

B. Tech. Scheme of Examination & Syllabus 2023-24

INFORMATION TECHNOLOGY

III Semester B. Tech. (Information Technology)

Sr. No	Course Code		K K Hd	ours oer eek		Credits	Maximum Marks		
		Course Title	L	Т	Р		Continual Assessment	End Sem Examination	Total
1	AS310T	Applied Mathematics – III	4	-	-	4	30	70	100
2	IT301T	Data Structures	3	-	-	3	30	70	100
3	IT301P	Data Structures Lab	-	-	4	2	25	25	50
4	IT302T	Computer Network	3	1	-	4	30	70	100
5	IT302P	Computer Network Lab	-	-	2	1	25	25	50
6	IT303T	Computer Architecture and Organization	3	1	-	4	30	70	100
7	IT304P	Computer Lab - 1	-	-	2	1	25	25	50
8	H102	Universal Human Value - II	3	-	-	3	30	70	100
9	IT305T	Career Development - I	2	-	-	0		Audit	
		Total	18	2	8	22	225	425	650

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Chairman - BoS	Dean – Academics	Date of Release	Version	2023-24



(An autonomous institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech. Scheme of Examination & Syllabus 2023-24

INFORMATION TECHNOLOGY

THIRD SEMESTER

As310T Applied Mathematics-III 4 0 4 CA ESE Total 30 Total 70 Image: The aim of this course is The aim of this course is To introduce the essential concepts of Numerical Computational techniques & Theory of Probability. Students will be able to Analyze and solve problems by numerical computation and statistics. Students will be able to Image: The aim of this course is and statistics. Total information and statistics. Students will be able to Analyze and solve problems requations. Identify angineering problems related to Matrices: Eigen value & Eigen vectors & Functions of Matrices. Image: The aim of this course is and statistics. Apply various concepts of vectors paces. Apply various concepts of vectors of Matrices. Apply various concepts of vectors and the course is and solve problems. Image: The aim of this course is and statistics. Eigen value and Eigen vector by Iteration method. Euler modified method, Runge Kutta method. [9Hr5] Image: The aim of the course is and transformation. Sylvester's theorem. [10Hr5] [10Hr5] Vector Space: Subspaces, Linear Dependence/Independence, Basis, Dimension, Linear transformation, Range Space and Rank, Null Space and Nullity. Rank nullity theorem, Matrix Representation of a linear transformation, Linear transformation, Streage Space and Rank, Null Space and Nullity. Rank nullity theorem, Matrix Representation of a linear transformation, Linear transformation, Range Space and	Cours	e Code	Course Name		Th	Tu	Pr	Credits	E	Evaluation	
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Course Objectives Course Course The aim of this course is Students will be able to • To introduce the essential concepts of Numerical Computational techniques & Theory of Probability. Students will be able to • To familiarize the students with concepts in linear algebra and statistics. Analyze and solve problems to numerical computation and statistics. • Unit I • Use statistical methods on transcendental equations and System of linear equations. • Unit I • Use statistical methods and tools in engineering problems. • Unit I • Use statistical methods and tools in engineering problems. • Unit I • Use statistical methods and tools in engineering problems. • Unit II • Use statistical methods and tools in engineering problems. • Matrices: Linear dependence of vectors, Characteristics equation, Eigen values and Eigen vectors, Reduction to diagonal torm, Reduction of quadratic form to canonical form by orthogonal transformation, Linear transformation, Linear Operators on R ⁿ and their representation as square matrices. Unit IV [10Hrs] Probability: Baye's rule, Review of discrete and continuous random variable, Marginal probability function and Conditional distribution of discrete random variable, Marginal probability function and Conditional distribution. [9Hrs] Probability: Baye's rule, Review of discrete and continuous random variables, Alternative hypothesis, I-test, F-test and Chi square test. [10Hrs]								0	0		
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B. Tech. Scheme of Examination & Syllabus 2023-24

INFORMATION TECHNOLOGY THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Eva	aluation			
IT301T	Data Structures	3	-		3	CA	ESE	Total		
						30	70	100		

Course Objectives			Cour	se Outcomes	5	
This • •	 This course is intended To imbibe basic data structures for searching and sorting – hash tables, trees, heaps, and the computational complexity of the searching and sorting algorithms that use these structures. To make intelligent decisions about alternative data structures and algorithmic techniques in the context of practical software problems To give emphasis on design and implementation of abstract data structures. To give emphasis on design and implementation of abstract data structures. To use appropriate data structures for solving various applications depending on behavioral properties. 		Students will to Demonstrate algorithms, and searching algorit Implement AD' Illustrate the of implementation Select and us structures like tre Use an approp like graph and representation problem	be able to the concep d implement thm T such as Sta operation on se appropriate e for data re oriate non Lin hashing teo for solving	t of analysis of t various sorting ack & Queue linked list through e non Linear data presentation hear data structures chniques for data data organization	
Unit I	: Algorithm, Searching & Sorting					[8Hrs]
An int asymp and B	roduction to algorithm, time and space ana ototic notations-Big O notations, omega not inary search, Selection sort, Bubble sort, In	lysis of ation & sertion	algorithm, genera theta notation. Av sort, Shell sort, qu	al concept of data /erage , Best, Wor uick sort	structure, typ st case analy	es of data structures. sis, Searching-Linear
Unit I	I: Stacks and Queues					[8Hrs]
Definition and Terminology, ADT stack and its operations, applications of stacks: Expression conversion and evaluation. ADT queue and its operation, Types of queue: Simple queue, circular queue, priority queue, double ended queue. Application of					on conversion ouble ended o	and evaluation. ADT queue. Application of
queue	Unit III: Linked Lists					
queue Unit II	II: Linked Lists					[8Hrs]
queue Unit I Singly insert Circu	II: Linked Lists y linked lists: Representation in memory, op ion into, deletion from linked list.Linked lis lar linked list, Doubly linked list, Circular do	peration t repre	on linked list, alg sentation of Stacl ked list; Applicatio	orithms of several k and Queue, Typ n of Linked Lists.	operations: T bes of linked l	[8Hrs] raversing, searching, list: Singly linked list,
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ST. VINCENT PALLOTTI COLLEGE OF ENGINEERING & TECHNOLOGY, NAGPUR (An autonomous institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech. Scheme of Examination & Syllabus 2023-24

INFORMATION TECHNOLOGY

THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits		Evaluation	
IT301P	Data Structures Lab		-	4	2	CA	ESE	Total
						25	25	50

Course Objectives	Course Outcomes
This course is intended	Students will be able to
 To imbibe basic data structures for searching and sorting – hash tables, trees, heaps, and the computational complexity of the searching and sorting algorithms that use these structures. To make intelligent decisions about alternative data structures and algorithmic techniques in the context of practical software problems To give emphasis on design and implementation of abstract data structures. To compare the efficiency of various sorting algorithms in terms of both time and space. To use appropriated structures for solving various applications depending on behavioural properties. 	 Demonstrate the concept of analysis of algorithms, and implement various sorting searching algorithm Implement ADT such as Stack & Queue Illustrate the operation on linked list through implementation Select and use appropriate non Linear data structures like tree for data representation Use an appropriate non Linear data structures like graph and hashing techniques for data representation for solving data organization problem

Expt. No.	Experiments based on
1	Implementation of Searching Sorting algorithm
2	Implementation of ADT-Stack
3	Implementation of ADT-Queue
4	Implementation of Linked & its operation
5	Implementation of non linear data structure-TREE
6	Implementation of non linear data structure-Graph

Reference Books

SN	Title	Authors	Edition	Publisher
1	Data Structures and Algorithm in Java	Goodrich, Tamassia	6th	Wiley publication
2	Introduction to Algorithms	T. H. Cormen, C. E. Leiserson, R. L.Rivest, C. Stein	зrd	MIT Press
3	Data structures using Java	Y. Langsam, M. J.Augenstein and A.M. Tanenbaum		Pearson Education
4	Murach's Java Programming	J. Murach	4th	Shroff Publishers
5	A Simplified Approach to Data Structures	V. Goyal, L. Goyal, P. Kumar	1st	Shroff Publishers

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B. Tech. Scheme of Examination & Syllabus 2023-24

INFORMATION TECHNOLOGY

THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluatio	n	
IT302P	Computer Network Lab			2	1	CA	ESE	Total
						25	25	50

Course Objectives	Course Outcomes
 This course is intended To delivers the fundamentals of computer network To discuss and focuses on network architectures, protocols and applications, techniques for encoding and modulation. 	 Students will be able to Learn and apply the concepts of computer network for real time system connection and communication. Analyze data link layer protocol peer to peer mode for handling data. Apply the knowledge of network layer concepts for subnetting. Implement the routing protocols for network route identification. Interpret and apply the concepts for installing and configuring DHCP.

Expt. No.	Experiments based on
1	Study of different types of Network cables and Network Devices practically implement the cross wired cable and straight
	through cable using clamping tool
2	Connect the computers in Local Area Network and demonstrate the data sharing and hardware sharing
3	Write a program for error detection and correction Hamming Codes or CRC.
4	Write a program to simulate Go back N and Selective Repeat Modes of Sliding Window Protocol in peer
	to peer mode and demonstrate the packets captured traces using Wireshark Packet Analyzer Tool for peer to peer mode
5	Write a program to demonstrate subnetting and find the subnet masks.
6	Demonstrate the packets captured traces using Wireshark Packet Analyzer Tool for peer to peer mode
7	Write a program for encryption decryption technique.
Tayt Daaka	

SN	Title	Authors	Edition	Publisher	
1	Computer Networking -A Top-Down Approach,	James F. Kurose	7 th	Pearson Publication	
2	Data Communications and Networking	Fourauzan B.	3rd	Tata McGraw-Hill Publications,	
3	Computer Networks	Tanenbaum A.	4 th	PHI	

SN	Title Authors		Edition	Publisher	
1	An Engineering Approach to Computer Networking	Keshav S	2 nd	Pearson Education,	
2	Computer Networks and Internet	Comer D.,	2 nd	Pearson Education,	
3	Local Area Networks	S.K.Basandra & S. Jaiswal	3rd	Galgotia Publications	
4	Data and Computer Communication				

Om	workpande	June 2023	1.1	Applicable for
Chairman - BoS	Dean – Academics	Date of Release	Version	2023-24



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B. Tech. Scheme of Examination & Syllabus 2023-24

INFORMATION TECHNOLOGY

THIRD SEMESTER

Course	e Code	Course Name	;		Th	Tu	Pr	Credits	s E	Evaluation		
ľ	T302T	Compute	r Network		3			3	CA	ESE	Total	
									30	70	100	
	Cour	se Objectives		Cou	rse O	utcome	es					
This	course is	intended	Students will be able to									
• T	o delivers	the fundamentals of	• Le	 Learn broad overview of computer networking and the Internet 								
C	omputer ne	etwork	• In	terpret s	severa	al impor	tant lin	k-layer c	oncepts and	technologies		
•	o discuss	s and focuses on	• Re	eflects a	a mode	ern viev	v of the	network	layer's role i	n computer n	etworking.	
	otocole	and applications	• Us	se peda	agogic	approa	ach to plomor	discuss	riansport-lay	er principies	and now	
te	chniques	for encoding and	• St	tudv in-r	denth (secure	commi	inication	and how con	ons Nouter networ	ks can be	
m	odulation.	ion. defended from intruders										
Unit I:	Computer	Networks and the Inte	ernet								[8Hrs]	
What Is	the Interr	net? The Network Edge	, The Networ	k Core,	Delay	/, Loss,	and T	hroughpu	ut in Packet-	Switched Net	works,	
Protoco	l Layers a	nd Their Service Models	, Encapsulat	ion, Net	works	Under	Attack	History	of Computer	Networking a	nd the	
Interne	t, Wireless	s Links and Network C	Characteristics	s ,WiFi:	802.	11 Wire	eless L	ANs ,Ce	ellular Intern	et access, N	lobility	
Manage	ement: Prii	nciples, Mobile IP ,Mana	aging Mobility	in Cellu	ular Ne	etworks	,Wirele	ess and I	Mobility: Imp	act on Higher	-Layer	
Protoco	IS. The Link	Lover and LANe									[6Uro]	
Introdu	ction to the	Layer and LANS	ction and -Co	rrection	Tech	niques	Multin		s Links and	Protocols Sw	vitched	
Local A	rea Netwo	orks. Link Virtualization:	A Network as	s a Link	Laver	Data (Center	Network	ing .Retrosp	ective: A Dav	in the	
Life of a	a Web Pag	je Request.			,	,						
Unit III:	Network	Layer									[6Hrs]	
Overvie	ew of Netw	work Layer ,What's Ins	ide a Router	r?, The	Interr	net Prot	tocol (IP): IPv4	, Addressing	g, IPv6, and	More,	
Genera	lized Forw	arding and SDN ,Routing	ng Algorithms	,Intra-A	AS Ro	uting in	the In	iternet: C	SPF ,Routin	g Among the	ISPs:	
BGP ,T	he SDN C	ontrol Plane, ICMP: The	Internet Con	trol Mes	ssage	Protoco	ol,Netw	ork Man	agement and	SNMP.	F011 - 1	
Unit IV	: Transpo	rt and Application Lay	er Multin Lauin				0		T		[8Hrs]	
Roliable	ction and	ransport-Layer Service	s, Multiplexing	g and D			, Coni	nectionie	ss Transport	: UDP ,Princij stwork Applic	ples of	
The We	h and HT	TP Electronic Mail in the	Internet DNS	S—The	Intern	et's Dir	ectory 3	Service	Peer-to-Peer	Applications	Video	
Stream	ing and Co	ontent Distribution Netwo	orks,	0 1110	intern	oto Bii	ootory			, applications,	Thate	
Unit V:	Security	in Computer Networks									[8Hrs]	
What I	s Network	Security? Principles o	f Cryptograph	hy, Mes	ssage	Integrit	y and	Digital S	, Signatures	Cryptographic	Hash	
Functio	ns, Messa	age Authentication Cod	e, Digital Sig	natures	,End-	-Point A	Authen	tication,	Securing E-I	Mail ,Securing	g TCP	
Connec	tions, Net	work-Layer Security: IF	sec and Virt	ual Priv	ate N	etworks	s (VPN), Securi	ing Wireless	LANs ,Opera	ational	
Securit	y: Firewalls	s and intrusion Detection	n Systems									
SN	00K5	Title			Autho	ors	Editio	n	Р	ublisher		
1	Compute	r Networking -A Top-Do	wn	James	F. Ku	irose		h	P	earson Public	ation	
	Approach	۱,										
2	Data Co	ommunications and Net	working	Foura	uzan I	В.	3 r	d	TataMcGra	w-Hill Publica	itions,	
3		Computer Networks	ks Tanenbaum A. ₄th PHI									
Referen	ce Books	•	•									
SN		Title			4	Authors	5	Ec	dition	Publis	sher	
1	An Engir	neering Approach to Cor	nputer Netwo	rking		Keshav	v S	2 r	nd	PearsonE	ducation,	
2	Co	omputer Networks and I	nternet	ternet Corr		Com	er D.,	2 r	nd	PearsonE	ducation,	
3		Local Area Network	S		S	.K.Basa	ndra 8	S. 31	ď	Galgotia Pu	blications	
						Jais	swal			-		
4	Data	a and Computer Commu	unication									

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THIRD SEMESTER

Course Code	Course Name	Th	Гu	Pr	Credits	Evaluation		
IT303T	Computer Architecture and Organization	3	-	-	3	CA	ESE	Total
						30	70	100

Course Objectives	Course Outcomes
 This course is intended To understand the design of the various functional units and components of computers. To make the students understand the basic operations involved in execution of an instruction. To Explain the basic concept of interrupts and their usage to implement I/O control and data transfers. To explain the function of each element of a memory hierarchy. 	 Students will be able to Summarize the organization and operation of digital computers. Study and apply knowledge of processor instruction sets and its execution. Demonstrate computer arithmetic operations on integer and floating-point numbers. Describe the organization of memory system. Explain concepts of I/O organization and pipelining of a processor.
Unit I: Basic structure of computer	[8Hrs]
Eurotional Unite Architecture of a small accumulator based CPU	A typical CPI I with gaparal register organization Instruction

Functional Units, Architecture of a small accumulator based CPU, A typical CPU with general register organization, Instruction execution cycle, Addressing modes, Instruction Format.

Trocessing onit. Execution of a complete instruction, beque	neing of control oignais, types of buses, oingle, 1 wo, multiple bus				
structure					
Unit II: Computer Arithmetic	[6Hrs]				
Binary Addition, Addition and subtraction, Multiplication of unsigned binary integers, Booth's algorithm for Two's complemer multiplication unsigned, Unsigned binary division, IEEE Floating-Point representation, Floating Point arithmetic.					
Unit III: Control Unit	[6Hrs]				
Control Unit operation: Introduction, Micro-operations, Control of the Processor, Hardwired implementation, Micro programmed control : Microinstruction formats, Micro programmed control unit, Functioning of micro programmed control					
unit, Microinstruction sequencing techniques.					
Unit IV: The Memory System	[8Hrs]				
Internal organization of memory chip, Static memories, Dynamic RAMs, Read-Only Memories, Memory interleaving, Cache Memory, Mapping techniques, Virtual memory, Memory Management requirements, I/O modules, Programmed I/O, Interrupt-Driven I/O, DMA.					
Unit V: Pipelining and parallel Processing	[8Hrs]				
Pipelining: Introduction, Pipeline organization, Pipelining issue of parallel processor systems, Vector processing	s, Memory delays, Branch delays, Parallel Processing, Types				

Processors: RISC & CISC Processors, Pentium processor, superscalar processor

Text	t Books			
SN	Title	Authors	Edition	Publisher
1	Computer Organization	V. Carl Hamacher	₄th	Mc GrawHill
2	Computer Organization and Design	David A.Patterson & John L. Hennessy Morg.	4th	
Refe	erence Books			
SN	Title	Authors	Edition	Publisher
1	Computer Architecture & Organization	William Stallings		
2	Computer Architecture & Organization	John P Hayes	зrd	Mc GrawHil

and	workpande	June 2023	1.1	Applicable for
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INFORMATION TECHNOLOGY

THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
IT304P	Computer Lab - 1	-	-	2	1	CA	ESE	Total
						25	25	50

Course Objectives	Course Outcomes			
This course is intended To develop required computer hardware skills in students so that they are able to acquire the competency such as Identify faults, troubleshoot, repair and do preventive maintenance of computer system and its Peripherals.	 Students will be able to Learn & Identify computer peripherals and Microprocessor kit. Demonstrate the installation of Operating Systems and device drivers. Interpret the configuring and maintenance process of various components in computer system and peripheral devices. Identify various faults, repair them and learn how to maintain computer system and its peripherals. 			

Expt. No.	Experiments based on
1	Study of computer peripherals. Processor, Motherboard, Harddisk, CD/DVD ROM, Monitor, SMPS, Safty Precautions.
2	Study and Configuration of BIOS.
3	Assembling of Personal Computer.
4	Partitioning Hard disk
5	Installation of Operating System (windows, linux, ubuntu etc).
6	Execution of basic commands (unix, linux,ubuntu etc).
7	Study Networking Basics and execution of networking commands.
8	File and Printer Sharing in Network.
9	Structured Cabling.
10	Building a Small Home Network.
11	WI-FI Basics.
12	Protecting PC From Virus, Spyware and Malware.
13	Study of cache memory, memory mapping by using simulators.

Text Books

S N	Title	Authors	Edition	Publisher
1	Computer Installation and Servicing	D Bala Subramanian		Tata McGraw Hill Education Private Limited
2	The complete PC Upgrade & Maintenance Guide	Mark Minasi		BPB Publications
3	IBM PC and clones	Govind Rajalu		Tata McGraw Hill Education Private Limited

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ST. VINCENT PALLOTTI COLLEGE OF ENGINEERING & TECHNOLOGY, NAGPUR (An autonomous institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

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INFORMATION TECHNOLOGY

THIRD SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
IT305T	Career Development-I	2	-	-	0	CA ESE Tota		Total
						Audit		

Course Objectives	Course Outcomes				
This course is intended to suit the need of the outgoing students and to acquaint them with frequently asked patterns in quantitative aptitude and logical reasoning during various examinations and campus interviews	 Students will be able to Enhance personality to deal with the various problems of a professional world Express and demonstrate the right soft skills Solve basic and complex mathematical problems in short time. perform well in various competitive exams and placement drives Compete in various competitive exams like CAT, CMAT, GATE, GRE, GATE, UPSC,GPSC etc 				
Unit I	[6Hrs]				
(Part-3 Power Cycle, Successive Division	Introduction to Numbers(Part-1: Divisibility Test, LCM/HCF Problems)Numbers(Part-2: Factorization, Remainder Theorem)Numbers (Part-3 Power Cycle, Successive Division, Puzzles).				
Unit-II	[6Hrs]				
Introduction to Simple Equations, Ratio	, Proportion & variation, Percentage, Clocks and Calendars				
Unit-III	[6Hrs]				
Analogy(number/Letter/ Word./Figure An	nalogy, Cube & Dice Problems, Extempore Speaking.				
Unit-IV	[6Hrs]				
Vocabulary Building Synonyms & Antonyms (Letter A to H).Vocabulary Building Synonyms & Antonyms (Letter I to P),Vocabulary Building Synonyms & Antonyms (Letter R to Z)					
Unit-V	[4Hrs]				
Group Discussion & Debate, Body Lang	Group Discussion & Debate, Body Language Dynamics, MS Word				

Text Books

SN	Title	A	uthors	Edition	Publisher	
1	Personality Development and Soft Skills	Barun K.	Mitra	2nd	OUP India	
2	The 55 Soft Skills That Guide Employee and	Bob Graham and Tobin Edward			Mason-WEST	
	Organizational Success	Porterfield	d Kiser Randall			
3	Verbal Reasoning, LSAT Material	GL Barrons		14th	Barrons Educational	
					Series	
4	A modern approach to logical Reasoning	R S Agarwal		₄th	S.Chand	
5	Quantitative Aptitude	R S Agarwal		₄th	S.Chand	
Refe	rence Books					
SN	Title		Authors	Edition	Publisher	
1	The Hard Truth About Soft Skills: Workplace Le	essons Smart	Peggy Klause	₁st	niversity of Houston-	
	People Wished They would Learned Se	ooner			Downtown,	
					OpenStax	
2	Bridging the Soft Skills Gap: How to Teach t	he	Bruce Tulgan	2nd	Wiley	
	Missing Basics to Today Young	Talent			Publication	

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