

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY



CIRCULAR NO.SU/Engg./B.Tech./41/2022

It is hereby inform to all concerned that, the syllabi recommended by the Dean, Faculty of Science & Technology, the Hon'ble Vice-Chancellor **has accepted revised following syllabi of Bachelor of Technology Final Year (VII & VIII semester) in accordance with Choice Based Credit & Grading System as per guidelines of AICTE** in his emergency powers under section 12(7) of the Maharashtra Public Universities Act, 2016 on behalf of the Academic Council as appended herewith.

Sr.No.	Syllabi as per CBC & GS
[1]	B.Tech. [Civil Engineering],
[2]	B.Tech. [Mechanical Engineering],
[3]	B.Tech. [Plastic and Polymer Engineering],
[4]	B.Tech. [Electronics and Telecommunication Engineering],
[5]	B.Tech. [Electrical Engineering],
[6]	B.Tech. [Computer Science & Engineering].
[7]	B.Tech.[Agricultural Engineering]

This is effective from the Academic Year 2022-23 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.
REF.NO.SU/2022/ 15213-22
Date:- 11.11.2022.

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(Signature)
Deputy Registrar,
Academic Section

Copy forwarded with compliments to :-

- 1] **The Principal of all concerned Colleges,**
Dr. Babasaheb Ambedkar Marathwada University,
- 2] **The Director, University Network & Information Centre, UNIC, with a request to upload this Circular on University Website.**

Copy to :-

- 1] **The Director, Board of Examinations & Evaluation, Dr.BAMU,A'bad.**
- 2] The Section Officer,[Engg.Unit] Examination Branch,Dr.BAMU,A'bad.
- 3] The Programmer [Computer Unit-1] Examinations, Dr.BAMU,A'bad.
- 4] The Programmer [Computer Unit-2] Examinations, Dr.BAMU,A'bad.
- 5] The In-charge,[E-Suvidha Kendra], Rajarshi Shahu Maharaj Pariksha Bhavan, Dr.BAMU,A'bad.
- 6] The Public Relation Officer, Dr.BAMU,A'bad.
- 7] The Record Keeper, Dr.BAMU,A'bad.

**Dr. Babasaheb Ambedkar Marathwada University,
Aurangabad-431004**



**Revised Syllabus of Final Year Bachelor of
Technology**

**Computer Science and Engineering
(VII& VIII Semester)**

Under Choice Based Credit System (CBCS)

Under Faculty of Science and Technology

(Effective from 2022-23 and onwards)

FACULTY OF SCIENCE AND TECHNOLOGY															
Syllabus Structure w.e.f. 2022-2023 (Choice Based Credit System)															
Final Year B. Tech. (Computer Science and Engineering)															
Semester-VII															
Course Code	Course Name	Teaching Scheme (Hours/Week)			Examination Scheme and Marks							Credits			
		Theory	Tutorial	Practical	MSE-I	MSE-II	TA	ESE	TW	PR/OR	Total	TH	TUT	TW/PR	Total
CSE401	Data Warehousing and Mining	3	-	-	15	15	10	60	-	-	100	3	-	-	3
CSE402	Principles of Compiler Design	3	-	-	15	15	10	60	-	-	100	3	-	-	3
CSE403	Cryptography and Network Security	3	-	-	15	15	10	60	-	-	100	3	-	-	3
CSE441- CSE443	Professional Elective Course-IV	3	-	-	15	15	10	60	-	-	100	3	-	-	3
CSE431	Open Elective-III	3	-	-	15	15	10	60	-	-	100	3	-	-	3
CSE421	Lab 1: Data Warehousing and Mining	-	-	2	-	-	-	-	-	25	25	-	-	1	1
CSE422	Lab 2: Principles of Compiler Design	-	-	2	-	-	-	-	-	25	25	-	-	1	1
CSE423	Lab 3: Cryptography and Network Security	-	-	2	-	-	-	-	50	-	50	-	-	1	1
CSE424	Major Project-II	-	-	8	-	-	-	-	50	50	100	-	-	4	4
		15	-	14	75	75	50	300	100	100	700	15	-	7	22
Semester-VIII															
Course Code	Course Name	Teaching Scheme (Hours/Week)			Examination Scheme and Marks							Credits			
		Theory	Tutorial	Practical	MSE-I	MSE-II	TA	ESE	TW	PR/OR	Total	TH	TUT	TW/PR	Total
CSE471	Internship	-	-	-	-	-	-	-	300	300	600	-	-	20	20
MSE- Mid Semester Exam, ESE- End Semester Examination, TH-Theory, OR- Oral, TA-Teacher Assessment, TW- Term Work, PR- Practical, Tut- Tutorial															

Professional Elective Course-IV

Course Code	CSE441	CSE442	CSE443
Course	Game Theory	Virtual Reality	Digital Forensics

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***Open Elective-III**

Sr. No.	Name of Course	Department	Course Code
1.	Ecology and Environmental Pollution	AED	AED431
2.	Town Planning	CED	CED431
3.	Big Data Analytics	CSED	CSE431
4.	Battery Management System	EED	EED431
5.	Data Science	ETC	ETC431
6.	Modern Management Technique	MED	MED431
7.	Packaging Technology	PPED	PPE431

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Syllabus of B. Tech.
(Computer Science and Engineering)
Semester VII and VIII

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

(Faculty of Science and Technology)

Syllabus of final year B. Tech. (Computer Science and Engineering) Semester VII

Course Code: CSE401 Course: Data Warehousing and Mining Teaching Scheme: Theory: 03 Hrs/week		Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks End Semester Examination (Duration): 3 Hrs			
Prerequisite	Database Management Systems and Applications.				
Objectives	1. To understand data warehouse and its applications. 2. To design multidimensional data models. 3. To understand Data Mining needs and Application. 4. To study concepts of pattern based data mining for decision making.				
Unit-I	Introduction to Data Warehousing Introduction to Decision Support System, Need for data warehousing, Operational & informational data, Data Warehouse definition and characteristics, Data Warehouse Architecture, The Process of Data Warehouse Design, A Three-Tier Data Warehouse Architecture. (6 Hrs)				
Unit-II	Data warehouse Components Architectural components: ETL Process, Data Preprocessing: Why Preprocess Data? Data Cleaning Techniques, Data Integration and Transformation, Data Reduction strategies overview. For categorical data techniques concept hierarchies, Significant role of metadata, Data warehouse applications and usage. (6 Hrs)				
Unit-III	OLAP in the Data Warehouse A Multidimensional Data Model, Schemas for Multidimensional Databases: Stars, Snowflakes, and Fact Constellations Measures, Concept Hierarchies, OLAP Operations in the Multidimensional Data Model, Need for OLAP, OLAP tools. (6 Hrs)				
Unit-IV	Introduction to Data Mining Definition of data mining, Data Mining Functionalities, Classification of Data Mining Systems, Data Mining Task Primitives, Mining Frequent Patterns, Associations, Market Basket Analysis, Apriori Algorithm, Association rules from frequent itemset .Text Mining and Web Mining. (6 Hrs)				
Unit-V	Classification and Prediction Introduction, Classification by Decision Tree Induction, Attribute selection measures, Bayesian Classification , Bayes Theorem, Naïve Bayesian Classification, Rule-Based Classification, If then rules for classification, Rule Extraction from decision tree, Classification by Back propagation, Support Vector Machines. (6 Hrs)				
Unit-VI	Cluster Analysis and Business Intelligence What Is Cluster Analysis?, A Categorization of Major Clustering Methods, Outlier Analysis. Introduction to Business Intelligence, Changing Business environment and Computerised decision support, Major tools and techniques of BI. (6 Hrs)				
References	Sr. No.	Title	Author	Publication	Edition
	1.	Data Mining Concepts and Techniques	Han, Kamber, Morgan Kaufmann	Margaret Dunham	Second
	2.	Data Mining: Concepts and Techniques	Margaret Dunham	Kaufmann	—
	3.	Data Mining: Concepts and Techniques	Jiawei Han, Micheline Kamber	Morgan Kaufmann	Second

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Syllabus of final year B. Tech. (Computer Science and Engineering) Semester VII

Course Code: CSE402 Course: Principles of Compiler Design Teaching Scheme: Theory: 03 Hrs/week		Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks End Semester Examination (Duration): 3 Hrs
Prerequisite	Theoretical foundations of computer science	
Objectives	At the end of the course, students are expected to have: 1. An ability to use of formal attributed grammars for specifying the syntax and semantics of programming languages. 2. Working knowledge of the major phases of compilation, particularly lexical analysis, parsing, semantic analysis, and code generation. 3. An ability to design and implement a significant portion of a compiler for a language chosen by the instructor.	
	Introduction to Compilers Introduction to compilation and programming languages, Interpreter, Compiler, Phases of compiler, compiler writing tools.	
Unit-I	Lexical analysis The role of lexical analyzer, design of lexical analyzer, Implementation of transition diagram, Regular expressions, definition of regular expressions, finite automata theory. Automatic Recognition of REG (LEX), Limitations of Regular Expressions. Implementation of lexical analyzer. (6 Hrs)	
Unit-II	Basic Parsing Techniques Review of context free grammar, Parsers, Shift reduce parsing, Operator precedence parsing, Operator precedence grammar, operator precedence algorithm, Top down parsing, Recursive descent parsing, Left Factoring, Predictive parser, FIRST and FOLLOW, construction of parsing table, LL(1) Grammars. Introduction to YACC tool. (6 Hrs)	
Unit-III	Automatic Construction of Efficient Parsers LR Parsers, LR Grammars, The canonical collection of LR (0) Items , Construction of SLR Parsing Tables, Constructing canonical LR parsing Tables, Constructing LALR parsing Table. Using Ambiguous grammars, Automatic Parser Generator, Implementation of LR Parsing Tables. Constructing LALR Sets of Items. (6 Hrs)	
Unit-IV	Syntax Directed Translation (SDT) SDT Schemes, Implementation of SDT, S, L-attributed grammar, Intermediate code, Control flow in postfix code, Syntax directed translation to postfix code, Parse trees and syntax trees, Three address code, Quadruples and triples, Translation of assignment statements, Boolean expressions, Postfix Translations. (6 Hrs)	
Unit-V	Symbol Table The contents of a symbol table, reusing symbol -table space, Array names, Storage allocation information, Data Structures for symbol table, Representation of scope. Code optimization Finding Loops and Loop Invariant Code, Strength Reduction, Constant Propagation and Constant Folding, Basic Induction Variable recognition. The Principal sources of optimization, Loop Optimization, The DAG representation of Basic Blocks. (6 Hrs)	

Unit-VI	Error Detection and Recovery Errors, Lexical phase errors, Syntactic phase errors, Error Recovery in LR Parsing, Automatic Error Recovery in YACC.				
	Run Time Storage Administration Implementation of a Simple Stack -Allocation Scheme, Activation Record, Implementation of Block structural Languages. Code generation Object programs, Problems in code generation, A simple code generator, The code generation algorithm (6 Hrs)				
References	Sr. No.	Title	Author	Publication	Edition
	1.	Principles of Compiler Design Mobile Communications	A. Aho, M. Lam, R. Sethi and J. Ullman	Addison Wesley	Second
	2.	Modern Compiler Design	David Galles	Pearson Education	-
	3.	Advanced Compiler Design & Implementation	Steven S. Muchnick, Morgan	Kaufmann Pulishers	-

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Syllabus of final year B. Tech. (Computer Science and Engineering) Semester VII

Course Code: CSE403 Course: Cryptography and Network Security Teaching Scheme: Theory: 03 Hrs/week		Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks End Semester Examination (Duration): 3 Hrs
Prerequisite	Basic Understanding of Computer Networks	
Objectives	1. To understand the fundamentals of Cryptography 2. To acquire knowledge on algorithms used to provide confidentiality, integrity and authenticity 3. To understand the various key distribution and management schemes. 4. To use encryption techniques to secure data in transit across data networks	
Unit-I	Introduction to the Concepts of Security Introduction, The Need for Security, Security Approaches, Principles of Security, Types of Attacks, Model for Network Security, Modular Arithmetic, Euclidean and Extended Euclidean algorithm. (6 Hrs)	
Unit-II	Introduction to Cryptography Techniques Introduction, Plain text and Cipher text, Substitution techniques, Transposition techniques, Encryption and Decryption, Symmetric and Asymmetric Key Cryptography, Possible types of attacks. (6 Hrs)	
Unit-III	Symmetric Key Cryptographic Algorithms Modes of operation, overview of Symmetric key cryptography, Data encryption Standard(DES), Strength of DES, 3DES, Advanced Encryption Standard(AES), AES structure, AES Transformation functions, Blowfish. (6 Hrs)	
Unit-IV	Public Key Cryptography Public Key Cryptosystems, Applications for public key Cryptosystems, Requirements for public key Cryptography, public key cryptanalysis, The RSA algorithms, The security of RSA, Diffie- Hellman Key Exchange algorithm, Key exchange protocol, Man-in the Middle Attack. (6 Hrs)	
Unit-V	Cryptographic Hash Functions Application of cryptographic hash functions: Message Authentication, other applications, Two simple hash functions, Requirements and security, hash function based on cipher block chaining, Secure hash algorithm(SHA-512), Message Authentication Requirement, Message Authentication functions, Message Authentication Code: Requirement, Security, Cryptanalysis. (6 Hrs)	
Unit-VI	Security in Networks Threats in networks, Security Controls- Architecture, Encryption, Content Integrity, Strong Authentication, Access Controls, Key Management and distribution, Digital signature, Digital Certificate. (6 Hrs)	

References	Sr. No.	Title	Author	Publication	Edition
	1.	Cryptography and Network Security	William Stallings	Pearson Education	Sixth
	2.	Cryptography and Network Security	Atul Kahate	McGraw Hill Education	Third
	3.	Cryptography and Network Security	Behrouz A. Forouzan	Tata McGraw Hill	-
	4.	Network Security Essentials: Applications and Standards	William Stallings	Prentice Hall	-

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Syllabus of final year B. Tech. (Computer Science and Engineering) Semester VII

Course Code: CSE441 Course: Professional Elective Course- IV: Game Theory Teaching Scheme: Theory: 03 Hrs/week		Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks End Semester Examination (Duration): 3 Hrs	
Objectives	1. Understand the concepts of Game design and development. 2. Learn the processes, mechanics and issues in Game Design. 3. Be exposed to the Core architectures of Game Programming. 4. Know about Game programming platforms, frame works and engines.		
Unit-I	Core Design Introduction to Game Theory, Creating the Game Spec. Example Game Spec, Initial Design: The Beginning, Hardware Abstraction, The Problem Domain, Thinking in Tokens. (6 Hrs)		
Unit-II	Use of Technology The State of the Art, Blue-Sky Research, Reinventing the Wheel, Use of Object Technology, Building Bricks: Reusability in Software, Initial Architecture Design: The Birth of Architecture, The Tier System, Architecture Design. (6 Hrs)		
Unit-III	Development: The Development Process. Code Quality, Coding Priorities, Debugging and Module Completion, The Seven Golden Gambits, The Three Lead Balloons, Game Programming: Technologies: Display, Mixing 2D and 3D, DirectX, User Interface code, Resource caching, the main loop. (6 Hrs)		
Unit-IV	Design Practices: Smart & naked pointers, using memory correctly, Game scripting languages, Building your game: Creating a project, source code repositories and version control, Building the game and scripts, User interface programming and input devices: Getting the Device State, Working with the Mouse (and Joystick), Working with the Keyboard, User Interface Components, More Control Properties. (6 Hrs)		
Unit-V	2D Drawing and DirectX: 2D Drawing and DirectX, Basic 2D Drawing Concepts, Drawing Text, Working with Sprites, Graphics File Formats, Initialization and the Main Loop: Initialization, Some C++ Initialization Pitfalls, Initializing your Game, the Main Loop, Stick the Landing: A Nice Clean Exit. (6 Hrs)		
Unit-VI	Loading and Caching Game Resources: Art and Sound Formats, Resource Files, Data Compression, IPac: A Resource File Builder, the Resource Cache, World Design and Cache Prediction, 3D Graphics and 3D Engines: 3D Graphics Pipeline, Setting Up a Project, Using a Scene Graph, 3D Middleware Review, Rolling Your Own 3D Engine. (6 Hrs)		

Text Books	Sr. No.	Title	Author	Publication	Edition
	1	Game Architecture and Programming	Shankarmani, Jain, Sinha	Wiley Publication, India	—
	2	Fundamentals of Game Design	Ernest Adams	Pearson Publication	Third
References	1	Game Theory: An Introduction	E. N. Barron	Wiley Student Edition.	—
	2	ActionScript 3.0 Game Programming University	Gary Rosenzweig	Pearson Education	Second
	3	Game Architecture and Design	Andrew Rollings and Dave Morris	—	—
	4	Professional Game Programming	Mike McShaffry	Dreamtech Press.	—

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Syllabus of final year B. Tech. (Computer Science and Engineering) Semester VII

Course Code: CSE442 Course: Professional Elective Course – IV: Virtual Reality Teaching Scheme: Theory: 03 Hrs/week		Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks End Semester Examination (Duration): 3 Hrs			
Prerequisite	Engineering Mathematics, Basic programming, Basics of Computer Graphics				
Objectives	1. Understand how the design of VR technology relates to human perception and cognition. 2. Discuss applications of VR to the conduct of scientific research, training, and industrial design. 3. Gain first-hand experience with using virtual environment technology, including 3D rendering software, tracking hardware, and input/output functions for capturing user data. 4. Learn the fundamental aspects of designing and implementing rigorous empirical experiments using VR.				
Unit-I	Introduction to virtual reality Goals, Definitions, Overview of the course, Historical perspective, Birds-eye view, Geometric Modeling, Transforms. (6 Hrs)				
	Geometry of Virtual Worlds				
Unit-II	Geometric modeling , Transforming models, Matrix algebra and 2D rotations, 3D rotations and yaw, pitch, and roll, Study of Perception and Sensation, Perceptual Engineering, Importance in Virtual Reality Light and Optics, Human Optical System. (6 Hrs)				
Unit-III	Light and Optics Three interpretations of light, Refraction, Simple lenses, Diopters, Imaging properties of lenses, Lens aberrations, Optical system of eyes. (6 Hrs)				
Unit-IV	VR Hardware & Software Human factors: the age- the ear- the semantic senses, equilibrium, conclusions. VR Hardware: Introduction – sensor hardware – Head-coupled displays, Aquatic hardware – Integrated VR systems. VR Software: Introduction – Modeling virtual world –Physical simulation- VR Polkits. (6 Hrs)				
Unit-V	Human Visual Physiology Photoreceptors, Sufficient resolution for VR, Light intensity, Eye movements , Eye movement issues for VR , Neuroscience of vision, Depth perception, Motion perception, Frame rates and displays, Orientation tracking. (6 Hrs)				
Unit-VI	Visual Rendering Visual Rendering-Overview, Visual Rendering-overview, Shading models, Rasterization, Pixel shading, VR-specific problems, Distortion shading, Post-rendering image warp , Interfaces for Virtual Reality, Locomotion, Manipulation, Social Interaction, Applications and Challenges in VR. (6 Hrs)				
Text	Sr. No.	Title	Author	Publication	Edition
	1	Virtual Reality Systems	John Vince	Addison Wesley	First
	2	Visualizations of Virtual Reality	Adams	Tata McGraw Hill	First
	3	Virtual Reality Technology	Grigore C. Burdea, Philippe Coiffet	Wiley-Interscience	First
	4	Understanding Virtual Reality: Interface, Application, and Design	William R. Sherman, Alan B. Craig	Morgan Kaufmann	First

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Syllabus of final year B. Tech. (Computer Science and Engineering) Semester VII

Course Code: CSE443 Course: Professional Elective Course- IV: Digital Forensics Teaching Scheme: Theory: 03 Hrs/week		Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks End Semester Examination (Duration): 3 Hrs			
Prerequisite	Engineering Mathematics, Basics of Computer Networks.				
Objectives	1. To understand the basic digital forensics and techniques for conducting the forensic examination on different digital devices. 2. To understand how to examine digital evidences such as the data acquisition, identification analysis.				
Unit-I	Computer forensics fundamentals, Benefits of forensics, computer crimes, computer forensics evidence and courts, legal concerns and private issues, cybercrime examples. (6 Hrs)				
Unit-II	Understanding Computing Investigations – Procedure for corporate High-Tech investigations, understanding data recovery work station and software, Investigative incident response actions, forensics analysis investigative actions. (6 Hrs)				
Unit-III	Data acquisition- understanding storage formats and digital evidence, determining the best acquisition method, acquisition tools, validating data acquisitions, performing RAID data acquisitions, remote network acquisition tools, other forensics acquisitions tools. (6 Hrs)				
Unit-IV	Processing crimes and incident scenes, securing a computer incident or crime, seizing digital evidence at scene, storing digital evidence, obtaining digital hash, reviewing case, forensic Evidence, Forensics Casework, Processing Evidence and Report Preparation. (6 Hrs)				
Unit-V	Current computer forensics tools- software, hardware tools, validating and testing forensic software, addressing data-hiding techniques, performing remote acquisitions, E-Mail investigations- investigating email crime and violations, understanding E-Mail servers, specialized E-Mail forensics tool. (6 Hrs)				
Unit-VI	Computer forensic analysis- Discover of Electronic Evidence Identification of Data – Reconstructing Past Events – Fighting against Macro Threats – Information Warfare Arsenal – Tactics of the Military – Tactics of Terrorist and Rogues – Tactics of Private Companies. (6 Hrs)				
Text	Sr. No.	Title	Author	Publication	Edition
	1	Computer Forensics: Incident Response Essentials	Warren G. Kruse II and Jay G. Heiser	Addison Wesley	First
	2	Computer Forensics: Computer Crime Scene	Adams	Tata McGraw Hill	–
	3	Computer Forensics and Cyber Crime: An Introduction	Grigore C. Burdea, Philippe Coiffet	Wiley- Interscience	First

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Syllabus of final year B.Tech (All) Semester-VII

Course Code: AED431 Course: Open Elective-III: Ecology and Environmental Pollution Teaching Scheme: Theory: 03 Hrs/week		Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks End Semester Examination (Duration): 3 Hrs
Prerequisite	Concept of ecology and types of pollution	
Objectives	1. To impart knowledge of ecological applications 2. To impart knowledge of environment and different types of pollution 3. To impart knowledge of pollution analysis and instrumentation	
Unit-I	Principles of Ecology Definition Principles and Scope of Ecology – Energy Flows, Ecological Pyramids, Types and Diversity, Food Chains and Food Webs. Homeostasis – Theories of Limiting Factors Ecological Succession – Population and Communities- Reproductive Strategies- r and k Factors. Community Ecology- Structure, Species Diversity and Species Interaction. (4 Hrs)	
Unit-II	Ecosystem Ecology Ecosystem- Structure- Components (Abiotic and biotic) and Functions of an Ecosystem. Ecosystem Types and Diversity- Terrestrial and Aquatic (Fresh water and Marine) Ecosystems. Ecotones - Concept of Edge Effect, Ecological Niche- Classification Biomes - General Relationships Landscapes and Biomes – Climatic factors - Bio-geographical Regions of the World and Modern Biogeography. (6 Hrs)	
Unit-III	Ecological Applications Sustainable Development- Ecological Sustainability- Organic Farming, Bio fertilizers and Bio pesticides - Integrated Pest Management (IPM) - Biological Monitoring of the Environment- Indicator species - Ecosystem Development- Theory of Human Ecology, Ecology of Space Travel- Types of Life Supporting Systems- Exobiology. (6 Hrs)	
Unit-IV	Atmosphere Structure of Atmosphere Temperature Profile – Influence of Meteorological factors on Air Pollution – Air Pollutants: Oxides of Sulphur – Oxides of Nitrogen – Carbon monoxide – Particulate matter, Dispersion and impacts – Photochemical smog – Green house effect – Ozone depletion – Acid Rains – Sources of noise pollution, measurement of noise and standards – impacts of Air Pollution on human health and structures. (6 Hrs)	
Unit-V	Hydrosphere and Lithosphere Classification of water and Water bodies – Abnormal properties of water – Water cycle Water Quality Parameters – Water Pollution – Sources – Classification, nature and Toxicology of water pollutants: Trace metals – Lead – Mercury – Zinc – Cadmium – Organic substances - Pesticides – Oil surfactants – Nutrients – Phosphates – Nitrates – Eutrophication – Ground water pollution – Ocean Pollution by toxic wastes – Ecological and Economic impacts of water pollution. Soil: Texture – Composition and distribution – Land use Classification and Patterns – Impacts of land use on soil ecology – Ecological and Economic impacts of soil erosion and soil pollution. (8 Hrs)	

Unit-VI	Pollution Analysis and Instrumentation: Principles of Sampling of Air, Water and Soil: Samplers and Sampling Techniques – Analysis of Pollutants: Titrimetry – Gravimetry – Spectrophotometry – Chromatography and Flame techniques. Instrumentation: Instruments for specific parameters – Principles and Applications of UV – VIS Spectrophotometer – Flame Photometer – Atomic Absorption Spectrophotometer – Gas Chromatography – GLC – HPLC – Instrumentation for Weather monitoring. (6 Hrs)
Reference Books:	1. Turk J and Turk A. 1984 Environmental Sciences 3rd Edn. Saunders College Publications. Seed Processing by Gregg, NSC 2. Odum E. P. 1971 Fundamentals of Ecology 3rd Edn. W. B. Saunders Company London 3. Laurent Hodges – Environmental Pollution 4. C.S. Rao – Environmental Science and Engineering

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Syllabus of final year B.Tech (All) Semester-VII

Course Code: CED431 Course: Open Elective –III : Town Planning Teaching Scheme: Theory: 03 Hrs/week		Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks End Semester Examination (Duration): 3 Hrs			
Prerequisite	Basic of Urban Planning and Development				
Objectives	1. The course is intended to provide the students an overview and understanding of Town Planning. 2. To study history & ancient planning in India. 3. To study origin and growth of towns.				
Unit-I	Introduction Necessity and scope of Town planning, Brief History Greek and Roman Town, Planning in Ancient India, Indus valley Civilization Vedic and Harappan period. Principals of Town Planning, Development of Towns, Elements of towns. (6 Hrs)				
Unit-II	Levels of planning process Town planning survey, Data collection and analysis, Growth Pattern, Development plan, Master Plan, Regional Plan, Zoning. (6 Hrs)				
Unit-III	Housing Importance of housing, Demand for houses, Requirements, Rural Housing, Village Planning, Low-cost Housing, Agencies for Housing, Functions of CIDCO, HUDCO, MHADA, HDFC, Housing problems in India. (6 Hrs)				
Unit-IV	Town Planning Scheme Concept, Preparation of town planning scheme,Relation with Development plan, Original Plot, Final plot, Semi Final Plot, Local Area Plan-Concept, objective, methods of Preparation, Case studies in India, Re-planning of Existing Towns. (6 Hrs)				
Unit-V	History of Architecture: Principle, Types of Architecture (Greek Egyptian Roman styles), Building Byelaws: Objective, Principles, Aspect, Prospect, Importance. (6 Hrs)				
Unit-VI	Acts: Land Acquisition Act, Necessity, and procedure of Acquisition,M RTP Act, RTI and RTS Act, URDPFI. Urban Road Development: Objectives Requirements, Classification, Types. (6 Hrs)				
References	Sr. No.	Title	Author	Publication	Edition
	1	Town Planning	Rangwala	Charotar	Twenty First
	2	Fundamentals of Town Planning	G.K.Hirasakar	Dhanpat Rai Publication	Second
	3	Textbook of Town Planning	G.K. Bandopadhyaya	Charotar	Second

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Syllabus of final year B.Tech (All) Semester-VII

Course Code: CSE431 Course: Open Elective –III: Big Data Analytics Teaching Scheme: Theory: 03 Hrs/week		Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks End Semester Examination (Duration): 3 Hrs			
Prerequisite	Knowledge of Programming Language (Java preferably), SQL				
Objectives	1. To understand the Big Data Platform and its Use cases 2. To understand the basics of Apache Hadoop and HDFS 3. To apply analytics on Structured, Unstructured Data				
Unit-I	Fundamentals of Big Data The Evolution of Data Management, Understanding the Waves of Managing Data, Defining Big Data, Four Vs, Big Data Management Architecture. Big Data Types: Defining Structured Data, Defining Unstructured Data, Big Data Applications. (6 Hrs)				
Unit-II	Big Data Technology Landscape Big Data Technology Components: Exploring the Big Data Stack, Virtualization, Understanding the Basics of Virtualization, Managing Virtualization with the Hypervisor, Abstraction and Virtualization, Implementing Virtualization to Work with Big Data. (6 Hrs)				
	Data Analytics				
Unit-III	Predictive Analytics: Linear Regression, Logistic Regression, Decision Trees, Descriptive Analytics: Association Rules, Sequence Rules, Segmentation, Social Network Analytics: Social Network Definitions, Social Network Metrics, Social Network Learning, Relational Neighbor Classifier, Business Process Analytics. (6 Hrs)				
Unit-IV	Hadoop And Map Reduce History of Hadoop, Analyzing Data with Hadoop, Hadoop Streaming, Hadoop Echo System, Hadoop Storage, Common Hadoop Shell commands, Hadoop Architecture, Hadoop MapReduce Paradigm: Map and Reduce tasks , Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Types and Formats. (6 Hrs)				
Unit-V	HDFS (Hadoop Distributed File System) The Design of HDFS, HDFS Concepts, Command Line Interface, Hadoop file system interfaces, Data flow, Data Ingest with Flume and Sqoop and Hadoop archives, Hadoop I/O: Compression, Serialization, Avro and File-Based Data structures. (6 Hrs)				
Unit-VI	Hadoop Echo Syatem Pig :Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Grunt, Pig Latin, User Defined Functions, Data Processing operators. Hive :Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables, Querying Data and User Defined Functions. Hbase :HBasics, Concepts, Clients, Example, Hbase Versus RDBMS. (6 Hrs)				
References	Sr. No.	Title	Author	Publication	Edition
	1.	Big Data Analytics	Seema Acharya, Subhasini Chellappan	Wiley	Second
	2.	Hadoop: The Definitive Guide	Tom White	O'reily Media	Third
	3.	Analytics in a Big Data World: The Essential Guide to Data Science and its Applications	Bart Baesens	Wiley	–

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Syllabus of final year B.Tech (All) Semester-VII

Course Code: EED431 Course: Open Elective III: Battery Management System Teaching Scheme: Theory: 03 Hrs/week		Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks End Semester Examination (Duration):03 Hrs
Objectives	The objective of this course is to introduce learner to batteries, its parameters, modeling and charging requirements. The course will help learner to develop battery management algorithms for batteries.	
Unit-I	Introduction Introduction to Battery Management System, Cells & Batteries, Nominal voltage and capacity, C rate, Energy and power, Cells connected in series, Cells connected in parallel. (5 Hrs)	
Unit-II	Battery cell Electrochemical and lithium-ion cells, Rechargeable cell, Charging and Discharging Process, Overcharge and Undercharge, Modes of Charging. (6 Hrs)	
Unit-III	Battery Management System Requirement Introduction and BMS functionality, Battery pack topology, BMS Functionality, Voltage Sensing, Temperature Sensing, Current Sensing, BMS Functionality, High-voltage contactor control, Isolation sensing, Thermal control, Protection, Communication Interface, Range estimation, State of charge estimation, Cell total energy and cell total power. (7 Hrs)	
Unit-IV	Battery State Parameters State of Charge (SoC), estimation of SOC, voltage-based methods to estimate SOC, Model-based state estimation, Battery Health Estimation , State of Health Definition (SoH), State of function definition (SoF), Charge acceptance (CA). Classification of Soc, SoH Estimation Methods. (6 Hrs)	
Unit-V	Cell Balancing and Aging Battery Cell Balancing. Causes of Imbalance in Battery Cells. Classification Systems for Balancing Methods-Static Methods, Dynamic methods. Lithium-ion aging: Negative electrode, Lithium ion aging: Positive electrode, Cell Balancing, Causes of imbalance, Circuits for balancing (7 Hrs)	
Unit-VI	Design of battery BMS Design principles of battery BMS, Effect of distance, load, and force on battery life and BMS, energy balancing with multi-battery system. (5 Hrs)	

References	Sr. No.	Title	Author	Publication	Edition
	1.	Battery management systems	Plett, Gregory L	Volume I: Battery modeling. Artech House, 2015	—
	2.	Battery management systems	Plett, Gregory L	Volume II: Battery modeling. Artech House, 2015	—
	3.	Battery Management Systems -Design by Modelling	. Bergveld, H.J., Kruijt, W.S., Notten, P.H.L	Philips Research Book Series 2002	—
	4.	Battery Management Systems for Large Lithium-ion Battery Packs	Davide Andrea	Artech House, 2010	—
	5.	Battery management systems: Accurate state-of-charge indication for battery-powered applications	Pop, Valer, et al.	Vol. 9. Springer Science & Business Media, 2008.	—

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Syllabus of final year B.Tech (All) Semester-VII

Course Code: ETC431 Course: Open Elective-III: Data Science Teaching Scheme: Theory: 03 Hrs/week		Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks End Semester Examination (Duration): 3 Hrs
Prerequisite	Programming Concepts, Data Structure, Basic Linear Algebra, Basic Probability and Statistics.	
Objectives	1. Give an introduction to data science and its applications. 2. Understand use of statistics in data science 3. Use data science to analyze large and unstructured data with different tools.	
Unit-I	Introduction Introduction, Terminologies in data science, Applications of Data science, Data science and Development, datafication, current landscape of perspective. Role of Data science in AI and ML. (6 Hrs)	
Unit-II	Statistical Inference and Exploratory data analysis Statistical modelling, probability distributions, fitting a model, Populations and samples, Basic Tools (Plots, Graphs and summary statistics) of EDA, philosophy of EDA, the data science process, Case Study. Introduction to R. (6 Hrs)	
Unit-III	Machine Learning Algorithm and its Usage Linear Regression, k-nearest Neighbors(k-NN), k-means. Spam filtering, naïve Bayes and its application for spam filtering, Data Wrangling: Tools and API for scrapping the web. (6 Hrs)	
Unit-IV	Feature Generation and Selection Feature generations algorithms, feature selection algorithms: filters, wrappers, decision trees, random forest. Algorithmic ingredients of a recommendation engine, dimensionality reduction, singular value decomposition, principal component analysis. (6 Hrs)	
Unit-V	Mining Social Network Social Networks as graphs, clustering of graphs, direct discoveries of communities in graphs, portioning of graphs, neighborhood properties of graphs. Illustration with an example. (6 Hrs)	
Unit-VI	Data visualization and ethical issues Basic principles, ideas and tools for data visualization, creation of visualization for complex data set. Aesthetics in data visualization, software's used for data visualization, Case study: Privacy, security and ethics of data science. (6 Hrs)	

References	Sr. No.	Title	Author	Publication	Edition
	1	Doing Data Science: Straight Talk From The Frontline	Cathy O'Neil and Rachel Schutt	O'Reilly Media, Inc	Third
	2	Mining of Massive Datasets. v2.1	Jure Leskovek, Anand Rajaraman and Jeffrey Ullman	Cambridge University Press	First
	3	Learning: A Probabilistic Perspective	Kevin P. Murphy	MIT Press	Second
	4	Data Science for Business:What You Need to Know about Data Mining and Data-analytic Thinking.	Foster Provost and Tom Fawcett	O'Reilly Media, Inc	First

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Syllabus of final year B.Tech (All) Semester-VII

Course Code: MED431		Credits: 3-0-0
Course: Open Elective-III:		Mid Semester Examination-I: 15 Marks
Modern Management Technique		Mid Semester Examination-II: 15 Marks
Teaching Scheme:		Teacher Assessment: 10 Marks
Theory: 03 Hrs/week		End Semester Examination: 60 Marks
		End Semester Examination (Duration): 3 Hrs
Prerequisites	:	1.Knowledge of basic concepts of manufacturing processes
Objectives	:	1)To understand the concepts of modern management to enhance creativity 2)To understand the significance of TPM & SCM.
Unit-I	:	Value Engineering Value-types, Value analysis, Value Engineering, Value Control, FAST analysis DARSARI method. (6 Hrs)
Unit-II	:	Supply Chain Management Introduction, Decision Phases in Supply Chain, Process view of a supply chain importance of supply Chain Flows. New Customer –Supplier relationship–Supplier selection, purchasing, JIT in Supply Chain, E-Business and the Supplier Chain. (06Hrs)
Unit-III	:	Methods Engineering Continuous method improvement, waste, type of waste elimination. KAIZEN Improvement versus Innovation, Finding & Implementing improvements-PDC Acycle, Five-Why Process. Process Reengineering. Ensuring Correct method of working POKAYOKE. Workplace layout & workstation design, single minute exchange of dies, material handling system. (06 Hrs)
Unit-IV	:	Lean Manufacturing Introduction Definition, distinctive features, mall-Lot Production, setup- time Reduction, Maintaining and Improving Equipment. Pull production system. Focused factories and group technology, work cells and Cellular Manufacturing Standard Operation. (06 Hrs)
Unit-V	:	Total Productive Maintenance Introduction, Definition, Distinctive features, Four developments striving for overall equipment effectiveness, the five TPM development activities the twelve steps of TPM, stages of TPM development. (06 Hrs)
Unit-VI	:	Management Information System Data, Information, Needs of computer based introduction system Definition & concept of MIS and Data processing, need of database, Role of MIS in organization Impact of MIS on function of organization. (06 Hrs)

	Sr. No.	Title	Author	Publication
Reference Books, e- books, e- Journals	1	Industrial Engineering & Production Management	Maratand Telsang	S. Chand
	2	Techniques of Value Analysis & Engineering	I.D. Miles	—
	3	Kaizen	Masaaki Imai	—
	4	Pokayoke	Hiroyuki Hirmaao	Productivity Press, Cembridge
	5	Management Information System	W.S. Jawadekar	TMH
	6	Supply Chain Management	Sunil Chopra, Peter Meindl	Pearson Education
	7	Competitive Manufacturing management	John M.Nicholas	TMH
	8	Management Information System, Conceptual foundation, Structure & Development	Garden Bdevis & Margrath H.Olson. MGH	—
	9	Industrial Engineering & Production & Operations Management	Sanjay S.Patil NanadkumarHukeri	Electrotech Publications
Additional References:	:	1. https://onlinecourses.nptel.ac.in/noc21_ge20/preview 2. https://onlinecourses.nptel.ac.in/noc22_cs97/preview 3. https://onlinecourses.nptel.ac.in/noc22_cs89/preview 4. https://onlinecourses.nptel.ac.in/noc22_cs73/preview		

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Syllabus of final year B.Tech (All) Semester-VII

Course Code: PPE431 Course: Open Elective-III: Packaging Technology Teaching Scheme: Theory: 03 Hrs/week		Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks End Semester Examination (Duration): 3 Hrs
Prerequisite	Basic knowledge of Polymeric Materials, Processing and Testing.	
Objectives	1. To impart knowledge and skills related to packaging system for various products. 2. To understand the concepts of materials, machinery used and testing of packaging material.	
Unit-I	Introduction Packaging history, need and evolution, elements, approach, functions of packaging, advantages of plastic packaging, applications. Elements of package design, importance of a good design, packaging hazards and their control. (6 Hrs)	
Unit-II	Plastic packaging materials Selection criteria, origin, types, properties, applications and limitations of plastic packaging materials, bio-degradable material. Packaging wastes and its management. (6 Hrs)	
Unit-III	Packaging forms Bottle, strip, skin, blister, shrink box, vacuum, gas, CAP, MAP, tubes, woven sack etc. (6 Hrs)	
Unit-IV	Specialty packages Aseptic, tetra, types of pouches/sack, stand up pouch, retort pouch, gusseted pouch, 2-seal, 3 side sealed pouch. Flexible packaging, forms of flexible packaging. Wrapping, form-fill-seal (FFS), sealing methods, metalising (6 Hrs)	
Unit-V	Food and agro-based packaging Requirements and their selection for raw and processed foods, meat, fish, poultry, eggs, milk and dairy products, fruits and vegetables, cereal grains and baked food products, beverages, snacks, ready to eat food, packaging of horticultural crops. Packaging of drugs and cosmetics. (6 Hrs)	
Unit-VI	Printing Surface treatment, printing processes, printing inks. Packaging quality control: Criteria, physical, chemical, mechanical test procedure for packaging materials & packaged products. (6 Hrs)	

	Sr. No.	Title	Author	Publication	Edition
References	1	Understanding Plastic Packaging Technology	Susan E.M. Seleke	Hanser publications - Munich	1 st 1997
	2.	Plastics in Packaging	A.S. Althalye	Tata McGrawHill publishing Co. Ltd., New Delhi.	1 st 1992
	3.	Food Packaging Technology Handbook	NIIR	Asia-Pacific publication.	1 st 2012
	4.	Package Engineering	Honlon J. F.	McGraw Hill	1 st 1984
	5.	Plastics Packaging	Turtle Ivor	Pira International	1 st 1990
	6.	Handbook of Packaging-Plastics	A.S. Althalye	Multi-tech Plastics publishing Co. Mumbai.	1 st 2013
	7.	The Wiley Encyclopedia of Packaging Technology	Kit L. Yam	John Wiley & Sons Inc. Publication	2009
	8.	The Packaging User's Handbook	F.A. Paine	Blackie Academic & Professional.	1 st 1999

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Syllabus of final year B. Tech. (Computer Science and Engineering) Semester VII

Course Code: CSE421		Credits: 0-0-1 Practical: 25 Marks
Course: Lab 1: Data Warehousing and Mining		
Teaching Scheme:		
Practical: 02 Hrs/week		
Objectives	:	1. To introduce students to the basic concepts and techniques of Data Mining 2. To develop skills of using recent data mining software for solving practical problems.
	:	List of practical Assignment .Minimum m 8 practical's to be conducted (4 from each section) Set-I: Implementation assignment should be performed using appropriate Programming language. 1. Demonstration of OLAP operation 2.Implementation of varying Arrays 3.Implementation of Nested arrays 4. Demonstration of any ETL tool. 5.Write Program for Naïve Bayesian classification 6.Write program for cluster Analysis using simple K means algorithm
List of Practicals	Set-II	
		Following Assignments should be performed using WEKA tool 8.Create data set in arff file format. Demonstration of preprocessing on WEKA dataset 9.Demonstration of Association rule process on dataset contact lenses.arff/supermarket using apriori algorithm 10.Demonstration of Classification rule process on WEKA dataset using j48 Algorithm 11. Demonstration of Classification rule process on WEKA dataset using ID3 Algorithm 12. Demonstration of Classification rule process on WEKA dataset using Naïve Bayes Algorithm 13.Demonstration of Clustering rule process on Data set irif.arff using simple k means

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Syllabus of final year B. Tech. (Computer Science and Engineering) Semester VII

Course Code: CSE422		Credits: 0-0-1
Course: Lab 2 - Principles of Compiler Design		
Teaching Scheme:		Practical: 25 Marks
Practical: 02 Hrs/week		
Objectives	:	1. Students will understand the phases of the compilation process and be able to describe the purpose and implementation approach of each phase. 2. Give students practical exposure to aspects of theoretical computer science including Languages, Grammar and Machines.
List of Practicals	:	1. Write a program to implement lexical analyzer to separate tokens such as identifier, constant, operator and keyword .Test the following sample input but not restricted. 2. Write a program to implement lexical analyzer to separate tokens such as identifier, constant, operator and keyword using Flex Tool. 3. Write a program to implement shift reduce parser. 4. Write a program to implement Recursive Descent Parsing method for following grammar but not restricted to $E \rightarrow E+T/T, T \rightarrow T*F/F, F \rightarrow (E)/id$ 5. Write a program to implement FIRST in predictive parser. 6. Write a program to implement infix to postfix conversion. 7. Write a program in YACC to implement YACC as Calculator 8. Write a program to generate three address codes for the given set of input expression. Test for the sample input :the three address code for the expression $a + b * c + d$: Output $T_1 = b * c$, $T_2 = a + T_1$, $T_3 = T_2 + d$, T_1, T_2, and T_3 are temporary variables 9. Write a program to implement quadruple form of three address code.. 10. Write a program to implement any one code optimization technique.

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Syllabus of final year B. Tech. (Computer Science and Engineering) Semester VII

Course Code: CSE423		Credits: 0-0-1
Course: Lab 3: Cryptography and Network Security		Termwork : 50
Teaching Scheme:		
Practical: 02 Hrs/week		
Objectives	:	1. To implement the fundamental algorithms of Cryptography 2. To apply DES, AES and RSA in the given scenario
List of Practicals	:	1. Write a Program to implement Monoalphabetic Cipher 2. Write a Program to implement Caesar Cipher 3. Write a Program to implement Affine Cipher 4. Write a Program to implement Rail fence technique 5. User A want to send message "Meet me very urgently" to User B by using DES algorithms encrypt it at sender end and decrypt it at receiver end. 6. User C want to send message "Welcome to CSE" to User D by using AES algorithms encrypt it and decrypt it at receiver end. 7. User A want to communicate to user B but it should be confidential by using Blowfish algorithms send encrypted message and decrypt it. 8. User A want to communicate to user B but they want to user Asymmetric Key Cryptography by using RSA algorithms to send message to each other. Encrypt message at sender side and Decrypt it at receiver side. 9. Write a Program to implement Secure hash algorithm 10. Write a Program to implement Digital Signature

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science and Technology) Syllabus of final year B. Tech. (Computer Science and Engineering) Semester-VII	
Course Code: CSE424 Course: Major Project-II Teaching Scheme: Theory: 8 Hrs/week	Credits: 0-0-4 Termwork: 50 Marks Practical/Oral: 50 Marks
Prerequisite	Software Engineering , Database Management System, Programming Language
Objectives	- The practical implementation of theoretical knowledge gained during the study to till date is important for engineering education. The student should be able implement their ideas/real time industrial problem / current application of their engineering branch which they have studied in curriculum. - To motivate students for creativity. - To create awareness regarding latest technology - To have common platform for interaction about emerging technology. - To inculcate qualities of team work.
	- To explore related information using books, research papers, journals & websites. - To improve presentation and communication skills.
	Guidelines For Students And Faculty: - Students shall complete the Project-II in continuation of the work planned in third year under the course Project-I - Each student/group is required to- - Submit a report with latest status of the project work. - Give a 10 minutes presentation through OHP, PC, and Slide projector followed by a 10 minute discussion in the second week of their academic semester. - Submit a report on the project topic with a list of required hardware, software or other equipment for executing the project in the third week of their academic semester. - Start working on the project and submit initial development and CPM/PERT planning drawing in the fourth week of their academic semester. - Preparation of PCB layout, wiring diagram, purchase of components, software demo, flowchart, algorithm, program/code, assembling, testing, etc. should be submitted by student/s within next five/Six weeks and minimum one page report should be there for each major activity. - Overall assembling, wiring, code writing, testing, commissioning along with performance analysis, should be completed within next two weeks. - In the last week, student/group will submit final project report to the guide. - Every assigned faculty/s should maintain record of progress of each student or group. The format and other guidelines for the purpose of the Project Submission in hard bound copies should be as follows,

REPORT STRUCTURE

Index/Contents/Intent

List of Figures

List of Tables

List of Symbols / Abbreviations

1. Introduction

2. Literature survey

3. System development

4. Performance analysis

5. Conclusions

References

Appendices

Acknowledgement

1. INTRODUCTION

1.1 Introduction

1.2 Necessity

1.3 Objectives

1.4 Theme

1.5 Organization

2. LITERATURE SURVEY

Literature Survey

Related information available in standard Books, Journals, Transactions, Internet Websites etc. till date (More emphasis on last three to five years)

3. SYSTEM DEVELOPMENT

Model Development

- Mechanical / Fabricated
- Analytical
- Computational
- Experimental
- Mathematical
- Software

(out of above methods at least one method is to be used for the model development) Some mathematical treatment or related information is required to be embodied

4. PERFORMANCE ANALYSIS

- Analysis of system developed either by at least two methods depending upon depth of standard
- These methods normally used are Analytical /Computational/Statistical/Experimental/ or Mathematical
- Results at various stages may be compared with various inputs
- Output at various stages with same waveforms or signals or related information/parameters
- Comparison of above results by at least two methods and justification for the differences or error in with theory or earlier published results

5. CONCLUSIONS

5.1 Conclusions

5.2 Future Scope

5.3 Applications

Contributions (if any,)

The innovative work/invention/new ideas generated from the analysis of the work which can be taken from the conclusions

REFERENCES

- Author, "Title", Name of Journal/Transactions/ Book, Edition/Volume, Publisher, Year of Publication, page to page (pp. __).

These references must be reflected in text at appropriate places in square bracket

In case of web pages complete web page address with assessing date has to be enlisted

List of references should be as per use in the text of the report

APPENDICES

Related data or specifications or referred charts, details computer code/program, etc.

ACKNOWLEDGEMENTS

Expression of gratitude and thankfulness for helping in completion of the said task with name & signed by the candidate

- General Guidelines

Text should be printed on front and correct side of the watermark on quality bond paper

Paper size- A4, 75 to 85 gsm paper

Left Margin-1.5"

Right Margin-3/4"

Top Margin-1"

Bottom Margin-1"

- Pagination

First page of every chapter need not be printed but counted, second page onwards page number to printed at bottom center place.

All Greek words must be italic

Report Heading -ALL CAPITAL—16 Font

Chapter heading -ALL CAPITAL—14 Font

Subchapter -Title Case-12 Font

Sub-Subchapter -First Alphabet Capital case-12 Font

Page numbers for Index/Contents/Intent should be in roman

All text should be in times new roman

Cover page should have complete symbol of institute

Suitable flap (bookmark) with name of the candidate, Department and Institute name and symbol can be used with nylon strip.

For more information and sample of hard copy please contact the respective Head of the Department.

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Faculty of Science & Technology) Syllabus of final year B. Tech. (Computer Science and Engineering) Semester-VII	
Course Code: CSE471 Course: Internship Teaching Scheme: Practical: Hrs/week	Credits: 0-0-20 Termwork: 300 Marks Practical/Oral: 300 Marks
(a)	Rationale: The techniques and processes of production of goods and services do not demand only technical skills, but also a cluster or conglomerate of skills. A significant part of which is related to the total humanistic growth of the man. Such conglomerate skills technical and humanistic cannot obviously be acquired through pure academic learning of concepts in formalized and institutional courses and in isolation of the actual work situation. It, therefore, naturally follows that no technical education will be complete till it has two components, one learning of concepts vis-a vis acquiring conceptual skill and other application of the concepts in real work situation vis-a vis acquiring manipulative or practicing skills. Technical education needs to have a complement of learning of the techniques of applying the concepts within the industry and business.
(b)	Objectives: 1) The students of B.Tech course shall get an opportunity to work on live problems of the industry. 2) He/She shall apply learning concepts in the real work situation. 3) He/She shall get an exposure to the industrial environment and thereby enable himself/herself to appreciate the other related aspects of industry viz. human, economic, commercial and regulatory. 4) He/She shall identify career paths taking into account their individual strengths and aptitude. 5) He/She shall contribute for the achievement of economic goals and aspirations of the industry and our country as a whole.
(c)	The curriculum for B.Tech students of Final Year Course of Part-II shall consist of; 1) Inplant training for a period of one full term, and the period of the term shall be as prescribed by the university from time to time. 2) A project on live problems of the industry shall be undertaken by the student/group of students undergoing training in the same establishment. 3) The term work shall consist of the inplant training record-daily diary, work diary, progress report, a record containing the literature survey in the field of appropriate branch of Engineering, a preliminary report related to project work etc. 4) Seminars will be arranged after successful completion of period specified in the scheme of semester VIII of B.Tech. The date and times will be decided according to the convenience of guide and student.
(d)	General Provisions, Rules and Regulation of Inplant Training 1. Definition In-plant training (IPT) means a course of training in any industry or establishment undergone in pursuance of memorandum of understanding between industry and institute and under the prescribed terms and conditions of Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

	• Institute means an academic Institution of higher learning associated and admitted under the privileges of university, i.e. Maharashtra Institute of Technology, Aurangabad affiliated to Dr. Babasaheb Ambedkar Marathwada University, Aurangabad. • Industry means any industry or business in which any trade, occupation or subject field in engineering or technology may be specified as a designated trade. • Establishment includes research organizations (like IITs, NITs, National Laboratories or research organization as recognized by Central Govt. / State Govt. / University) • University means any of the universities mentioned in the schedule of Maharashtra University Act, 1994 i.e. Dr. Babasaheb Ambedkar Marathwada University, Aurangabad. • Collaboration means collaborative academic activity of the Institute with industry. • Student means a B Tech Course student.
	2. Memorandum of understanding: Maharashtra Institute of Technology, Aurangabad will enter into an agreement with the industry through 'Memorandum of Understanding' for creating facilities of inplant training in the appropriate branch of Engineering according to the Course Curriculum and keep this agreement for a period of 10 years to foster a healthy industry- institute interaction for mutual benefits of both.
	3. Admission to inplant training: No student will be deputed for inplant training unless he/she produces testimonial of having kept one term for the subject under B.Tech. of final year course satisfactorily in Maharashtra Institute of Technology, Aurangabad.
	4. Period of inplant training: The period of Inplant training will be the period of one term for the subject under B.Tech. course semester- VIII, which will be notified by Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.
	5. Contract of Inplant Training : • The student of Maharashtra Institute of Technology shall enter into a contract of inplant training with the employing industry. • The inplant training shall be deemed to have commenced on the date, on which the contract of inplant training has been entered into. • Every contract of inplant training will contain the Terms and Conditions to be agreed by both the parties. • Every contract of inplant training shall be registered with the Maharashtra Institute of Technology within 15 days from entering into the contract.
	6. Violation of contract: Where an employer, with whom a contract for inplant training has been entered into, is for any reason, unable to fulfill his obligation under the contract, the contract end with the consent of Maharashtra Institute of Technology. It is agreed between the employer, the student and any other employer that the student shall be engaged as an "inplant trainee" under the other employer till the expiry period of the inplant training. The agreement on registration with Maharashtra Institute of Technology shall be deemed to be the contract of inplant training between the student and other employer, and from the date of such registration, the contract of inplant training with the first employer shall terminate and no obligation under that contract shall be enforceable at the instance of any party to contract against the other party thereto.

	7. Termination of Contract: The contract of inplant training shall terminate on the expiry of the period of inplant training. Either party to the contract of inplant training make an application to Maharashtra Institute of Technology, Aurangabad for the termination of the contract. After considering the content of the application, and objection, Maharashtra Institute of Technology by order in writing, will terminate the contract, if it is satisfied that the parties to the contract have/has failed to carry out the Terms and Conditions of the contract. Provided that where a contract is terminated- - For the failure on the part of the Employer, Maharashtra Institute of Technology will depute students to another Employer for providing facilities of inplant training to the remaining period of training. - For the failure on the part of the student, the student will not be allowed to continue his/her inplant training in that term. The student shall be deputed for inplant training in the next coming term.
	8. Expectation from the Employer / Industry / Establishment: The following expectations are derived for effective inplant training. - To provide legitimate facilities for the training and learning of all the processes. - To guide the student for understanding a project of immense importance to industry and to help him/her for his/her career advancement.
	9. Obligation of Students: - Student must maintain a minimum attendance of 90% of total working days for the period of Inplant Training. - To learn his/her subject field in Engineering or Technology consciously and diligently at his place of training. - To carry out all orders of his/her Employer and the Superior in the establishment. - To abide by the Rules and Regulations of the Industry/Establishment in all matters of conduct and discipline. - To carry out the obligation under the contract of inplant training. - The student shall maintain a report of his work during the period of his inplant training in a proforma (form no: 2) made available in Annexure. - Except in case of extreme urgency, the B.Tech. student shall submit an application for all other leaves except the medical leave to the Manager/Gen. Manager (Personnel) of the concerned industry, where he is undergoing an inplant training and obtain sanction before the leave is taken. In case of Medical Leave, he shall submit an application to Maharashtra Institute of Technology, Aurangabad. The shortage in attendance will be subjected to extending the period of inplant training in which case, the student may not be allowed to appear for the test, project seminar and assessment of term work etc. which will be held immediately after successful completion of the inplant training.
	10. Maintenance of Record: Every student of B.Tech. course shall maintain a daily record of the work done by him/her relating to the inplant training in the proforma (Annexure).
	11. Industry Sponsored Student Projects: The scheme envisages working out suitable programme for B.Tech. students. They are required to complete their inplant training in a given period. During this period, they shall be familiar with the understanding of the shop process and activities. The students can be asked

	to solve the mini-shop problem, which will make them think and try out short experiments as an improvement in the process, tools and equipment. The students in a group alone can undertake a project of immense importance for the benefit of the industry and also useful for the students for their advancement of career. Industry staff and Maharashtra Institute of Technology faculty can plan in advance to effectively complete the practical training with the project for preliminary studies on the floor. The projects should aim mainly- • Cost reduction • Enhancing productivity • Development/Improvement/ Effective use of Softwares/ Systems • Energy conservation measures • Process Improvement technique • Application Development • Plastic and Polymer working • Hardware/ Software • Agro engineering and so on.
	12. What will form a good project? Through the project, it is hoped to provide the students an exciting experience in solving line problems under practical constraints. Hence it is desired that the project should be a well-defined problem, which can be completed and implemented within the project period. It may be a problem, evolving analysis, design, fabrication and / or testing.
	13. Time Schedule for the Project: The following time schedule should be planned by each student or groups of students, who undertake the project. • Proposal to be received before specified date. • Project acceptance before. • Commencement of the project. • Completion of the project.
	14. Commitment on the part of the Institute: • Providing a faculty member to supervise the project. • Providing the Institute facilities to complete the project. • Coordinator from industry will be invited to participate in the stage wise assessment of the students performance.
	15. Assistance for completion of the Project: All the projects undertaken by the students are time bound. Although, every attempt results may not be achieved within the period available for the student. In such cases, the services of the associated faculty members can be sought for the completion of the same on mutually agreed terms.
	16. Monitoring of Inplant Training: The B.Tech. students are expected to follow all the rules and discipline of the industry. However, because of other academic requirements and the nature of the project, the student may have to work in other places outside the industry. The faculty and Industry supervisor will work out a suitable arrangement to review the progress of the work from time to time. Maharashtra Institute of Technology, Aurangabad will monitor the progress of inplant training in association with industry authority.
	17. Conduct and Discipline: In all matters of the conduct and discipline, B.Tech. student shall be governed by the rules and regulations (applicable to employees of the corresponding category) in the Establishment, where he/she is undergoing a training.

	18. B.Tech. Students are Trainees and not Workers: • Every B.Tech. student undergoing an inplant training in the respective branch of Engineering & Technology in any Establishment shall be treated as a trainee and not a worker and- • The provision of any law with respect to labour will not apply to such a trainee.
	19. Settlement of Disputes: Any disagreement or dispute between an industry and a B.Tech. student trainee arising out of the contract of inplant training shall be resolved both by Maharashtra Institute of Technology and the industry with mutual cooperation. The decision of both Maharashtra Institute of Technology and the industry shall be final.
	20. Holding of Test and Grant of Certificate: The progress in inplant training of every student shall be assessed by the industry and Maharashtra Institute of Technology faculty from time to time. Every B.Tech. student undergoing an inplant training shall be issued a certificate of Proficiency on completion of his/her training to the satisfaction of the industry.
	21. Offer of Stipend / Other Welfare Activities and Employment: It shall not be obligatory on the part of the Employer / Industry to offer any stipend and other welfare amenities available, if any, to the students of B.Tech. courses undergoing an inplant training. However, if the industry desirous to do so will be a privilege for the students and also for Maharashtra Institute of Technology in view of the bonding of better understanding and cooperation forever.
	PRACTICAL EXAMINATION
(e)	The Practical examination will be conducted after successful completion of the inplant training for which guide will be internal examiner and external examiner will be appointed by the university. The date of practical examination will be same for the students of a branch and will be notified by the university. The assessment of the practical examination shall consist of 1. Seminar Performance 2. An oral on the project work done. 3. Assessment of the term work / report.