

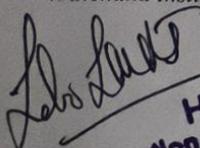


Walchand Institute of Technology, Solapur
(An Autonomous Institute)

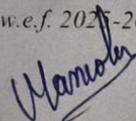
Affiliated to
Punyashlok Ahilyadevi Holkar Solapur University,
Solapur

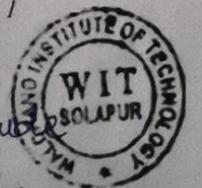
Choice Based Credit System (CBCS)

Structure and Syllabus
for
Final. Year. B.Tech. Information Technology
W.E.F. 2025-26


HEAD
Information Technology Dept.
W.I.T., Solapur.




Dr. Mrs M. A. Nirgude
Dean Academics



Department of Information Technology

Vision

- To be a frontier in Information Technology, to produce globally competent engineers with an aptitude for leadership and research, who will be instrumental in continuous socio-economic development.

Mission

- **M1:** To impart quality education in Information Technology in accordance with the needs of the society through blended mode.
- **M2:** To inculcate critical thinking and creativity for identifying various issues and to provide sustainable solutions by becoming a lifelong learner.
- **M3:** To enhance career opportunities through academia-industry interaction and research, while embodying professional ethics.



Department of Information Technology

Program Educational Objectives (PEOs)

- Graduates will exhibit strong fundamental knowledge and skills in the field of Information Technology to pursue successful professional careers, higher studies and research.
- Graduates will exhibit capabilities to understand and resolve the various issues through their problem-solving skills.
- Graduates will be sensitive to ethical, societal and environmental issues while serving at their professional work and society.

Knowledge and Attitude Profile (WK)

WK1	A systematic, theory-based understanding of the natural sciences applicable to the discipline and awareness of relevant social sciences.
WK2	Conceptually-based mathematics, numerical analysis, data analysis, statistics and formal aspects of computer and information science to support detailed analysis and modelling applicable to the discipline.
WK3	A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline.
WK4	Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline.
WK5	Knowledge, including efficient resource use, environmental impacts, whole-life cost, re-use of resources, net zero carbon, and similar concepts, that supports engineering design and operations in a practice area.
WK6	Knowledge of engineering practice (technology) in the practice areas in the engineering discipline.
WK7	Knowledge of the role of engineering in society and identified issues in engineering practice in the discipline, such as the professional responsibility of an engineer to public safety and sustainable development.
WK8	Engagement with selected knowledge in the current research literature of the discipline, awareness of the power of critical thinking and creative approaches to evaluate emerging issues.
WK9	ethics, inclusive behavior and conduct. Knowledge of professional ethics, responsibilities, and norms of engineering practice. Awareness of the need for diversity by reason of ethnicity, gender, age, physical ability etc. with mutual understanding and respect, and of inclusive attitudes.



Program Outcomes (POs)	
PO 1	Engineering Knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.
PO 2	Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)
PO 3	Design/Development of Solutions: Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)
PO 4	Conduct Investigations of Complex Problems: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).
PO 5	Engineering Tool Usage: Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)
PO 6	The Engineer and The World: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).
PO 7	Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)
PO 8	Individual and Collaborative Team work: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.
PO 9	Communication: Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning difference
PO 10	Project Management and Finance: Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.
PO 11	Life-long Learning: Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and



emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8)

Program Specific Outcomes (PSOs)

- **PSO 1:** Graduates will be able to apply fundamentals of mathematics, algorithms and computational systems to Information technology.
- **PSO 2:** Students will be able to provide a solution to the problem in the areas of Networking, Database management, System Software, Web Technology, Information Security and Thrust areas.
- **PSO 3:** Students will be able to design and develop IT solution for societal problem/s while encouraging usage of Free and Open-Source Software (FOSS).



Department of Information Technology

Legends Used

L	Lecture Hours / week
T	Tutorial Hours / week
P	Practical Hours / week
FA	Formative Assessment
SA	Summative Assessment
ESE	End Semester Examination
ISE	In Semester Evaluation
ICA	Internal Continuous Assessment
POE	Practical and Oral Exam
OE	Oral Exam
MOOC	Massive Open Online Course
HSS	Humanity and Social Science
NPTEL	National Programme on Technology Enhanced Learning
F.Y.	First Year
S.Y.	Second Year
T.Y.	Third Year
B. Tech.	Bachelor of Technology



Department of Information Technology

Course Code Format									
2	2	I	T	U/P	2	C	C	1	T/L
Year of Syllabus revision		Program Code		U-Under Graduate P-Post Graduate	Semester No./ Year 1/2/3/...8	Course Type		Course Serial No 1-9	T-Theory, L-Lab session A- Tutorial P- Programmin g

Program Code	
IT	Information Technology
Course Type	
BS	Basic Science
ES	Engineering Science
HU	Humanities & Social Science
MC	Mandatory Course
CC	Core Compulsory Course
SN*	Self-Learning <i>N* indicates the serial number of electives offered in the respective category</i>
EN*	Core Elective <i>N* indicates the serial number of electives offered in the respective category</i>
ON*	Open Elective <i>N* indicates the serial number of electives offered in the respective category</i>
SK	Skill Based Course



SM	Seminar
MP	Mini project
PR	Project
IN	Internship

Sample Course Code	
22ITU7CC1T	Cyber Security



Department of Information Technology

B. Tech. Semester VII

Course Code	Name of Course	Engagement Hours			Credits	SA		FA		Total
		L	T	P		Theory	OE/ POE	ISE	ICA	
22ITU7CC1T	Cyber Security	3	-	-	3	60	-	40	-	100
22ITU7CC2T	Generative AI	3	-	-	3	60	-	40	-	100
22ITU7EN*3T	Professional Elective-II	3	-	-	3	60	-	40	-	100
22ITU7EN*4T	Professional Elective-III	3	-	-	3	60	-	40	-	100
	Subtotal	12	0	0	12	240	0	160	0	400
Laboratory Courses										
22ITU7CC1L	Cyber Security	-	-	2	1	-	-	-	25	25
22ITU7CC2L	Generative AI	-	-	2	1	-	-	-	25	25
22ITU7EN*3L	Professional Elective-II	-	-	2	1	-	-	-	25	25
22ITU7EN*4L	Professional Elective-III	-	-	2	1	-	-	-	25	25
22ITU7CC5P	DevOps	2	-	2	3	-	50	25	25	100
22ITU7PR6L	Project Implementation	-	-	10	5	-	100	-	50	150
	Subtotal	2	0	20	12	0	150	25	175	350
	Grand Total	14	0	20	24	240	150	185	175	750

Note:

- N* indicates the serial number of electives offered in the respective category
- ## indicates program code of offering Program

Professional Elective II at Final year B. Tech. Information Technology, Semester VII

Sr. No	Course Code	Course Name
1	22ITU7E13T	Embedded Systems
2	22ITU7E23T	Distributed Systems
3	22ITU7E33T	Block Chain Technology



Professional Elective III at Final Year B. Tech. Information Technology, Semester VII

Sr. No	Course Code	Course Name
1	22ITU7E14T	Management Information System
2	22ITU7E24T	Big Data Analytics
3	22ITU7E34T	Information Retrieval



Department of Information Technology

B. Tech. Semester VIII

Course Code	Name of Course	Engagement Hours			Credits	Theory	OE/ POE	ISE	ICA	Total
		L	T	P						
22ITU8PR1L	Project Evaluation	-	-	4	2	-	50	-	50	100
22ITU8IN2L	Internship	-	-	20	10	-	100	-	100	200
	Subtotal	0	-	24	12	-	150	-	150	300

Internship:

- a. Students may complete an internship of a minimum of two months duration at the industry during Final Year Sem VIII.
- b. The Industry shall appoint a Supervisor to assess the performance of the student and share the same with the departmental supervisor for the fulfilment of ICA marks
- c. The student shall prepare a report of the work completed at the Industry duly endorsed by the industry Supervisor and submit the same as an Internship report.
- d. The ESE for Internship shall be conducted by the departmental supervisor in the presence of an external industry or academic expert





WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
(An Autonomous Institute)
Final Year B.Tech. (Information Technology), Semester-VII

22ITU7CC1T: Cyber Security

Teaching Scheme		Examination Scheme	
Lectures	3 Hours/week	ESE	60 Marks
Practical	2 Hours/week	ISE	40 Marks
Credits	4	ICA	25 Marks

Introduction:

Introduction to Cyber security: Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security, who are Cybercriminals? Classifications of Cybercrimes, Cybercrime: The Legal Perspectives, Cybercrimes: Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens.

Course Prerequisite:

Basics of Programming, Probability, Statistics

Course Objectives:

1. Develop a comprehensive understanding of computer security concepts, security attacks, services, and mechanisms, as well as cryptography techniques.
2. Analyse and classify various types of Cybercrimes, trace their origins, and assess the impact they have on individuals and organizations.
3. Acquire proficiency in evaluating tools and methods employed by Cybercriminals, such as phishing, password cracking, malware, DoS attacks, and SQL injection.
4. Students will develop the skills to ensure the confidentiality, integrity, and availability of data and information in the mobile computing era, protecting against unauthorized access and Cyber-attacks.
5. Examine the Indian IT Act and its relevance in combating Cybercrimes.

Course Outcomes:

At the end of the course, student will be able to

1. Demonstrate knowledge of computer security concepts, OSI Security Architecture, security attacks, services, mechanisms, and cryptography techniques.
2. Comprehend various Cybercrimes, their origins, and their impact on individuals and organizations.
3. Use Cybercriminal tools and effective countermeasures for system and network security.
4. Analyse security challenges in mobile and wireless devices and create organizational security policies for mobile computing.

Identify appropriate Indian IT Act section for a given Cybercrimes in the Indian context

Unit – I	Security Fundamentals	8 Hours
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Computer Security Concepts: The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, a Model for Network Security. Cryptography: Concepts, Classical Encryption Techniques: Symmetric Cipher Model, Cryptography. Substitution Techniques and Transposition Techniques, Rotor Machines, Steganography.		
Unit – II	Introduction to Cybercrime	8 Hours
Introduction to Cyber security: Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security, who are Cybercriminals? Classifications of Cybercrimes, Cybercrime: The Legal Perspectives, Cybercrimes: Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens.		
Unit – III	Cyberoffenses: How Criminals Plan Them	6 Hours
Cyber offenses: How Criminals Plan Them: How Criminals Plan the Attacks, Social Cyber stalking Cyber Cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector, Cloud Computing.		
Unit – IV	Tools and Methods Used in Cybercrime	8 Hours
Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks. Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft).		
Unit – V	Cybercrime: Mobile and Wireless Devices	8 Hours
Cybercrime: Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops		
Unit – VI	The Legal Perspectives on Cybercrimes and Cyber security	7 Hours
The Legal Perspectives on Cybercrimes and Cyber security: The legal landscape around the world. Need of Cyber laws in the Indian context. The Indian IT Act. Digital signatures and The Indian IT Act. Amendments to The Indian IT Act. Cybercrime and Punishment.		
ICA consists of minimum 10 assignments requiring students to develop machine learning applications for real world problem/use- case/scenario based on the following topics:		
<ol style="list-style-type: none"> 1. Basic mathematics for Machine Learning – Simulating solutions using Python to: I. Matrix operations II. Problems using Probability 2. Data exploration, Visualization and Pre-processing 3. Feature Engineering 4. Naive-Bayes classifier 5. Decision Tree regressor 6. K-Nearest Neighbour (KNN) classifier 7. Logistic Regression classifier 8. Support vector machine (SVM) Classifier 		



9. Linear and Multilinear Regression
10. Ensemble Models

Text Books

1. “Computer Security: Principles and Practices”, William Stallings, , Pearson Ed. ISBN :978-81-317- 3351-6 (Chapter 1,3)
2. “Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives”, Sunit Belapure and Nina Godbole, Wiley India Pvt Ltd, ISBN: 978-81-265-21791, Publish Date 2013

Reference Books

- 1., “Information Systems Security”, Nina Godbole, Wiley India Pvt Ltd, ISBN -978-81-265-1692-6
2. “Introduction to information security and cyber laws”, Dr. Surya Prakash Tripathi, Ritendra Goyal, Praveen Kumar Shukla, KLSI. Dreamtech Pre ss. ISBN: 9789351194736, 2015





WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
(An Autonomous Institute)
Final Year B.Tech. (Information Technology), Semester-VII

22ITU7CC2T: Generative AI

Teaching Scheme		Examination Scheme	
Lectures	3 Hours/week	ESE	60 Marks
Practical	2 Hours/week	ISE	40 Marks
Credits	4	ICA	25 Marks

Introduction:

This syllabus provides a comprehensive exploration of Generative AI, starting with an introduction to its history, evolution, and ethical considerations. It covers the mathematical foundations critical for understanding generative models, including probability, statistics, and information theory. The course then delves into machine learning basics, discussing key frameworks like TensorFlow and PyTorch. Advanced units focus on various generative models such as GANs, VAEs, and large language models, and their applications in natural language processing, computer vision, and other domains, while also examining emerging trends and ethical implications

Course Prerequisite:

Basics of Programming, Probability, Statistics

Course Objectives:

1. Understand the Fundamentals of Generative AI: Gain a comprehensive understanding of the history, evolution, and core principles of generative AI, along with its diverse applications and ethical challenges.
2. Master Mathematical Foundations: Develop a solid grasp of the mathematical concepts essential for generative AI, including probability, statistics, linear algebra, calculus, and information theory, to effectively understand and implement generative models.
3. Learn Key Machine Learning Techniques: Acquire knowledge of supervised and unsupervised learning, neural networks, deep learning, and evaluation metrics, and gain proficiency in using key frameworks such as TensorFlow and PyTorch.
4. Apply Generative AI to Real-World Problems: Explore advanced generative models like GANs, VAEs, and large language models, and apply these techniques to practical scenarios in natural language processing, computer vision, healthcare, finance, and more, while staying informed about emerging trends and responsible innovation practices.

Course Outcomes:

1. Students will demonstrate a thorough understanding of the fundamental concepts, history, and ethical considerations of Generative AI.
2. Students will acquire proficiency in the mathematical foundations, including probability, statistics, linear algebra, and optimization techniques, essential for understanding and developing generative models.



<p>3. Students will develop the ability to implement, experiment with, and evaluate various generative models, including GANs, VAEs, and transformer-based NLP models.</p> <p>4. Students will explore and apply generative AI techniques across various domains such as computer vision, healthcare, and entertainment, while understanding and promoting ethical AI practices and responsible innovation</p>		
Unit – I	Introduction to Generative AI	5 Hours
Overview of Generative AI, History and evolution of Generative AI, Applications and use cases, Ethical considerations and challenges of Generative AI		
Unit – II	Mathematical Foundations	8 Hours
Overview of Probability and statistics for AI, Role of Probability in Generative AI Statistics: Understanding Data Distributions, variables, Bayesian Inference in Generative Models, Estimation and Hypothesis Testing, Overview of Linear algebra and calculus, Information theory		
Unit – III	Machine Learning Basics	10 Hours
Introduction to Supervised and unsupervised learning algorithms, Different types of Supervised and unsupervised algorithms, Introduction to Neural networks and deep learning, Evaluation metrics and model validation, Introduction to key frameworks (TensorFlow, PyTorch)		
Unit – IV	Generative Models	8 Hours
Generative Adversarial Networks (GANs), Variational Autoencoders (VAEs), Generative vs. Discriminative Models, Flow-based models, Energy-based models, Large Language Models and its examples.		
Unit – V	Natural Language Processing (NLP) with Generative AI	8 Hours
Introduction to Text generation models, Transformer architecture (GPT-Generative Pre -trained transference, BERT- Bidirectional Encoder Representations from Transformers), Lang chain framework basics, Sequence-to-sequence models, Applications in language translation, summarization, and dialogue systems		
Unit – VI	Applications and Future Trends	6 Hours
Generative AI in computer vision (image generation, style transfer), Generative AI in healthcare, finance, and entertainment, Emerging trends and future research directions Ethical AI and responsible innovation		
Text Books		
<p>1. "Deep Learning" by Ian Goodfellow, Yoshua Bengio, and Aaron Courville: This comprehensive book covers fundamental concepts in deep learning, including generative models, and provides a solid foundation for understanding the mathematical and theoretical underpinnings of generative AI.</p> <p>2. "Pattern Recognition and Machine Learning" by Christopher M. Bishop: This textbook offers an in-depth exploration of machine learning principles, including probability and statistics, which are crucial for understanding and developing generative models.</p> <p>3. "Generative Deep Learning: Teaching Machines to Paint, Write, Compose, and Play" by David Foster: This book specifically focuses on generative models such as GANs and</p>		



VAEs, and their applications, making it highly relevant for the advanced topics covered in the syllabus.

Reference Books

1. **"Probabilistic Graphical Models: Principles and Techniques"** by **Daphne Koller and Nir Friedman**: This book offers a detailed exploration of probabilistic models and inference techniques, providing a strong theoretical background essential for understanding generative models.
2. **"Information Theory, Inference, and Learning Algorithms"** by **David J.C. MacKay**: This text provides a comprehensive look at information theory and its applications in inference and learning, which are key components in generative AI.
3. **"Bayesian Reasoning and Machine Learning"** by **David Barber**: This book focuses on Bayesian methods, which are fundamental to many generative models, and provides practical insights into applying these techniques in machine learning.





WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
(An Autonomous Institute)
Final Year B.Tech. (Information Technology), Semester-VII

22ITU7EN3T: Professional Elective-II / 22ITU7E13T: Embedded Systems

Teaching Scheme		Examination Scheme	
Lectures	3 Hours/week	ESE	60 Marks
Practical	2 Hours/week	ISE	40 Marks
Credits	4	ICA	25 Marks

Introduction:

This course provides a thorough introduction to the architecture of ARM7TDMI core-based microcontroller. The course also introduces assembly and C programming for microcontroller and enables student to write programs addressing high level programming skills and also interfacing with different peripherals. The real time operating system concepts are also introduced

Course Prerequisite:

Student has completed a course in microcontroller and its interfacing and has an adept knowledge of assembly language and C language programming. Student also has knowledge of interfacing techniques and working of different peripherals

Course Objectives:

1. To make student aware of hardware and software architecture of embedded system
2. To make student learn architecture of ARM7TDMI core.
3. To make student write assembly and C language programs for ARM7TDMI core-based microcontroller.
4. To make student learn interfacing of different peripherals with microcontroller.
5. To make student learn architecture of real time operating system and its services.

Course Outcomes:

- After completing this course, student shall be able to -
1. Describe hardware and software architecture of embedded system.
 2. Describe ARM7TDMI core architecture
 3. Write assembly and C program for different applications for microcontroller.
 4. Interface different peripherals with microcontroller.
 5. Explain and use different services of real time operating system.

SECTION- I

Unit – I	Introduction to Embedded system	6 Hours
Concept of embedded system, RISC and ARM design philosophy, embedded system hardware and embedded system software		
Unit – II	ARM7 Core Fundamentals	8 Hours



ARM7TDMI core programmer's model: data types, processor modes, registers, exceptions, memory format support, unaligned access support, pipeline concept, core extensions and ARM7TDMI instruction set: data processing instructions, branch instructions, load/store instructions, software interrupt instruction, program status register instructions, and loading constants, arm addressing modes		
Unit – III	Architecture of ARM7TDMI based Microcontroller	7 Hours
ARM7TDMI based microcontroller architecture: study of on-chip peripherals like		
SECTION- II		
Unit – IV	Microcontroller Programming and Interfacing	7 Hours
Basic embedded C programs for ARM7TDMI based microcontroller's on-chip peripherals of like ADC, DAC, I / O devices interfacing and serial communication, analog interfacing & data acquisition		
Unit – V	Real Time Operating System Concepts	8 Hours
Concepts of real time operating system, need of RTOS, comparison of traditional and embedded OS, foreground/background systems, multitasking, tasks, context switching, kernel structure, schedulers, mailboxes, task management, time management, inter-task communication, interrupts, clock tick		
Unit – VI	- RTOS Programming	7 Hours
Introduction to μ C/OS-II RTOS, features of μ C / OS-II, kernel structure of μ C/OS-II, system services related to task management, time management, semaphore management, and mailbox management, programs by using above system services		
Text Books		
<ol style="list-style-type: none"> 1. ARM System Developers Guide, Andrew Sloss, Elsevier. 2. Micro C/OS-II: The Real Time Kernel, Jean J Labrose, CMP Books. 3. ARM System On Chip Architecture, Steve Furber, Addison-Wesley. 		
Reference Books		
<ol style="list-style-type: none"> 1. ARM7TDMI based microcontroller's datasheet. 2. Embedded systems software primer, David Simon, Pearson. 3. Embedded Systems: Architecture, Programming and Design, Raj Kamal, McGraw Hill India. 		





WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
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Final Year B.Tech. (Information Technology), Semester-VII

22ITU7EN3T: Professional Elective-II 22ITU7E23T: Distributed Systems

Teaching Scheme		Examination Scheme	
Lectures	3 Hours/week	ESE	60 Marks
Practical	2 Hours/week	ISE	40 Marks
Credits	4	ICA	25 Marks

Introduction:

A distributed system is a collection of independent computers, connected by a network, that work together to appear as a single, coherent system to the user. These systems leverage multiple nodes to achieve high performance, scalability, and fault tolerance, crucial for modern applications like the web and cloud computing.

Course Prerequisite:

A basic course on operating systems and algorithms.

Course Objectives:

1. To provide students with existing knowledge in distributed systems.
2. To furnish students with skills to analyse and design distributed applications.
3. Enhance skills to measure the performance of distributed synchronization algorithms.

Course Outcomes:

At the end of the course, student will be able to

1. Demonstrate knowledge of the basic elements of distributed system technologies.
2. Analyse the various techniques used for clock synchronization and mutual exclusion
3. Exhibit the concepts of Resource and Process management.
4. Apply the knowledge of Distributed File System to analyse various file systems and security.

SECTION- I

Unit – I	Fundamentals	4 Hours
Fundamentals of OS, what is Distributed System? Evolution of Distributed Computing System, Distributed Computing System Models, Distributed Computing Gaining Popularity, Issues in designing distributed System		
Unit – II	Message Passing	6 Hours



Introduction, Desirable features of Good Message-Passing System, Issues in IPC by Message Passing, Synchronization, Buffering, Message Passing Interface, Multi-datagram Messages, Process Addressing, Failure Handling, Group communication		
Unit – III	Remote Procedure Calls	6 Hours
Introduction, The RPC Model, Transparency of RPC, Implementing RPC mechanism, Stub Generation, RPC Messages, Marshalling Arguments and Results, Server Management, Parameter-Passing Semantics, Call Semantics, Communication Protocols for RPCs, Client-Server Binding		
Unit – IV	Distributed Shared Memory	6 Hours
Introduction, Architecture, Implementation and Design issues, Granularity, Structure of share memory, Consistency models, Replacement Strategy, Heterogeneous DSM.		
SECTION- II		
Unit – V	Synchronization in Distributed Systems	6 Hours
Introduction, Clock Synchronization, Event Ordering, Election algorithms, Process Migration		
Unit – VI	Distributed File Systems	6 Hours
Introduction, Architecture, Mechanisms for building Distributed File System, Design issues, Log-Structured file systems, Case studies- Google FS		
Unit – VII	Naming	5 Hours
Features of naming system, Fundamental Terminologies, System oriented names, Object Locating Mechanisms, Name caches		
Unit – VIII	Security	6 Hours
Introduction, Potential attacks, Cryptography, Authentication, Access Control, Digital signatures		
Text Books		
<ol style="list-style-type: none"> 1. Distributed Operating System Concepts and Design, P.K.Sinha, PHI 2. Distributed System Principles and Paradigms, Andrew S. Tanenbaum, 2nd edition, PHI 		
Reference Books		
Distributed Systems Concepts and Design, George Coulouris, Jean Dollimore, Tim Kindberg, Gordon Blair, 5 th Edition, PHI		
ICA: It should consist of the following assignments		
<ol style="list-style-type: none"> 1. Implementation of RMI for any given application. 2. Implementation of RPC for any given application. 3. Implementation of Communication Protocol of RPC (R, RR, RRA Protocol). 4. Implementation of different sorting algorithms using dispatcher thread model. 		



5. Implementation of logical clocks by using Counters.
6. Implementation of logical clocks by using Physical clocks.
7. Implementation of Mutual Exclusion by using Token-Passing approach.
8. Implementation of Stateful and Stateless server in file reading application.
9. Implementation of Bully Algorithm.
10. Implementation of Ring Algorithm





WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
(An Autonomous Institute)
Final Year B.Tech. (Information Technology), Semester-VII

22ITU7EN3T: Professional Elective-II 22ITU7E33T: Block Chain Technology

Teaching Scheme		Examination Scheme	
Lectures	3 Hours/week	ESE	60 Marks
Practical	2 Hours/week	ISE	40 Marks
Credits	4	ICA	25 Marks

Introduction:

The course is designed to introduce students to the concept of Blockchain and explain the fundamentals of Blockchain and its implementation. Students will be learning the importance of consensus in transactions, how transactions are stored on Blockchain, the history of Bitcoin and how it's used. Students will be introducing to Ethereum development platform and develop and deploy smart contracts from web and console.

Course Prerequisite:

An individual should have a good knowledge of distributed systems, networking, cryptography, data structures, basic knowledge of Linux commands.

Course Objectives:

By the end of the course, students will be able to

1. Understand how blockchain systems (Bitcoin and Ethereum) work,
2. Design, build, and deploy smart contracts and distributed applications,
3. Integrate ideas from blockchain technology into their own projects.

Course Outcomes:

At the end of the course, students will be able to

1. Explain the fundamentals of Blockchain Technology
2. Use various blockchain data structures
3. Use cryptographic hash functions & distributed consensus algorithms
4. Design, build, and deploy a smart contract and distributed application.

SECTION- I

Unit – I	Overview of Blockchain Technology	6 Hours
Defining Block chain and Distributed Ledger, Blockchain Properties Decentralized, Transparent, Immutable and secure. Blockchain Applications. Types of Blockchain: Public, private, and consortium based blockchain, when to use, and when not to use Blockchain, History of Blockchain.		
Unit – II	Introduction to computing models and P2P network	6 Hours



Centralized, Decentralized and Distributed Systems, Decentralization vs distributed, P2P systems, properties of P2P systems, P2P communication architecture. P2P network applications: File sharing, P2P network for blockchain		
Unit – III	Foundational Concepts Block Chain Data Structure	6 Hours
Cryptographic Hash Functions, Digital Signatures, Public Keys as Identities, Hash Pointers and Hash chain and Merkel tree, Consensus mechanisms		
Unit – IV	Block chain Characteristics	6 Hours
Decentralized Identity management, Transactions, incentivising and mining. Distributed Consensus (PoW), Cryptocurrency as the first blockchain application. Mechanics of Bitcoin, Bitcoin Scripts, Storing and Using Bitcoins, Mining in Bitcoin.		
SECTION- II		
Unit – V	- Consensus Mechanisms	6 Hours
Proof of storage, proof of stake, proof of deposit, proof of burn, proof of activity. algorithms for adjusting difficulty and retargeting. Limitations of Bitcoin, alternative cryptocurrencies		
Unit – VI	Smart Contracts and Ethereum	6 Hours
History, Purpose and types of smart contracts, Introduction to Ethereum, bitcoin vs Ethereum stack. P2P network in Ethereum, consensus in Ethereum, scripts in Ethereum, Smart contracts (Ethereum Virtual Machine). Developing and executing smart contracts in Ethereum. State and data structure in Ethereum		
Unit – VII	Private and Consortium based Blockchain: Hyperledger	5 Hours
Need for the consortium. Hyperledger stack, Multichain blockchain. Innovation in Hyperledger, smart contracts, and distributed applications in Hyperledger		
Unit – VIII	Case studies/ Enabling Technologies and applications	6 Hours
Application of blockchain in privacy and security, IoT and smart cities, Business and Industry, Data management, e-Governance		
Text Books		
<ol style="list-style-type: none"> 1. Distributed Operating System Concepts and Design, P.K.Sinha, PHI 2. Distributed System Principles and Paradigms, Andrew S. Tanenbaum, 2nd edition, PHI 		
Reference Books		
<ol style="list-style-type: none"> 1. https://nptel.ac.in/courses/106/104/106104220/ 2. https://www.investopedia.com/terms/b/blockchain.asp 3. Bitcoin and Cryptocurrency Technologies, Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder,: A Comprehensive Introduction, Princeton University Press (July 19, 2016). 		



4. Mastering Blockchain - Distributed ledgers, decentralization and smart contracts explained, Author- Imran Bashir, Packt Publishing Ltd, Second Edition, ISBN 978-1- 78712-544-5, 2017
4. The Science of the Blockchain, Wattenhofer,
5. Mastering Bitcoin: Unlocking Digital Cryptocurrencies, Antonopoulos,
6. A Peer-to-Peer Electronic Cash System , Satoshi Nakamoto, Bitcoin:
7. “ETHEREUM: A Secure Decentralized Transaction Ledger, ” DR. Gavin Wood, Yellow paper.2014.
8. A survey of attacks on Ethereum smart contracts Nicola Atzei, Massimo Bartoletti, and Tiziana Cimoli,





WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR

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Final Year B.Tech. (Information Technology), Semester-VII

22ITU7EN4T: Professional Elective-III /

22ITU7E14T: Management Information System

Teaching Scheme		Examination Scheme	
Lectures	3 Hours/week	ESE	60 Marks
Practical	2 Hours/week	ISE	40 Marks
Credits	4	ICA	25 Marks

Introduction:

A Management Information System (MIS) is a system that provides managers with the information they need to make informed decisions, plan, organize, and control organizational activities. It's a computer-based system that collects, processes, stores, and communicates information to support decision-making at all levels of management. MIS is more than just technology; it's a system that integrates information technology with business practices to help organizations achieve their goals.

Course Prerequisite:

A basic course on databases, frontend technologies and AI.

Course Objectives:

1. To understand basic infrastructure and strategy for information systems.
2. To make student learn professional ethical codes of conduct as appropriate to industry and organizational environments.
3. To introduce the Communication Technology required for IT.
4. To make student learn to develop secure information system.

Course Outcomes:

5. Student can elaborate basic infrastructure and strategies used in information systems.
6. Student can apply professional ethical codes of conduct as appropriate to industry and organizational environments.
7. Students can design information systems using principles of Communication Technologies.
8. Students will be able to develop secure information systems.

SECTION- I

Unit – I	Information Systems in Global Business Today	6 Hours
The Role of Information Systems in Business Today, how information systems are transforming business, what is new in information system. Business Processes and Information systems, Systems for collaboration and social business, Tools and technologies for collaboration and social business		
Unit – II	Information Systems, Organizations, and Strategy	7 Hours



Organizations and its features, How Information Systems Impact on Organization Competitive strategies using information systems, Challenges posed by strategic information systems		
Unit – III	Ethical and Social Issues in Information Systems	6 Hours
Understanding Ethical, Social, political issues raise by information systems, principles for conduct in ethical decisions, Contemporary information systems technology. Challenges to the protection individual privacy and intellectual property.		
SECTION- II		
Unit – IV	IT Infrastructure and Emerging Technologies	6 Hours
IT Infrastructure, Infrastructure Components, Contemporary Hardware Platform Trends, Contemporary Software Platform Trends, Management Issues		
Unit – V	Foundations of Business Intelligence: Databases and Information Management	6 Hours
Organizing Data in a Traditional File Environment, Major Capabilities of Database Management Systems, Using Databases to Improve Business Performance and Decision Making, Managing Data Resources, Telecommunications, the internet, and Wireless Technology: Principles Components of Telecommunications Network & Ket Networking Technologies, Different types of networks, principal technologies and standards for wireless networking, communication, internet access.		
Unit – VI	Security Management of Information Technology	7 Hours
Introduction, Tools of Security Management, Internet worked Security Defences, Encryption, Firewalls, Denial of Service Attacks, E-mail Monitoring, Other Security Measures, security codes, Security Monitors, Fault Tolerant Systems, and Disaster Recovery, System Control & Audits, Information Systems Controls, Auditing IT Security		
Unit – VII	E-commerce: Digital Markets, Digital Goods	7 Hours
Text Books		
1. Management Information Systems: Managing the Digital Firm, 15 th Edition by Kenneth C. Laudon and Jane Laudon, Pearson Education 2. Management Information Systems: James A O'Brien, George M Marakas, Ramesh Behi. (Tenth Edition), McGraw Hill Publication		
Reference Books		
1. Information Technology for Management: Transforming Organizations in the Digital Economy, Efraim Turban, 6th Edition, Wiley Edition 2. Management Information Systems: Shubhalakshmi Joshi, Smita Vaze, Biztantra		
Internal Continuous Assessment (ICA): Teacher can make a group of 4-5 students & assign Case Study and implement a management information system Evaluation will be done by teacher by considering different factors based on the topics given in the syllabus		





WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
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Final Year B.Tech. (Information Technology), Semester-VII

22ITU7EN4T: Professional Elective-III / 22ITU7E24T: Big Data Analytics

Teaching Scheme		Examination Scheme	
Lectures	3 Hours/week	ESE	60 Marks
Practical	2 Hours/week	ISE	40 Marks
Credits	4	ICA	25 Marks

Introduction:

Big data analytics refers to the process of examining large, varied datasets – often called "big data" – to uncover hidden patterns, correlations, and other useful information that can be used to make better business decisions. It involves using advanced analytical techniques and specialized tools to extract meaningful insights from massive amounts of data, including structured, semi-structured, and unstructured data.

Course Prerequisite:

A basic course on database, distributed systems and AI.

Course Objectives:

1. To get acquainted with the basic concepts of big data analytics
2. To Provide hands on Hadoop Eco System
3. To get acquainted to use analytics on Structured, Unstructured Data.
4. To implement concepts of Big Data Analytics with R

Course Outcomes:

The students will be able to:

1. Demonstrate Big Data concepts and its Business Implications.
2. Elaborate the components of Hadoop and Hadoop Eco-System
3. Apply analytics on Structured, Unstructured Data.
4. Apply Machine Learning Techniques using R.

SECTION- I

Unit – I	Introduction To Big Data and Hadoop	6 Hours
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Types of Digital Data, Introduction to Big Data, Big Data Analytics, History of Hadoop, Apache Hadoop, Analysing Data with Unix tools, Analysing Data with Hadoop, Hadoop Streaming, Hadoop Echo System, IBM Big Data Strategy, Introduction to Infosphere Big Insights and Big Sheets.



Unit – II	HDFS (Hadoop Distributed File System)	8 Hours
The Design of HDFS, HDFS Concepts, Command Line Interface, Hadoop file system interfaces, Data flow, Data Ingest with Flume and Scoop and Hadoop archives, Hadoop I/O: Compression, Serialization, Avro and File-Based Data structures		
Unit – III	Map Reduce	8 Hours
Anatomy of a Map Reduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Types and Formats, Map Reduce Features		
SECTION- II		
Unit – IV	Hadoop Eco System	8 Hours
<p>Pig: Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Grunt, Pig Latin, User Defined Functions, Data Processing operators.</p> <p>Hive: Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables, Querying Data and User Defined Functions</p>		
Unit – V	Advances in Hadoop Eco System	7 Hours
<p>HBase: HBasics, Concepts, Clients, Example, Hbase Versus RDBMS.</p> <p>Big SQL: Introduction</p>		
Unit – VI	Data Analytics with R	8 Hours
Machine Learning: Introduction, Supervised Learning, Unsupervised Learning, Collaborative Filtering. Big Data Analytics with BigR.		
Text Books		
<ol style="list-style-type: none"> 1. Tom White “Hadoop: The Definitive Guide” Third Edit on, O’reily Media, 2012. 2. Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015. 		
Reference Books		
<ol style="list-style-type: none"> 1. "Intelligent Data Analysis”, Michael Berthold, David J. Hand, Springer, 2007. 2. “Big Data and Business Analytics”, Jay Liebowitz, Auerbach Publications, CRC press (2013) 3. “Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop”, Tom Plunkett, Mark Hornick, McGraw-Hill/Osborne Media (2013), Oracle press. 		





WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
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Final Year B.Tech. (Information Technology), Semester-VII

22ITU7EN4T: Professional Elective-III / 22ITU7E34T: Information Retrieval

Teaching Scheme		Examination Scheme	
Lectures	3 Hours/week	ESE	60 Marks
Practical	2 Hours/week	ISE	40 Marks
Credits	4	ICA	25 Marks

Introduction:

Information Retrieval (IR) helps to find relevant information from large collections of documents. It can be defined as a software program that deals with the organization, storage, retrieval and evaluation of information from documents. It is like a smart librarian who doesn't give you direct answers but tells you where to find the right book like this IR system scans them and pulls out the ones that match your query.

Course Prerequisite:

A basic course and AI, databases, operating systems.

Course Objectives:

1. To acquaint students to information retrieval process and information models.
2. To evaluate the performance of information retrieval systems.
3. To search text using sequential searching & pattern matching algorithms and using various indexing structures.
4. To learn difference in data retrieval, information retrieval and multimedia retrieval systems.
5. To learn different components of search engine and ranking algorithms.

Course Outcomes:

Students will be able to

1. Perform text operations, build classic information retrieval models, and evaluate the performance of information retrieval algorithms.
2. Formulate various queries for text retrieval.
3. Use various indexing and searching techniques to speed up text retrieval results.
4. Model, index and search documents containing multimedia objects.
5. Search web using web search engines & web directories and use ranking algorithms to rank web pages

SECTION- I

Unit – I	Introduction	7 Hours
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Information retrieval vs. data retrieval, User Task, Logical View of the documents, Information retrieval process, Text Operations: Introduction, document pre-processing, Document Clustering, Text Compression, Comparing text compression techniques		
Unit – II	Information Retrieval Models & Performance Evaluation	8 Hours
A Formal Characterization of IR Models, Classic Information Retrieval, Models for Browsing, Recall and Precision, Alternative measures		
Unit – III	Query Languages and Query Operations	8 Hours
Keyword based querying, Pattern Matching, Query operations: User relevance feedback, Automatic local analysis, Automatic global analysis		
SECTION- II		
Unit – IV	Indexing and searching	10 Hours
Inverted Files and Indices for text search, Boolean Queries, Sequential searching, Pattern Matching		
Unit – V	Multimedia IR - Models and Languages	8 Hours
Data Modelling & Query Languages, Indexing and searching		
Unit – VI	Searching the Web	8 Hours
Search Engine architecture, User interfaces, Ranking, Web Crawling, Browsing, Metasearchers, Searching using Hyperlinks		
Text Books		
1. Modern Information Retrieval - Ricardo Baeza-Yates and Berthier Ribeiro-Neto - Pearson Education (Low Price Edition)		
Reference Books		
1. Introduction to Information Retrieval, Christopher D. Manning, Prabhakar Raghavan and Hinrich Schütze, Cambridge University Press. 2008. (http://nlp.stanford.edu/IR-book/information-retrieval-book.html)		
2. Information Storage and Retrieval- Robert R Korthage, WILEY-INDIA		





WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
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Final Year B.Tech. (Information Technology), Semester-VII

22ITU7CC5T: DevOps

Teaching Scheme		Examination Scheme	
Lectures	2 Hours/week	ISE	25 Marks
Practical	2 Hours/week	ICE	25 Marks
Credits	3	POE	50 Marks

Introduction:

DevOps is a methodology that integrates software development (Dev) and IT operations (Ops) to streamline the software development life cycle, enabling more frequent delivery of features, fixes, and updates. It fosters seamless collaboration between development and operations teams, aiming to enhance efficiency and productivity. Throughout this course, students will explore the foundational principles of DevOps, key tools and practices, and acquire practical, hands-on experience.

Course Prerequisite:

1. Understand fundamental DevOps principles and their significance in the software development lifecycle.
2. Apply practical skills for version control and collaborative software development.
3. Apply practical skills in utilizing Maven for build automation and project management.
4. Configure Jenkins for Continuous Integration and Continuous Delivery processes.
5. Utilize Docker for efficient application deployment, leveraging containerization advantages for streamlined processes, scalability, and portability.

Course Outcomes:

At the end of this course, students will be able to:

1. Describe DevOps principles and their role in modern software development.
2. Demonstrate the use of Git for version control and team collaboration.
3. Demonstrate the use of Maven to manage project builds.
4. Demonstrate the use of Jenkins for Continuous Integration and Continuous Delivery.
5. Demonstrate the use of Docker for efficient application deployment.

SECTION- I

Unit – I	Introduction to DevOps	3 Hours
Introduction to DevOps and its significance in the software development lifecycle, DevOps Key Principles: collaboration, automation, continuous integration and continuous delivery, Benefits of adopting DevOps practices for organizations and development teams		
Unit – II	Version Control with Git	6 Hours



A Formal Characterization of IR Models, Classic Information Retrieval, Models for Browsing, Recall and Precision, Alternative measures		
Unit – III	Introduction to Maven	3 Hours
Understanding Maven as a build automation and project management tool, Maven Architecture, Maven - Build Life Cycle, Maven's project structure and POM (Project Object Model), Configuring Maven for a project: setting up dependencies and plugins, building a simple project using Maven		
SECTION- II		
Unit – IV	Continuous Integration and Continuous Delivery with Jenkins	8 Hours
Why Continuous Integration is essential for software projects, Jenkins Master-slave architecture, Configuring Jenkins and its basic features, Plugin Management in Jenkins, Jenkins Pipeline, setting up automated builds triggered by code commits, Understanding Continuous Delivery and its benefits.		
Unit – V	Introduction to Docker	8 Hours
The concept of containerization and its advantages, Docker Architecture, Docker Container Lifecycle, Installing and running Docker on the local machine, creating a Dockerfile to build a custom Docker image, Running and interacting with containers using Docker CLI, Sharing Docker images using Docker Hub or a private registry. Integrating Jenkins with Docker for automated deployments.		
Unit – VI	Infrastructure as Code	3 Hours
Introduction to Configuration Management, understanding Infrastructure as Code (IaC) and its benefits		
Text Books		
Text book 1: Effective DevOps: Building a Culture of Collaboration, Affinity, and Tooling at Scale, Jennifer Davis & Katherine Daniels, OREILLY.		
Text book 2: Practical Devops: Harness the power of DevOps to boost your skill set and make your IT organization perform better. Joakim Veronam PACKT publishing Open source community experience distilled, Mumbai.		
Reference Books		
<ol style="list-style-type: none"> 1. The DevOps 2.1 ToolKit: Docker Swarm, Building, Testing, Deploying, and Monitoring services inside Docker Swarm clusters by Viktor Farcic Packt Birmingham, Mumbai 2. THE DEVOPS HANDBOOK: How to Create World-Class Agility, Reliability, & Security in Technology Organizations, By Gene Kim, Jez Humble, Patrick Debois, and John Willis 		
e-Resources		
Internal Continuous Assessment (ICA):		
Practical Assignments:		



1. Set up the Git Server and perform the following operations:
 - Create a Repository
 - Create Branches
 - Perform Add, Commit, Push, Pull
 - Merge and Rebase
 - Squashing Commits
 - Delete branches
 - Undo commits
2. Perform the following operations on Git and GitHub
 - Create a Repository
 - Create Branches
 - Perform Add, Commit, Push, Pull
 - Fork a project, Open and merge Pull request
 - Merge and Rebase
 - Squashing Commits
 - Delete branches
 - Undo commits
3. Perform the following operations on Git and GitLab.
 - Create a Repository/Project
 - Create Branches
 - Perform Add, Commit, Push, Pull
 - Undo commits
 - Fork a project, Open and merge Pull request
 - Merge and Rebase
 - Squashing Commits
 - Delete local & remote branches
4. Set up a GitLab CI/CD Pipeline.
5. Automate Deployment using Jenkins's plugin "Deploy to container".
6. Use Jenkins "Deploy to Container Plugin" and "Build Pipeline Plugin".
7. Build a Docker image and push it to Docker Hub. Pull it on another system. Create and run a new container from an image. (Note: Perform commands on PowerShell / Command Prompt.)
8. Set up a Jenkins job that picks up an application from a GitHub repository, builds it, and runs it and dockerizes the application.

Create an application, push to GitHub/GitLab repository. Use GitHub/GitLab, Maven, Tomcat with Jenkins. Automate Deployment of the application to a container (Tomcat





WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
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Final Year B.Tech. (Information Technology), Semester-VIII

22ITU7PR6L: Project Phase-I

Teaching Scheme		Examination Scheme	
Lectures	-	ESE	100 Marks
Practical	10 Hours/week	ICA	50 Marks
Credits	5		

Introduction:

This Phase deals with conceptualising an idea. This idea is then elaborated to a design which is performed taking into consideration the requirements of the problem defined.

Course Prerequisite:

Methodology of idea conceptualization, designing methods like conventional model creation or UML.

Course Objectives:

1. To guide students to explore research areas and to undertake literature survey.
2. To identify & formulate a realistic problem statement.
3. To define the problem of the proposed research work
4. To follow an appropriate designing technique for further development of project.
5. To prepare to work in a team and to understand importance of teamwork.
6. To develop soft skills including presentation and technical writing

Course Outcomes:

At the end of the course students will be able to

1. Explore research areas, conduct literature survey and formulate a problem statement catering societal/professional need.
2. Able to identify and formulate project problem statement and select an appropriate design with due consideration for society.
3. Carry out impact analysis for environment and sustainability concern.
4. Prepare Software requirement specification (SRS) and design document using software engineering techniques and modern tools.
5. Engage in team work and communicate effectively while observing professional ethics.
6. Inculcate habit of self-study to become a lifelong learner.





WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
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Final Year B.Tech. (Information Technology), Semester-VIII

22ITU8PR1L: Project Phase II

Teaching Scheme		Examination Scheme	
Lectures	-	ESE	50 Marks
Practical	4 Hours/week	ICA	50 Marks
Credits	2		

Introduction:

This Phase is the implementation phase where the design created in the phase I is brought into reality as a solution to a problem selected.

Course Prerequisite:

Basics of programming, design and computer languages.

Course Objectives:

1. To study methods to analyse technological alternatives for developing IT solution with relevance to environment and sustainability.
2. To explore state-of-art tools and FOSS alternatives to develop solutions meeting societal and professional needs.
3. To enable development of a system through Software Development Life Cycle.
4. To get acquainted to work in teams observing professional ethics.
5. To enable effective written and oral communication for presentation.
6. To enable self-study and lifelong learning

Course Outcomes:

At the end of the course students will be able to

1. Analyse technological alternatives for developing IT solution with relevance to environment and sustainability.
2. Explore state-of-art tools and FOSS alternatives to develop solutions meeting societal and professional needs.
3. Able to design and develop solution to the problem through Software Development Life Cycle.
4. Demonstrate ability to engage in teamwork while observing professional ethics.
5. Communicate project work in writing and oral presentation.
6. Inculcate habit of self-study to become a lifelong learner.





WALCHAND INSTITUTE OF TECHNOLOGY, SOLAPUR
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Final Year B.Tech. (Information Technology), Semester-VIII

22ITU8IN2L: INTERNSHIP

Teaching Scheme		Examination Scheme	
Lectures	-	ESE	100 Marks
Practical	20 Hours/week	ICA	100 Marks
Credits	10		

Introduction:

Internships are educational and career development opportunities, providing practical experience in a field or discipline. Internships are far more important as the employers are looking for employees who are properly skilled and having awareness about industry environment, practices and culture. Internship is structured, short-term, supervised training often focused around particular tasks or projects with defined time scales.

Course Prerequisite:

Basics in computer technology or the area of interest intended for internship to be done

Course Objectives:

1. To give exposure of industrial environment and create competent professionals for the industry.
2. To provide possible opportunities to learn, understand and sharpen the real time technical/managerial skills.
3. To familiarize with processes, products, software and their applications along with relevant aspects of quality control.
4. To understand various approaches towards problem solving.
5. To expose students to the engineer's responsibilities and ethics.
6. To understand the social, economic and administrative considerations that influences the working environment of industrial organizations.

Course Outcomes:

1. At the end of the course students will be able to
2. Develop professional competence through internship.
3. Apply academic knowledge in a personal and professional environment.
4. Build the professional network.
5. Apply professional and societal ethics in their day-to-day life.
6. Become a responsible professional having social, economic and administrative considerations
7. Make own career goals and personal aspirations.



Engineering internships are intended to provide students with an opportunity to apply theoretical knowledge from academics to the realities of the field work/training. The following guidelines are proposed to give academic credit for the internship undergone as a part of the Final Year Engineering curriculum.

1. Students may undergo internship with Small/ Medium / Large scale industries to make themselves ready for the industry.
2. Students should be available in the industry for the period of 3 months of the semester.
3. The evaluation of internship activities carried out shall be done by Program Head / Cell In-charge / Project Coordinator / Project Guide / Faculty mentor / Industry mentor.
4. Every intern shall send weekly report to their internal guide without fail. Interns shall have at least fortnightly communication with the internal guide without fail.
5. Students shall maintain Internship Diary/ Internship Workbook. The students should record in the daily training diary account of the observations, impressions, information gathered and suggestions given, if any.
6. Student will give a seminar based on his training report every month, before an expert committee constituted by the department as per norms of the institute as a part of ICA.
7. The Internship report shall be presented covering following recommended fields but not limited to:
 1. Title/Cover Page
 2. Internship completion certificate.
 3. Internship Place Details- Company background-organization and activities/Scope and object of the study / personal observation.
 4. Index/Table of Contents
 5. Introduction
 6. Title/Problem statement/objectives
 7. Motivation/Scope and rationale of the study
 8. Methodological details
 9. Results / Analysis /inferences and conclusion
 10. Suggestions / Recommendations for improvement to industry, if any
 11. Attendance Record
 12. References (Library books, magazines and other sources)
8. The report submitted by student will be accepted and considered for final evaluation only if student continuously reports their work to the project guide and periodically evaluated by the internal examiners at college level.

