



TULSIRAMJI GAIKWAD-PATIL
College of Engineering & Technology

Mohgaon, Wardha Road, Nagpur - 441 108



**DEPARTMENT OF INFORMATION
TECHNOLOGY**

Structure & Curriculum

From

Academic Year 2021-22

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.

Program Education Objectives (PEO)

- Acquire fundamental knowledge of mathematics, science and engineering to analyze, design and implement solutions to the Information Technology problems
- Understand emerging concepts and trends in Information Technology.
- Apply IT tools to develop innovative computational systems.
- The students are encouraged to develop the habit of lifelong learning to face the challenges.
- The students will be embedded as a responsible individual having ethical and social values to lead the society and to nurture team spirit.

Program Outcomes (PO)

- 1. Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4. Conduct investigations of complex problems:** Use research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and software tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- 6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- 11. Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- 12. Lifelong learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

Program Specific Outcomes (PSO)

- PSO-1:** Ability to apply the acquired knowledge and recent techniques to come up with ideas in the domains of algorithms, computer networks and software systems.
- PSO-2:** Ability to build and enhance the efficiency of networking and database systems using recent technologies.
- PSO-3:** Analyzing the impact of Information technology solutions in the societal and human context to create good human resource for the country.

Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur

SCHEME OF INSTRUCTION & SYLLABI

Programme: Information Technology

Scheme of Instructions: Second Year B.Tech.in Information Technology

Semester – III

Sr. No.	Course Category	Course Code	Course Title	L	T	P	Contact Hrs/Wk	Course Credits	EXAM SCHEME				
									CT-1	CT-2	TA/CA	ESE	TOTAL
1	BSC	BIT2301	Applied Mathematics-III	3	-	-	3	3	15	15	10	60	100
2	ESC	BIT2302	Digital Logic and fundamentals of Microprocessor	3	-	-	3	3	15	15	10	60	100
3	PCC	BIT2303	Computer Networks	3	-	-	3	3	15	15	10	60	100
4	HSMC	BIT 2304	Ethics & Managerial Skills in IT	3	-	-	3	3	15	15	10	60	100
5	PCC	BIT 2305	Data Structures	3	-	-	3	3	15	15	10	60	100
6	ESC	BIT 2306	Digital Logic and fundamentals of Microprocessor Lab	-	-	2	2	1	-	-	25	25	50
7	ESC	BIT 2307	Object Oriented Programming with C++ Lab	-	-	4	4	2	-	-	25	25	50
8	PCC	BIT 2308	Data Structures Lab	-	-	2	2	1	-	-	25	25	50
9	PCC	BIT 2309	Computer Lab-I (Introduction to Computer Hardware and Linux Lab)	-	-	2	2	1	-	-	25	25	50
10	HSMC	BSH2301	Human Values for Professional Society	3	-	-	3	3	15	15	10	60	100
11	MCC	BAU2303	Environmental Science	2	-	-	2	Audit	-	-	-	-	-
Total				20	0	10	30	23	90	90	160	460	800

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

Course Category	HSMC (Hum., Soc. Sc, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Programme Core Courses)	PEC (Programme Elective Courses)	OEC (Open Elective courses from other discipline)	Project /Seminar / Industrial Training	MCC (Mandatory Courses)
Credits	6	03	06	08	--	--	--	--
Cumulative Sum	9	21	20	08	--	--	--	--

PROGRESSIVE TOTAL CREDITS :35+23=58

W. Gaikwad
 Head of Dept. (Information Technology)
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 Engineering & Technology, Nagpur.

Amr
 Dean Academics
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 and Technology, Nagpur

P. Patil
 Vice Principal
 Tulsiramji Gaikwad-Patil
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 Technology, Nagpur.

A. Aulde
 Principal
 Tulsiramji Gaikwad Patil College Of
 Engineering and Technology, Nagpur

Tulsiramji Gaikwad-Patil College of Engineering & Technology, Nagpur

SCHEME OF INSTRUCTION & SYLLABI

Programme: Information Technology

Scheme of Instructions: Second Year B.Tech.in Information Technology

Semester – IV

Sr. No.	Course Category	Course Code	Course Title	L	T	P	Contact Hrs/Wk	Course Credits	EXAM SCHEME				
									CT-1	CT-2	TA/CA	ESE	TOTAL
1	BSC	BIT2401	Discrete Mathematics and Graph Theory	3	1	-	4	4	15	15	10	60	100
2	PCC	BIT2402	Operating System Concepts	3	-	-	3	3	15	15	10	60	100
3	PCC	BIT 2403	Database Management Systems	3	-	-	3	3	15	15	10	60	100
4	ESC	BIT2404	Competitive Programming with Java	2	-	-	2	2	15	15	10	60	100
5	PCC	BIT2405	Design & Analysis of Algorithms	3	-	-	3	3	15	15	10	60	100
6	PCC	BIT2406	Internet Programming	3	-	-	3	3	15	15	10	60	100
7	PCC	BIT2407	Internet Programming Lab	-	-	2	2	1	-	-	25	25	50
8	PCC	BIT2408	Database Management Systems Lab	-	-	2	2	1	-	-	25	25	50
9	ESC	BIT2409	Competitive Programming Java Lab	-	-	2	2	1	-	-	25	25	50
10	MCC	BAU2404	Group Reading of Classics	2	-	-	2	Audit	-	-	-	-	-
Total				20	01	06	27	21	90	90	135	435	750

L- Lecture

T-Tutorial

P-Practical

CT1- Class Test 1

TA/CA- Teacher Assessment/Continuous Assessment

CT2- Class Test 2

ESE- End Semester Examination (For Laboratory End Semester performance)

Course Category	HSMC (Hum., Soc. Sc, Mgmt.)	BSC (Basic Sc.)	ESC (Engg. Sc.)	PCC (Programme Core courses)	PEC (Programme Elective courses)	OEC (Open Elective courses from other discipline)	Project / Seminar / Industrial Training	MCC (Mandatory Courses)
Credits	--	04	03	14	--	--	--	Yes
Cumulative Sum	9	25	23	22	--	--	--	--

PROGRESSIVE TOTAL CREDITS :58+21=79

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Dean Academics
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Vice-Principal
Tulsiramji Gaikwad Patil
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Principal
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Engineering and Technology, Nagpur



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Program: B. Tech. Information Technology

Semester	Course Code	Name of Course	L	T	P	Credits
III	BIT2301	Applied Mathematics-III	3	-	-	3
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		
Pre-Requisites: Mathematics – I, Mathematics – II						
Course Contents						
Unit I	Laplace Transform: Laplace transforms and their simple properties, Unit step function, inverse of Laplace transform, convolution theorem, Applications of Laplace transform to solve ordinary differential equations					
Unit II	NUMERICAL METHODS: Error in numerical calculations, Errors in series approximation, Rounding of errors, Solution of Algebraic and Transcendental Equation: Bisection method, False position method, Newton –Raphson method and their convergence, Solution of system of simultaneous linear equations: Gauss elimination method, Gauss Jordan method. Gauss Seidel method, Crout's method,					
Unit III	Linear Algebra: Vector Space, Subspaces, Linear Dependence/Independence, Basis, Dimension, Linear transformation, Null Space and Nullity, Matrix Representation of a linear transformation, Linear Operators on R^n and their representation as square matrices, Singular Value Decomposition.					
Unit IV	Stochastic Process & Sampling Techniques- Introduction of Stochastic Process, Classification of Random Process, Stationary and Nonstationary Random Process, Stochastic Matrix. Markov Chain- Classification of States, Classification of Chains, Random walk and gambler Ruin. Testing a hypothesis, Null hypothesis, Alternative hypothesis, t-test, F-test and Chi square test.					
Unit V	Probability, Probability Distributions & Mathematical Expectation: Random variables, discrete and continuous random variable, probability density function; probability distribution function for discrete and continuous random variable joint distributions. Definition of mathematical expectation, the variance and standard deviations, moment generating function Binomial, Geometric distribution, Poisson distribution,					

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

Reference Books	
1	Introductory methods of Numerical Analysis, by S.S. Sastry, PHI
2	P, G. Bhattacharya, S.K. Jain and S.R. Nagpaul: First Course in Linear Algebra Wiley Eastern New Delhi
3	An introduction to Linear Algebra V Krishnamoorthy et al Affiliated East West Press New Delhi
4	A text book of Engineering Mathematics by N. P. Bali & M. Goyal, Laxmi Publication
5	Probability, Statistics and Random Process T. Veerarajan
Useful Links	
1	https://nptel.ac.in/courses/117/106/117106034/
2	https://nptel.ac.in/courses/108108076/
3	https://nptel.ac.in/courses/108105062/

	Course Outcomes	CL	Class Sessions	Lab Sessions
IT2301.1	Apply the concept of Laplace Transform to solve Differential Equation	3	9	-
IT2301.2	Analyzenumerical techniques to find the roots of equations different types of equations.	4	9	-
IT2301.3	Apply principles of matrix algebra to linear Transformation	3	9	-
IT2301.4	Apply the most appropriate Stochastic and sampling techniques for a given applied problems	3	9	-
IT2301.5	Use of a probability distribution for a random variable to evaluate probabilities	5	9	-


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**Program: B. Tech. Information Technology**

Semester	Course Code	Name of Course	L	T	P	Credits
III	BIT2302	Digital Logic and Fundamentals of Microprocessor	3	-	-	3
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	

Pre-Requisites: Basics of Microprocessor**Course Contents**

Unit I	Introduction Analog & Digital Signals, Number system, Number system Conversions, Code Conversion, Digital Logic Gates, Universal Gates, Exclusive-OR & Nor, Boolean Algebra, De Morgan's Theorem Binary Arithmetic, One's and Two's complement, Binary Addition.
Unit II	Standard representations for logic functions, k map representation of logic functions (SOP & POS forms), minimization of logical functions for min-terms and max-terms (upto 4 variables), don't care conditions.
Unit III	Design Examples: Arithmetic Circuits, BCD - to - 7 segment decoder, Code converters. Adders and their use as subtractor, look ahead carry, ALU, Digital Comparator, Parity generators/checkers, Static and dynamic hazards for combinational logic. Multiplexers and their use in combinational logic designs, multiplexer trees, Demultiplexers, Encoders & Decoders.
Unit IV	1 Bit Memory Cell, Clocked SR, JK, MS J-K flip flop, D and T flip-flops. Use of preset and clear terminals, Excitation Table for flip flops. Conversion of flip flops., Registers, Shift registers, Counters (ring counters, twisted ring counters), Sequence Generators, ripple counters, up/down counters, synchronous counters, lock out, Clock Skew, Clock jitter. Effect on synchronous designs.
Unit V	Introduction to microprocessor, Architecture of 8085 microprocessor, Addressing modes, 8085 instruction set, Concept of assembly language programming, Interrupts in 8085.

Text Books

1	Morris Mano : " An approach to digital Design", Pearson Publications.
2	Ramesh Gaonkar : " Microprocessor Architecture, Programming and Applications with the 8085", Penram International Publications.
3	W. Fletcher : "Engg. Approach to Digital Design", PHI Publications.

Reference Books

1	Wakerly Pearson : "Digital Design: Principles and Practices", Pearson Education Publications.
2	Mark Bach : "Complete Digital Design", Tata McGraw Hill Publications
3	R.P. Jain : "Modern digital electronics", TMH Publications.

Useful Links	
1	https://www.youtube.com/watch?v=yqv9tTE5fhM
2	https://www.youtube.com/watch?v=RZQTTfU9TNA
3	https://www.youtube.com/watch?v=jm0PGDSSBkI

	Course Outcomes	CL	Class Sessions
BIT2302.1	Demonstrate the use of basic logic gates and various reduction techniques of digital logic circuit in detail.	2	9
BIT2302.2	Classify combinational and sequential circuits.	2	9
BIT2302.3	Implement the circuit to test performance and application.	3	9
BIT2302.4	Analyze the concept of flip-flops in digital electronics.	4	9
BIT2302.5	Integrate the architecture and use of microprocessor for basic operations and Simulate using simulation software.	5	9


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Program: B. Tech. Information Technology

Semester	Course Code	Name of Course	L	T	P	Credits
III	BIT2303	Computer Networks	3	-	-	3

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

Pre-Requisites:-Basics of C Programming

Course Contents

Unit I	Introduction of computer networks, LAN, MAN, WAN, Topologies and their characteristics, wireless networks, protocol hierarchies interfaces and services, connection oriented and connectionless services, Reference models- OSI and TCP/IP. Comparison of OSI & TCP/IP reference model.
Unit II	Physical layer: theoretical basis for data communication, Guided transmission media, wireless transmission: electromagnetic spectrum, radio transmission, infrared transmission. Transmission Media, Techniques for Bandwidth utilization: Multiplexing - Frequency division, Time division and Wave division, Concepts on spread spectrum.
Unit III	Data Link Layer and Medium Access Sub Layer: Error Detection and Error Correction - Fundamentals, Hamming Distance, CRC; Flow Control and Error control protocols - Stop and Wait, Go back - N ARQ, Selective Repeat ARQ, Sliding Window, Random Access, Multiple access protocols -Pure ALOHA, Slotted ALOHA, CSMA/CD,CDMA/CA.
Unit IV	Network Layer: -Routing Algorithms ,Congestion Control Algorithms, quality of service, internetworking, network layer in Internet: IP protocol, Internet control protocols, OSPF, BGP, Internet multicasting, Switching, Logical addressing - IPV4, IPV6,Address mapping - ARP, RARP, BOOTP and DHCP-Delivery, Forwarding and Unicast Routing protocols.
Unit V	Mobile IP, addressing, agents, three phases, agent discovery, registration and data transfer, Internet Security, privacy, digital signature, application layer security, transport layer security, security at the IP layer IPSec, Real Time traffic over the Internet.

Text Books

T.1	Computer Networks, Fifth Edition, Andrew Tanenbaum(Pearson Education)
T.2	TCP/IP Protocol Suite, Behrouz A Forouzan, McGraw Hill Fourth Edition
T.3	Internetworking with TCP/IP, Volume 1, 6th Edition Douglas Comer, Prentice Hall of India.

Reference Books

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

	Course Outcomes	CL	Class Sessions
BIT2303.1	Apply the different aspects of networks, protocols, network design models and types of transmission media used in computer networks.	3	9
BIT2303.2	Classify the various Physical layer design issues and select appropriate routing algorithms for a network.	3	9
BIT2303.3	Analyze the important aspects and functions of Data link layer and Protocols.	4	9
BIT2303.4	Categorize the aspects and functions of Network layer and Internet Control Protocols..	4	9
BIT2303.5	Generalize the concept of Mobile IP and IPSec.	5	9


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Program: B.Tech. Information Technology

Semester	Course Code	Name of Course	L	T	P	Credits
III	BIT2304	Ethics & Managerial Skills in IT	3	-	-	3

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

Pre-Requisites: Ethical Sciences & Business Ethics in Industry

Course Contents

Unit I	An overview of Ethics: Ethics in business world, Ethics in IT, Ethics for IT professionals and IT users, IT professionals, Ethical behavior, IT professional malpractices, IT users
Unit II	Computer and Internet Crime: IT security incidents: Increasing Complexity Increases Vulnerability, Higher Computer user Expectations, Expanding and changing systems. Introduces new risks, Increased Reliance on Commercial Software with known Vulnerabilities, Types of Exploits, Perpetrators, Reducing Vulnerabilities, Risk Assessment, Establishing a Security Policy, Educating Employees, contractors and parttime Workers, Prevention, Detection, Response.
Unit III	Privacy: The right of Privacy, Recent History of Privacy Protection, Key Privacy and Anonymity issues, Governmental Electronic Surveillance, Data Encryption, Identity Theft, Consumer Profiling, Treating Consumer Data Responsibility, Workplace Monitoring, Advanced surveillance Technology, Defamation, Freedom of Expression: Key issues, Controlling Access to Information on the Internet, Anonymity, National, Security Letters, Defamation and Hate Speech
Unit IV	Strategic Management: -Definition, Classes of Decisions, Levels of Decision, Strategy, Role of different Strategist, Relevance of Strategic Management and its Benefits, Strategic Management in India
Unit V	Ethics of IT Organization: Need for Nontraditional Workers, Contingent Workers H-IB Workers, Whistle-blowing, Protection for Whistle-Blowers, Dealing with Whistle-Blowing Situation.

Text Books

T.1	George Reynolds, "Ethics in information Technology" Cengage Learning
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T.2	Ethics in Information Technology, CRC Press By : Mr. G. K. Awari & Mr. Sarvesh Warjurkar
T.3	Management – Principles, Processes and Practices – Anil Bhat and Arya Kumar – Oxford Publications
Reference Books	
R.1	Deborah G.Johnson,"Computer Ethics",3/e Pearson Education.
R.2	Richard A.Spinello, "Case study in Information Technology Ethics", second Edition PHI Publications.
Useful Links	
1	https://archive.nptel.ac.in/courses/109/106/109106117/
2	https://onlinecourses.nptel.ac.in/noc19_hs35/preview

	Course Outcomes	CL	Class Sessions
BIT2304.1	Describe the overview of ethical and professional behavior	3	9
BIT2304.2	Articulate the concepts of computer and internet crime	4	9
BIT2304.3	Appraise various privacy techniques.	4	9
BIT2304.4	Implement the concepts of strategic management to take decisions.	5	9
BIT2304.5	Apply the concept of ethics of IT organization	2	9


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Program: B. Tech. Information Technology

Semester	Course Code	Name of Course	L	T	P	Credits
III	BIT2305	Data Structures	3	-	-	3

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

Pre-Requisites:Basics of C Programming,

Course Contents

Unit I	An Introduction to data structure: Introduction, Definition, Classification of data structure, Concept of data, Data types, Abstract data Types (ADT), Features of structured program. Introduction to algorithms: Definition and Characteristics of an Algorithm, Apriori analysis, Time and space complexity, Average , Best and Worst case complexities, Big O" Notations, Recursion.
Unit II	Sorting Techniques: Bubble sort, selection sort, quick sort, Merge sort, heap sort, Shell sort, Analysis of these algorithms in worst and average cases.
Unit III	Stacks and Queue: Definition and Terminology, Concept of stack, Stack implementation, Operation on stack, Algorithms for push and pop, Implementing stack using pointers, Application of stacks, Evaluation of polish notation, multiple stack. Queue: Queue as ADT Implementation of queue, Operation on queue, Limitations, Circular queue, Double ended queue (dequeue), Priority queue, Application of queues, multiple queues.
Unit IV	Linked List: Introduction, Linked list, Representation of linear linked list, Operation on linked list, Types of linked list, Singly linked list, Circular linked list, Doubly linked list, Circular doubly linked list.
Unit V	Tree: Introduction to Non Linear Data Structures, Binary tree Concept and terminology, Algorithm for tree traversals (recursive and non recursive). Binary search trees, extended binary tree, threaded binary tree. Height balanced and weight balanced binary trees, B-Tree, B+ Tree, AVL tree. Graphs: Concepts and terminology, Representation of graphs using adjacency matrix, adjacency list, Depth First search and Breadth First Search Algorithms, Spanning trees, Minimal cost spanning tree and Shortest path algorithm (Single Source-all pairs).

Text Books

1	Data Structures with C by SEYMOUR LIPSCHUTZ [TMH].
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2	Data Structure using C by ISRD Group [TMH].
3	Introduction to Data Structure in C by Ashok N. Kamthane [Pearson].
Reference Books	
1	Data Structure through C by G. S. BALUJA [Dhanpat Rai & co.].
2	Data structures using C and C++ by Tenenbaum [Pearson].
3	Data structures Pseudocode with C by Gilberg/Foruzen, Cengage Learning
Useful Links	
1	https://nptel.ac.in/courses/106/102/106102064/
2	https://nptel.ac.in/courses/106/106/106106127/
3	https://nptel.ac.in/courses/106/103/106103069/

	Course Outcomes	CL	Class Sessions	Lab Sessions
BIT2305.1	Analyze the average, best, worst case in terms of space and time complexity.	4	9	4
BIT2305.2	Describe appropriate data structures and algorithms, understand the ADT/libraries, and use it to design algorithms for a specific problem by using various sorting techniques.	3	9	4
BIT2305.3	Illustrate expertise in algorithmic analysis and algorithm design techniques with respect to stacks & queues.	3	9	4
BIT2305.4	Analyze and select algorithm design approaches in a problem specific manner using Linked List	4	9	4
BIT2305.5	Evaluate with analysis of efficiency and proofs of correctness for graphs and trees as a data structure	5	9	4


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Program: B. Tech Information Technology

Semester	Course Code	Name of Course	L	T	P	Credits
III	BIT2306	Digital Logic and Fundamentals of Microprocessor Lab	-	-	2	1
Teaching Scheme					Examination Scheme	
Practical	2 Hrs/week				CT-I	-
Tutorial	-				CT-II	-
Total Credits	1				CA	25 Marks
					ESE	25 Marks

Pre-Requisites:

Sr. No.	List of Experiment
1	Design Circuit for logic gates.
2	Design proof of universal gates.
3	Illustrate proof of Demorgan's theorem.
4	Implement circuit for Multiplexer.
5	Construct Half and Full adder circuits and verify the truth table
6	Design Circuit for Code converter.
7	Design Circuit for Conversion of Flip Flop
8	Construct and design Flip Flop Circuit.
9	To Study Internal architecture of 8085 microprocessor and its PIN Diagram.
10	Write 8085 assembly language program for addition of two 8-bit numbers and sum is 8 bit.

Text Books

1	Morris Mano : " An approach to digital Design", Pearson Publications.
2	Ramesh Gaonkar : " Microprocessor Architecture, Programming and Applications with the 8085",
3	W. Fletcher : "Engg. Approach to Digital Design", PHI Publications.

Reference Books

1	Wakerly Pearson : "Digital Design: Principles and Practices", Pearson Education Publications.
2	Mark Bach : "Complete Digital Design", Tata MCGraw Hill Publications
3	R.P. Jain : "Modern digital electronics", TMH Publications.



Useful Links

1	https://www.youtube.com/watch?v=yqv9tTE5fhM
2	https://www.youtube.com/watch?v=RZOTTfU9TNA
3	https://www.youtube.com/watch?v=jm0PGDSSBkI

	Course Outcomes	CL	Lab Sessions
BIT2306.1	Demonstrate the use of basic logic gates and various reduction techniques of digital logic circuit in detail.	2	4
BIT2306.2	Classify combinational and sequential circuits.	2	4
BIT2306.3	Implement the hardware circuit to test performance and application.	3	4
BIT2306.4	Analyze state machine in digital electronics.	5	4
BIT2306.5	Integrate the architecture and use of microprocessor for basic operations and Simulate using simulation software.	4	4


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Program: B. Tech Information Technology

Semester	Course Code	Name of Course	L	T	P	Credits
III	BIT2307	Object Oriented Programming with C++ Lab	-	-	4	2
Teaching Scheme					Examination Scheme	
Practical	4 Hrs/week				CT-I	-
Tutorial	-				CT-II	-
Total Credits	2				CA	25 Marks
					ESE	25 Marks

Pre-Requisites: C Language

Sr. No.	List of Experiment
1	Derive a program to sort a list of numbers in ascending order.
2	Write C++ programs that illustrate how the following forms of inheritance are supported: a)Single inheritance b)Multiple inheritance c)Multi level inheritance d)Hierarchical inheritance
3	Write a program Illustrating Class Declarations, Definition, and Accessing Class Members.
4	Implement a C++ program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
5	Design a C++ program to find the sum of individual digits of a positive integer.
6	Program to illustrate default constructor, parameterized constructor and copy constructors
7	Write a Program to Demonstrate the i)Operator Overloading.ii) Function Overloading.
8	Write a Program to Demonstrate Friend Function and Friend Class.
9	Write a Program Containing a Possible Exception. Use a Try Block to Throw it and a Catch Block to Handle it Properly.
10	Write a C++ program to implement the matrix ADT using a class. The operations supported by this ADT are: a) Reading a matrix. b) Addition of matrices. c) Printing a matrix. d) Subtraction of

Text Books

1	Object Oriented Programming with C++ by Balagurusamy
2	C++, the Complete Reference, 4th Edition, Herbert Schildt, TMH.
3	Matt Weisfeld, "The Object-Oriented Thought Process", Pearson

Reference Books

1	C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.
2	The C++ Programming Language, 3rd Edition, B.Stroustrup, Pearson Education.

Useful Links



1	https://nptel.ac.in/courses/106/105/106105151/
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	Course Outcomes	CL	Class Sessions	Lab Sessions
BIT2307.1	Interprete the object oriented concepts and their utility in object oriented development.	2	-	4
BIT2307.2	Discover the library file to write complex programs by using classes & objects.	3	-	4
BIT2307.3	Correlate the class from another class by different ways of class derivation.	4	-	4
BIT2307.4	Categorize the features of an object oriented language like abstract classes and interfaces, exceptions and libraries of object collections.	4	-	4
BIT2307.5	Estimate the interactive programs using applets and Stream function.	5	-	4

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Program: B. Tech Information Technology

Semester	Course Code	Name of Course	L	T	P	Credits
III	BIT2308	Data Structures Lab	-	-	2	1
Teaching Scheme					Examination Scheme	
Practical	2 Hrs/week				CT-I	-
Tutorial	-				CT-II	-
Total Credits	1				CA	25 Marks
					ESE	25 Marks

Pre-Requisites: Basics of C Programming,

Sr.	List of Experiment
1	Write a program that uses functions to perform the following operations on singly linked list i)Creation ii)Insertion iii)Deletion iv)Traversal.
2	Write a program that uses functions to perform the following operations on doubly linked list i)Creation ii)Insertion iii) Deletion iv)Traversal.
3	Write a program that uses functions to perform the following operations on circular linked Listi) Creation ii) Insertion iii)Deletion iv)Traversal.
4	Write a program that implement stack (its operations) using i) Arraysii) Linked list(Pointers).
5	Write a program that implement Queue (itsoperations)using i)Arrays ii)Linked list(Pointers).
6	Write a program that implement Circular Queue using arrays. Write a program that uses both recursive and non recursive
7	Write a program that implements the following sorting i)Bubble sort ii)Selection sort iii)Quick sort.
8	Write a program that implements the following i)Insertion sort ii)Merge sort iii)Heap sort.
9	Write a program to implement all the functions of a dictionary(ADT)using Linked List.
10	Write a program to perform the following operations: Insert an element in to a binary search tree.

Text Books

- 1 Data Structures with C by SEYMOUR LIPSCHUTZ [TMH].
- 2 Data Structure using C by ISRD Group [TMH].
- 3 Introduction to Data Structure in C by Ashok N. Kamthane [Pearson].

Reference Books

- 1 Data Structure through C by G. S. BALUJA [Dhanpat Rai & co.].
- 2 Data structures using C and C++ by Tenenbaum [Pearson].

3	Data structures Pseudocode with C by Gilberg/Foruzen, Cengage Learning
Useful Links	
1	https://nptel.ac.in/courses/106/102/106102064/
2	https://nptel.ac.in/courses/106/106/106106127/
3	https://nptel.ac.in/courses/106/103/106103069/

	Course Outcomes	CL	Lab Sessions
BIT2308.1	Analyze the average, best, worst case in terms of space and time complexity.	2	4
BIT2308.2	Describe appropriate data structures and algorithms, understand the ADT/libraries, and use it to design algorithms for a specific problem by using various sorting techniques.	3	4
BIT2308.3	Illustrate expertise in algorithmic analysis and algorithm design techniques with respect to stacks & queues.	3	4
BIT2308.4	Analyze and select algorithm design approaches in a problem specific manner using Linked List	5	4
BIT2308.5	Evaluate with analysis of efficiency and proofs of correctness for graphs and trees as a data structure	4	4


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Program: B. Tech Information Technology

Semester	Course Code	Name of Course	L	T	P	Credits
III	BIT2309	Computer Lab-I(Introduction to Computer Hardware and Linux Lab)	-	-	2	1
Teaching Scheme					Examination Scheme	
Practical	2 Hrs/week				CT-I	-
Tutorial	-				CT-II	-
Total Credits	1				CA	25 Marks
					ESE	25 Marks

Pre-Requisites:Computational Skills

Sr. No.	List of Experiment
1	Demonstration of different generations and types of Computers- Hardware's- Parts of a Personnel Computer System –input output devices-memories- and Types of Languages and Software's.
2	Identify and study the different parts of Motherboard
3	To demonstrate about SMPS Power supply
4	Demonstration of different types of monitors
5	Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or directory and reports accordingly. Whenever the argument is a file it reports no of lines present in it.
6	To demonstrate about the Hard disk Drives
7	Identify and study Building and Assembling a Desktop PC
8	To demonstrate the BIOS' Setup Utility. (Introduction to Linux)
9	Implement in C the following Unix commands using system calls A) cat B)mv
10	Write a C program to emulate the Unix ls-l command?

Text Books

1	PC Hardware: The complete Reference by Craig Zacker, 1st Edition, TMH publication.
2	Troubleshooting, Maintaining and Repairing PCs by Stephen Bigelow, 5th Edition, TMH publication.

Reference Books

1	Mastering Windows XP registry by Peter D Hipson. Sybex publication.
2	Windows ® Command-Line Administration: Instant Reference by John PaulMueller, Sybex publication

Useful Links



	Course Outcomes	CL	Lab Sessions
BIT2309.1	Examine the different types of computers, its Languages, parts of PC's and the various components typically contained on the motherboard, Motherboard interface connectors and internal headers.	4	4
BIT2309.2	Work with peripherals of computers like SMPS and examine the different types of monitors.	4	4
BIT2309.3	Handle the different Types of Keyboards and identify the different components of the hard disk drive.	4	4
BIT2309.4	Build and assemble a PC and learn customization of a PC and acquire knowledge about BIOS Setup utility and Power on self Test.	5	4
BIT2309.5	Learn the necessary skills to install and uninstall an Application Software with Installation and Configuration of a DVD Writer and practice to write in a Blank DVD.	5	4

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Program: B. Tech. III Semester (All Branches)			
Semester III	BSH2301: Human Values for Professional Society		
Teaching Scheme		Examination Scheme	
Theory	3 Hrs/week	CT-I	15 Marks
Tutorial	-	CT-II	15 Marks
Total Credits	3	CA	10Marks
Duration of ESE: 3Hrs		ESE	60 Marks
Pre- Requisite: Ethical Science & Business Ethics		Total Marks	100 Marks
Course Contents			
Unit I	Introduction to Value Education Value Education, Definition, Concept and Need for Value Education, The Content and Process of Value Education, Basic Guidelines for Value Education, Self-exploration as a means of Value Education.		
Unit II	Harmony in the Human Being, Family, Society and Nature Human Being is more than just the Body, Understanding Myself as Co-existence of the Self and the Body, Understanding the activities in the Self and the activities in the Body, Family as a basic unit of Human Interaction and Values in Relationships, The Basics for Respect and today's Crisis: Affection, Guidance, Reverence, Glory.		
Unit III	Social Ethics The Basics for Ethical Human Conduct, Defects in Ethical Human Conduct, Holistic Alternative and Universal Order, Universal Human Order and Ethical Conduct.		
Unit IV	Basic Theories Basic Ethical principles, Moral Developments, Deontology, Utilitarianism, Virtue theory, Rights Theory, Casuist Theory, Moral Absolution, Moral Rationalism, Moral Pluralism, Ethical Egoism, Feminist Consequentialism, Moral Issues, Moral Dilemmas, Moral Autonomy.		
Unit V	Global Issues in Professional Ethics: Introduction- Current Scenario, Technology Globalization of MNCs, International Trade, World Summits, Issues, Business Ethics and Corporate Governance, Sustainable Development Ecosystem, Energy Concerns, Ozone Deflection, Pollution, Ethics in Manufacturing and Marketing, Media Ethics; War Ethics; Bio Ethics, Intellectual Property Rights.		


Text Books	
T.1	A.N Tripathy, New Age International Publishers, 2003.
T.2	Bajpai. B. L, New Royal Book Co, Lucknow, Reprinted, 2004.
T.3	Bertrand Russell Human Society in Ethics & Politics.
T.4	Professional Ethics: R. Subramanian, Oxford University Press, 2015.
Reference Books	
R.1	Corliss Lamont, Philosophy of Humanism.
R.2	Gaur. R.R, Sangal. R, Bagaria. G.P, A Foundation Course in Value Education, Excel Books, 2009.
R.3	Gaur. R.R, Sangal. R, Bagaria. G.P, Teachers Manual Excel Books, 2009.
R.4	I.C. Sharma. Ethical Philosophy of India Nagin & co Julundhar.
R.5	Mortimer. J. Adler, – Whatman has made of man.
R.6	Engineering Ethics, Concepts Cases: Charles E Harris Jr., Michael S Pritchard, Michael J Rabins, Cengage Learning, 2015.

COs	Course Outcomes	CL	Class Sessions
CO1	Describe Value Education and its role for Self-exploration.	2	9
CO2	Illustrate the Harmony in the Human Being and Society.	3	9
CO3	Examine the Ethical Human Conduct along with Universal Order.	3	9
CO4	Use of various theories of Basic Ethical principles.	3	9
CO5	Predict Global Issues in Professional Ethics and Sustainable Development.	3	10


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Program: B. Tech. (Audit Course)

Semester	Course Code	Name of Course	L	T	P	Credits
III	BAU2303	Environmental Science	2	-	-	Audit
Teaching Scheme			Examination Scheme			
Theory	2Hrs/week		CT-I	-		
Tutorial	-		CT-II	-		
Total Credits	Audit		CA	-		
Duration of ESE: 2 Hrs			ESE	50 Marks (MCQ)		

Course Contents

Unit I	<p>Natural Resources: Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Energy resources: Growing energy needs, use of alternate energy sources. Forest resources: Use and over-exploitation, deforestation, mining, dams and their effects on forest. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources.</p>
Unit II	<p>Ecosystems: Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers. Energy flow in the ecosystem, Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems.</p>
Unit III	<p>Environmental Pollution: Definition, Cause, effects and control measures of: - a. Air pollution, b. Water pollution, c. Noise pollution, d. nuclear hazards. E-Solid waste Management: Causes, effects and control measures of urban and industrial wastes.</p>

Text Books

1	Ecology and Environmental Science, Rana S.V.S, PHI Learning Private Ltd.
2	Environmental Science and Engineering, Anjali Bagad, PHI Learning Private Ltd.
3	Environmental Science, Fundamentals, Ethics & Laws, Shulka, Ashish & Others, I. K. International P. Ltd.


Reference Books


1	Environmental Science and Demystified, William Linda, Tata McGraw Hill
2	Essential of Ecology and Environmental Science, Rana SVS, Prentice Hall Of India.

3	Environmental Pollution Control Engineering, C S Rap, New Age International Publishers.
Useful Links	
1	https://youtu.be/NRoFvz8Ugeo
2	https://youtu.be/iMSwvJh1A8
3	https://youtu.be/els4M2QG0

	Course Outcomes	CL	Class Sessions
BAU2303.1	Examine natural resources and their importance	3	8
BAU2303.2	Illustrate the energy flow in the ecosystem	3	8
BAU2303.3	Predict the causes of environmental pollution and preventive measures.	3	8


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