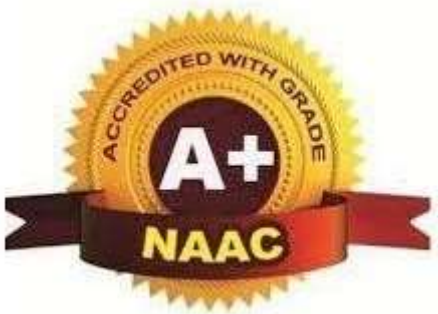
TULSIRAMJI GAIKWAD-PATIL College of Engineering & Technology

Mohgaon, Wardha Road, Nagpur - 441 108

An Autonomous Institute



DEPARTMENT OF INFORMATION TECHNOLOGY

B.Tech. Information Technology

Second Year

Syllabus

From

Academic Year 2024-25

Vision of Institute

To emerge as a learning Center of Excellence in the National Ethos in domains of Science, Technology and Management.

Mission of Institute

- To strive for rearing standard and stature of the students by practicing high standards of professional ethics, transparency and accountability.
- To provide facilities and services to meet the challenges of Industry and Society.
- To facilitate socially responsive research, innovation and entrepreneurship.
- To ascertain holistic development of the students and staff members by inculcating knowledge and profession as work practices

.

Vision of the Department

To contribute in the enhancement of capabilities of youth to face Information Technology challenges, by empowering them with innovative ideas.

Mission of the Department

- To stimulate students to learn effectively and apply the knowledge in the field of Engineering and Technology.
- To undertake industry academic collaboration to enhance competency in graduates.
- To foster innovative ideas amongst students for becoming leaders.
- To create an environment of research culture.
- To impart social and ethical values for inculcating the culture of lifelong learning.

Tulsiramji Gaikwad-Patil College of Engineering &Technology, Nagpur

(An Autonomous Institution Affiliated to RTM Nagpur University, Nagpur)

SCHEME OF INSTRUCTION & SYLLABI

Programme: B. Tech. in Information Technology

Scheme of Instructions: B. Tech. Information Technology (As Per NEP 2020)

Semester- III

Sr. No	Sem	Type	BoS/ Dept	Sub Code	Subject	T/P	Contact Hours			Credits	% Weightage			ESE Duration	Total Marks
							L	P	Hrs		CT/IA	CA	ESE		
1	III	PCC	IT	BIT32301	Data Structure	T	3	-	3	03	30	10	60	3 Hrs.	100
2		PCC	IT	BIT32302	Computer Networks	T	3	-	3	03	30	10	60	3 Hrs.	100
3		MDM	SH	BSH32303	Numerical Methods and Statistical Analysis	T	2	-	2	02	14	06	30	2 Hrs.	50
4		OEC	IT	BIT32312	Open Elective-I(Operating System)	T	4	-	4	04	30	10	60	3 Hrs.	100
5		HSSM	MBA	BBA32303	Personal Finance Management	T	2	-	2	02	14	06	30	2 Hrs.	50
6		VEC	IT	BIT32303	Ethics & Managerial Skill in IT	T	2	-	2	02	14	06	30	2 Hrs.	50
7		FP/CP	IT	BIT32304	Community Engineering Project	P	-	4	4	02	50	-	-	2 Hrs.	50
8		PCC	IT	BIT32305	Data Structure Lab	P	-	2	2	01	-	25	25	2 Hrs.	50
9		PCC	IT	BIT32306	Computer Networks Lab	P	-	2	2	01	-	25	25	2 Hrs.	50
Total							**16**	**08**	**24**	**20**	**182**	**98**	**320**	**21 Hrs**	**600**

Course Category	BSC/ ESC (Basic Science Course/ Engineering Science Course.)	PCC/PEC (Programme Core courses	VSEC (Skill Course)	Multidisciplinary Courses		Humanities Social Science & Management				Experiential Learning Courses				CC (Co-Curricular Courses)
				MDM (Multidisciplinary minor	OE(Open Elective)	AEC (Ability Enhancement Course)	IKS(Indian Knowledge System)	VEC(Value education Course	Management Course	Research Methodology	Field Project	Project	Internship /OJT	
Credits	-	08	00	02	04	-	-	02	02	-	2	-	-	-
Cumulative Sum	16 / 13	10	04	02	04	02	02	02	02	-	2	-	-	04

PROGRESSIVE TOTAL CREDITS:43+20=63

Chairperson	Dean-Academics	Vice-Principal	Principal	June,2024	1.00
				Date of Release	Version

Applicable for AY2024-25 Onwards

Head of Dept. (Information Technology)
Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur

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

Dr. Pravin Patil
Vice-Principal
Tulsiramji Gaikwad Patil College of Engineering & Technology, Nagpur

Principal
Tulsiramji Gaikwad Patil College Of Engineering and Technology, Nagpur

Programme: B.Tech In Information Technology
List of **Program Electives** offered by Information Technology Department

Program Elective- I	Program Elective-II	Program Elective- III	Program Elective- IV	Program Elective- V
Semester V	Semester VI	Semester VI	Semester VII	Semester VIII
BIT33504- Natural Language Processing	**BIT33603-** Machine Learning	**BIT33606-** Deep Learning	**BIT34702-** Block Chain	**BIT34803-** Generative AI
BIT33505- Data Warehousing and Mining	**BIT33604-** Social Media Analytics	**BIT33607-** Big Data Analytics	**BIT34703-** Industrial IoT	**BIT34804-** Information Retrieval
BIT33506- Cyber Laws and Ethics	**BIT33605-** Social Frauds and Privacy	**BIT33608-** Ethical Hacking	**BIT34704-** Digital Forensics	**BIT34805-** Multimedia Forensics

Program: B.Tech In Information Technology
List of **Open Electives** offered by Information Technology

Open Elective-I	Open Elective-II	Open Elective-III
Semester-III	Semester-IV	Semester-V
BIT32312- Operating Systems	BIT32413- Artificial Intelligence	BIT33514- Cyber Security

	Tulsiramji Gaikwad-Patil College of Engineering and Technology Wardha Road, Nagpur-441 108 **NAAC Accredited (A+ Grade)**	

Second Year (Semester-III) B. Tech. Information Technology

BIT32301: - Data Structure

Teaching Scheme			Examination Scheme	
Theory	**3 Hrs/week**		CT-I	15 Marks
Tutorial	**-**		CT-II	15 Marks
Total Credits	**3**		CA	10 Marks
Duration of ESE: 3Hrs			ESE	60 Marks

Course Objectives:

1.	To gain knowledge about basic concepts of data structures.
2.	To acquire knowledge of stacks and queues with their applications
3.	To aware about the concepts of trees with their applications.
4.	To learn and design the algorithm for graphs with their applications.
5.	To implement basic operation on link list.

Course Contents

Unit I	**Introduction:** Concept and need of data structure, Abstract data type, Types of data structure : Linear data structure and Nonlinear data structure, **Searching & Sorting:** linear search and binary search methods, Sorting Techniques: Algorithms for Bubble sort, Selection sort, Insertion sort, Shell sort, Radix sort, Quick sort and Merge sort. Searching Techniques: Algorithms for Sequential search, Binary search,
Unit II	**Linked List:** Introduction of link list terminologies: Node, Address, Pointer, Information field/ data field, Next pointer, Null pointer, Empty list. Types of lists: Linear list, Circular list, Operation on link list: Inserting new node in link list, deleting node from link list.
Unit III	**Stack & Queue:** **Stacks:** Concept of stack as ADT, stack Representation in memory using array. Applications of Stacks: Arithmetic expression conversion, evaluation, operation of stack: push& pop stack conditions: stack overflow, stack underflow. **Queues:** Concept of queue as ADT, Representation and implementation of linear queue & circular queue using sequential organization. Types of Queues: Linear queue, circular queue,priority queue, queue operation: Insert, Delete
Unit IV	**Graph:** Graph as an ADT, operations, graphs storage structures: Adjacency list, Adjacency Matrix, Traversals: DFS, BFS, Minimum spanning trees: Kruskal's and Prim's. Algorithm for shortest path.
Unit V	**Tree:** Basic tree concepts, binary trees and their properties, full and complete binary trees, converting tree to a binary tree, binary tree traversals, Binary search trees & operations. BST as an ADT, threaded binary trees, Insertion, and deletion of nodes in in-order threaded binary tree, pre-order, in-order and post order traversals of in-order threaded binary tree, AVL tree.

Head of Dept. (Information Technology) Tulsiramji Gaikwad-Patil College of

Dean Academics Tulsiramji Gaikwad-Patil College Of Engineering & Technology, Nagpur

Text Books	
T.1	Data structures Dr, Rajendra Kawale Devraj publication
T.2	Practical C programming, OReilly Media
Reference Books	
R.1	Fundamentals of data structures, Ellis Horowitz, 1993
R.2	Data structures and algorithms, Adam Drozdek, 1995
Useful Links	
1	https://www.geeksforgeeks.org/learn-data-structures-and-algorithms-dsa-tutorial/
2	https://www.w3schools.com/dsa/dsa_intro.php

	Course Outcomes	CL	Class Sessions
BIT32301.1	**Demonstrate** the concept of analysis of algorithms, and implement various sorting searching algorithm	3	9
BIT32301.2	**Discuss** the operation on linked list through implementation	2	9
BIT32301.3	**Implement** ADT such as Stack & Queue	3	9
BIT32301.4	**Use** an appropriate non- linear data structures like graph and techniques for data representation for solving data organization problem	3	9
BIT32301.5	**Select** and use appropriate non- linear data structures like tree for data representation	5	9

Dean Academics

Tulsiramji Gaikwad-Patil College of Engineering and Technology
Wardha Road, Nagpur-441 108
NAAC Accredited (A+ Grade)
(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)

Second Year (Semester-III) B. Tech. Information Technology

BIT32302: - Computer Networks

Teaching Scheme		Examination Scheme	
Theory	**3 Hrs/week**	CT-I	15 Marks
Tutorial	**-**	CT-II	15 Marks
Total Credits	**3**	CA	10 Marks
Duration of ESE: 3Hrs		ESE	60 Marks

Course Contents

Unit I	**Data communication Components:** Representation of data and its flow Networks, Various Connection Topology, Protocols and Standards, OSI model, Transmission Media, LAN: Wired LAN, Wireless LANs, Techniques for Bandwidth utilization: Multiplexing - Frequency division, Time division and Wave division.
Unit II	**Data Link Layer**: Error Detection and Error Correction - Fundamentals, Block coding, Hamming Distance, CRC; Flow Control and Error control protocols - Stop and Wait, Go back – N ARQ, Selective Repeat ARQ. Medium Access Sub Layer: Switching, Random Access, Multiple access protocols - Pure ALOHA, Slotted ALOHA, CSMA/CD, CDMA/CA, IEEE 802 standard protocols.
Unit III	**Network Layer:** Internet Protocol (IP) – Logical Addressing: IPV4, IPV6; Address mapping: ARP, RARP, BOOTP and DHCP–Delivery, Forwarding and Unicast Routing protocols.
Unit IV	**Transport Layer:** Elements of Transport protocols: Addressing, Connection establishment, Connection release, Crash recovery, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), TCP Congestion Control; Quality of Service, QoS improving techniques: Leaky Bucket and Token Bucket algorithm.
Unit V	**Application Layer**: Domain Name Space (DNS), DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls; AI in network infrastructure, Self-Healing Networks.

Text Books

T.1	Internetworking with TCP/IP, Volume 1, 6th Edition Douglas Comer, Prentice Hall of India.
T.2	TCP/IP Protocol Suite, Behrouz A Forouzan, McGraw Hill Fourth Edition

Reference Books

R.1	TCP/IP Illustrated Volume 1, W. Richard Stevens, Addison-Wesley, United States of America.

Useful Links

1	https://nptel.ac.in/courses/106/105/106105080/
2	https://nptel.ac.in/courses/106/106/106106091/
3	http://www.nptelvideos.in/2012/11/computer-networks.html

Head of Dept. Information Technology, Tulsiramji Gaikwad-Patil College of

Dean Academics, Tulsiramji Gaikwad-Patil College Of Engineering & Technology, Nagpur

	Course Outcomes	CL	Class Sessions
BIT32302.1	**Understand** basics of computer networks and reference models.	2	9
BIT32302.2	**Identify** the Design issues of each layer of OSI model.	2	9
BIT32302.3	**Implement** the protocols of OSI model.	3	9
BIT32302.4	**Compare** the aspects and functions of Transport Layer	4	9
BIT32302.5	**Identify** the different types of network topologies and protocols.	2	9

Head of Dept. Information Technology
Tulsiramji Gaikwad-Patil College of

Dean Academics
Tulsiramji Gaikwad-Patil
College Of Engineering
& Technology, Nagpur

Tulsiramji Gaikwad-Patil College of Engineering and Technology

Wardha Road, Nagpur-441108

NAAC Accredited with A+ Grade

(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)

Second Year (Semester-III) B. Tech. Information Technology

BSH32303: Numerical Method and Statistical Analysis

Teaching Scheme			Examination Scheme (Th)	
Theory (Th)	2 Hrs/week		**CT-I**	7 Marks
Practical (P)			**CT-II**	7 Marks
Total Credits	**2**		**CA**	6 Marks
Duration of ESE: 2 Hrs			**ESE**	30 Marks

Course Objective:

1.	To make students aware about error handling in numerical methods and solving of algebraic equations
2.	Aware students about probability and mathematical expectation to real-world Phenomena.
3.	Make students use appropriate Stochastic and sampling techniques for a given applied problem

Course Contents

Unit I	**Numerical Methods**: Error in numerical calculations, Errors in series approximation, Rounding off errors. **Solution of Algebraic and Transcendental Equation:** Bisection method, False position method, Newton –Raphson method, Solution of system of simultaneous linear equations: Gauss elimination method, Gauss Jordon method. Gauss Seidel method.
Unit II	**Probability Distributions & Mathematical Expectation:** Random variables, discrete and continuous random variable, joint distributions. **Mathematical Expectations:** Definition of mathematical expectation, the variance and standard deviations, moment generating function Binomial, Geometric distribution, Poisson distribution.
Unit III	**Stochastic Process & Sampling Techniques-** **Stochastic Process:** Introduction of Stochastic Process, Classification of Random Process, Stochastic Matrix. Markov Chain, Transition Matrix and state transition Diagram. **Sampling Techniques:** Population, sample, standard error, confidence intervals, Testing a hypothesis, Null hypothesis, Alternative hypothesis, t-test and Chi-square test.

Text Books

T.1	Higher Engineering Mathematics by B.S. Grewal, 40th Edition, Khanna Publication
T.2	Advanced Engineering Mathematics by Erwin Kreyszig, 8th Edition, Wiley India
T.3	Applied Mathematics for Engineers & Physicist by L.R. Pipes and Harville

Head of Dept. Information Technology
Tulsiramji Gaikwad-Patil College of

Dean Academics
Tulsiramji Gaikwad-Patil
College Of Engineering
& Technology, Nagpur

T.4	Probability, Statistics and Random Processes T. Veerarajan.
T.5	Fundamentals of Mathematical Statistics (Modern Approach) S.C. Gupta and V. K. Kapoor 10th Edition
Reference Books	
R.1	A Text Book of applied Mathematics, Volume I &II, by P.N. Wartikar& J.N. Wartikar, Poona Vidyarthi Griha Prakashan
R.2	Introductory methods of Numerical Analysis, by S.S. Sastry, PHI
R.3	Mathematics for Engineers by Chandrika Prasad
R.4	A text book of Engineering Mathematics by N. P. Bali & M. Goyal, Laxmi Publication

Course Code	Course Outcomes	CL	Class Sessions
BSH32303.1	**Analyze** numerical techniques to find the roots of equations different types of equations.	4	9
BSH32303.2	**Apply** the concept of probability and mathematical expectation to real-world Phenomena.	3	9
BSH32303.3	**Apply** the most appropriate Stochastic and sampling techniques for a given applied problem	3	9

Head of Dept. Information Technology
Tulsiramji Gaikwad-Patil College of

Dean Academics
Tulsiramji Gaikwad-Patil
College Of Engineering
& Technology, Nagpur

	Tulsiramji Gaikwad-Patil College of Engineering and Technology Wardha Road, Nagpur-441 108 **NAAC Accredited (A+ Grade)**	

Second (Semester-III) B. Tech. Information Technology

BIT32312: Operating Systems

Teaching Scheme			Examination Scheme	
Theory	**4 Hrs/week**		CT-I	15 Marks
Tutorial	**-**		CT-II	15 Marks
Total Credits	**4**		CA	10 Marks
Duration of ESE: 3 Hrs			ESE	60 Marks
			Total	100 Marks

Course Objectives:

1.	Introduces general idea, structure and functions of operating system.
2.	Making students aware of basic mechanisms used to handle processes, memory, storage devices and files.
3.	Recent trends in the operating system

Course Contents

Unit I	Evolution of OS, Types of OS, Basic h/w support necessary for modern operating systems, services provided by OS, system programs and system calls, system design and implementation.
Unit II	Process concept, process control block, Types of schedulers, context switch, threads, multithreading model, goals of scheduling and different scheduling algorithms, Process Synchronization
Unit III	Memory management techniques, contiguous and non-contiguous, paging and segmentation, Relocation, Paging, Segmentation, Segmentation with paging, demand paging, Virtual Memory Concepts, Thrashing.
Unit IV	Deadlock definitions, Prevention, Avoidance, detection and Recovery, Goals of Protection, access matrix, Deadlock implementation
Unit V	File concept, Access methods space allocation strategies, disk arm scheduling strategies, file attributes, File operations.

Text Books

T.1	Operating System concepts – Silberchatz; Galvin, Addison Wesley, 6thEdn.
T.2	Modern Operating Systems – Tanenbaum, Pearson Edn. 2 ndedn
T.3	Operating Systems: Internals and Design Principles -- William Stallings

Head of Dept. Information Technology
Tulsiramji Gaikwad-Patil College of

Dean Academics
Tulsiramji Gaikwad-Patil
College of Engineering
& Technology, Nagpur

Reference Books	
R.1	Operating Systems – S R Sathe, Macmillan Publishers, India, 2008
R.2	Operating System –Milan Milenkovik, McGraw-Hill, 1987
R.3	Operating Systems - 3 rd Edition by Gary Nutt, Pearson Education.
Useful Links	
1	https://nptel.ac.in/courses/106/108/106108101/

	Course Outcomes	CL	Class Sessions
BIT32312.1	Identify basic structure and purpose of operating system.	2	9
BIT32312.2	Interpret the concepts of process and illustrate various CPU scheduling algorithms.	3	9
BIT32312.3	Differentiate between contiguous and non-contagious memory allocation strategies.	4	9
BIT32312.4	Schematize Deadlock & security mechanisms in operating systems.	4	9
BIT32312.5	Design and implement file systems.	6	9

Head of Dept. Information Technology
Tulsiramji Gaikwad-Patil College of

Dean Academics
Tulsiramji Gaikwad-Patil
College Of Engineering
Technology, Nagpur

Tulsiramji Gaikwad-Patil College of Engineering and Technology

Wardha Road, Nagpur-441 108

NAAC Accredited (A+ Grade)

Second Year (Semester-III) B. Tech. Information Technology

BBA32301: Personal Finance Management

Teaching Scheme		Examination Scheme	
Theory	2 Hrs/week	CT-I	07 Marks
Tutorial	-	CT-II	07 Marks
Total Credits	2	CA	06 Marks
Duration of ESE: 3Hrs		ESE	30 Marks
		Total	50 Marks

Course Objectives:

1.	To introduce basic principles for managing personal finance.
2.	To help individual learn investment decisions.
3.	To assist Investment in Physical Assets.

Course Contents

Unit I	**Basics of Personal Financial Management**: Basics of Personal Financial Management: Budget, The Personal Financial Planning Process, Preparation of Personal Budget, Personal Financial Statements, Personal Income Tax Planning. Case studies on personal financial planning of individuals.
Unit II	**Personal Savings & Investment**: Investment Criteria- liquidity, safety and profitability. Savings instruments of Post Office and Banks. Chit Funds. Investment in Shares, Debentures, Corporate and Government Bonds, Mutual Fund.
Unit III	**Investment in Physical Assets**: Real Estate, Gold and Silver, Gold certificates. Risk and Return associated with these investments. Case studies on risk and return perception of retail investors on various investments.

Text Books

T.1	Personal Finance by Jack R. Kapoor, Les R. Dlabay and Robert J. Hughes, Tat McGraw-Hill Publishing Company Ltd. New Delhi.
T.2	Fundamentals of Financial Management" by Eugene F. Brigham and Joel F. Houston, 15th Edition, published by Cengage Learning.

Head of Dept. Information Technology, Tulsiramji Gaikwad-Patil College of

Dean Academics, Tulsiramji Gaikwad-Patil College Of Engineering & Technology, Nagpur

Reference Books	
R.1	Foundations of Financial Management" by Stanley B. Block, Geoffrey A. Hirt, Bartley R. Danielsen, and Doug Short, 17th Edition, published by McGraw-Hill Education.
R.2	Personal Finance by E. Thomas Garman and Raymond E. Forgue, 13th Edition, published by Cengage Learning.
Useful Links	
1	https://nptel.ac.in/courses/ Q7k-7H6kxJg
2	https://nptel.ac.in/noc/courses/noc20/SEM1/noc20-cs12/

	Course Outcomes	CL	Class Sessions
BBA32301.1	**Apply** the different aspect of Basics of Personal Financial Management.	3	9
BBA32301.2	**Illustrate** the Personal Savings & Investment.	3	9
BBA32301.3	**Classify** the different types of assets like real estate, gold and silver Risk and Return associated with these investments.	5	9

Head of Dept. Information Technology
Tulsiramji Gaikwad-Patil College of

Dean Academics
Tulsiramji Gaikwad-Patil
College Of Engineering
& Technology, Nagpur

Tulsiramji Gaikwad-Patil College of Engineering and Technology

Wardha Road, Nagpur-441 108

NAAC Accredited (A+ Grade)

Second Year (Semester-III) B. Tech. Information Technology

BIT32303: - Ethics & Managerial Skills in IT

Teaching Scheme		Examination Scheme	
Theory	**2 Hrs/week**	CT-I	07 Marks
Tutorial	**-**	CT-II	07 Marks
Total Credits	**2**	CA	06 Marks
Duration of ESE: 3Hrs		ESE	30 Marks
		Total	50 Marks

Course Objectives:

1.	Introduced to a variety of important issues in technology in ethics.
2.	Introduce a richer understanding of Safety and Risk.
3.	Introduce human values in ethic theories to interpret personal and group behavior when using a variety of information technology tools.

Course Contents

Unit I	**An overview of Ethics-** Definition of Ethics**,** Computer Ethics, Senses of Engineering Ethics, Variety of moral issues, Ethical behavior, Ethics for IT user.
Unit II	**Safety Responsibility and Rights**-Safety and Risk, Assessment of Safety and Risk, Risk Benefit Analysis and Reducing Risk, Respect for Authority, Collective Bargaining, Confidentiality, Conflicts of Interest, Occupational Crime, Professional Rights, Employee Rights, Intellectual Property Rights (IPR), Discrimination
Unit III	**Human Values in ethics-** Morals, values and Ethics, Integrity, Work ethic, Service learning, Civic virtue, Respect for others, living peacefully, Caring, Sharing, Honesty, Courage,Valuing time, Cooperation, Commitment, Multinational Corporations, Environmental Ethics Empathy, Spirituality.

Text Books

T.1	Ethics in Computing, Science and Engineering - Barry G. Blundell
T.2	Ethics and Engineering- Behnam Taebi

Head of Dept. Information Technology, Tulsiramji Gaikwad-Patil College of ...

Dean Academics, Tulsiramji Gaikwad-Patil College Of Engineering & Technology, Nagpur

Reference Books	
R.1	The Handbook of Information and Computer Ethics– Kenneth Einar Himma
R.2	"Professional Ethics and Human Values"-Govindarajan M
Useful Links	
1	https://blog.mitsde.com/10-business-ethics-every-manager-should-possess/
2	https://onlinecourses.nptel.ac.in/noc20_mg08/preview

CO	Course Outcomes	CL	Class Sessions
BIT32303.1	**Describe** the human values in ethics regarding the individual lifestyle for the society	2	9
BIT32303.2	**Implement** Safety Responsibility and Rights Assessment of Safety and Risk	3	9
BIT32303.3	**Evaluate** Human Values in ethics	5	9

Head of Dept. Information Technology
Tulsiramji Gaikwad-Patil College of

Dean Academics
Tulsiramji Gaikwad-Patil
College Of Engineering
& Technology, Nagpur

	Tulsiramji Gaikwad -Patil College of Engineering and Technology Wardha Road, Nagpur-441108 **NAAC Accredited with A+ Grade** **(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)**	

Second Year (Semester-III)B.Tech. Information Technology

BIT32305: Data Structure Lab

Teaching Scheme			Examination Scheme	
Practical	**2Hrs/week**		CA	25Marks
Total Credits	**1**		ESE	25Marks
			Total	50Marks

Sr. No	List of Practical	CO
1	To study and understand basic concepts of data structures.	**CO1**
2	Implement a C program for search a particular data from the given array using linear search.	**CO1**
3	Implement a C program to perform following operation on singly linked list: Insertion and Deletion.	**CO2**
4	Implement a C program to perform following operation on circular linked list: Insertion, Deletion.	**CO2**
5	Write a C program to perform PUSH and POP on stack using array.	**CO3**
6	To write a C program to perform INSERT and DELETE on queue using array.	**CO3**
7	Write a C program for Depth First Search.	**CO4**
8	Implement a C program to Breadth First Search.	**CO4**
9	Write a C program to implement BST.	**CO5**
10	Write a C program to traverse the tree in order, preorder & post order.	**CO5**

Head of Dept. Information Technology
Tulsiramji Gaikwad-Patil College of

Dean Academics
Tulsiramji Gaikwad-Patil
College Of Engineering
& Technology, Nagpur

Text Books	
1	Data structures Dr, Rajendra Kawale Devraj publication
2	Practical C programming, OReilly Media
Reference Books	
1	Fundamentals of data Structures, Ellis Horowitz, 1993
2	Data structures and algorithms, Adam Drozdek, 1995
Useful Links	
1	https://nptel.ac.in/courses
2	https://nptel.ac.in/courses/106102064

	Course Outcomes	CL	Lab Sessions
BIT32305.1	Understand practical knowledge on the operations of arrays	2	4
BIT32305.2	Understand the concept of linked list.	2	4
BIT32305.3	Implement operation on linked list.	3	4
BIT32305.4	Implement practical knowledge of Stack & Queue	3	4
BIT32305.5	Explain Graphs and related concepts.	2	4

Head of Dept. Information Technology
Tukaramji Gaikwad-Patil College of

Dean Academics
Tukaramji Gaikwad-Patil
College of Engineering
Technology, Nagpur

	Tulsiramji Gaikwad -Patil College of Engineering and Technology Wardha Road, Nagpur-441108 **NAAC Accredited with A+ Grade** **(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)**	

Second Year (Semester-III)B.Tech. Information Technology

BIT32306: Computer Networks Lab

Teaching Scheme			Examination Scheme	
Practical	**2Hrs/week**		CA	25Marks
Total Credits	**1**		ESE	25Marks
			Total	50Marks

Sr. No	List of Practical	CO
1	Study of different types of Network cables and practically implement the cross-wired cable and straight through cable using clamping tool.	**CO1**
2	Study of Network Devices in Detail.	**CO1**
3	Write a program for error detecting code using CRC-CCITT (16- bits).	**CO2**
4	Write a program to find the shortest path between vertices using bellman-ford algorithm.	**CO2**
5	Using TCP/IP sockets, write a client – server program to make the client send the file name and to make the server send back the contents of the requested file if present	**CO3**
6	Write a program on datagram socket for client/server to display the messages on client side, typed at the server side.	**CO3**
7	Write a program for simple RSA algorithm to encrypt and decrypt the data.	**CO4**
8	Write a program for congestion control using leaky bucket algorithm.	**CO4**
9	Implement Dijkstra's algorithm to compute the shortest path through a graph.	**CO5**
10	Write a program that illustrates communication between two processes using named pipes or FIFO.	**CO5**

Dean Academics
Tulsiramji Gaikwad-Patil College Of Engineering & Technology, Nagpur

Text Books	
1	TCP/IP Protocol Suite, Behrouz A Forouzan, McGraw Hill Fourth Edition
2	Internetworking with TCP/IP, Volume 1, 6th Edition Douglas Comer, Prentice Hall of India.
Reference Books	
1	Computer Networks, Fifth Edition, Andrew Tanenbaum (Pearson Education)
2	TCP/IP Illustrated Volume 1, W. Richard Stevens, Addison-Wesley, United States of America.
Useful Links	
1	https://nptel.ac.in/courses/106/106/106106091/
2	http://www.nptelvideos.in/2012/11/computer-networks.html

	Course Outcomes	CL	Lab Sessions
BIT32306.1	Understand basics of computer networks and reference models.	2	4
BIT32306.2	Identify the Design issues of each layer of OSI model.	2	4
BIT32306.3	Implement the protocols of OSI model.	3	4
BIT32306.4	Categorize the aspects and functions of Transport Layer	4	4
BIT32306.5	Identify the different types of network topologies and protocols.	2	4