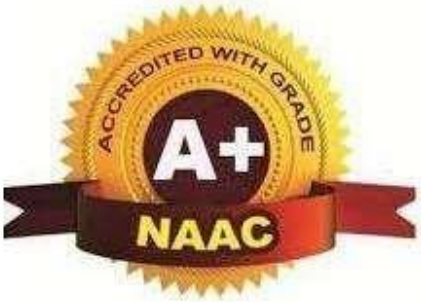
TULSIRAMJI GAIKWAD-PATIL
College of Engineering & Technology

Mohgaon, Wardha Road, Nagpur - 441 108

An Autonomous Institute



DEPARTMENT OF INFORMATION TECHNOLOGY

B.Tech. Information Technology

As Per NEP-2020

IInd Year IV Semester

Syllabus

From

Academic Year 2024-25

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- IV

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	IV	PCC	IT	BIT32401	Operating System	T	3	-	3	03	30	10	60	3 Hrs.	**100**
2		PCC	IT	BIT32402	Database Management System	T	3	-	3	03	30	10	60	3 Hrs.	**100**
3		MDM	SH	BSH32401	Discrete mathematics & Graph Theory	T	2	-	2	02	14	6	30	2 Hrs.	**50**
4		OEC	IT	BIT32413	Open Elective-II (Artificial Intelligence)	T	2	-	2	02	14	6	30	2 Hrs.	**50**
5		VSEC	IT	BIT32403	Object Oriented Programming with C++	P	-	4	4	02	-	50	50	2 Hrs.	**100**
6		AEC	SH	BSH32404	Leadership and Team Dynamics	P	-	4	4	02	-	50	50	2 Hrs.	**100**
7		HSSM	MBA	BBA32402	Innovation and Entrepreneurship	T	2	-	2	02	14	6	30	2 Hrs.	**50**
8		VEC	SH	BSH32403	Human Value for Professional Society	T	2	-	2	02	14	6	30	2 Hrs.	**50**
9		PCC	IT	BIT32404	Operating System using Python Lab	P	-	2	2	01	-	25	25	2 Hrs.	**50**
10		PCC	IT	BIT32405	Database Management System Lab	P	-	2	2	01	-	25	25	2 Hrs.	**50**
Total							**14**	**12**	**26**	**20**	**116**	**194**	**390**	**22 Hrs**	**700**

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	02	02	02	02	-	02	02	-	-	-	-	-
Cumulative Sum	16 / 13	18	06	04	06	04	02	04	04	-	2	-	-	04

PROGRESSIVE TOTAL CREDITS:63+20=83

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

Applicable forAY2024-25 Onwards

Dr. Pragati Patil
Vice-Principal

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

Principal
Tulsiramji Gaikwad Patil College Of Engineering and Technology, Nagpur

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

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SCHEME OF INSTRUCTION & SYLLABI

Programme: B. Tech. in Information Technology

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

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

Chairperson	Dean Academics	Vice Principal	Principal	June, 2024	1.00	Applicable for AY 2024-25 Onwards
				Date of Release	Version	

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

Principal
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Second Year (Semester-IV) B. Tech. Information Technology

BIT32401: Operating System

Teaching Scheme	
Theory	3 Hrs/week
Tutorial	-
Total Credits	3

Examination Scheme	
CT-I	15 Marks
CT-II	15 Marks
CA	10 Marks
ESE	60 Marks
Total	100 Marks
Duration of ESE: 3Hrs	

Course Objectives: Student will able to

1.	Understand the core function and structure of an operating system.
2.	Understand the principles of file management, including file system structure and access methods.
3.	Apply various page replacement algorithms (Optimal, FIFO, LRU) for efficient memory management in virtual memory systems.
4.	Apply synchronization techniques such as semaphores and monitors to solve concurrency issues.
5.	Understand the definition of deadlock and the necessary and sufficient conditions for its occurrence in operating systems.

Course Contents

Unit I	**Introduction**: What is Operating System(OS), structure of OS, history of OS, Types of OS: Time sharing, real-time, multi process (Asynchronous & Synchronous), multiprogramming (loosely coupled, tightly coupled), Distributed, web-based, client server, peer-to-peer, services of OS, user view & machine view of OS, System calls, Spooling and buffering.
Unit II	**Process Management:** Process concept, process scheduling, operations on process, inter process communication, communication between client-server, multithreading model, process scheduling criteria, scheduling algorithm. **Process Synchronization:** Critical Section problem, semaphores, classic problems: Dining Philosopher problem, producer-consumer, reader-writer's problem, bounded buffer problem, monitors, Atomic transaction, synchronization examples.
Unit III	**Memory Management:** Basic concept, Logical and physical address map, Memory allocation: Contiguous Memory allocation – Fixed and variable partition–Internal and External fragmentation and Compaction; Paging: Principle of operation – Page allocation – Hardware support for paging, Protection and sharing, Disadvantages of paging. **Virtual Memory**: Basics of Virtual Memory – Hardware and control structures –Locality of reference, Page fault, Working Set, Dirty page/Dirty bit– Demand paging, Page Replacement algorithms: Optimal, First in First Out (FIFO), Optimal Page Replacement and Least Recently used (LRU).
Unit IV	**Deadlocks:** Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, and Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery.

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Unit V	**File Management:** File Concept, file attributes, file operations, file system structure, file system implementation, file access methods, Disk Scheduling Algorithms, File protection, free space management on disk.
Text Books	
T.1	Modern Operating Systems – A. S. Tanenbaum, Pearson Education
T.2	Operating System Concepts by Silberchatz et al, 5th edition, 1998, Addison-Wesley.
T.3	Advanced Concepts In Operating Systems by Niranjan G. Shivaratri
Reference Books	
R.1	Operating Systems by Mandrik & Donovan, TMH
R.2	Operating Systems concepts and Design – Milan Milenkovic, Tata McGraw Hill
Useful Links	
1	https://archive.nptel.ac.in/courses/106/105/106105214/
2	https://onlinecourses.nptel.ac.in/noc20_cs04/preview

CO	Course Outcomes	CL	Class Sessions
BIT32401.1	Classify the structure and key features of operating system	2	9
BIT32401.2	Analyze the interaction between process scheduling and synchronization techniques to ensure efficiency.	4	9
BIT32401.3	Illustrate memory allocation techniques and their impact.	3	9
BIT32401.4	Evaluate strategies for managing deadlocks, and recovery techniques.	5	9
BIT32401.5	Examine the performance of disk scheduling algorithms and their role in optimizing file system operations.	4	9

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

BIT32402:Database Management System

Teaching Scheme	
Theory	3 Hrs/week
Tutorial	-
Total Credits	3

Examination Scheme	
CT-I	15 Marks
CT-II	15 Marks
CA	10 Marks
ESE	60 Marks
Total	100 Marks
Duration of ESE: 3Hrs	

Course Objectives:

1.	Understand the fundamentals of database systems and DBMS concepts.
2.	Identify the concepts of conceptual data modeling using the E/R model.
3.	Illustrate the concept of embedded SQL and its role in application development.
4.	Analyze the process of database normalization and the steps for achieving 1NF, 2NF, 3NF, and BCNF
5.	Compare various indexing techniques like hash-based indexing, dynamic hashing, and B+ trees.

Course Contents

Unit I	**Introduction** - General introduction to database systems; Database - DBMS distinction, approaches to building a database, data models, database management system, three-schema architecture of a database, challenges in building a DBMS, various components of a DBMS.
Unit II	**E/R Model** - Conceptual data modeling - motivation, entities, entity types, various types of attributes, relationships, relationship types, E/R diagram notation, examples. Relational Data Model - Concept of relations, schema-instance distinction, keys, referential integrity and foreign keys, relational algebra operators: selection, projection, cross product, various types of joins, division, example queries, tuple relation calculus, domain relational calculus, converting the database specification in E/R notation to the relational schema.
Unit III	**SQL** - Introduction, data definition in SQL, table, key and foreign key definitions, update behaviors. Querying in SQL - basic select-from-where block and its semantics, nested queries - correlated and uncorrelated, notion of aggregation, aggregation functions group by and having clauses, embedded SQL.
Unit IV	**Dependencies and Normal forms** - Importance of a good schema design, problems encountered with bad schema designs, motivation for normal forms, dependency theory - functional dependencies, Armstrong's axioms for FD's, closure of a set of FD's, minimal covers, definitions of 1NF, 2NF, 3NF and BCNF, decompositions and desirable properties of them, algorithms for 3NF and BCNF normalization, multi-valued dependencies and 4NF, join dependencies and definition of 5NF.

Unit V	**Data Storage and Indexes** - file organizations, primary, secondary index structures, various index structures - hash-based, dynamic hashing techniques, multi-level indexes, B+ trees. **Transaction processing and Error recovery** - concepts of transaction processing, ACID properties, concurrency control, locking based protocols for CC, error recovery and logging, undo, redo, undo-redo logging and recovery methods.

Text Books	
T.1	Database System Concepts (Sixth Edition) Avi Silberschatz, Henry F. Korth, S. Sudarshan McGraw-Hill 2011 ISBN 978-0071325226/ 0-07-352332-1
T.2	Database Management Systems, Third Edition Raghu Ramakrishnan and Johannes Gehrke McGraw-Hill ©2003 ISBN: 978-0072465631/ 0-07-246563-8
Reference Books	
R.1	Fundamentals of Database Systems, 7th Edition Ramez Elmasri, University of Texas at Arlington Shamkant B. Navathe Pearson India ©2011 ISBN 978-0321369574
Useful Links	
1	https://onlinecourses.nptel.ac.in/noc22_cs91/preview

CO	Course Outcomes	CL	Class Sessions
BIT32402.1	Classify the fundamentals of database systems and DBMS concepts.	2	9
BIT32402.2	Demonstrate attributes and their significance in database modeling.	3	9
BIT32402.3	Examine the use of aggregation functions and GROUP BY/HAVING clauses.	4	9
BIT32402.4	Analyze a given schema to determine violations of normal forms and suggest improvements.	4	9
BIT32402.5	Evaluate error recovery mechanism and suggest improvements for ensuring data integrity.	5	9

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

BSH32401: Discrete Mathematics & Graph Theory

Teaching Scheme	
Theory	**2 Hrs/week**
Tutorial	-
Total Credits	2

Examination Scheme	
CT-I	7 Marks
CT-II	7 Marks
CA	6 Marks
ESE	30 Marks
Total	50 Marks
Duration of ESE: 2Hrs	

Course Objectives:

1.	Use combinatorial methods to approach counting problems and apply these algebraic systems in various mathematical and practical contexts.
2.	Understand the fundamental concepts of Fuzzy Sets and Systems, including the difference between crisp and fuzzy sets.
3.	Apply graph theory to solve problems, such as algorithmic graph problems.

Course Contents

Unit I	**Combinatorics**: Rules of Sum and Product, Permutations, Combinations. Pigeonhole Principle, Recurrence Relation, Linear Recurrence Relations with constant coefficients, Total Solutions, Applications of Relations and Functions, **Groups, Ring and Lattices :** Algebraic Systems, Semi Group, Groups, Monoide, Abellian Group, Sub Group, Isomorphism, Automorphisms and homomorphism group, Rings, Integral Domain & Fields Lattices and Algebraic Systems, Boolean Lattices.
Unit II	**Fuzzy Sets and Fuzzy Logic:** Fuzzy Sets and Systems, Crisp Set, Operations and Combinations on Fuzzy Sets, Relation Between Crisp and Fuzzy Sets, Fuzzy Relation, Overview of Fuzzy logic and Classical Logic.
Unit III	**Graph Theory:** Basic Concepts of Graph Theory, Digraphs, Basic Definations, Matrix Representations of Graphs, Subgraphs and Quetiont Graph, Isomorphic Graph, Paths and Circuits, Reach ability and connectedness, Node base, Eulers Path and Hamiltons Path, Binary Tree, Undirected Tree, Spanning Tree, Weighted Graph (Only Definations & Examples), Minimum Spanning tree by Prims Algorithm and Kruskals Algorithm, Representation of Algebraic Expression by Venn Diagram, and Binary Tree.

Text Books	
T.1	C. L. Liu and D. P. Mohptra, " Elements of Discrete Mathematics", 4th Edition, MCGraw Hill
T.2	Kenneth H. Rosen, " Discretr Mathematics and Its Applicatios", 7th Edition, MCGraw Hill
T.3	Bernard Kolman, Robert C. Busby, Sharon Cutler Ross, " Discrete Mathematical Structural", 6th Edition, Prentice Hall of India.
Reference Books	
R.1	Edger G. Goodaire, Michael M. parmenter, " Discrete Mathematics with Graph Theory", 3rd Edition, Pcarson Education.
R.2	Tremblay J. S., " Discrete mathematical structures with Applications", 3rd Edition, Tata MCGraw Hill
R.3	Mathematics for Engineers by Chandrika Prasad
R.4	A text book of Engineering Mathematics by N. P. Bali & M. Goyal, Laxmi Publication
Useful Links	
1	https://onlinecourses.nptel.ac.in/noc20_cs82/preview

CO	Course Outcomes	CL	Class Sessions
BSH32401.1	Solve Recurrence Relations, Generating Functions, Combinatorial Problems and Understand the concepts of Groups, Rings, Lattices.	3	9
BSH32401.2	Interpret Fuzzy Set Theory and Uncertainty Concept.	3	9
BSH32401.3	Analyze Computational Problems in Graph Theoretical Framework.	4	9

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

BIT32413: Artificial Intelligence(Open-Elective)

Teaching Scheme	
Theory	2 Hrs/week
Tutorial	-
Total Credits	02

Examination Scheme	
CT-I	7 Marks
CT-II	7 Marks
CA	06 Marks
ESE	30 Marks
Total	50 Marks
Duration of ESE: 2Hrs	

Course Objectives:

1.	Understand the fundamental concepts and terminologies of AI and Machine Learning.
2.	Develop skills to choose, plan, and execute AI projects collaboratively within a team.
3.	Recognize the roles and responsibilities of AI team members within organizations.

Course Contents

Unit I	**Introduction:** Machine Learning, What is data, The terminology of AI, What makes an AI company, What machine learning can and cannot do, Non-technical explanation of deep learning, basics of neural networks, Examples of AI, Application domains of AI.
Unit II	**Building AI projects** :Workflow of a machine learning project, Workflow of a data science project, how to use data, How to choose an AI project, Working with an AI team, How to process and visualize data, Technical tools for AI teams, use of python in AI related projects
Unit III	**Building AI in Your Company:** Smart speaker, Case study: Self-driving car, Example roles of an AI team, AI pitfalls to avoid, Survey of major AI application areas **AI and Society** : A realistic view of AI, Discrimination / Bias, Adversarial attacks on AI, Adverse uses of AI, AI and developing economies, AI and jobs

Text Books

T.1	Artificial Intelligence: A Modern Approach Stuart Russell Peter Norvig 2010 Prentice Hall
T.2	Artificial Intelligence: The Basics Kevin Warwick, Routledge 2nd edition Routledge

Reference Books

R.1	Artificial Intelligence for Humans Jeff Heaton 1st edition Independent Publishing

Useful Links

1	https://onlinecourses.nptel.ac.in/noc22_cs56/preview
2	https://onlinecourses.nptel.ac.in/noc24_ge47/preview

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CO	Course Outcomes	CL	Class Sessions
BIT32413.1	**Explain** the fundamental concepts and terminologies of Artificial Intelligence and Machine Learning.	2	9
BIT32413.2	**Describe** the workflows of Machine Learning and Data Science projects.	2	9
BIT32413.3	**Evaluate** major application areas of AI in industries, assessing their potential and limitations.	5	9

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

BIT32403: Object Oriented Programming with C++ Lab

Teaching Scheme		Examination Scheme	
Practical	4 Hrs/week	CA	50 Marks
Total Credits	02	ESE	50 Marks
		Total	100 Marks

Sr. No	List of Practical	CO
1	Write a programs to implement the concepts of classes and object.	CO1
2	Develop a program that uses a class where the member functions are defined outside And inside a class.	CO1
3	Implement a program to demonstrate the use of static data members.	CO2
4	Design a program to Demonstrate concept of a. Arrays within a class, Arrays of Objects (e.g Develop program to calculate best of two class Test marks of six subjects of a student) b. Objects as Function Arguments, Returning Objects. (e.g. Complex number arithmetic).	CO2
5	Develop a program to demonstrate Opening and Closing of file using constructors and open ( ) function.	CO3
6	Write a program to demonstrate the use of explicit constructor.	CO3
7	Design a C++ program that illustrates the order of execution of constructors and destructors when new class is derived from more than one base class.	CO4
8	Develop a program to demonstrate the overloading of increment and decrement operators	CO4
9	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.	CO5
10	Design a program to implement Array of pointers, pointer to functions, pointer to objects.	CO5

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Text Books	
1	Object Oriented Programming with C++ by Balagurusamy
2	C++, the Complete Reference, 4th Edition, Herbert Schildt, TMH.
Reference Books	
1	C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.
2	The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Education.
Useful Links	
1	https://onlinecourses.nptel.ac.in/noc21_cs02/preview
2	https://sreevahini.edu.in/pdf/oops.pdf

CO	Course Outcomes	CL	Lab Sessions
BIT32403.1	Apply the class and object concepts by using C++.	3	4
BIT32403.2	Analyze the programs using inheritance and Arrays of Objects.	4	4
BIT32403.3	Construct the significance of constructors and destructor.	6	4
BIT32403.4	Demonstrate the function and operator overloading using C++.	3	4
BIT32403.5	Design the Programs using pointer to object concepts in C++.	6	4

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

BSH32404: Leadership and Team Dynamics

Teaching Scheme		Examination Scheme	
Practical	2 Hrs/week	CA	50 Marks
Total Credits	2	ESE	50 Marks
		Total	100 Marks

Course Objectives:

1.	To provide a framework for the students to understand the importance of Leadership and team effectiveness in organizations.
2.	To develop an understanding of the interpersonal processes and group dynamics.
3.	To provide a theoretical understanding of leadership practices in organizations.

Course Contents

Unit I	**Introduction to Leadership & Team Management**; Leadership Myths; Interactional Framework for analyzing leadership; Leadership Development: The First 90 Days as a Leader; Leader Development-The Action-Observation-Reflection Model LMX Theory and Normative Decision Model; Situational Leadership Model; Contingency Model and Path Goal Theory; Emotional Approach Charismatic and Transformational Leadership; Leadership for Tomorrow
Unit II	**Leadership Attributes**: Personality Traits and Leadership: Personality Types and Leadership; Intelligence and Leadership; Emotional Intelligence and Leadership Power and Leadership: The art of influence in leadership: Leadership and "Doing the Right Things: Character-Based Approach to Leadership; Role of Ethics and Values in Organizational Leadership
Unit III	**Leadership Behavior:** Leadership Pipeline: Assessing Leadership Behaviors: Multi-rater Feedback Instruments: The Dark Side of; Leadership- Destructive Leadership; Managerial Incompetence and Derailment Conflict Management Negotiation and Leadership: Leadership under a crisis situation: The Situation and the Environment: Culture and Leadership: Global Leadership

Text Books

T.1	Leadership: Enhancing the lessons of experience by Hughes, R.L., Ginnett, R.C., & Curphy, G.J. (2019), 9th Edition, McGraw Hill Education, Chennai, India.
T.2	Robbins, S.P. Judge, T.A. & Vohra, N., "Organizational Behavior," 18th Ed, Pearson Education. (2019)

Reference Books

R.1	Baron R. A. and Byrne D., "Social Psychology", 10th Ed., Pearson Education, Inc. (2004)

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R.2	Luthans F., "Organizational Behavior",10th Ed., McGraw-Hill Companies. (2004)
Useful Links	
1	https://onlinecourses.nptel.ac.in/noc22_mg39/preview

	Course Outcomes	CL	Class Sessions
BSH32404.1	Explain how global leadership skills contribute to leadership effectiveness.	2	9
BSH32404.2	Understand the leader's role in team-based organizations.	2	9
BSH32404.3	Classify the potential contribution of outdoor training to the development of team leadership.	2	9

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

BBA32402: Innovation & Entrepreneurship

Teaching Scheme	
Theory	2 Hrs/week
Tutorial	-
Total Credits	2

Examination Scheme	
CT-I	7 Marks
CT-II	7 Marks
CA	6 Marks
ESE	30 Marks
Total	50 Marks
Duration of ESE: 2Hrs	

Course Objectives:

1. Students will be able to know about basic concept of economics.
2. Students will be able to aware about competitions and entrepreneurship.
3. Students will be able to get the knowledge of sales and marketing.

Course Contents

Unit I	**Theory of Demand & Utility:** Law of Demand, Types of Demand, Elasticity of Demand, Methods of measurement of elasticity of demand, law of diminishing marginal utility. **Theory of Production:** Factors of production (meaning & characteristics of Land, Labour, capital & entrepreneur).
Unit II	**Price Determination & Depreciation:** Laws of return, Average cost, Marginal cost, fixed cost, variable cost, Depreciation, Methods to calculate depreciation. **Market:** Perfect competition, Imperfect competition (monopoly, oligopoly, monopolistic competition).
Unit III	**Entrepreneurship, Business Plan and Idea Presentation:** Definition, steps towards successful enterprise, opportunity identification, various analytics to be performed for idea validation. **Business Plan and Idea Presentation:** Transforming idea to plan on paper, various reports for validation of business, presenting and pitching idea. Stages of idea stage to fully scaled corporation, types of company and their difference in specifications, legislation and legal precautions, finding sources, stages of funding, various methods of collaborations, disinvestment, winding up company.

Text Books

T.1	O.P. Khanna, *Industrial Engineering and Management*, Dhanpat Rai & Sons, 1999.
T.2	R. Panner Selvam, *Production and Operations Management*, PHI Learning, 2002.
T.3	Mart and Telsang, *Industrial Engineering and Production Management*, S. Chand and Co., 1998.

Reference Books

R.1	Shailendra Kale, *Production and Operations Management*, McGraw Hill, India 2013.
R.2	Fundamentals of Management: Essential Concepts and Applications, Pearson Education, Robbins, S.P. and Decenzo David A.

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Useful Links	
1	https://onlinecourses.nptel.ac.in/noc22_mg70/preview
2	https://onlinecourses.nptel.ac.in/noc22_d0x8/preview

CO	Course Outcomes	CL	Class Sessions
BBA32402.1	Describe demand & utility of product in industries.	2	9
BBA32402.2	Discuss the terms price determinations, depreciation, and market	2	9
BBA32402.3	Apply the elements of a business plan required to set up and start a business.	3	9

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Tulsiramji Gaikwad-Patil College of Engineering and Technology

Wardha Road, Nagpur-441 108

NAAC Accredited (A+ Grade)

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

BSH32403: Human Values for Professional Society

Teaching Scheme	
Theory	2 Hrs/week
Tutorial	-
Total Credits	2

Examination Scheme	
CT-I	7 Marks
CT-II	7 Marks
CA	6 Marks
ESE	30 Marks
Total	50 Marks
Duration of ESE: 2Hrs	

Course Objectives:

1.	To introduce students to know the difference between values and ethics and to ensure sustained happiness and prosperity, which are the core aspirations of all human beings.
2.	To teach harmony in the Family and Society-Human Relationship.
3.	To explain ethics in personal and professional life.

Course Contents

Unit I	Need, Content and Process for Value Education: - Meaning and importance of Value Education, Types of Values - Personal Values, Social Values, and Moral Values & Spiritual Values, Relevance of Human values: Integrity, Empathy.
Unit II	Harmony in the Human Life :- Define Harmony and significance of Harmony, Importance of - Harmony in the family, society and human relationship, and understand Harmony with self and Nature.
Unit III	Ethics in the Professional Society: -Nature, characteristics and scope of professional ethics; Types of Professional Ethics, Professional Values: Trusteeship, Inclusiveness, Commitment, Sustainability, Accountability, Transparency, Impartiality.

Text Books

T.1	R.R. Gaur, R Sangal, G.P. Bagaria (2009): A Foundation Course in Human Values and Professional Ethics, Excel Books
T.2	D.R. Kiran (2014) Professional Ethics and Human Values, McGraw Hill Education (India).

Reference Books

R.1	LaFollette, Hugh, ed. Ethics in Practice: An Anthology. Cambridge: Blackwell,1997
R.2	Vivian L Vignoles (2017): Identity: Personal and Social, Chapter to appear in Oxford Handbook of Personality and Social Psychology (2nded.), edited by Kay Deaux and Mark Snyder.
R.3	Happiness and Well-Being, NIOS Module V (Health and well-being)

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Useful Links	
1	https://onlinecourses.nptel.ac.in/noc23_hs89/preview
2	https://archive.nptel.ac.in/courses/109/104/109104068

CO	Course Outcomes	CL	Class Sessions
BSH32403.1	Classify the importance of value education in life.	2	9
BSH32403.2	Discuss the significance of harmony in family and society.	2	9
BSH32403.3	Demonstrate the ethics in professional and personal life	3	9

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

BIT32404: Operating System using Python Lab

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

Sr. No	List of Practical	CO
1	Exploring features and installation of any Operating Systems	CO1
2	Apply use system monitoring tools (e.g., `ps`, `top`, `vmstat`) to observe machine-level resource utilization.	CO1
3	Write a Program to implement the critical section problem using semaphores to achieve mutual exclusion and prevent race conditions.	CO2
4	Write a Program to create and manage processes using Python's `multiprocessing` module to understand process creation, scheduling, and inter-process communication..	CO2
5	Write a Program to simulate paging and address translation between logical and physical memory.	CO3
6	To implement and compare page replacement algorithms (FIFO, LRU, Optimal) and evaluate their performance in handling page faults.	CO3
7.	To implement deadlock prevention strategies (e.g., resource ordering, preemption) and prevent deadlocks by eliminating necessary conditions.	CO4
8.	Write a Program to implement deadlock detection and recovery mechanisms	CO4
9.	Write a Program to implement file operations (create, read, write, append, and delete) in Python to understand the concepts of file management, file attributes, and file operations.	CO5
10	Write a Program to implement the Producer-Consumer problem using semaphores to synchronize producer and consumer processes and avoid buffer overflow/underflow.	CO5

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Text Books	
1	Modern Operating Systems by Andrew S. Tanenbaum
2	Python Programming for the Absolute Beginner by Michael Dawson
Reference Books	
1	Python for Systems Programming" by Brian P. Ladd
2	Python Programming: An Introduction to Computer Science by John Zelle
Useful Links	
1	https://www.geeksforgeeks.org/operating-systems/
2	https://docs.python.org/3/library/os.html#os.getpgid

	Course Outcomes	CL	Lab Sessions
BIT32404.1	Classify the structure and key features of operating system	2	4
BIT32404.2	Analyze the interaction between process scheduling and synchronization techniques to ensure efficiency.	4	4
BIT32404.3	Illustrate memory allocation techniques and their impact.	3	4
BIT32404.4	Evaluate strategies for managing deadlocks, and recovery techniques.	5	4
BIT32404.5	Examine the performance of disk scheduling algorithms and their role in optimizing file system operations.	4	4

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BIT32405: Database Management System Lab

Teaching Scheme	
Practical	2Hrs/week
Total Credits	01

Examination Scheme	
CA	25 Marks
ESE	25 Marks
Total	50 Marks

Sr. No	List of Practical	CO
1	Implement Data Definition Language commands.	CO1
2	To study different function of database.	CO1
3	Write and implement primary key and foreign key concepts.	CO2
4	Implement set of operator and view on a database.	CO2
5	Design a database using normalization.	CO3
6	To study and implements joins in oracle.	CO3
7	Design Constraints on a database.	CO4
8	Create nested queries and joining queries using DML commands.	CO4
9	Implement the concept of Indexes and views.	CO5
10	Implement the basics of PL/SQL	CO5

Text Books	
1	http://5.202.73.55:8026/opac//temp/7646.pdf
2	https://dl.ebooksworld.ir/motoman/Pearson.Database.Systems.A.Practical.Approach.to.Design.Implementation.and.Management.6th.Global.Edition.www.EBooksWorld.ir.pdf
Reference Books	
1	https://artifex.com/samples/pdf/db-systems.pdf
2	https://xuanhien.wordpress.com/wp-content/uploads/2011/04/database-management-systems-raghu-ramakrishnan.pdf

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Useful Links	
1	https://www.geeksforgeeks.org/dbms/
2	https://www.scribd.com/doc/265693011/Dbms-Lab-Exercise-pdf

	Course Outcomes	CL	Lab Sessions
BIT32405.1	Classify the fundamentals of database systems and DBMS concepts.	2	4
BIT32405.2	Demonstrate attributes and their significance in database modeling.	3	4
BIT32405.3	Examine the use of aggregation functions and GROUP BY/HAVING clauses.	4	4
BIT32405.4	Analyze a given schema to determine violations of normal forms and suggest improvements.	4	4
BIT32405.5	Evaluate error recovery mechanism and suggest improvements for ensuring data integrity.	5	4

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