bioin	formati	ics in CSE,
		Alignment of pair	rs of s	sequence	es; Introd	luction,D	efinition of se	quence	e alignr	nent, M	Iethods ,Dot
Uni	t I	matrix sequence co	compar	rison							
		Sequences: Problem statement, Edit distance and substitution matrices, Global and local									
		alignments, Splice	ed alig	nment, S	Space-eff	ficient see	quence alignme	ent, M	ultiple a	lignme	nt
		Phylogenetic trees	s: Lar	ge parsi	imony an	nd small	parsimony pro	blems	, Proba	bilistic	approaches,
Unit	+ TT	Grammar-based approaches									
		Overview of Gene Control, Working of Genetic Switches, Introductory Systems Biology, The									
		biochemical paradi	ligm, g	genetic p	paradigm	and the s	systems paradig	gm			
TT. 4		Building an Organism Starting From a Single Cell, Quorum Sensing, Programmed Population									
Unit	111	Control by Cell,Ce	ell Co	mmunic	cation and	l Regulat	ed Killing; Ger	ne regu	lation a	t a sing	le cell level
		Transcription Netv	works	basic o	concepts of	coherent	Feed Forward	Loop	(FFL) :	and dela	av gate. The
Unit	IV	incoherent FFL. Te	'empor	ral order	r. Signalin	ng networ	rks and neuron	circuit	s Asne	cts of m	ulti stability
	- '	in gene networks	n gene networks								
		Probabilistic Met	thode	Introd	uction to	n Learni	ng Bayesian	Netw	orks fr	om Da	ata Modeling
Unit	۰V	biological systems. Hidden Merkey models									ita, woodening
Um	. •	Pathways and networks. Micro-arrays. Riomedical images. Genetic Algorithms and applications									
Toyt	Book	r aniways and netw	works,	, 10110-	anays, Di	Iometrica	i intages, Gene		gommi	s and a	spireations
IEXU	DUUK	Don E. Knone, Mich	haalI	Darma	on "Eunde	am antal (Concents of Di	inform	mation ?	Deema	
T.1		Dan E. Krane, Mich		. Kayine	r, r			JIIIOII	natics,	, Pearso	211
		Education, Inc. Fou	$\frac{1}{2}$	$\frac{11100}{5}$	/8080534	46336.	1 4 11 .1	•• •			
T.2	2	Harshawardhan P. H	Bal, "I	Bioinfor	rmatics Pr	rıncıples	and Applicatio	ns", T	ata McC	draw-H	ill,
	:	seventh reprint, 978	801950	692303.							
ТЗ	3	Alon. Chapman & H	Hall/C	CRC Pre	ess"An Int	troductio	n to Systems B	iology	: Desig	n Princi	iples of
1.0	Biological Circuits".										
Refer	rence	Books									
D 1		Teresa Attwood, Da	avid P	Parry-Sn	nith, "Intr	roduction	to Bioinforma	tics", I	Pearson	Educat	tion Series,
K.I	L	9788180301971									
D 7	, [R. Durbin, S. Eddy,	, A. K	rogh, G	. Mitchiso	on., "Bio	logical Sequen	ce Ana	alysis: P	robabil	istic Models
K .2		of proteins and nucleic acids", Cambridge University Press, 9780521629713.									

Useful Li	inks
1	https://archive.nptel.ac.in/courses/102/106/102106065/
2	https://bioboot.github.io/bioinf525_w16/class-material/lecture1-1_525_W16_large.pdf
3	https://onlinecourses.swayam2.ac.in/cec21_bt04/preview

	Course Outcomes	PO/PSO	CL	Class Sessions
MCS1106.1	Analyze Bioinformatics, Method for bioinformatics	PO1,PO2,PO3	4	9
MCS1106.2	Estimate Phylogenetic trees and Gene control and Genome Algorithms	PO1,PO2,PO3	4	9
MCS1106.3	Summarize cell and Quorum Sensing	PO1,PO2,PO3	5	9
MCS1106.4	Evaluate Transcription Networks	PO1,PO2,PO3	5	9
MCS1106.5	Illustrate Probabilistic Methods for bio informatics	PO1,PO2,PO3	6	9

	Tulsiramji Ga An Autonom	Tulsiramji Gaikwad-Patil College of Engineering andTechnology Wardha Road, Nagpur-441 108 An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur NAAC Accredited with A+ Grade									
	Progra	m: M.Tech. Cor	nputer Science & I	Engin	eering	5					
Semester	Course Code	Name o	of Course	L	Т	Р	Credits				
II	MCS1206	Bioinformatics		3	-	-	3				
	Su	immary of Rev	visions in the Co	nten	ts						
Unit No.	Modification	s Proposed	Source of collection of proposed content		Reason						
	Used in Industry p	urpose with	VNIT ,Nagpur	Rea Me	Real time used for making projects Medical field						

र्	Tulsiramji Gaikwad-Patil College of Engineering and Technology Wardha Road, Nagpur-441 108 An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur NAAC Accredited (A+ Grade)								G				
		Pr	rog	ram: N	M. Tec	ch Con	npute	r Science	Engine	ering			
Sen	nester	Course Code	N	ame of	of Cour	rse				L	Т	Р	Credits
	II	MCS1207	Bi	ig Data	ta Anal	lytics				3	-	-	3
Pre-Requisites: Database Management system													
Cou	Course Objectives: At the end of the course students will be able to												
1.	Under	stand the basics of	f bus	siness	analyti	ics and	l its lif	e cycle.					
2.	Gain k	nowledge about fu	unda	lamenta	al busir	ness an	nalytic	s and To a	acquire i	nsigh	t on oth	er analy	ytical
2	Irame	WORKS. modeling for unco	ortoi	intry on	datatia	otionlin	nfaran	as and un	doratord	lonal	tion	ng Ugd	oon and
5.	Learn Man F	educe frameworks	ertai.	inty and	ia statis	stical II	meren	ce and und	Jerstand	anary	fucs us.	ing Hau	oop and
	wiap r	couce frame works			(Cours	e Con	tents					
		Introduction to H	Big	Data:	Charac	cteristi	ics of l	Data ,Clas	sificatio	on of I	Data, Ev	olution	of Big Data
		,Definition of Big	g Da	ata , Cl	halleng	ges wit	th Big	Data ,5Vs	s of Big	Data	, Non l	Definitio	onal traits of
U	nit I	Big Data – Busine	iess l	Intellig	gence v	vs. Big	Data .	Challenge	es of big	data,	Need o	f big Da	ata analytics,
		Importance of big	g da	ta anal	lytics ,I	Big Da	ata An	alytics: Cl	assifica	tion o	f analy	ics.	
		Types of Big Dat	ta A	Analyti	ics: Pre	escripti	ive Ar	nalytics, D	iagnosti	ic Ana	alytics,	Descrip	otive
		Analytics, Predictive Analytics, Cyber Analytics. Comparison of Types of big data analytics.											
Uı	nit II	Big data Architecture : Data source laver. Ingestion laver. Storage laver. Physical Infrastructure											
		layer, Platform management layer etc.											
		Distributed and	nor	rollol o		ting to	big d	ata . Fran	nowork	Tool	· Sal N	0501	
		Introduction to H	u par Uada		Need	of Ha	doon	Limitatio	n of Pl			MC V	
TIn	;+ III	Introduction to Hadoop : Need of Hadoop, Limitation of RDBMS, RDBMS VS HADOOP Hadoop Components Architecture HDES Map Paduace Mappar Paduace Combiner											
U		,Hadoop Components ,Architecture, HDFS ,Map Reduce: Mapper, Reducer, Combiner ,											
		Partuoner, Searching, Sorung, Compression.											
		Technologies har		ing Ric	a data	$- \frac{1}{1000}$	Introd	with Had	DIG(Dat	a flou	$\frac{1}{2}$	ution M	Indes of Pig
		Lechnologies nandling Big data : Pig: Introduction to PIG(Data flow), Execution Modes of Pig, Comparison of Pig with Databases, Pig Latin, Data types used in pig. Data Processing operators											
		Comparison of Pig with Databases, Pig Latin, Data types used in pig, Data Processing operators											
		,rig on Haucop Hive (SOL): Introduction to Hive Hive Shall Hive Services Hive Metestore Comparison with											
Un	it IV	Hive (SQL): Introduction to Hive, Hive Shell, Hive Services, Hive Metastore, Comparison with											
UI.		Spark : Introduction to data analytics with Spark programming with PDDS. Working with kay											
		value pairs Adva	ance	ed snarl	k nrogr	rammi	no	uik, piogi	amming	, within	RDDD	,	ing with key
		Hhase · HBasic (Cor	ncents	Client	ts Exa	mnle	Hhase Ve	rsus RD	BMS			
		Big SOL · Introdu	Rease : Industries, Concepts, Chemis, Example, Hoase Versus KDBMS.										
		Big data analytic	$\frac{1}{1}$ ics t	tools ·	Kafka	Spar	·k An	ache Splu	ink R pi	norar	nming	Data Vi	sualization ·
		Tableau	105 0		ituinu	, opun	к, тр	uene ,opia	init,it pi	ogran		Juliu VI	suullation .
Unit V		CART Algorithm	nn u	ised bi	ig data	analvt	tics Ca	ase study o	on plavi	ng Te	ennis .A	oplicat	ion Big data
		analytics			-8	uning t			on proje				
Tex	t Book												
	T 1	Pries, Kim H. and	d Du	unniga	an, Rob	ert; Bi	ig Data	a Analytics	s - A Pr	actica	l Guide	for Ma	nagers;
	Т.1	CRC Press; 2015.	5.	0									
	Т.2	T 2 Seema Acharva, Subhashini Chellannan, "Big Data and Analytics", Wiley Publication, 2015											

Т.3	Loshin, David; Big Data Analytics - From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph; Morgan Kaufmann; 2013.
Reference	Books
R .1	Marz, Nathan and Warren, James; Big Data - Principles and Best Practices of Scalable Real- Time Data Systems; Manning Publication; 2015.
R.2	Prajapati, Vignesh; Big Data Analytics with R and Hadoop; Packt Publishing; 2013.
Useful Lin	ks
1	https://nptel.ac.in/courses/106/105/106105036/
2	https://nptel.ac.in/courses/106/105/106105172/

	Course Outcomes	РО	CL	Class Sessions
MCS1207.1	Analyze Big data analytics characteristic ,Challenges with real world	PO1,PO3	4	9
MCS1207.2	Categorize types of Big Data analytics and Architecture	PO1,PO2,PO3	5	9
MCS1207.3	Evaluate Big data with Distributed and parallel computing and Analyze Hadoop,Mapreduce	PO1,PO2,PO3	5	9
MCS1207.4	Differentiate various technology handling big data : Hive,Spark ,Hbase	PO2,PO3	6	9
MCS1207.5	Estimate Big data analytic tools and Case study on it	PO1,PO2,PO3	4	9

		Tulsiramji Gaikwad-Patil College of Engineering and Technology Wardha Road, Nagpur-441 108 An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur NAAC Accredited (A+ Grade)									
Program: M. Tech Computer Science & Engineering											
Semester		Course Code	Name of	Course	L	Т	Р	Credits			
II		MCS1207	Big Data Analytics		3	-	-	3			
		Su	immary of Revisi	ons in the Cont	ents						
Unit No.	Init No. Modifications Proposed			Source of collectio conte		Reason					
New Subject			Anna University, C	time project in stry							

	Tulsiramji Gaikwad-Patil College of Engineering and Technology Wardha Road, Nagpur-441 108 An Autonomous Institute Affiliated to RTM Nagpur University NAAC Accredited (A+ Grade)									
	Pro	ogram: M. Tech C	omputer Science I	Engine	ering					
Semeste	r Course Code	Name of Course			L	Т	Р	Credits		
II	MCS1208	Information And	Cyber Security		3	-	-	3		
Pre-Req	uisites: - Nil									
Course	Objectives: At the e	nd of the course stu	dents will be able t	0						
1. To 1	earn the foundations	of Information of	cyber security	1 1		• .1	1. 1.1	•,•		
$\frac{2}{2}$ To 1	become familiar with	the design technol	ogies for individua	ils and j	persoi	ns with	disabil	ities.		
5. 101	earn the guidennes i	or mormation and	rse Contents							
		Cou	ise contents							
Unit I	Overview of sec Architecture, sec Internetwork Secu	urity , Need of Inf curity mechanisms urity.	ormation Security, . Security Attack	, Attrib cs, Sec	utes curity	of secu servic	rity, O æs, A	SI Security model of		
Unit II	Unit IIConventional Encryption: Classical Encryption Techniques and Problems on classical ciphers, Security architecture. Introduction to Secret key and cryptography, Encrypt given messages using DES, AES, IDEA, IDEA, RC5,Problems on cryptography algorithms, stream cipher, block cipher modes of operation, key distribution.									
Unit III	Functions, Messa HMAC, CMAC,	ge authentication co Digital signatures	odes, Hash Functio	ons, Sec	ure h	ash algo	orithm,	Whirlpool,		
Unit IV	Authentication Infrastructure, Bio Security Technol Devices,	Applications: Kenometric Authenticat ogy, IDS, Scannir	beros, X.509 Au ion. Ig and Analysis T	thentica	ation Crypt	Servic ography	e, Puł , Acc	olic – Key ess Control		
Unit V	WEB SECURIT (TLS), Secure 1 FIREWALL: Fin Case Studies on Elections, Single Vulnerability.	Y: Requirements, S Electronic Transac rewall Design princ h Cryptography sign On, Secure I	Secure Socket Laye tion (SET), Intru iples, Trusted Syste and security: Sec nter-branch Payme	er (SSL uders, ems. cure M ent Tra) and Virus Iultip nsacti	Transp ses and arty Ca ions, C	ort La l relat alculati ross si	yer Security ted threats. ton, Virtual te Scripting		
Text Bo	oks									
T.1	Michael E Whitma Publishing House,	n and Herbert J Ma New Delhi, 2003	attord, Principles of	f Inform	natior	Securi	ty, Vik	as		
T.2	T.2 Cryptography and Network Security - Principles and Practice: William Stallings, Pearson Education, 6th Edition									
Referen	ce Books									
R.1	R.1 Cryptography and Network Security: Forouzan Mukhopadhyay, Mc Graw Hill, 3rd Edition									
Useful L	Useful Links									
1	https://nptel.ac.in/c	courses/106106129								
2	https://nptel.ac.in/c	courses/106106178								

	Course Outcomes	РО	CL	Class Sessions
MCS1208.1	Identify the need of Information Security, OSI Security Architecture, Conventional Encryption	PO1,PO2,PO3	2	9
MCS1208.2	Relate the traditional encryption method to conventional encryption.	PO1,PO2,PO3	6	9
MCS1208.3	Apply message authentication and hash function for the data security.	PO1,PO2,PO3	4	9
MCS1208.4	Use security application and Technologies.	PO1,PO2,PO3	3	9
MCS1208.5	Apply web security and there tools.	PO1,PO2,PO3	3	9

	An Autor	Tulsiramji Gaikwad-Patil College of Engineering and Technology Wardha Road, Nagpur-441 108 An Autonomous Institute Affiliated to RTM Nagpur University NAAC Accredited (A+ Grade) Program: M. Tech Computer Science & Engineering									
Program: M. Tech Computer Science & Engineering											
Semester	Course Code	Name of	Course	L	Т	Р	Credits				
II	MCS1208	Information And	Cyber Security	3	-	-	3				
		Summary of Revisi	ions in the Conter	nts							
Unit No.	Modifica	tions Proposed	Source of coll proposed co		Reason						
	New Subject		Anna University,	Chen	nai	Ind	ustry needs				
			JNTU,Haidrabad				Strengthen PO5 Modern tool usage				

र्		Tulsiramji An Autono	Tulsiramji Gaikwad-Patil College of Engineering and Technology Wardha Road, Nagpur-441 108 An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur <u>NAAC Accredited (A+ Grade)</u> Program: M. Toch Computer Science Engineering														
		Pr	Prog	ogran	<u>m: M.</u>	[. Tech	h Cor	mpu	iter S	Scienc	ce En	gine	ering	1			
Sen	nester	Course Code		Nam	ne of (Cours	se						L	Т	_	Р	Credits
	<u> </u>	MCS1209	(Clou	ud Co	omput	ting						3	-		-	3
Pre	-Requ	isites: NIL	1	1 - 6 41	(1					1.1.							
	urse U	Djectives: At the en	end	1 OI th	the cou	ourse s	studen	$\frac{1}{2}$	VIII De	e able				u ha		antad	fuere ether
1.	1. Understand the principles, techniques, protocols and algorithms that can be adapted from othe distributed computing peredigms to the development of successful clouds									from other							
2	Appl	v cloud-practices an	and	l ann	licatic	ons a	and hi	ighlig	$\frac{1000}{1000}$	early	denlo	vme	nt exr	erienc	25		
3.	Unde	erstand about the clo	lou	id sec	curity	y and r	privac	cv cc	oncer	ots an	d im	oleme	entatio	on strat	egi	ies.	
						(Cours	se Co	onter	nts	1				0		
		Overview : Clou	oud	d con	mputi	ing ,7	Taxor	nomy	y, H	istory	y of	Clou	d co	nputin	g,	Type	s, Services,
	• / •	Application ,Com	mpa	ariso	ons: Cl	Cluster	r, Gric	d and	d Clo	oud , I	Issues	ς,					
U	nit I	Cloud deployme	nent	t me	nodel:	Publ	lic cl	louds	s, Pri	ivate	clou	d,C	ommı	inity c	lot	ud ,H	ybrid cloud
		,Advantages of Cl	Clou	oud co	comput	iting, l	Regul	larity	y issu	ues: C	Gover	nmer	nt poli	cies.			
		Cloud Architectu	ture	e Mo	[odels]	Layer	ers in o	clou	d arc	hitect	ture,						
		Services : 1.Softw	twa	are as	s a Sei	ervice	(SaaS	S), fe	eature	es of	SaaS	and	benefi	its,			
Ur	nit II	2.Platform as a Se	2.Platform as a Service (PaaS), features of PaaS and benefits.														
		3.Infrastructure as a Service (IaaS), features of IaaS and benefits, Service providers, challenges															
		and risks in cloud	d ad	dopt	tion.									-			-
		Cloud Simulato	ors	s- C	CloudS	Sim a	and (Gree	enClo	ud I	ntrod	uctio	n to	Simul	atc	or, un	derstanding
		CloudSim simulator, CloudSim Architecture(User code, CloudSim, GridSim, SimJava)															
Un	it III	Understanding W	Wor	rking	g plat	tform	for C	Clou	ıdSim	ı, Inti	roduc	tion	to Gr	eenClo	oud	l. Dis	scovery and
		Load- Clouds: Hig	ligh	h- thr	rough	nput sc	cience	e usi	ing th	e Nir	nrod	Tool	Fami	ly			•
		Application deve	velo	opme	ent- S	Securi	ity lev	vel of	of thir	d par	ty - s	ecuri	ty ber	efits			
		Need of VMW f	for	r Clo	loud c	compu	uting	: Si	imula	tor B	asics	of V	MWa	re, adv	an	itages	of VMware
		virtualization, us	ising	ng V	Vmwai	are wo	orksta	ation	n, cro	eating	g vir	tual	mach	ines-ui	nde	erstanc	ling virtual
		machines, create	e a	new	v virtu	ual m	achin	ne or	n loca	al ho	st, cl	oning	g virtu	ial ma	chi	nes, v	virtualized a
Un	it IV	physical machine,	ie, s	starti	ing an	nd sto	opping	g a v	virtua	l mac	chine	.Buil	ding (Cloud 1	Net	twork	s Designing
		and Implementing	ng a	a Da	ata Ce	enter-l	Based	d Clo	oud I	Instal	ling (Open	Sour	ce Clo	ıd	servic	e. Amazon
		Web Services (A	AW	VS). (Googl	gle Clo	oud P	latfo	orm								
		Cloud Security a	an	nd St	torage	ge : Cl	loud	Infra	astruc	cture	Secu	rity, 1	Identi	ty and	ac	cess n	nanagement
		Architecture, IAM	Мp	pract	tices in	in the	cloud	d, Cl	loud	Secur	rity ar	nd M	anage	ment,	Sec	curity	and Privacy
		issues in Cloud.	-	-							-		•			-	
Ur	nit V	Storage Systems	ıs a	and	Stora	age V	/irtua	aliza	tion:	Stor	age 1	Devic	es, F	ile Sys	ter	ms an	d Volumes,
		Storage Networks	ks,	Stor	rage N	Model	ls on c	cloud	d.		-						
		Tools : Docker at	Tools : Docker at a Glance: Process Simplification, Broad Support and Adoption. Architecture.														
	Getting the Most from Docker, The Docker Workflow																
Tex	xt Bool	KS															
	T.1	Cloud Computing	g: 1	Prine	nciples	s, Sys	stems	and	d Ap	plicat	tions,	Ant	onop	oulos,	Nil	kos, (Gillam, Lee
		(Eas.), Springer	<u>σ</u> , D	Dring	ciples	and T	Darad	liam	c Do	ikum	ar D.	11/1/0	Iamo	e Broh	ore	n and	Andrzej M
	T.2	Goscinski, Wiley, 2	ы. , 20	011	cipies	anu I	i ai au	ngills	., к а	JKUIII	a Di	• y ya,	Jaine		υĘ	5 anu	<i>i</i> muizej 1 vi .

т 2	Microsoft Azure: Enterprise Application Development, R. J. Dudley and N. A. Duchene, SPD
1.5	Publication.
Referenc	e Books
D 1	Cloud Security and Privacy An Enterprise Perspective on Risks and Compliance By Tim Mather,
K.1	SubraKumaraswamy, ShahedLatif Publisher: O'Reilly Media
рγ	Cloud Computing: Concepts, Technology & Architecture by Thomas Erl, ZaighamMahmood
К.2	Ricardo Puttini
Useful Li	nks
1	https://archive.nptel.ac.in/courses/106/104/106104182/
2	https://archive.nptel.ac.in/courses/106/105/106105167/
3	https://archive.nptel.ac.in/courses/106/105/106105223/

	Course Outcomes	РО	CL	Class Sessions
MCS1209.1	Analyze the principles, techniques, Types of Cloud computing	PO1,PO2,PO3	4	9
MCS1209 .2	Differentiate services of cloud computing Illustrate Cloud computing architecture	PO1,PO3	4	9
MCS1209 .3	Analyze the cloud simulators and security purpose of Cloud computing	PO1,PO2,PO3	5	9
MCS1209.4	Estimate use of Virtualization technique in cloud computing	PO1, PO2	4	9
MCS1209 .5	Evaluate the Security purpose of cloud and Categorize the various tools of Cloud computing	PO1,PO2,PO3	6	9

	An Autono	Gaikwad-P War omous Institut NAA	atil College of Engineering and otha Road, Nagpur-441 108 te Affiliated to RTM Nagpur Univers AC Accredited (A+ Grade)	ity, Na	anolog Agpur	gy	G				
	Program: M. Tech Computer Science & Engineering										
Semester	Course Code		Name of Course	L	Τ	Р	Credits				
II	MCS1209		Cloud Computing	3	-	-	3				
		Summary	of Revisions in the Contents								
Unit No.	Modifications	Proposed	Source of collection of proposed	Reason							
Unit V	To know implemen	ntation of	Anna University, Chennai	Tools Indus appli	s used in stry and its cation						

y	4	Tulsiramji Gaikwad-P	atil College of Engineerin	ng and T	Fechno l	ogy					
F	●	War	dha Road, Nagpur-441 108	Inivarit	u Noonu						
3		All Autonomous mistru	AC Accredited (A+ Grade)	Universit	y, Magpu	11					
		Program: M. To	ech Computer Science & En	gineerin	ø						
Sem	ester	Course Code	Name of Course	L	Т	Р	Credits				
	Π	MCS1210	Deep Learning	3	-	-	3				
Pre-	Reaui	sites: Machine Learning, Arti	ficial Neural Networks	_							
Cour	rse Ot	ojectives:									
1.	Und	erstand complexity of Deep Le	earning algorithms and their li	mitations							
2.	Be c	apable of performing distribut	ed computations;								
3.	3. Be capable of performing experiments in Deep Learning using real-world data										
			Course Contents								
		Introduction:Machine learn	ing : History, Types of Ma	achine L	earning,	Adva	ntages and				
		Disadvantages of ML, Need of	Deep learning.								
		Introduction to neural network	Orks:	formund	nourol	notuv	orlz Doolz				
Uni	it I	1.Artificial Neural fietwor	K : Artificial fieuron, reed-	lorward	neurai	netwo	лк , Баск-				
		2. Deep Neural Network Types Percentron Training Pule Forward Neural network									
Forward Neural Networks ,Back propagation neural network ,Gradient Descent & F											
		Propagation Algorithm : Grad	lient Descent, Stochastic Gradi	ent , Van	ishing G	radier	nt problem				
		Introduction to deep learnin	g: Defination, Importance,	Types of	f Deep L	earni	ng:				
Uni	f TT	Networks: Feed forward neural network., Radial basis function neural networks, Multi-layer									
UIII	ι 11	perceptron.,Convolution neural network (CNN),Recurrent neural network.									
		Application of Deep learning	in real time.	1 4							
T T •/		Deep learning architecture) learning architectures: LSTM, GRU, Encoder/Decoder Architectures, Deep learning								
Unit		Autoencoder and DBM	Denoising Auto encoders, A	Adversari	al Gene	rative	Networks,				
	,	Types of Algorithms used in	Deen Learning: Convolution	al Neura	l Networ	ks (C	NNs) Long				
		Short Term Memory Netwo	orks (LSTMs).Recurrent Neu	ral Netw	orks (R	NNs).	Generative				
Unit	IV	Adversarial Networks (GANs	s),Restricted Boltzmans mach	ine (RBN	A),Radia	al Bas	is Function				
		Networks (RBFNs), Multilay	er Perceptrons (MLPs),Self	Organiz	ing Map	os (SC	OMs),Deep				
		Belief Networks (DBNs)									
		Convolutional Neural No	etworks: CNN Architectur	es ,Conv	olution	,Pooli	ing Layers				
		,Variants of the Basic Conv	olution Function ,Structured	Outputs	, Data 🛛	Гуреѕ	, Efficient				
Uni	t V	Convolution Algorithms, Rar	ndom or Unsupervised Featur	es,LeNet	, AlexNe	et					
		Deep learning tools- NumP	y.,Keras,TensorFlow,Installat	tion of K	eras and	Tens	orFlow for				
Toyt	Book	Deep learning.									
т	1	Coodfollow I Pongio V and	A Deep Courville A Deep Learnin	a MIT D	·						
T.	1	Introduction to Artificial Neural	Systems PV Jacob M. Zurada	g, witt Fl	1855, 2010	•					
Т.	2			0014 41	1 7	1 0					
Т.	Tamara Munzer, Visualization Analysis and Design -, CRC Press 2014 Alexandru Telea, Data										
	Visualization Principles and Practice CRC Press 2014										
Refe	rence l	Books									
R .	1	Deep Learning: A Practitioner	r's Approach by Josh Patterson	n,Adam (Gibson						
Usefu	ıl Link	XS									
1		http://www.cit.edu.in/wp-conte	ent/uploads/2019/12/M.E.CSE-C	urriculum	-and-Sylla	abus-2	019.pdf				

Course code	Course Outcomes	PO/PSO	CL	Class Sessions
MCS1210.1	Analyze the Machine Learning and Categorize Neural network	PO2, PO3	4	9
MCS1210.2	Evaluate Deep learning types and application in real time	PO1,PO2, PO3	4	9
MCS1210.3	Illustrate Deep learning architecture	PO1,PO2, PO3	6	9
MCS1210.4	Differentiate the Algorithm used in Deep learning	PO1, PO3	4	9
MCS1210.5	Estimate CNN and Tools for Deep learning : Keras,Numpy	PO1,PO2, PO3,PO5	6	9

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	Program	: M. Tech Cor	nputer Science and	Engin	eering					
Semester	Course Code	Name of Course			Т	Р	Credits			
II	MCS1210	Deep Learnir	ıg	3	-	-	3			
	Su	mmary of R	evisions in the Co	ontent	S					
Unit No.	Modifications	Proposed	Source of collection content	posed	Reason					
Unit no I-IV	New Sul	oject	VNIT Sylla	Research oriented programming skill						
Unit no V	one can use in Ind	ustry	VNIT Sylla	Strength	PO5					

	An Autono	kwad-Patil College of Engine Wardha Road, Nagpur-441 mous Institute Affiliated to RTM NAAC Accredited (A+ Gra	eering a 108 Nagpur de)	nd Te	chnology sity	G					
	Progra	m: M. Tech Computer Science &	z Engine	eering							
Semeste	er Course Code	Name of Course	L	Т	Р	Credits					
II	MCS12011	Digital Forensics	3	-	-	3					
Pre-Req	uisites: Basic of Cyber S	Security									
Course	Objectives:										
1. To	b learn about examination	n, preventing and fighting digital c	rimes								
2. To	o model about data acqui	sition and storing digital evidence									
3. To	explore operating system	m file structure, file system and mo	obile dev	vice fore	nsics and its						
ac	quisition procedures										
	D' ' LE	<u>Course Contents</u>	· T		1.D' '/ 1	г ·					
	Digital Forensics	overview-Difference between co	mputer I	orensic	s and Digital	Forensics,					
Unit	I Digital Forensics	Digital Forensics in today's world, Computer Forensics investigation process, Forensics									
	computer forensic	computer forensics evidence and courts legal concerns and private issues									
	Understanding	Digital Forensic Investigati	on–Digi	tal Fo	rensics Life	e Cycle-					
	Understanding ke	Understanding key steps in Forensics investigation, Role of forensic investigator - Ethics of									
Unit	II a forensic investig	a forensic investigator-challenges faced by forensic investigators. Understanding Computing									
	Investigations –	Investigations - Procedure for corporate High-Tech investigations, understanding data									
	recovery work sta	tion and software, conducting and	investiga	ations.		-					
	Data acquisition-	understanding storage formats an	d digital	evidenc	ce, determinir	ng the best					
Unit I	II acquisition metho	acquisition method, acquisition tools, validating data acquisitions, performing RAID data									
	acquisitions, remo	te network acquisition tools, other	forensic	s acquis	itions tools.						
Unit I	v Processing crimes	Processing crimes and incident scenes, securing a computer incident or crime, seizing digital									
	evidence at scene,	evidence at scene, storing digital evidence, obtaining digital hash, reviewing case.									
	Current computer	Current computer forensics tools- software, hardware tools, validating and testing forensic									
Unit	v software, address	sing data-hiding techniques, per	forming	remote	e acquisition	s, E-Mail					
Unit	investigations- in	vestigating email crime and vio	lations,	understa	unding E-Ma	il servers,					
	specialized E-Mai	l forensics tool.									
Text Bo	oks										
T1 $\begin{bmatrix} V \\ V \end{bmatrix}$	Warren G. Kruse II and Jay Wesley, 2002.	G. Heiser, "Computer Forensics: Inci	dent Res	ponse Es	sentials", Addi	son					
	Nelson, B, Phillips, A, Enfin	nger, F, Stuart, C., "Guide to Compute	er Forens	ics and Ir	vestigations, 2	2nd ed.,					
12]	Thomson Course Technolog	gy, 2006, ISBN: 0-619-21706-5.									
Referen	ce Books										
R1 I	R1 Vacca, J, Computer Forensics, Computer Crime Scene Investigation, 2nd Ed, Charles River Media, 2005, ISBN: 1-58450-389.										
Useful I	Links										
$1 \frac{h}{d}$	ttps://www.nitt.edu/home/a ligital forensics/	academics/departments/cse/programm	nes/mtech	/curricul	um/semester_1	/electives/					
2 h	ttps://onlinecourses.swaya	m2.ac.in/cec20_lb06/preview									

	Course Outcomes	PO/PSO	CL	Class Sessions
MCS1211.1	Analyze how to apply forensic analysis tools to recover important evidence for identifying computer crime.	PO1,PO2, PO3	4	9
MCS1211.2	Develop well-trained next-generation computer crime investigators.	6	9	
MCS1211.3	Explain data acquisition techniques as forensic tool	PO1,PO2,/PO3	4	9
MCS1211.4	Evaluate crime scenes and how to store digital evidences	PO1,P 9 2, PO3	5	9
MCS1211.5	Design computer forensic tools	PO1,PO2, PO3	6	9

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	Program	i: M. Tech Co	mputer Science and	Enginee	ring	I			
Semester	Course Code	Name of Course L		Т	Р	Credits			
II	MCS1211	Digital Forensics		3	-	-	3		
	Su	mmary of F	Revisions in the C	ontents					
Unit No.	Modifications Proposed Source of collection content				on of proposed ent		Reason		
	New Sul	bject	Technical and Generic Skills from Search Conference, JNTU Hyderabad		Strengthen PO1 Engineering knowledge and Research oriented programming skill				

HOD

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Dean Academics Tulsiramji Gaikwad-Patii College Of Engineering and Technology, Nagpur



Principal Tulsiramji Gaikwad Patil College Of Engineering and Technology, Nagpur