Prof. Ram Meghe Institute Of Technology And Research Badnera -444701

**An Autonomus College Affiliated to
Sant Gadge Baba Amravati University,
Amravati, Maharashtra (India)**

PROGRAMME SCHEME & SYLLABI
2023-2024

M. Tech.
(Information Technology)

✚ Department Vision :

"Attaining growing needs of industry and society through Information Technology with ethical values".

✚ Department Mission :

1. To become leading education center by inspiring the students to become competent IT Engineers

2. To make students more innovative and research-oriented, to improve their ability to provide appropriate support for industry and society

3. To train students to adapt the life-long learning with ethical values.

✚ Program Educational Objectives :

1. To provide a sustainable foundation in mathematics, science and engineering to enable them to become competent IT Engineers

2. To deliver a comprehensive education in Information Technology and related engineering fields to ensure the core competency to be successful in Industry and in higher studies.

3. To analyze, design and create solutions in alignment with industry and emerging trends in multidisciplinary environments.

4. To communicate effectively as a part of team for self-learning, lifelong learning and career enhancement in industry and society.

Program Outcomes :

On completion of the course a graduate of Information Technology program will be able to :

1. **Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem Analysis:** Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
3. **Design/Development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct Investigations of Complex Problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions for complex problems.
5. **Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
6. **The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the the broadest context of technological change.

Program Specific Outcomes :

1. Apply core aspects of Information Technology, Networking, Internet of Things and Security to pursue successful career in IT industry.

2. Develop, analyze and find IT solutions through programming paradigm, Web Designing and Cloud Computing.

Prof. Ram Meghe Institute of Technology and Research, Badnera-Amravati
(An Autonomous Institute)
Two Year Post Graduate Degree Program in Master of Technology
Choice Based Credit System (Semester Pattern)
Branch : Information Technology

			Teaching Scheme					Examination Scheme											
			Hours/ Week					THEORY							PRACTICAL				
										Internal Marks					Max. Marks			
Sr. No.	Course Code	Name of the Course	Lecture	Tutorial	P/D	Total Hours/ Week	Credits	Duration of paper (Hrs)	Max. Marks ESE/ ESSE	Max. Marks MSE/ MSIE	Max. Marks TA	Total	Min. Passing Marks in ESE/ ESSE	Overall Min Passing Marks	Int.	Ext.	Total	Min. Passing Marks
Theory																		
01	1SMTN01	Operating System Configuration	3			3	3	3	60	30	10	100	24	50				
02	1SMTN02	Database System Design	3			3	3	3	60	30	10	100	24	50				
03	1SMTN03	Net Centric Computing	3			3	3	3	60	30	10	100	24	50				
04	1SMTN04	PE- 1	3			3	3	3	60	30	10	100	24	50				
05	1SMTN05	Audit Course	2			2												
Practicals																		
06	1SMTN04	Operating System Configuration Lab			2	2	1								25	25	50	25
07	1SMTN05	Database System Design Lab			2	2	1								25	25	50	25
08	1SMTN06	Net Centric Computing Lab			2	2	1								25	25	50	25
09	1SMTN07	Seminar1		2		2	2								25	25	50	25
		Total	**14**		**6**	**22**	**17**					**400**					**200**	

Seminar1: It will be based on Recent Trends in Technology/ Research Methodology related to the program

PE 1 : Software Engineering Methodologies/Intelligent Systems/ Real Time Embedded System Design

Total	**600**

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			Hours/ Week					THEORY							PRACTICAL				
									Internal Marks						Max. Marks				
Sr. No.	Course Code	Name of the Course	Lecture	Tutorial	P/D	Total Hours/ Week	Credits	Duration of paper (Hrs)	Max. Marks ESE/ ESSE	Max. Marks MSE/ MSIE	Max. Marks TA	Total	Min. Passing Marks in ESE/ ESSE	Overall Min Passing Marks	Int.	Ext.	Total	Min. Passing Marks
Theory																		
01	2SMTN01	Integrative programming	3			3	3	3	60	30	10	100	24	50				
02	2SMTN02	Digital Medial Development	3			3	3	3	60	30	10	100	24	50				
03	2SMTN03	System Security	3			3	3	3	60	30	10	100	24	50				
04	2SMTN04	PE - 2	3			3	3	3	60	30	10	100	24	50				
05	2SMTN05	Audit Course	2			2												
Practical																		
06	2SMTN05	Lab based on Integrative Prog			2	2	1								25	25	50	25
07	2SMTN06	Lab based on Digital Medial Development			2	2	1								25	25	50	25
08	2SMTN07	Lab based on System Security			2	2	1								25	25	50	25
09	2SMTN08	Mini- Project			4	4	2								50	50	100	50
		Total	14		10	24	21					400					250	
														Total			**650**	

Mini-Project: Project should be relevant to current technology and must include innovative element

PE 2 : Software Testing/Wireless Networks and Communication/ Information Technology Management

Exit Option after completion of First Year : Student has to complete 8 credit online courses (NPTEL/MOOCS/SWAYAM) suitable for Information Technology to qualifyfor the **Post Graduate Diploma in Information Technology.**

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(An Autonomous Institute)

Two Year Post Graduate Degree Program in Master of Technology

Choice Based Credit System (Semester Pattern)

Branch : Information Technology

			Teaching Scheme					Examination Scheme											
			SEMESTER: III																
			Hours/ Week					THEORY								PRACTICAL			
Sr. No.	**Course Code**	**Name of the Course**	**Lecture**	**Tutorial**	**P/D**	**Total Hours/ Week**	**Credits**	**Duration of paper (Hrs)**	**Max. Marks ESE/ ESSE**	Internal Marks		**Total**	**Min. Passing Marks in ESE/ ESSE**	**Overall Min Passing Marks**	Max. Marks		**Total**	**Min. Passing Marks**
										Max. Marks MSE/ MSIE	**Max. Marks TA**				**Int.**	**Ext.**		
Theory																		
01	3SMTN01	PE- 3	4			4	4	3	60	30	10	100	24	50	..	..	..	..
02	3SMTN02	PE- 4	4			4	4	3	60	30	10	100	24	50	..	..	..	..
Practical																		
03	3SMTN03	Seminar 2		2		2	2								25	25	50	25
04	3SMTN04	Seminar 3		8		8	4								100		100	50
		Total	8	10		18	14					200						150

Seminar2: It will be based on Literature Survey of any Current technology

Seminar3: It will be based on Research/ Dissertation Topic selected for the Major Project

Total	**350**

PE 3 : Data Warehousing and Data Mining / Machine and Deep Learning

PE 4 : Cyber Security and Forensics / Mobile Adhaoc Networks

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Sr. No.	Course Code	Name of the Course	Lecture	Tutorial	P/D	Total Hours/ Week	Credits	Duration of paper (Hrs)	Max. Marks ESE/ ESSE	Max. Marks MSE/ MSIE	Max. Marks TA	Total	Min. Passing Marks in ESE/ ESSE	Overall Min Passing Marks	Int.	Ext.	Total	Min. Passing Marks
SEMESTER: IV																		
				Teaching Scheme				**Examination Scheme**										
				Hours/ Week				**THEORY**							**PRACTICAL**			
										Internal Marks					**Max. Marks**			
Practical																		
01	4SMTN01	Major Project: Dissertation and Viva-voce			10	10	12								100	200	300	150
		Total			10	10	12										300	

Summary of Marks & Credits					
Year	**Semester**	Sem Marks	Yearly Marks	Sem Credits	Yrly Credits
First Year	I	600	1250	17	38
	II	650		21	
Second Year	III	350	650	12	24
	IV	300		12	
	Total	**1900**		**62**	

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Branch : Information Technology

Skill Development Lab Details		
Semester		
III	Skill Development Lab - I	Instrumentation Lab
IV	Skill Development Lab - II	Web Development Lab
V	Skill Development Lab - III	Android Application Development Lab
VI	Skill Development Lab - IV	Mini project based on IIoT
VII	Skill Development Lab -V	Single Board Computers Lab
VIII	Skill Development Lab - VI	Lab Based on 8IIoT01 and 8IIoT02

SYLLABUS PRESCRIBED FOR TWO YEAR P.G. DEGREE COURSE
IN
MASTER OF TECHNOLOGY (FULL-TIME)
INFORMATION TECHNOLOGY
SEMESTER PATTERN

SEMESTER: FIRST

1SMTN01   OPERATING SYSTEM CONFIGURATION

Teaching Scheme : 3(L)   **Credit : 3**

Unit-I : Introduction to OS Internals. Overview of OS and Kernel, Linuxand classic UNIX kernels. Kernel Source tree. Process management in Linux: Process descriptor and task structure, process creation, implementation of threads, process termination, process scheduling.

Unit-II : Process Scheduling in Linux: The Linux Scheduling Algorithm, Preemption and Context Switching, Real-Time, Scheduler- Related System Calls, System Calls: Handler, Implementation and Context. Interrupts and Interrupt Handlers.

Unit-III : Kernel Synchronization in Linux: Critical Regions and Race Conditions, Locking, Deadlocks, Contention and Scalability. Kernel Synchronization Methods: Spin Locks, Semaphores, Completion Variables. Preemption Disabling.

Unit-IV : Time Management in Linux: Kernel Notion of Time, Hardware Clocks and Timers, The Timer Interrupt Handler, Delaying Execution. Memory Management in Linux: pages, zones, kmalloc, vmalloc, slab layer allocator, statically allocating onthe stack, high memory mapping. Per-CPU Allocations.

Unit-V : The Virtual File System in Linux: common file system interface, file abstraction layer, UNIX file system, VFS, dentry object, Super block object, file object, data structure associated with file systems and with a process. The Block I/O Layer and I/O Scheduler in Linux.

Unit-VI : The Process Address Space, the Memory Descriptor, Memory Areas, Page Tables. The Page Cache and Page Write back: Page Cache, Radix Tree, Buffer Cache. Linux Kernel Modules:Building, installing, Loading and managing. Portability in Linux.

TEXT BOOK:
Robert Love, "Linux Kernel Development" Pearson Education, 2/e.

REFERENCE BOOKS :
i. Daniel Bovet, "Understanding the Linux Kernel" O'Reilly Publications 2/e.
ii. Rubini and J. Corbet . Linux Device Drivers. O'Reilly and Associates, 2001.
iii. D. Mosberger an d S . Erania n. IA-64 Linux Kernel: Design &Implementation. Prentice Hall, 2002
iv. M.McKusick and G.Neville-Neil .The Design and Implementation ofthe FreeBSD Operating System. Addison-Wesley, 2004.

1SMTN01 DATABASE SYSTEM DESIGN

Teaching Scheme : 3(L)   **Credit : 3**

Unit - I : Introduction to Database Processing, File Processing Systems, Definition of Database. The Entity-Relationship(E-R) Model: Element of the E-R Model, E-R Diagrams, Examples, Databaseas Models of Models. The Semantic Object Model: Semantic Objects, Creating Data Models with Semantic Objects, Types of Objects, Comparison of the Semantic Object and the E-R Model.

Unit - II : The Relational Model and Normalization: The Relational Model, normalization, First through Fifth Normal Forms, Domain Key Normal Forms, The Synthesis of Relations, Multi-Value Dependencies, Iteration, Optimization.

Unit III : Database Design using Entity-Relationship Models: Transformation of Entity Relationship Models into Relational Database Designs, Example Design. Trees, Networks. Database Design with Semantic Object Models: Transformation of Semantic Objects into Relational Database Design, Sample Objects.

Unit IV: Foundation of Relational Implementation: Defining Relational Data, Relational Data manipulation, Relational Algebra. SQL: Querying a Single Table, Querying Multiple Tables, Exist and Not Exists, Changing Data. Database Application Design: Creating, Reading, Updating and Deleting View Instances, Form Design, Report Design, Enforcing Constraints, Security and Control, Application Logic.

Unit V : Managing Multi-User Databases: Database Administration, Concurrency Control, Database Security, and Database Recovery. Managing Database with Oracle: Creating an Oracle Database, Application Logic, Data Dictionary, Concurrency Control, Oracle Security, Oracle Backup and Recovery.

Unit VI: Networks, Multi-Tier Architecture, and XML: Network Environments, Multi-Tier Architecture, Markup Languages HTML and DHTML, XML-Extensible Markup Language. ODBC, OLE DB, ADO and ASP: The Web Server Data Environment, Open Database Connectivity (ODBC) Standard, JDBC, Java Server Pages, MySQL.

TEXT BOOK:
1. David M. Kroenke: Database Processing- Fundamentals, Design and Implementation, 8Edition (PHI)th .

REFERENCE BOOKS:
1. C.J. Date: Database Processing, (Addison Wesley).
2. R. Ramakrishnan: Database Management Systems, (McGraw Hill).
3. Ramez Elmasri and Shamkant B. Navathe: Fundamentals of DatabaseSystems, 2nd Edition.

1SMTN03   NET - CENTRIC COMPUTING

Teaching Scheme : 3(L)   **Credit : 3**

Unit I : Overview of Computer Communications and Networking, Types of Computer Networks, Network Addressing, Routing, Reliability, Interoperability, and Security, Network Standards, Network Applications and Application Protocols, Computer Communications and Networking Models, Communication Service Methods and Data Transmission Modes, Analog and Digital Communications, Speed and Capacity of a Communications Channel, Multiplexing and Switching, Network Architecture and the OSI Reference Model.

Unit II : Physical Layer Concepts, Copper Media, Fiber-Optic Media, Wireless Communications, Satellite Communications, structuredcabling Systems, Data Link Layer Concepts, LLC Sub layer, MAC Sub layer, Data Prioritization and Quality of Service.

Unit III : Internetworking Concepts, The Network Layer and Routing Concepts, Routing Protocols, RIP, OSPF, Router and Switches, VPNs, Internet Administration, TCP/IP, TCP/IP Transport and Network Layer Protocols, IP Addresses, IPv6, TCP/IP Application Level Protocol.

Unit IV : Ethernet and 802.3 Networks, 10-MBPS Ethernet/802.3 LANS, Switched Ethernet, Full-Duplex Ethernet, and Virtual LANs, Fast Ethernet, Gigabit Ethernet, Token Ring, Frame Formats, Priority and Reservation, Monitor Stations, Second-Generation token Ring, Token Ring versus Token Bus.

Unit V : Fiber Distributed Data Interface, Physical Layer Specifications, Frame Formats and Medium Access Specifications, Configuration and Design Issues, Integrated services Digital Network, Components, Channel types, BRI, PRI, ISDN Protocols, Frame Relay Circuits, Data link Layer Issues & Information.

Unit VI : Switched Multimegabit Data Services, Technical Overview, SIP, SMDS Addressing, SMDS versus Other LAN-to-LAN Technologies, ATM, Concepts and Operation, ATM interface Standards, ATM Cells, Virtual Connections, And Addressing, AAL, ATM and Convergence Technology, ATM versus OtherTechnologies and Services, Dialup Networking, DSL Services.

TEXTBOOK:

Michael A. Gallo, William M. Hancock: Computer Communications and Networking Technologies. Cengage Learning

REFERENCEBOOKS:

1) Stallings W., "High Speed Networks and Internets: Performance andQuality of Service",

Prentice Hall, 2002.

2) Kershenbaum A., "Telecommunications Network Design Algorithms",Tata McGraw Hill.

3) Douglas E. Comer, "Computer Networks and Internet", Pearson Edu.Asia.

4) Andrew Tanenbaum, "Computer Network", PHI.

(i)   SOFTWARE ENGINEERING METHODOLOGIES

Teaching Scheme : 3(L)   **Credit : 3**

Unit I : Software Process Models : Software Process Framework, Process Patterns, Personal and Team Process Models, Process Models: Waterfall Model, Incremental Models, Evolutionary Models, Iterative Development, The Unified Process, Agile process, Process Assessment, CMMI, Impact of Processes and Outcomes, Process Selection and applicability.

Unit II : Requirements Engineering: Requirements Engineering Tasks, Requirement Elicitation Techniques, Software Requirements: Functional, Non-Functional, Domain, Requirements Characteristics and Characterization, Requirement qualities, Requirement Specification, Requirement Traceability, SystemAnalysis Model Generation, Requirement Prioritization.

Unit III : UML Concepts : Programming In Small Versus Programming In Large, UML 2.0 History/ New Features MDA/ MOF/ XMI/ CORBA, Introduction to UML Meta model, Extensibility Mechanisms and its usage, Introduction to OCL, Specification techniques of diagrams in UML.

Unit IV: Behavioral Model: Use Cases, Use Case Diagram Components, Use Case Diagram, Actor Generalization, Include and Extend, Template for Use Case Narrative, Using Use Cases Data Dictionary: Finding the Objects, Responsibilities, Collaborators, and Attributes, CRC Cards, Dynamic Behavior: Sequence diagrams physiology diagrams, object lifelines and message types, Activity Diagrams: Decisions and Merges, Synchronization.

Unit V : Design Engineering: Design quality, Design Concepts, The Design Model, Introduction to Pattern-Based Software Design, Architecture styles: Main program with sub program style, Abstract data type style, Repository, Layered. Architectural Design: Software Architecture, Data Design and ArchitecturalDesign.

Unit VI : Object Oriented Design: Design of Objects, Design and Factoring, Design of Software Objects, Features and Methods, Cohesion of Objects, Coupling between Objects, Coupling and Visibility, Inheritance, Establishing The Object Model, Refiningclasses and associations, Analysis model vs. design model classes, Categorizing classes: entity, boundary and control, Modeling associations and collections, Achieving reusability,Reuse through delegation, Identifying and using service packages.

TEXT BOOK:

1. Ian Sommerville, "Software Engineering", 7th Edition, Addison-Wesley, 2004

REFERENCE BOOKS:

2. Grady Booch, James Rambaugh, Ivar Jacobson, "Unified ModelingLanguage Users Guide", 2nd Edition, Addison- Wesley,.
3. Jim Arlow, Ila Neustadt, "UML 2 and Unified Process: Practical ObjectOriented Analysis and Design. ", 2nd Edition, Addison- Wesley,
4. Tom Pender, "UML Bible", John Wiley & Sons,.
5. Stephen H. Kan, "Metrics and Models in Software Quality.

(ii)   INTELLIGENT SYSTEMS

Teaching Scheme : 3(L)   **Credit : 3**

Unit I : Artificial Intelligence: Intelligence, Artificial intelligence, intelligent systems. Knowledge representation: Reasoning, issue and acquisition: propositional calculus, predicate calculus, Rule-based knowledge representation, Truth Maintenance system

Unit II : Artificial Intelligence: Intelligence, Artificial intelligence, development of expert system, expert system tools, difficulties in developing expert systems, applications of expert systems.

Unit III : Fuzzy Systems : introduction, foundation of fuzzy systems, fuzzy relations, arithmetic operations of fuzzy numbers, linguistic descriptions and their analytical forms, defuzzification methods, fuzzy logic in control and decision-making applications.

Unit IV: Artificial Neural Networks: introduction, Neuron physiology diagrams, artificial neurons, artificial neural networks, features of artificial neural networks, back propagation training algorithms, functional link neural networks, cascasde correlation neural networks.

Unit V: Genetic Algorithms and Evolutionary Programming: introduction, genetic algorithms, procedures of genetic algorithms, the working of genetic algorithms, evolutionary programming, genetic-algorithm-based machine learning classifier system.

Unit VI : Swarm Intelligent Systems : introduction, importance of the ant colony paradigm, ant colony systems, development of the ant colony systems, application of ant colony intelligence, the working of ant colony systems : Probabilistic Transition rule, Pheromone Updating ,Types of ant colony models. Particle Swarm intelligent systems.

TEXT BOOK:

N.P.Padhy, "Artificial Intelligence and Intelligent Systems", Oxford.

REFERENCEBOOKS:

1. Hakin, Simon 2003, "Neural Networks : A Comprehensive Foundation", PHI, New Delhi.
2. Kosko B. 1997, "Neural Networks and Fuzzy Systems", PHI, Delhi.
3. Rajasekaran S. and G.A.Vijayalakshmi Pai, 2003, "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI, New Delhi.
4. Sriram, Ram D. 1977, "Intelligent Systems for Engineering - Knowledge-Based Approach", Springer, London.

(iii)   REAL TIME EMBEDDED SYSTEM DESIGN

Teaching Scheme : 3(L) **Credit : 3**

Unit- I : Architecture of Embedded System, Hardware Architecture, Software Architecture, RTOS**,** Architecture of Kernel, Features/ Characteristics of RTOS,. Task Scheduling, Signals, Events, Queues, Mail Boxes, Semaphores, Creation of Threads and InterThread Communication, Memory Management

Unit II : Detailed study of PIC18 Family Microcontroller Architecture, Pin Description, File Structure, Status Register, PIC data formats, Directives, RISC Architecture in PIC, SFR, PIC18 Hardware Connections, PIC 18 Timers, PIC 18 Serial Port, PIC 18 Interrupts. Features of ATMEL, ARM, AVR Microcontrollers.

Unit III : PIC 18 Instruction set, Programming using C / Assembly: Data types, time delays, I/O Programming, Data Conversion, Timer/ Counter, Serial Port, Interrupt programming, ADC,DAC, Sensor Interfacing.

Unit IV : Clock-Driven Scheduling: Notation and Assumptions, Static, Timer Driven Scheduler, General structure of Cyclic Schedules, Cyclic Executives, Improving the Average Response Time of periodic Jobs, Scheduling Sporadic Jobs, Practical Consideration and Generalizations, Algorithms for ConstructingStatic Schedules, Pros and Cons of Clock-Driven Scheduling.

Unit V : Priority-Driven Scheduling of Periodic Tasks: Static Assumption, Fixed-Priority versus Dynamic-Priority Algorithms, Maximum Schedulable Utilization, Optimality of the RM and DM Algorithms, A Schedulability Test for Fixed-Priority Taskswith Short Response Times, Schedulability Test for Fixed-Priority Tasks with Arbitrary Response Times, Sufficient Schedulability Conditions for the RM and DM Algorithms.

Unit VI : Scheduling A periodic and Sporadic Jobs in Priority-Driven Systems: Assumption and Approaches, Deferrable Servers, Sporadic Servers, Constant Utilization, Total Bandwidth, and Weighted Fair Queuing Servers, Scheduling of Sporadic Jobs, Real-time Performance for Jobs with Soft Timing Constraints.

TEXTBOOKS:
1. Dr. K.V. K. K. Prasad "Embedded / Real Time System: Concepts, Design, & Programming -Black Book" Dreamtech Press Publication
2. Mohammad Ali Mazidi, Rolin D. Mckinly,Danny Causey: PIC Microcontroller and Embedded system using Assembly and C for PIC18, Pearson Education
    3. Jane W.S. Liu: Real Time System, Pearson Education.

REFERENCEBOOKS
    1. Raj Kamal, "Embedded Systems Architecture, Design", Tata McGraw-Hill
    2. John B. Beatman, Design with PIC Microntroller,
    3. Barry B. Brey, Appling PIC18 Microntroller, and Interfacing using Cand Assembly,
    4. Phillip A. Laplante: Real-Time Systems design and Analysis, (WileyInterScience)

1SMTN05 AUDIT COURSE I :

Teaching Scheme : 2(L)   **Credit : 0**

(i)   PEDAGOGY STUDIES

(ii)   VALUE EDUCATION
Please note : One of these audit course is to be studied in self study mode by registering relevant courses on NPTEL / Swayam.

1SMTN06   OPERATING SYSTEM CONFIGURATION LAB
Hours/week :2(L)   **Credit : 3**

Performance of Minimum of 8 experiments based on subject 1SMTN01

1SMTN07   DATABASE SYSTEM DESIGN LAB
Hours/week :2(L)   **Credit : 3**

Performance of Minimum of 8 experiments based on subject 1SMTN02

1SMTN08   NET CENTRIC COMPUTING LAB
Hours/week :2(L)   **Credit : 3**

Performance of Minimum of 8 experiments based on subject 1SMTN03

1SMTN09   SEMINAR I
Hours/week :2(L)   **Credit : 3**

Seminar I will be based on Recent Trends in Technology / Research Methodology related to the program

SEMESTER: SECOND

2SMTN01 INTEGRATIVE PROGRAMMING

Teaching Scheme : 3(L)   **Credit : 3**

Unit I : Object Oriented Programming: Methodology, features, design finalizers, garbage collector, cloning objects, nested classes and interfaces, inner classes, Java I/O: Byte-oriented streams, File I/ O, Character streams, Object serialization.

Unit II : Multithreaded Programming: Threads and life cycle of a thread, Creating and running the threads. Thread class and Runnable interface. Service threads, JVM and task scheduling, thread synchronization, synchronizing methods of inner classes. Thread communication, Grouping the threads.

Unit III: Databases Programming : Model-View-Persistence design pattern, Mapping between Java objects and Data elements, JDBC and drives for RDBMS, SQL to Java type mapping, Java and Javax SQL APIs and their uses in database programming, Transaction coding, Connection pooling.

Unit IV : XML : Introduction, XML structure, XML DTD creation and Schema creation, well formed and valid XML documents, XML parsers like SAX & DOM, Parsing XML documents with DOM, JDOM and SAX parsers, XML transformation using XSLT and X Path.

Unit V : Network Programming : Java approach for URLs, Sockets – TCP/ IP and Datagram sockets, Programming using sockets, Remote method invocation (RMI) : server and client development for RMI, RMI registry, JNDI service and its packages, Security : Cryptography, Secure Socket Layer, Security policy definition, Java AAS.

Unit VI : Web application development: Technology of the web, Servlet and Servlet API, building web application. Java Server Pages, JSP tags and API, JSP processing, Java coding in JSP, Web application frameworks. Robust web application development.

TEXTBOOK:

Wigglesworth J & McMillan P: Java Programming: Advanced Topics, 3/e, Thomson Course Technology.

REFERENCE BOOKS:

1. Schildt H and Naughton P: Java: The Complete Reference, Osborne, McGraw Hill
2. Dustin R Callaway: Inside Servlet, Pearson Education, LPE
3. Larne Pekowasky : Java Server Pages, Pearson Education, LPE
4. Dietel & Dietel : WWW : How to Program, Pearson Education, LPE.

2SMTN02 DIGITAL MEDIA DEVELOPMENT

Teaching Scheme : 3(L)   **Credit : 3**

Unit - I : Introduction to Multimedia Systems design, Elements, Systems architecture & technologies, Objects for multimedia systems , Multimedia data interface standards, Multimedia Databases, Data Compression need, lossy and lossless compression, binary image compression Schemes, color, grey and still video imagecompression , Full motion video compression , audio compression.

Unit II : Data and file format standards RTF, TIFF,RIFF, MIDI , JPEGAVI, MPEG Standards, video and image display systems, image scanners , Digital voice and audio, Digital camera, video images and animation, Full motion video.

Unit III : Unit III Telecommunications considerations for Multimedia, Specialised processors, ISDN, LAN and WAN for Enterprise Multimedia Applications, Distributed Object Model, Multimedia communication protocols (UDP , RTP , RTCP , TELNET) Multimedia Applications and Design issues, Virtual Reality Design, Components of Multimedia Systems,, Application Workflow & Distributed Application Design Issues.

Unit IV : Multimedia Authoring and User Interface, Design   Considerations, Hypermedia Applications, Information Access Object display, Hypermedia Messaging, Integrated document management.

Unit V : Distributed Multimedia Systems, Components, Client-server Operation, Object Server, Network Performance Issues Distributed Multimedia databases, managing distributed Objects.

Unit VI : System Design: Design issues, requirements, feasibility, Performance Analysis, Design for performance, Multimedia Systems Design, Extensibility and example.

REFERENCE BOOKS:-
1. Prabhat K Andleigh and Kiran Thakrar "Multimedia Systems Design"
2. Fred Halsall," Multimedia Communications by (Pearson Publications).
3. Ze-Nian Li, Mark S.Drew,"Fundamentals of Multimedia" (PearsonPublications).
4. John K.Koegel Buford, "Multimedia Systems" (Pearson Education)

2SMTN03 SYSTEM SECURITY

Teaching Scheme : 3(L)   **Credit : 3**

Unit- I : Introduction: Security, Attacks, Computer criminals, Method of Defense **Cryptography**: Substitution ciphers, Transpositions, Symmetric and asymmetric systems, cryptanalysis, data encryption standard (DES) AES Encryption algorithms Public Key Cryptography, RSAAlgorithms, Uses of Encryptions.

Unit - II : Program Security: Secure programs, Non-malicious program errors, Computer Viruses and Other malicious code, Targetedmalicious code, controls against program threats.

Unit-III : Operating System Security: Protected Objects and methods of protection, Memory address protection, Control of access to general objects, File protection Mechanism, User Authentication**:** Authentication basics, Password, Biometrics,

Unit- IV : Trusted Operating System, Security Policies, models of Security, Trusted Operating System, Design, Design elements , securityfeatures of ordinary and Trusted Operating System, Kernalised design , separation , virtualizations , Layered design , typical OS Flows assurance method , Open Source Evolutions

Unit- V: Database Security: Security requirements for Database, Reliability and integrity, sensitive data, interface, multilevel database, Proposals for multilevel security: separations, design of multilevel secure databases, Trusted Front-end Practical issues

Unit -VI : Networks Security: Threats in networks, Network security controls, Firewalls Intrusion detection systems, Secure E-mail. **Administrating Security**: Planning, Risk Analysis, Organizationsecurity policies, Physical security.

TEXT BOOK:
C.P. Pfleeger and S.L.Pfleeger, "Security in Computing", Pearson Education(LPE)

REFERENCE BOOKS:
1. Stallings, "Cryptography and Network Security:" Pearson Education(LPE)
2. Matt Bishop, "Computer Security: Art and Science", PearsonEducation
3. Kaufman, Perlman, Speciner, "Network Security" PHI.
4. Eric Malwald, "Network Security: ABeginner's Guide", TMH

Teaching Scheme : 3(L)   **Credit : 3**

Unit I : Introduction of testing: Goals for testing, phases in a tester's mental life, test design, testing versus debugging, designer versus tester, model for testing: project overview, environment, the program, bugs test, testing & levels, the role of models.

Unit II : Software testing process : verification & validation, testing team & development team, characteristics of test engineers, level of testing, testing approaches, test plan, manual testing & its limitations / drawbacks.

Unit III: Flow graphs and path testing: path testing basics, predicates, path predicates and achievable paths, path senstizing, implementation and application of path testing, transaction - flow testing techniques.

Unit IV: Testing of object oriented systems: peimer on object oriented software, differences in OO testing, software test automation: what to automate, steps of automation, design and architecture for automation, process model for automation, selecting a testtool.

Unit V : Software testing tools overview : Win Runner, testing and application using Win Runner, test script language, data driventesting, silk test, load runner, test director.

Unit VI: Source code testing utilities in UNIX/LINUX environment : GNU tools, timing of programs, profiler, code optimization, productivity tools, portability testing tool, testing application using QTP.
TEXT BOOKS:

1) Boris Beizer : Software Testing Techniques, Dreamtech Press, 2nd edition.
2) Srinivasan Desikan, Gopalaswamy Ramesh : Software Testing
3) Principle and Practices, Pearson Education.
4) Dr. K.V.K.K. Prasad : Software Testing Tools, Dreamtech Press, 2006edition.

Teaching Scheme : 3(L)   **Credit : 3**

Unit - I : Introduction to Wireless Telecommunication Systems and Networks, evolution of modern telecommunications infrastructure, OSI model, FDMA, TDMA, CDMA, Future Wireless Networks, Future Wireless Networks, 1 G to 4 G cellular systems, Wireless Standards Organizations.

Unit- II : Cellular network hardware components, cellular network databases; SS7 signaling, cellular cluster, backhaul networks, mobility management, concepts of power management and network security, GSM network and System architecture, DECTarchitecture.

Unit III : CDPD, GPRS and EDGE data networks, network layout, packet data transfer, GPRS protocol reference model, data rates, evolution of GSM and NA-TDMA to 3 G..

Unit IV : Wireless modulation techniques and hardware: spread spectrum modulation, ultra wideband radio technology, BSC and RBS hardware, digital modulation techniques : OFDM, subscriber devices.

Unit V : Wireless LANs / IEEE 802.1x: evolution, architecture, Wi-Fisystem, WLAN FHSS and DSSS physical layer, wireless LANhardware and system deployment strategies.

Unit VI : PANs and WLANs, IEEE 802.15.1 standard, Bluetooth protocolstack, Bluetooth link controller, Broadband wireless MANs/ IEEE 802.16x, IEEE 802.16 physical layer, WiMax System, Broadband satellite applications, emerging wireless technologies, wireless sensor networks.

TEXTBOOK:
1. Gary Mullett, Wireless Telecommunications Systems and Networks,Thomson Delmar Learning, 2006.

REFERENCEBOOKS:
1. Jochen Schiller, Mobile Communications.
2. William Stallings, Wireless Communications and Networks.
3. T.S.Rappaport, Wireless Communications.

Teaching Scheme : 3(L)   **Credit : 3**

Unit- I : IT and Strategy: Information revolution, Business and strategy.IT Strategy, Strategy and Success, Design Parameters, Strategic positioning, Evolution of strategy sequences and getting the right, development of a strategy, types of strategy, context andstrategy.

Unit-II : Managing IT: IT management and its roles, It governance, It governance and strategy, Technology management process, Technology selection, Strategic aspects of technology. IT and business alignment, Risk Management ,Exploiting IT Capabilities, Deploying IT in strategic manner ,Strategic planning for information technology and frameworks , Measuring IT, Performance Measures: Balanced Score Card.

Unit-III : E- strategy: What is e- strategy. E-business and E-strategy, E- business objectives, E-Commerce and E-Business, Making e, strategy work, E-strategy and the E-economy. IT strategies forIT companies: Project Vs Product Companies Strategies aspects for an IT product company, IT Strategic perspective for product company ,IT Strategies for Product company information Technology Strategy development, Product life cycle and project life cycles.

Unit-IV : IT strategies for Knowledge Management Knowledge Management, Knowledge Management and IT strategies, role of Knowledge Management in IT strategies for IT companies, knowledge industry and knowledge strategy knowledge workers, IT strategic services ,product and Consulting. IT strategies for non –IT companies : Role of IT in non –IT companies , IT Investment decision, measurement of IT, IT strategies for Non-IT companies, IT supply chain management and constraint management, IT enabled supply chain management.

Unit-V : IT Strategies in specific scenario, Enterprise resource planning implementation, mapping IT strategies initiatives to ERP , supply chain contribution and business strategy, IT strategies for business process outsourcing, IT strategy implementation
: IT strategy implementation, Development and need of it strategic plan ,IT strategy implementation to gain competitiveadvantage, IT strategy and leadership, IT strategy and differentiation , Execution and IT strategy.

Unit-VI : Global dimension of It Strategy: IT strategies in global environment, Global product cycle, Making It global scenario, globalization and competitive strategy, global project management, Mergers and acquisitions, IT compatibility in M&A.

TEXTBOOK:
1.   Parag Kulkarni,Pradip K Chande "IT Strategy for Business", OXFORDUniversity Press.

REFERENCE BOOKS:
1. Earl. M, "Management Strategies for Information Technology",Prentice Hall.
2. Gottschalk, P "Strategic Knowledge Managements Technology "IGPUSA
3. Hill, C and G Jones "Strategic management "Houghton Miffen USA
4. Honeycutt J "Knowledge management Strategies", Microsoft PressUSA.

2SMTN05 AUDIT COURSE I :

Teaching Scheme : 2(L)   **Credit : 0**

(i)   RESEARCH PAPER WRITING

(ii)   I P R

Please note : One of these audit course is to be studied in self study mode by registering relevant courses on NPTEL / Swayam platform .

2SMTN05 INTEGRATIVE PROGRAMMING LAB

Teaching Scheme : 2(P)   **Credit : 1**

Performance of Minimum of 8 experiments based on subject 2SMTN01

2SMTN 06   DIGITAL MEDIA DEVELOPMENT LAB

Teaching Scheme : 2(P)   **Credit : 1**

Performance of Minimum of 8 experiments based on subject 2SMTN02

2SMTN 07 SYSTEM SECURITY LAB

Teaching Scheme : 2(P)   **Credit : 1**

Performance of Minimum of 8 experiments based on subject 2SMTN03

2 SMTN 08   MINI PROJECT

Teaching Scheme : 4(P)   **Credit : 2**

Project should be relevant to current technology and must include innovative element in it.