M.E. (Part Time) **Prospectus No. 131737**

Information Technology

संत गाडगे बाबा अमरावती विद्यापीठ

SANT GADGE BABA AMRAVATI UNIVERSITY

अभ्यासक्रमिका

(FACULTY OF ENGINEERING & TECHNOLOGY)

PROSPECTUS

Prescribed for
Post Graduate Three Year Degree Course
Master of Engineering
(Part Time)
Credit Grade System

I to III Year Examinations 2012 - 2013 & Onwards

BRANCH

Information Technology (Part Time)

2012

Visit us at www.sgbau.ac.in

Price Rs. ...../-

Published by
Dineshkumar Joshi
Registrar,
Sant Gadge Baba
Amravati University
Amravati - 444 602

SANT GADGE BABA AMRAVATI UNIVERSITY

SPECIAL NOTE FOR INFORMATION OF THE STUDENTS

(1) Notwithstanding anything to the contrary, it is notified for general information and guidance of all concerned that a person, who has passed the qualifying examination and is eligible for admission only to the corresponding next higher examination as an ex-student or an external candidate, shall be examined in accordance with the syllabus of such next higher examination in force at the time of such examination in such subjects papers or combination of papers in which students from University Departments or Colleges are to be examined by the University.

(2) Be it known to all the students desirous to take examination/s for which this prospectus has been prescribed should, if found necessary for any other information regarding examinations etc., refer the University Ordinance Booklet the various conditions/provisions pertaining to examination as prescribed in the following Ordinances.

Ordinance No. 1	:	Enrolment of Students.
Ordinance No. 2	:	Admission of Students
Ordinance No. 4	:	National cadet corps
Ordinance No. 6	:	Examinations in General (relevent extracts)
Ordinance No. 18/2001	:	An Ordinance to provide grace marks for passing in a Head of passing and Inprovement of Division (Higher Class) and getting Distinction in the subject and condonation of defficiency of marks in a subject in all the faculties prescribed by the Statute No.18, Ordinance 2001.
Ordinance No. 9	:	Conduct of Examinations (relevent extracts)
Ordinance No. 10	:	Providing for Exemptions and Compartments
Ordinance No. 19	:	Admission of Candidates to Degrees.

Ordinance No. 109	:	Recording of a change of name of a University student in the records of the University.
Ordinance No. 6 of 2008	:	For improvement of Division/Grade.
Ordinance No.19/2001	:	An Ordinance for Central Assessment Programme, Scheme of Evaluation and Moderation of answerbooks and preparation of results of the examinations, conducted by the University, Ordinance 2001.

Dineshkumar Joshi
Registrar
Sant Gadge Baba Amravati University

PATTERN OF QUESTION PAPER ON THE UNIT SYSTEM

The pattern of question paper as per unit system will be boradly based on the following pattern.

(1) Syllabus has been divided into units equal to the number of question to be answered in the paper. On each unit there will be a question either a long answer type or a short answer type.

(2) Number of question will be in accordance with the unit prescribed in the syllabi for each paper i.e. there will be one question on each unit.

(3) For every question long answer type or short answer type there will be an alternative choice from the same unit. However, there will be no internal choice in a question.

(4) Division of marks between long answer and short answer type question will be in the ratio of 40 and 60.

(5) Each short answer type question shall Contain 4 to 8 short sub question with no internal choice.

SANT GADGE BABA AMRAVATI UNIVERSITY

DIRECTION

No. 33/2012 Date : 26 /09/2012

Subject :- Corrigendum to Direrction No.32 of 2010 regarding Examinations leading to the Degree of Master of Engineering (M.E.) (Part-Time) (Semester Pattern... Credit Grade System)

Whereas, the Direction No.32 of 2010 in respect of the Examinations leading to the Degree of Master of Engineering (M.E.) (Part-Time) (Semester Pattern.. Credit Grade System) is in existence**,**

AND

Whereas, the Schemes of teaching & examinations for various branches of Three Year Post Graduate Degree Course in Master of Engineering (Part-Time) in the faculty of Engineering & Technology have been provided vide appendices A, B, C, D & E appended with Direction No. 32 of 2010,

AND

Whereas, the provisions for the admissions and other detailed provisions to the Degree of Master of Engineering (Part-Time) are prescribed by the Direction No. 32 of 2010,

AND

Whereas, the proposal is received from the Principal, Prof. Ram Meghe Inst. of Technology & Research, Badnera regarding starting of new course M.E. Information Technology (Part-Time) from the Current Academic Session 2012-2013,

AND

Whereas, the Board of Studies in Information Technology in its meeting held on 23.07.2012 resolved to recommend the eligibility criteria, scheme of teaching & examination and draft syllabus of Master of Engineering (Part-Time) in Information Technology course for its implementation from the Current Academic Session 2012-2013 and onwards,

AND

Whereas, Hon'ble Vice Chancellor has accepted the eligibility criteria, scheme and syllabus of Master of Engineering in Information Technology course under section 14(7) of the Maharashtra Universities Act, 1994 on behalf of the Faculty of Engineering & Technology on dated 17.08.2012,

AND

Whereas, the Academic Council in its meeting held on 28-8-2012 vide Item No. 96 has considered and approved the scheme of teaching & examination and syllabus alongwith eligibility criteria for admission to M.E. Information Technology (Part-Time),

AND

Whereas, the scheme of teaching & examination and syllabus alongwith eligibility criteria for admission to the said course are to be implemented from the academic session 2012-2013 in phase wise manner,

AND

Whereas, admissions to the First Year of Master of Engineering (Part-Time) course are to be made in the academic session 2012-2013,

AND

Whereas, the matter for admission of the students at the examination is required to be regulated by an Ordinance,

AND

Whereas, the scheme of teaching & examination for the said course in the Faculty of Engineering & Technology is required to be regulated by the Regulation,

AND

Whereas, the process of making an Ordinance and the Regulation is likely to take some time,

AND

Whereas, the syllabus along with the scheme of teaching & examination of the said course for Semester first & second of M.E. (Part-Time) Course is to be made available for the students admitted during the academic session 2012-2013,

Now, therefore, I, Dr. Mohan K. Khedkar, Vice-Chancellor of Sant Gadge Baba Amravati University, Amravati in exercise of powers conferred upon me under sub-section (8) of Section 14 of the Maharashtra Universities Act, 1994, do hereby direct as under :-

1. This Direction shall be called " Corrigendum to Direrction No. 32 of 2010 regarding Examinations leading to the Degree of Master of Engineering (M.E.) (Part-Time) (Semester Pattern... Credit Grade System), Direction, 2012."

2. This Direction shall come into force with effect from the session:
   i) 2012-2013 for Semester - First & Second,
   ii) 2013-2014 for Semester - Third & Fourth and
   iii) 2014-2015 for Semester- Fifth & Sixth.

3. The Eligibility Criteria for admission to the Degree of Master of Engineering (M.E.) (Part-Time) course shall have passed the Degree Examination with atleast 55% marks in Bachelor of Engineering in a branch as given below of the University or any other examination recognised by the University equivalent thereto for the Part-Time M.E. Course they must have a full time work experience of minimum 2 years in a registered firm/ company/ industry / education and research institution/ govt. deptts./ govt.

autonomous organisation in the relevant field in which admission is being sought.

Entry level qualification for Part-Time M.E. (I.T.) :

M.E. Branch		Entry Level Qualification B.E./B.Tech. of any statutory University
1.		2.
a)	M.E.(Information Technology)	Information Technology, Computer Sci.& Engineering., Computer Technology, Computer Engineering ,Electronics & Telecomunications, Electronics Engineering

4. The Scheme of Teaching & Examination for M.E. (Information Technology)(Part-Time) shall be as per Appendix-A, appended with this Direction.

5. Other related provisions of the Direction No. 32 of 2010 shall be applicable for the said course.

Date : /09/2012

(Mohan K. Khedkar)
Vice-Chancellor

THREE YEAR POST GRADUATE DEGREE COURSE IN MASTER OF ENGINEERING (PART TIME)

INFORMATION TECHNOLOGY

CREDIT GRADE SYSTEM

Appendix - A

Sr.No.	Subject Code	Subject	Teaching Scheme (Hours per Week)					Examination Scheme									
								Theory						Practical			
			Lecture	Tutorial	P/D	Total Hrs./Wk	Credits	Theory. Duration of Paper (Hr.)	Max. Marks Th. Paper	Max. Marks College Assesmnt	Total	Minimum Passing Marks		Max. Marks		Total	Min. Passing Marks
												Th. Paper	Subject	External	Internal		
1	1NMEP1	Operating System Configuration	4	0	0	4	4	3	80	20	100	40	50	--	--	--	--
2	1NMEP2	Database System Design	4	0	0	4	4	3	80	20	100	40	50	--	--	--	--
3	1NMEP3	LAB-I (Based on 1NMEP1 & 1NMEP2)	0	0	2	2	1	--	--	--	--	--	--	25	25	50	25
			8	0	2	10	9	--	--	--	200					50	
		Total									250						

SECOND SEMESTER

Sr.No.	Subject Code	Subject	Teaching Scheme (Hours per Week)					Examination Scheme									
								Theory						Practical			
			Lecture	Tutorial	P/D	Total Hrs./Wk	Credits	Th. Duration of Paper (Hr.)	Max. Marks Th. Paper	Max. Marks College Assesmnt	Total	Minimum Passing Marks		Max. Marks		Total	Min. Passing Marks
												Th. Paper	Subject	External	Internal		
1	2NMEP1	Digital Medial Development	4	0	0	4	4	3	80	20	100	40	50	--	--	--	--
2	2NMEP2	Information Technology Management	4	0	0	4	4	3	80	20	100	40	50	--	--	--	--
3	2NMEP3	System Security	4	0	0	4	4	3	80	20	100	40	50	--	--	--	--
4	2NMEP4	LAB-II (Based on 2NMEP1 & 2NMEP2)	0	0	2	2	1	--	--	--	--	--	--	25	25	50	25
			12	0	2	14	13	--	--	--	300					50	
		Total									350						

THIRD SEMESTER

Sr.No.	Subject Code	Subject	Teaching Scheme (Hours per Week)					Examination Scheme									
								Theory						Practical			
			Lecture	Tutorial	P/D	Total Hrs./Wk	Credits	Th. Duration of Paper (Hr.)	Max. Marks Th. Paper	Max. Marks College Assesmnt	Total	Minimum Passing Marks		Max. Marks		Total	Min. Passing Marks
												Th. Paper	Subject	External	Internal		
1	3NMEP1	Net Centric Computing	4	0	0	4	4	3	80	20	100	40	50	--	--	--	--
2	3NMEP2	Real Time Embeded System Design	4	0	0	4	4	3	80	20	100	40	50	--	--	--	--
3	3NMEP3	Elective-I	4	0	0	4	4	3	80	20	100	40	50	--	--	--	--
4	3NMEP4	LAB-III (Based on 3NMEP1 & 3NMEP2)	0	0	2	2	1	--	--	--	300	--	--	--	--	50	--
		Total	12	0	2	14	13	--			300						
													TOTAL			350	

ELECTIVE-I : 1) SOFTWARE ENGINEERING METHODOLOGIES (2) INTELLIGENT SYSTEMS (3) LEGAL AND PROFESSIONAL ETHICS

FOURTH SEMESTER

Sr.No.	Subject Code	Subject	Teaching Scheme (Hours per Week)					Examination Scheme									
								Theory						Practical			
			Lecture	Tutorial	P/D	Total Hrs./Wk	Credits	Th. Duration of Paper (Hr.)	Max. Marks Th. Paper	Max. Marks College Ass.	Total	Minimum Passing Marks		Max. Marks		Total	Min. Passing Marks
												Th. Paper	Subject	External	Internal		
1	4NMEP1	Integrative Programming	4	0	0	4	4	3	80	20	100	40	50	--	--	--	--
2	4NMEP2	Elective-II	4	0	0	4	4	3	80	20	100	40	50	--	--	--	--
3	4NMEP3	LAB-IV (Based on 4NMEP1)	0	0	2	2	1	--	--	--	--	--	--	25	25	50	25
			8	0	2	10	9	--	--	--	200					50	
		Total							250								

ELECTIVE-II : 1) SOFTWARE TESTING (2) WIRELESS NETWORKS AND COMMUNICATION (3) DATA WAREHOUSING AND DATA MINING

FIFTH SEMESTER

Sr.No.	Subject Code	Subject	Lecture	Tutorial	P/D	Total Hrs./Wk	Credits	Internal Marks	Total	Min. Passing Marks
1	5NMEP1	Seminar and Dissertation	--	--	6	6	15	100	100	50
		Total			6	6	15		100	--

SIXTH SEMESTER

Sr.No.	Subject Code	Subject	Lecture	Tutorial	P/D	Total Hrs./Wk	Credits	External Marks	Internal Marks	Total
1	6NMEP1	Seminar and Dissertation	--	--	12	12	30	200	100	300
		Total			6	6	15			100
					GRAND TOTAL					**1600**

Semester V :

Seminar : Seminar to be delivered on work completed during fifth semester. 50 internal marks out of 100 will be assessed by a committee consisting of Head of Department, dissertation guide and subject expert appointed by Principal of the College/ Head of university department. Remaining 50 internal marks will be given by guide based on performance .

Dissertation : Title of the dissertation work to be submitted to the University on or before 15 Sept. (For regular examination) and 15th of February for supplementary exam.)
Title modified /rejected by the sanctionary authority to be conveyes to the concern within a month.

Semester VI

Seminar: To be delivered on the complete work of dissertation. 50 internal marks out of 100 will be assessed by a committee consisting of Head of Department, dissertation guide and subject expert appointed by Principal of the College/ Head of university department. Remaining 50 internal marks will be given by guide based on performance.

Note: 1. Thesis of dissertation work must be submitted to the University on or before 30th April (for regular exam.) and 30th November (for supplementary exam.) Thesis of Dissertation work can be submitted with late fee to the University upto 31 May (for regular exam.) and 31st December (for supplementary exam.). The late fees will be charged as in case of Examination form.

Notes: 1. Student should be fill the examination form in the beginning of 5th semester jointly for 5^{th} & 6^{th} semester.
2. Single mark sheet for 5^{th} & 6^{th} semester together will be given to the student.

SYLLABUS PRESCRIBED FOR
THREE YEAR P.G. DEGREE COURSE IN
MASTER OF ENGINEERING (PART TIME)
INFORMATION TECHNOLOGY
SEMESTER PATTERN

SEMESTER : FIRST

1NMEP1 OPERATING SYSTEM CONFIGURATION

Unit-I : Introduction to OS Internals. Overview of OS and Kernel, Linux and 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 on the 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 of the FreeBSD Operating System. Addison-Wesley, 2004.

1NMEP2 DATABASE SYSTEM DESIGN

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, Database as 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 Database Systems, 2nd Edition.

1NMEP3 LAB-I (Based on 1NMEP1 & 1NMEP2)

******

SEMESTER: SECOND

2NMEP1 DIGITAL MEDIA DEVELOPMENT

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 image compression , Full motion video compression , audio compression.

Unit II : Data and file format standards RTF, TIFF,RIFF, MIDI , JPEG AVI, 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” (Pearson Publications).
4. John K.Koegel Buford, “Multimedia Systems” (Pearson Education)

2NMEP2 INFORMATION TECHNLOGY MANAGEMENT

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 and strategy.

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 for IT 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 competitive advantage, 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.

TEXT BOOK:

1. Parag Kulkarni,Pradip K Chande "IT Strategy for Business", OXFORD University Press.

REFERENCE BOOKS:

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

2NMEP3 SYSTEM SECURITY

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, RSA Algorithms, Uses of Encryptions.

Unit - II : **Program Security**: Secure programs, Non-malicious program errors, Computer Viruses and Other malicious code, Targeted malicious 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 , security features 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, Organization security 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", Pearson Education
3. Kaufman, Perlman, Speciner, "Network Security" PHI.
4. Eric Malwald, "Network Security: A Beginner's Guide", TMH

2NMEP4 LAB-II (Based On 1NMEP1 / 1NMEF3 & 1NMEP2/1NMEF4)

******

SEMESTER: THIRD
3NMEP1 NET - CENTRIC COMPUTING

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, structured cabling 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 Other Technologies and Services, Dialup Networking, DSL Services.

TEXT BOOK:

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

REFERENCE BOOKS:

1) Stallings W., "High Speed Networks and Internets: Performance and Quality 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.

3NMEP2 REAL TIME EMBEDDED SYSTEM DESIGN

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 Inter Thread 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 Constructing Static 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 Tasks with 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.

TEXT BOOKS:

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.

REFERENCE BOOKS

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 C and Assembly,
4. Phillip A. Laplante: Real-Time Systems design and Analysis, (Wiley InterScience)

3NMEP3 Elective-I
(1) SOFTWARE ENGINEERING METHODOLOGIES:

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, System Analysis 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 Architectural Design.

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, Refining classes 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.

REFERENCE BOOKS:

1. Ian Sommerville, “Software Engineering”, 7th Edition, Addison-Wesley, 2004
2. Grady Booch, James Rambaugh, Ivar Jacobson, “Unified Modeling Language Users Guide”, 2nd Edition, Addison- Wesley,.
3. Jim Arlow, Ila Neustadt, “UML 2 and Unified Process: Practical Object Oriented 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.

3NMEP3 Elective-I
(2) INTELLIGENT SYSTEM

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: Expert Systems: introduction, expert systems, stages in the 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.

REFERENCE BOOKS:

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.

3NMEP3 Elective - I
(3) LEGAL AND PROFESSIONAL ETHICS

Unit-I : Technical communication: Oral presentations Technical writing, System documentation, Technical requirements Team Work Culture: Collaboration, Group dynamics, Leadership styles, Personality types, Collaboration tools.

Unit-II: Social informatics, Social impact of IT on society, Online communities & social implications, Philosophical context, Diversity issues, Gender-related issues, Cultural issues, Accessibility issues, Globalization issues, Economic issues in computing, Digital divide. Constructors

Unit-III : Foundations of intellectual property, Ownership of information, Plagiarism, Software piracy, Fair use, Digital Millennium Copyright Act (DMCA), Copyrights, patents, trademarks and trade secrets, NDAs, International differences.

Unit-IV : Legal Issues: Compliance to Cyber laws, Hackers/crackers, Computer crime, Viruses, System use policies & monitoring, and liabilities of computer-based systems, Accountability, responsibility, liability.

Unit-V : Organizational context: Business processes, IT environment, Organizational culture, Professionalism, Relationships with professional societies, Codes of professional conduct, such IEEE, ACM, BCS, ITAA, AITP. Ethics and history of ethics, Whistle-blowing, Workplace issues (harassment, discrimination), Identify theft, Ethical hacking,

Unit-VI : Implications of: History of computer hardware, software, History of the Internet History of Telecommunications, The IT profession, IT education. Privacy and civil liberties.

BOOKS RECOMMENDED:

1. Meenakshi Raman, Sangeeta Sharma,"Technical Communication – English Skills for Engineers" Oxford Higher Education
2. George Reynolds, "Ethics in Information Technology", Thomson Course Technology, 2003
3. Sara Baase,"A Gift of Fire: Social, Legal and Ethical Issues for Computing and the Internet ", PHI publications
4. Richard A. Spinello, "Case Studies in Information Technology Ethics", Second Edition, PHI

3 NMEP4 Lab.-III (based on 3NMEP1 & 3NMEP2 / 2NMEF1)

******

SEMESTER: FOURTH

4NMEP1 INTEGRATIVE PROGRAMMING

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.

TEXT BOOK:

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.

4NMEP2 / 2NMEF5 Elective-II

(1) SOFTWARE TESTING

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 test tool.

Unit V : Software testing tools overview : Win Runner, testing and application using Win Runner, test script language, data driven testing, 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 Principle and Practices, Pearson Education.
3) Dr. K.V.K.K. Prasad : Software Testing Tools, Dreamtech Press, 2006 edition.

4NMEP2 ELECTIVE-II

(2) WIRELESS COMMUNICATION AND NETWORKS

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, DECT architecture.

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-Fi system, WLAN FHSS and DSSS physical layer, wireless LAN hardware and system deployment strategies.

Unit VI : PANs and WLANs, IEEE 802.15.1 standard, Bluetooth protocol stack, 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.

TEXT BOOK:

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

REFERENCE BOOKS :

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

4NMEP2 ELECTIVE-II
(3) DATA WARE HOUSING & DATA MINING

Unit - I : Need for Data Warehousing: Operational Vs. Decisional support system, data warehouse defined, data warehouse users, benefits of data warehousing: tangible benefits, intangible benefits. Features of a data warehouse. Subject oriented data. Integrated data, data cleansing, data transformation, non volatile data, time varient data, data granularity, benefits of data granularity, data granularity – pros and cons, dual levels of data granularity, the information flow mechanism.

Unit - II : Metadata. Role of metadata, classification of metadata, metadata management. Direct access mode, indirect access mode. Data warehouse architecture, the two tier architecture, three tier architecture, four tier architecture, data warehouse and data marts, reasons for creating data marts, pushing and pulling data, data warehouse schema, the star schema, the snowflake schema, characteristics of a dimension table, and characteristics of a fact table.

Unit -III : Keys in the data warehouse schema: primary keys, surrogate keys, foreign keys. Data clustering, OLAP in the data warehouse, OLAP functions, multi dimensional analysis, OLAP and multidimensional analysis, OLAP design considerations, OLAP models, data warehouse design stage, security issues in a data warehouse.

Data Mining

Unit-IV: Introduction : fundamentals of data mining, data mining functionalities, classification of data mining systems, major issues in data mining, mining frequent patterns, associations and correlations, classification and prediction, cluster analysis, outlier analysis, evolution analysis.

Unit - V : Market basket analysis, frequent item sets, closed item sets and association rules, frequent pattern mapping, the Apriori Algorithm, generating association rules from frequent item sets, mining multilevel association rules, mining multidimensional association rules, constrained based association rules.

Unit VI : Classification and prediction: preparing data for classification and prediction, comparing classification and prediction methods, decision tree induction, Baye's theorem, rule based classification using IF-THEN rules, classification by back propagation, rule extraction from decision tree.

TEXT BOOKS:

1) Reema Thareja : Data Warehousing, Oxford Unviersity Press.
2) Paulraj Ponniah : Data Warehousing Fundamentals, John Wiley.
3) Vikram Pudi and P. Radha Krishna, Oxford University Press.

REFERENCE BOOKS :

1) M.H.Dunham : Data Mining Introductory and Advanced Topics, Pearson Education, 2.
2) Han, Kamber : Data Mining Concepts and Techniques, Morgan Kaufmann, Pieter Adriaans, Dolf Zantinge.

4NMEP3 Lab. - IV (based on 4NMEP1 & 4NMEP2 / 2NMEF2 & 2NMEF4)

******

THIRD SEMESTER
5NMEP1 Seminar and Dissertation

******

FOURTH SEMESTER
6NMEP1 Seminar and Dissertation
As per given in the Scheme
******