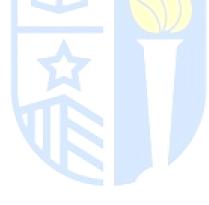
B.E.COMPUTER AND COMMUNICATION ENGINEERING Regulation 2019 OPEN ELECTIVES (OE)

(Offered by Department of Computer and Communication Engineering)

SI. No.	Course Code	Course Title	Category	Contact Periods	L	т	Ρ	с
1	U19CC601	Multi-Core Architecture and Programming	OE	3	3	0	0	3
2	U19CC602	Service Oriented Architecture	OE	3	3	0	0	3
3	U19CC603	Network Protocols	OE	3	3	0	0	3
4	U19CC604	Software Defined Networks	OE	3	3	0	0	3
5	U19CC605	GPU Architecture and Programming	OE	3	3	0	0	3
6	U19CC606	High Speed Networks	OE	3	3	0	0	3
7	U19CC607	Introduction to Industrial Networking	OE	3	3	0	0	3
8	U19CC608	Basics of Mobile Communication	OE	3	3	0	0	3
9	U19CC609	Introduction to Wireless Communication Networks	OE	3	3	0	0	3



U19CC	C601	MULT	I - CORE ARCHITECTURE AND PROGRAMMING	L 3	T O	P 0	C 3
		After o	completion of this course, the students will be able to				
		CO1	Visualize Multi-core Processors and its different architectures				<1
Outco	omes	CO2	Express knowledge about the synchronization primitives in ch parallel program	nalleng	ges in	1	<2
		CO3	Observe to develop shared memory programming with Open M	IP			<2
		CO4	Apply distributed memory programming with MPI				<3
		C05	Illustrate parallel architecture for real time scenarios				<2
MODUL	LE-I	IN	TRODUCTION TO MULTI-CORE PROCESSORS				9
	etric an I progra		ibuted Shared Memory Architectures – Cache coherence - Pe gn.	erform	ance	Issue	s -
MODUL			RALLEL PROGRAM CHALLENGES Dility – Synchronization and data sharing – Data races – Synchr				9
(conditi			naphores, barriers) – deadlocks and livelocks – communicatic signals, message queues and pipes).	on bei	tween	une	ads
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	CO1	Recall XML	fundar	mentals a	nd builc	d applica	tions based	d on XML	-		K1
	CO2	Summarize	e the t	he key p	rinciples	s and se	ervices of S	OA to p	erform	the	K2
		service con	npositi	on							112
Outcomes	CO3	Compare the	he diffe	erent web	service	s and W	'S standard	S			K2
	CO4	Choose we	eb serv	vices exte	ensions	to dev	elop soluti	ions for	real	time	K
		application									IX.
	CO5	Model and	d desi	gn a se	ervice-o	riented	system u	ising ar	chitect	ural	
		principles,	devel	lopment	method	ds with	n SOA ar	nd serv	ice-rel	ated	K
		technologie	es syste	ematically	and ef	fectively	/				
10DULE-I	XML					DTD					9
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10DULE III	WEE	B SERVICES	(WS)	AND ST	ANDAR	DS	-	AP – Ser	vice d	iscove	9 ery
IODULE III Veb Services P	WEE	B SERVICES Service de	scriptic	AND ST	ANDAR DL - M	DS lessaging	g with SOA	\P – Ser	vice d	iscove	-
IODULE III Veb Services P IDDI – Service-	WEE latform – Level Inte	B SERVICES Service de	scriptic erns –	AND ST/ ons – WSI Orchestra	ANDAR DL - M	DS lessaging	g with SOA	\P – Ser	vice d	iscove	-
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U19CC603	NETW	VORK PROTOCOLS	Т	Ρ	С
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	After	completion of this course, the students will be able to			
	60.1	Understand the Basics of Protocols, Addressing and its Functi	ions	in	142
	CO1	Computer Networks.			K2
	CO2	Identify the Different Types of IP Addressing and its Functions	in tl	he	К2
Outcomes		Networks.			
	CO3	Summarize Functionalities of Internet Protocol and its Elements.			K1
	CO4	Describe and Analysis the Basics of TCP Protocol Design	n ai	nd	K4
		Operations. Identify the Different Types TCP/IP Family of Network Protocols	with	vin	
	CO5	the Network.	WILI		K2
MODULE-I	PRO	TOCOLS AND STANDARDS			10
		s- Internet Standards-Protocol Layers-OSI Reference Model-TCI	P/IP	Prot	осо
uite-Addressing	: Physica	al, Logical, Application And Port Addressing.			
ODULE-II	ΤΡ ΔΙ	DDRESSING			8
		n- Range of Addresses-Classful Addressing: Classes And Blocks	s- Tı	wo-L	-
		And Supernetting-Classless Addressing: Variable-Length Blocks			
ddressing- Block	 Allocati 	ion.			
10DULE III	INT	ERNET PROCOCOL			8
CP/IP Protocol	Suite -D	Datagram-Fragmentation-Opt <mark>ions- Checks</mark> um-Security: Packet Sni	iffing	, Pa	cke
		-IP Packaging-Internet Control Message Protocol: Messages and Fo	orma	ts- E	rro
Reportina-Ouerv-	Checks	um- Internet Control Message Protocol Design.			
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MODULE IV	TRA	NSMISSION CONTROL PROTOCOL	`		9
MODULE IV Process To Proce	TRAN ss Com	NSMISSION CONTROL PROTOCOL munication -TCP Services -Segment -Options- Checksum-Flow C			rro
MODULE IV Process To Proce Control- TCP Tin	TRAN ss Com	NSMISSION CONTROL PROTOCOL			rro
MODULE IV Process To Proce Control- TCP Tin	TRAN ss Com	NSMISSION CONTROL PROTOCOL munication -TCP Services -Segment -Options- Checksum-Flow C			irro
MODULE IV Process To Proce Control- TCP Tin Design.	TRAN ss Com mers-Co	NSMISSION CONTROL PROTOCOL munication -TCP Services -Segment -Options- Checksum-Flow C onnection-State Transition Diagram-Congestion Control-TCP Op			TCF
MODULE IV Process To Proce Control- TCP Tin Design. MODULE V	TRAI ess Comi mers-Co	NSMISSION CONTROL PROTOCOL munication -TCP Services -Segment -Options- Checksum-Flow Connection-State Transition Diagram-Congestion Control-TCP Ope	erati	on-	TCF
MODULE IV Process To Proce Control- TCP Tip Design. MODULE V Jser Datagram	TRAN ss Comi mers-Co TCP/ Protoc	NSMISSION CONTROL PROTOCOL munication -TCP Services -Segment -Options- Checksum-Flow Connection-State Transition Diagram-Congestion Control-TCP Operators /IP FAMILY PROTOCOLS col: UDP Services-UDP Applications-File Transfer Protocol:	eratio Conr	on-	TCF
MODULE IV Process To Proce Control- TCP Tin Design. MODULE V Jser Datagram Communication-C	TRAN ess Commens-Co TCP/ Protoc	NSMISSION CONTROL PROTOCOL munication -TCP Services -Segment -Options- Checksum-Flow Connection-State Transition Diagram-Congestion Control-TCP Ope	eratio Conr	on-	TCF 10
MODULE IV Process To Proce Control- TCP Tin Design. MODULE V Jser Datagram Communication-C	TRAN ess Commens-Co TCP/ Protoc	NSMISSION CONTROL PROTOCOL munication -TCP Services -Segment -Options- Checksum-Flow Connection-State Transition Diagram-Congestion Control-TCP Operations /IP FAMILY PROTOCOLS col: UDP Services-UDP Applications-File Transfer Protocol: d Processing-File Transfer-Anonymous FTP-Security For FTP	erati Conr P- H	on- nectio	TCF
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	U19CC604	SOF	WARE DEFINED NETWORKS	L 3	T O	P O	C 3
		After	completion of this course, the students will be able to	5	U	U	3
		CO1	Understand the fundamentals of software defined r	netwo	orks.		K2
		CO2	Implement the operation of SDN control plane	with	differ	ent	
	Outcomes		controllers.				K3
	outcomes	CO3	Apply the use of SDN in the current networking sce	enario).		К3
			Utilize the Interfaces and tools for SDN Programmi				К3
				iigi			
		CUS	Design and develop various applications of SDN.				К5
M	ODULE-I	FUN	DAMENTALS OF SOFTWARE DEFINED NETWOR	KS			9
Εv	olving network	require	ements-The SDN Approach: Requirements, SDN Architect	ture,			
			rking, SDN and NFV-Related Standards: Standards-Dev	elopir	ng Org	anizat	ions
[n	dustry Consort	ia, Oper	n Development Initiatives.				
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	ODULE-II	-	N FLOW & SDN CONTROLLERS		Deeed	0	9
			 Drawbacks of Open SDN, SDN via APIs, SDN via Hyper Device – SDN Controllers – General Concepts. 	visoi -	Daseu	Overia	ays -
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M	ODULE III	DAT	A CENTERS				9
Mι	ultitenant and	Virtualiz	zed Multitenant Data Center - SDN Solutions for the D	ata C	enter	Netwo	ork -
VL	ANs – EVPN –	VxLAN -	- NVGRE.				
	ODULE IV		PROGRAMMING				9
			orthbound Application Programming Interface, Current				
			- Network Functions Virtualization (NFV) and Softwa	re De	efined	Netw	orks:
CO	ncepts, impler	nentatio	on and Applications.				
М	DDULE V		LICATIONS				9
			- IETF SDN Framework - Open Daylight Controller -	Flood	liaht C	ontrol	-
	ndwidth Calen		- IETF SDN Framework - Open Daylight Controller -	FIOOU	igni C	ontroi	ier -
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	XT BOOKS						
TE	William Stal	lings, "	Foundations of Modern Networking", Pearson Ltd.,20	016.			
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1			and Chuck Black, -Software Defined Networks	: A	Comp	brehe	nsiv
1		irct Edi	tion, Morgan Kaufmann, 2014.				
1	Approach, F	iist Lui					
1 2		iist Lui	tion, morgan Raumann, 2014.				
1 2	Approach, F EFERENCES		tion, morgan Raumann, 2014.				
1 2 RE	FERENCES			Reilly	Media	, 201	3.
1 2 RI 1	FERENCES Thomas D. I	Nadeau	, Ken Gray, —SDN: Software Defined Networks, O'R				
1 2 RI 1	FERENCES Thomas D. I SiamakAzod	Nadeau					
1 2 RI 1 2	FERENCES Thomas D. I SiamakAzod 2013.	Nadeau Iolmolk	, Ken Gray, —SDN: Software Defined Networks, O'R y, —Software Defined Networking with Open Flov	v, Pa	cket l	Publis	shing
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1 2 RI 1 2	FERENCES Thomas D. I SiamakAzod 2013. Vivek Tiwari	Nadeau Iolmolk , —SDI :or,- Ne	, Ken Gray, —SDN: Software Defined Networks, O'R y, —Software Defined Networking with Open Flov	v, Pa vices	cket I , Inc.,	Publis	shin <u>c</u> 3.

U19CC605	GDU		CTURE AND PROGRAMMIN	IG	L	Т	Р	С
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	After	completio	n of this course, the students	s will be able to				
	C01	Identify	GPU Architecture.					К3
	CO2	Make us	e of programs using CUDA, i	dentify issues ar	nd debug	them.		K3
Outcomes	CO3	Experim	ent with efficient algorithm	ns in GPUs for	common	applic	ation	K3
		kernels,	such as matrix multiplication	n				
	CO4	Build sir	nple programs using OpenCL	-				K3
	CO5	Interpre	t efficient parallel programm	ing patterns to s	olve prol	olems		K2
MODULE-I			LS OF GPU ARCHITECTURE					9
10DULE-II	MULT	I GPU AN	locks, Grids, Warps, Schedul I D CUDA ns – Optimizing CUDA Appl		_			9 morv
			d Usage, Resource Contentio			•		
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	J19CC606	нтен	SPEED NETWORKS	L	Т	Р	С
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		After o	completion of this course, the students will be able to				
		CO1	Understand the Basics of Architecture of ATM and High Sp	peec	l LANs	5.	K2
		CO2	Able to Understand and Analyse the Congestion Control Scenarios within the Packet Switching Networks.	rol	in Va	rious	K2
	Outcomes	CO3	Describe and Analysis the a Range of Traffic Management	ts In	ATM.		K4
		CO4	Explain the Basic Taxonomy in High Speed Wirele	ess	LANs	and	
			Architecture Implementation.				K2
		CO5	Compare and Select Appropriate Modes in Wireless ATM N	Vetw	vorks.		K4
М	DDULE-I	HIGH	SPEED NETWORKS				9
٩s	ynchronous T	ransfer	Mode – ATM Protocol Architecture, ATM Logical Connectio	on –	• ATM	Cell -	ATM
5e	rvice Catego	ries – A	AL. High Speed LANs – Fast Ethernet – Gigabit Etherne	et –	Fibre	Chan	nel –
Wi	reless LAN's A	Applicati	ons, Requirements – Architecture Of IEEE 802.11.				
М	DDULE-II	QUEU	ING ANALYSIS AND CONGESTION CONTROL				9
Sir	ngle Server Q	ueues -	Multiserver Queues - Queues with Priorities - Networks of	of Q	ueues	-Effe	cts of
Со	ngestion – C	Congesti	on Control - Traffic Management - Congestion Control	in	Packe	t Swit	ching
Ne	tworks – Frar	ne Relay	Congestion Control.				
М	DDULE III	ATM	CONGESTION CONTROL				9
Tra	affic and Cong	gestion (Control in ATM – Requirements – Attributes – Traffic Mana	agen	nent F	rame	Work
			Control in ATM – Requirements <mark>– Attribut</mark> es – Traffic Mana Traffic Management – ABR Rate Control – RM Cell Form	-			
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Outcomes	CO2	(Understand) Explore and study cellular system corresource availability	oncepts	base	d on	K2
	CO3	(Analyze) Analyze the performance of various modula	ition so	hemes	5.	K4
	CO4	(Understand) Understand the concepts of various MI	MO sys	tems.		K2
	C05	(Understand) Understand the basic wireless networki	ng con	cepts.		K2
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MODULE II	CELLI	LAR COMMUNICATION CONCEPTS				9
		ncy reuse - channel assignment - handoff - co	overac	ie and	d cap	-
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