DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY

CIRCULAR NO.ACAD/NP/Sci./B.Sc. & M.Sc./Syllabus/26/2013

It is hereby notified for information of all concerned that, on the recommendations of Ad-hoc Boards in Computer Science & Information Technology and Biochemistry, **the Hon'ble Vice-Chancellor has accepted the *"New Syllabi of [1] B.Sc. Artificial Intelligence and Mobile Computing, [2] M.Sc. Artificial Intelligence and Embedded Technology, [3] M.Sc. Computer Science and Networking and [4] M.Sc. Plant Breeding and Molecular Genetics First Year, Semester-I & II"* under the Faculty of Science"** on behalf of the **Academic Council Under Section-14(7) of the Maharashtra Universities Act, 1994 as appended herewith.**

This is effective from the **Academic Year 2013-2014** 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.ACAD/NP/ B.Sc. & M.Sc. /
SYLLABUS/2013/29551-60

Date:- 13-08-2013.

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Director,
Board of College and University Development.

Copy forwarded with compliments to :-

1] The Principals, affiliated concerned Colleges, Dr. Babasaheb Ambedkar Marathwada University.

2] The Director, University Network & Information Centre, UNIC, with **a request to upload the above Syllabus on University Website [www.bamu.ac.in].**

Copy to :-

1] The Controller of Examinations,
2] The Superintendent, [B.Sc. Unit],
3] The Superintendent, [Co-Ordination],
4] The Programmer [Computer Unit-1] Examinations,
5] The Programmer [Computer Unit-2] Examinations,
6] The Director, [E-Suvidha Kendra], in-front of Registrar's Quarter, Dr. Babasaheb Ambedkar Marathwada University,
7] The Record Keeper,
Dr. Babasaheb Ambedkar Marathwada University.

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S/-130813/-*

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

Syllabus of
B.Sc. (Artificial Intelligence and Mobile Computing)
Three year Integrated Semester Course

With Effective from June 2013
(Academic Year 2013-2014 Onwards)

Dr. Babasaheb Ambedkar Marathwada University.

Appendix 'A'

A Candidate shall be admitted to the I year of the B.Sc.(Artificial Intelligence and Mobile Computing) degree course only if he/she satisfies the following condition:

(a) 1. He/ She must have passed the higher secondary (multipurpose) examination conducted by H.S.C. board Government of Maharashtra with science / technical subjects Or an Examination of any statutory University and Board recognized as equivalent thereto.

OR

He / She must have passed examination prescribed at the end of second year of the junior college conducted by the H.S.C. board, Government of Maharashtra with English, Second language, Physics, Chemistry, Mathematics and or Biology or one of the technical subjects prescribed at the said examination as the optional or elective subjects or an examination recognized as equivalent thereto.

OR

Candidate having offered prescribed vocational course (MCVC) with Computer techniques / I.T. / Electronics.

OR

Three years Diploma Course in engineering conducted by the board of technical Education, Maharashtra State.

(b) 2. He/ She must have passed at qualifying examination.

A candidate who has passed the B.Sc. (Artificial Intelligence and Mobile Computing) examination of this university may be allowed to present himself subsequently at the degree examination in a subject or subjects other than those he has taken earlier provided that he puts in three years of attendance as a regular candidate for First, Second and Third year in the subject or subjects concerned excluding compulsory English, Second Language and remaining optional subject(s).

A candidate shall not be allowed to appear for such examination if he has passed the higher examination.

The Degree of Bachelor of Science (Artificial Intelligence and Mobile computing) shall be conferred on candidate who has pursued a regular course of study consisting of six semesters in the relevant subject as prescribed and has appeared at the end examination and passed in all the examination prescribed for the Degree course in the faculty.

The pattern of the examination and the scope is indicated in the syllabus. [Annexure B]

- The Number of students in a theory class shall not exceed 60.
- Maximum number of students in a batch for practicals in first four semesters shall consist of 20 students and for fifth & sixth semester the batch shall consist of 15 students.

- The rules for admission to the subsequent (next) semesters will be the same as per the University guidelines.
- Final Examination will be conducted by the University based on the complete syllabus.
- Final Practical Examination will be conducted by the university and examiners will submit the marks in the prescribed format of students for practical examination to the university.

The infra-structure & Number of Teaching Staff required to run the course will be as follow:-

The graduation is very important phase in the life of our young students. The college responsibility is not only to deliver a quality syllabus based education, but also to motivate them to be a good healthy citizen. In this direction, the college must have sufficient facilities to run the course. A guideline is listed below.

The College must have following minimum facilities:

Infrastructure:

1. One Class room to accommodate 60 students. (approximately 250 sq.ft.)
2. A well equipped software Laboratory having a LAN system of 30 nodes and having internet connectivity with broad band. All legal software, antivirus software, firewall be available for smooth functioning of the laboratory.
3. A hardware laboratory having twenty microprocessor kits with add on-cards as per their syllabus. Staff room of 100 sq.ft. with one table and one Almeria for each faculty member.
4. One office space of 100 sq.ft. with appropriate furniture.
5. One lady room of 100 sq.ft. with attached toilet.
6. One reading room of 200 sq.ft. with seating arrangements for at least 30 people. The library may be accommodated in the library.
7. One copy of every text book among five student for each subject be available along with one copy of reference book as per the syllabus.
8. Library must subscribe for computer and scientific magazines. Appropriate general reading materials must be available for overall development of students.
9. An open space for sports activities. The college must be encouraged to have sport equipments.

Staff:

1. The head of the department in the scale of reader / Professor.
2. The minimum number of teachers must be appointed as per the work load per semester, the work load may be computed on the basis of theory classes, tutorials and practical class per batch. Minimum number of teachers to run the course must be five excluding the head. Teachers must be appointed by the university/UGC norms. The quality of the course is directly related to quality of teachers for the course.
3. There must be one clerk in the office to look after administrative work. The placement of all staffs must be maintained properly.
4. One qualified librarian
5. An appropriate number of class IV employees.

PATTERN OF QUESTION PAPERS

A) THEORY:-

- Each theory paper will carry Maximum 50 marks; duration of examination of theory paper will be 02 hours.

B) PRACTICALS: - Total marks 50 marks

- Each Practical paper will carry Maximum 50 marks, duration of examination of each practical paper will be 2 hours.
- Internal Distribution of marks for each practical paper will be as follows.
  - Journal/ Record book (certified) 10 marks.
  - Oral/ viva 10 marks.
  - Practical Exam 30 marks.

D) PROJECT:-

- Students of semester VI will have to perform ONE project of 150 marks. (A group of maximum 3 candidates will allow working on one project work)
- Internal Distribution of project marks will be as follows.
  - Review 1 Report : 25
  - Review 2 Report : 25
  - Project work (certified) 25 marks.
  - Project work Presentation. 50marks.
  - Viva/ Oral. 25 marks.

PATTERN OF QUESTION PAPERS

Note:
1) All questions carry equal marks.
2) All questions are compulsory.
3) Not More than 3 bits should be asked in each question of 10 Marks.

(Only for Paper Setter)

Q. No.	Format	Marks
1	Multiple choice / Fill in the blanks / Match the pair / One line answer. 1) 2) . . 10)	1 X 10 = 10
2	a) b) OR a)	5 X 2 = 10 10
3	a) b) OR a)	5 X 2 = 10 10
4	a) b) OR a)	5 X 2 = 10 10
5	Write a short notes on: (Any Two) a) b) c)	5 X 2 = 10
	Total	**50**

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.

Curriculum Structure and Scheme of Evaluation: B.Sc. (Artificial Intelligence & Mobile Computing)

Sr. No.	Course Code	Name of the Subject	Scheme of Teaching			Scheme of Evaluation (Marks)			
			Th (hrs / week)	Pr (hrs / week)	Total hrs/week	Univ. Th. Exam	Univ. Pr. Exam	Univ. Exam. Duration (in hrs.)	Total Marks
Semester I									
1	BAM101	Basic Electronics (T)	3	-	3	50	-	2	50
2	BAM102	Computer Fundamentals (T)	3	-	3	50	-	2	50
3	BAM103	Programming in 'C' (T)	3	-	3	50	-	2	50
4	BAM104	Networking fundamentals (T)	3	-	3	50	-	2	50
5	BAM105	Mathematics-I (T)	3	-	3	50	-	2	50
6	BAM106	Basic English (T)	3	-	3	50	-	2	50
7	BAM107	Basic Electronics (P)	-	4	4	-	50	2	50
8	BAM108	Computer Fundamentals (P)	-	4	4	-	50	2	50
9	BAM109	Programming in 'C' (P)	-	4	4	-	50	2	50
10	BAM110	Networking fundamentals (P)	-	4	4	-	50	2	50
Semester II									
1	BAM201	Mobile Computing-I (T)	3	-	3	50	-	2	50
2	BAM202	Operating System & Network Security (T)	3	-	3	50	-	2	50
3	BAM203	Programming in C++ (T)	3	-	3	50	-	2	50
4	BAM204	Digital Electronics (T)	3	-	3	50	-	2	50
5	BAM205	Artificial Intelligence-I (T)	3	-	3	50	-	2	50
6	BAM206	Mathematics-II (T)	3	-	3	50	-	2	50
7	BAM207	Mobile Computing-I (P)	-	4	4	-	50	2	50
8	BAM208	Operating System & Network Security (P)	-	4	4	-	50	2	50
9	BAM209	Programming in C++ (P)	-	4	4	-	50	2	50
10	BAM210	Digital Electronics (P)	-	4	4	-	50	2	50

Syllabus for B.Sc Artificial Intelligence and Mobile Computing

Semester-I

Paper Code:BAM101 **Subject Name: Basic Electronics** **Total Lectures:40**

Unit-1 **(8 Th.Hrs)**

SEMICONDUCTORS, DIODES AND DIODE CIRCUITS:

Insulators, semiconductors and metals, Mobility and conductivity, Intrinsic and extrinsic semiconductors and charge densities in semiconductors, current components in semiconductors, continuity equation. PN Junction diode – characteristic and analysis, Types of diodes – Zener diodes, Photodiodes, Light emitting diodes (LED's), Varactor diodes and tunnel diodes. Rectifiers and filter circuit: Half wave, full wave and Bridge rectifier circuits and their analysis, L, C and Pi filters, Basic regulator supply using zener diode. Working of Switched Mode Power Supply .

Unit-2 **(8 Th.Hrs)**

TRANSISTORS:

Construction and characteristics of bipolar junction, transistors (BJT's)-Comm. Base, Comm. emitter, Comm. Collector configuration. Transistor at low frequencies – small signal low frequency transistor model (h-parameters). Analysis of transistor amplifier circuit using h-parameters. transistor biasing and bias stabilization: - the operating point, stability factor, analysis of fixed base bias, collector to base bias, Emitter resistance bias circuit and self bias circuit. Bias compensation techniques.

Unit-3 **(8 Th.Hrs)**

FIELD EFFECT TRANSISTOR:

Construction and characteristics of JFET. JFET biasing circuit JFET amplifier MOSFET construction and characteristics.

Unit-4 **(8 Th.Hrs)**

AMPLIFIERS AND OSCILLATORS:

Classification of amplifiers, concept of feedback, general characteristics of feedback amplifiers, Single stage RC coupled amplifier.

Oscillators – Criterion for Oscillation, type of oscillators: Hartley oscillator, Colpitt Oscillator & RC Phase shift oscillator.

Unit-5 **(8 Th.Hrs)**

OPERATIONAL AMPLIFIERS:

Introduction to Op-amp, Inverting and non-inverting configuration, Applications – adder, subtractor, integrator, differentiator and comparator, practical op -amps.

Electronic Instruments

Role and importance of general purpose test instruments, Electronic Millimeter, Cathode Ray Oscilloscope, Measurement of amplitude, frequency and phase using CRO.

TEXT BOOKS

- Electronics Devices and circuits by Millman & Halkias.
- Electronics devices and circuit theory by Robert Boylestad
- Electronics Devices and circuits by P.John Paul
- Electronics Devices and circuits by Y.N.Bapat.
- Electronics devices and circuit by G.K. Mittal

Semester-I

Paper Code: BAM102 **Subject Name: Computer Fundamentals** **Total Lectures:40**

Unit-1 **(8 Th.Hrs)**

Introduction to Computers

Overview and functions of a computer System.Input and output devices .Storage devices: Hard Disk, Diskette, Magnetic Tape, RAID, ZIP devices, Digital Tape, CD- ROM, DVD (capacity and access time) Main Circuit Board of a PC: Chips, Ports, Expansion Slots .

Unit-2 **(8 Th.Hrs)**

Computer Structures:

Memory: Register, buffer, RAM, ROM, PROM, EPROM, EEPROM (comparison).Types of Processing: Batch, Real-Time, Online, Offline. History of -Computers: Evolution, Generation of computers (I, II, III, IV, V), Classification of computers (mainframes, mini computers, Microcomputers, special purpose) - comparison with memory, power, cost, size -then and now . Types of modem computers: The workstation, The Minicomputer, Mainframe Computers, Parallel Processing Computer, The Super Computer An overview of Computer viruses: What is a virus? Virus symptoms, How do they get transmitted? What are the dangers, General Precautions.

Unit-3 **(8 Th.Hrs)**

Number Systems:

Binary, Octal, Decimal, HexaDecimal, Their Conversions, Binary Arithmetic. ASCII, BCD, EBCDIC.

Language Evolution :

Generation of Languages : Machine, Assembly, High Level Languages. Characteristics of Good Language Translators : Compiler, Interpreter and Assembler. Source and Object Program.

Unit-4 **(8 Th.Hrs)**

Introduction to Operating System and Hardware

Input Devices:

Keyboard, Mouse, Light Pen, Touch Screen, Voice Input , MICR, OCR, OMR, Barcode Reader and Flatbed Scanner.

Output Devices:

VDU, Printers: Dot Matrix, Laser and Inkjet. Plotters: Drum, Flat-Bed and Inkjet.

Introduction to operating systems:

Operating System concept, Windows 98/XP, Windows server NT/2000, UNIX/LINUX The Internet and its Resources, World Wide Web (WWW).

Unit-5 **(8 Th.Hrs)**

Introduction to Computer Network

Computer Networking, OSI Reference Model, Network Topologies and Protocols, Networking gadgets (Router,Switch, etc), Data Communication (ISDN, VPN, DSL, cable modem, cellular modem, etc), CommunicationLinks (Wire pairs, Coaxial cables, Fiber optics, Microwave, Satellite, etc) .Local Area Network (LAN), Wide Area Network (WAN), Metropolitan Area Network (MAN) .Network Security (Firewall, Packet filtering, etc).

Text Books:

- Information technology concepts by Dr. Madhulika Jain, Shashank & Satish Jain,[BPB Publication, New Delhi.]
- Fundamentals of Information Technology By Alexis And Mathews Leon [Leon Press, Chennai & Vikas Publishing House Pvt Ltd, New Delhi]

Semester-I

Paper Code: BAM103 **Subject Name: Programming In C** **Total Lectures:40**

Unit-1: **(8 Th.Hrs)**

Introduction to C:

Importance of C, Basic structure of C program, creating a simple C program, executing a C program, why to include header files? Data types, Operators and Expressions: Character set, keywords and identifiers, constants and variables, data types, declaration of variables, defining symbolic constants. Operators: relational operators, logical operators, assignment operators, increment and decrement operators, conditional operator, library functions, arithmetic expressions evolution of expression, precedence of arithmetic operators, operator precedence and associatively .

Unit-2: **(8 Th.Hrs)**

Data Input-Output, Branching and Loops: Reading a character, writing a character, formatted input and formatted output. Decision making and if... else statement, nesting of if... else statement, the switch statement, the? : operator, the goto statement, The while statement, the do statement, the for statement.

Unit -3: **(8 Th.Hrs)**

Arrays and Functions: One dimensional arrays, two dimensional arrays, sorting algorithm- bubble sort and insertion sort. Defining a function, function prototype, return type, passing arguments, call by value, call by reference, recursive function, passing array to function, scope rule.

Unit-4: **(8 Th.Hrs)**

Pointers: Pointer operators, pointer expressions, initializing pointers, pointer arithmetic, pointers and function arguments, pointers to function, pointers and arrays, pointers and strings, memory allocation malloc[ ], calloc[ ], free[ ], realloc[ ] functions, array of pointers, pointers to pointers Structure: structure declaration, initialization of structure, structure and functions, array of structures, nested structures, structures and pointers, unions, user defined data type[typedef], enumerated data type.

Unit-5: **(8 Th.Hrs)**

Files: File system basics, file operations, file open, file read, file close operations, file opening modes, string I/O in files, and record I/O in files, text and binary files.

Text Books:

- Byron Gottfried, "Programming with C" 2 nd edition. Tata Mcgraw Hill.
- Yashwant Kanetkar: "Let Us C", BPB publication
- G.S.Baluja& G.K.Baluja:"Understanding C, a practical approach",Dhanpat Rai& Co

Semester-I

Paper Code: BAM104 **Subject Name: Networking Fundamentals** **Total Lectures:40**

Unit-1 **(8 Th.Hrs)**

Introduction to Computer Networks

Objective components of Communication Networks, topologies, centralized and distributed networks, LAN, MAN, WAN, Broadcast vs Point to Point networks,Overview of network model: ISO - OSI and TCP/IP. Network design issues,layered architecture, interfaces and services, service primitives and relationships of services to protocols.

Unit-2 **(8 Th.Hrs)**

Physical Layer & Data Link Layer

Communication Media: Twisted pair, coaxial cables, fiber optic cables,Wireless Communication. Design issues, framing, error detection and correction, CRC, Elementary protocols – stop and wait, Sliding window, Slip,bridges, circuit switching, message switching, packet switching network.

Unit-3 **(8 Th.Hrs)**

Networks and Transport Layer

Virtual circuits, and datagram networks, circuit switching, and packet switching. Routing algorithms, routers and routing protocols. Congestion control. Transport layer services and principles. Connectionless v/s connectionoriented services like UDP and TCP, QOS (Quality of Services).

Unit-4 **(8 Th.Hrs)**

Application Layer

Introduction to Cryptography, Secret key and public key algorithm, Security issues for Intranet and Internet, DNS (Domain name System), Electronic mail,World wide Web, Writing a web page in HTML.

Unit-5 **(8 Th.Hrs)**

TCP/IP Protocol Suite

Layered Architecture, Protocol Stack., IP Addressing: Classes, static, dynamic (DHCP). Ipv4 v/s Ipv6, Sub-netting: masking and subnet masking. Protocols:Ping, FTP, telnet, http(www), SMTP, SNMP, Trace route, TFTP, BOOTP,DNS, NFS, RPC, ICMP, IGMP, ARP, RARP, etc.

Digital Networks

Advantages, Signal conversion, digital carrier systems, ISDN, SIDN Channels, ISDN Layers, SBS, Integrated Networks, IEEE LAN Standards, IEEE 802 standards, IEEE 802.11 standards for wireless networks.

Text Books:

- Behrouz A. Forouzan: Data Communication and Networking, 4th Edition Tata McGraw-Hill, 2006.
- Alberto Leon-Garcia and Indra Widjaja: Communication Networks -Fundamental Concepts and Key architectures, 2 nd Edition Tata McGraw-Hill, 2004.
- William Stallings: Data and Computer Communication, 8th Edition, Pearson Education, 2007.
- Larry L. Peterson and Bruce S. Davie: Computer Networks – A Systems Approach, 4th Edition, Elsevier, 2007.
- Nader F. Mir: Computer and Communication Networks, Pearson Education, 2007.

Semester-I

Paper Code:BAM105 **Subject Name: Mathematics-I** **Total Lectures-40**

Unit-1 **(8 Th.Hrs)**

Complex number: Argand's Diagram, polar form, DeMoivre's Theorem, Exponential, Circular, Hyperbolic Functions, Inverse Hyperbolic Functions, Separation of real and imaginary parts of a circular and hyperbolic functions, Logarithm of complex quantity.

Unit-2 **(8 Th.Hrs)**

N^{th} Derivatives, Taylor's and Maclaurian's theorem, Expansion of Function using standard series, using method of differentiation & integration and using method of substitution. Linear dependence and linear independence of vectors, linear transformations, orthogonal transformation of a quadratic form.

Unit-3 **(8 Th.Hrs)**

Differential equations of first order and first degree: Solution of linear differential equation, reducible to linear differential equation, exact differential equations, Applications to mathematics.

Unit-4 **(8 Th.Hrs)**

Partial differentiations: Partial differentiations, Total differentiations, Euler's Theorem, change of independent variables, Jacobian, Chain rule, Maxima and Minima of two independent variables, Lagrange's method of undetermined multipliers.

Unit-5 **(8 Th.Hrs)**

Sequences, series, convergences and divergence, ratio test, compression test, Integral test, Cauchy's root test, Raabe's test, Absolute and conditional convergence.

Text Books/Reference Books:

- A Textbook of Applied Mathematics, Vol. I and II,Author: P. N. Wartikar , J. N. Wartikar
- Higher Engineering Mathematics Author: Dr.B. S. Grewal
- Advanced Engineering Mathematics. Author: H. K. Dass
- A Text Book of Engineering Mathematics, Vol. I and II D. T. Deshmukh
- Engineering Mathematics Vol. I and II Author: M. L. Bhatiya

Semester-I

Paper Code:BAM-106 **Subject Name: Basic English** **Total Lectures:40**

Unit-1 **(8 Th.Hrs)**

Programme of writing

Thinking and planning, information, ideas. Topic vocabulary: meaning of words, precise usages synonym, technical terms, nomenclature, context, superfluous words.

Unit-2 **(8 Th.Hrs)**

Use of Good English

Noun, pronoun, verb adverb, objective, Conjunction, article tense spelling etc Compilation of experimental records, writing progress reports

Unit-3 **(8 Th.Hrs)**

Communication skill

Letters and memoranda communication as a part of science. Reading; How to read, making notes as you read,writing a book review

Unit-4 **(8 Th.Hrs)**

Helping the reader

Easy reading (how to begin, control, explain, sentence length, rhythm, style) capture and hold readers interest-effective communication. The art of illustrations, figures,

Unit-5 **(8 Th.Hrs)**

The art of thesis and report writing Editing and correcting

Reference Books:

- "Written communication in English" Sarah Freeman
- "English for students of science", A.Roy,P,L. Sharma
- Mcmillan Grammer ; A Handbook of "Augustione andJoseph", Orient Longman
- A new guide to precise writing R.W. Jepson (O,L)

Paper Code : BAM107 Subject Name : Basic Electronics (Practical)

It will contain list of practical assignments based on Basic Electronics (BAM101)

Paper Code : BAM108 Subject Name : Computer Fundamentals (Practical)

It will contain list of practical assignments based on Computer Fundamentals (BAM102)

Paper Code : BAM109 Subject Name : Programming In C (Practical)

It will contain list of practical assignments based on Programming In C (BAM103)

Paper Code : BAM110 Subject Name : Networking Fundamentals (Practical)

It will contain list of practical assignments based on Networking Fundamentals (BAM104)

Semester -II

Paper Code : BAM201 **Mobile Computing-I** **Total Lectures:40**

Unit-1 **(8 Th.Hrs)**
Introduction

Principle of Cellular Communication, Overview of 1G, 2G, 2.5G and 3G and 4G technologies. Applications - Vehicles , Emergencies , Business , Replacement of wired networks ,Infotainment and more ,Location dependent services , Mobile and wireless devices. Mobile OS

Unit – 2 **(8 Th.Hrs)**
Wireless transmission

Frequencies for radio transmission, Regulations Signals ,Antennas , Signal propagation Path loss of radio signals, Additional signal propagation effects , Multipath propagation. Multiplexing -Space division multiplexing , Frequency division multiplexing , Time division multiplexing , Code division multiplexing. Modulation -Amplitude shift keying , Frequency shift keying , Phase shift keying , Advanced frequency shift keying , Advanced phase shift keying , Multicarrier modulation , Spread spectrum -Direct sequence spread spectrum , Frequency hopping spread spectrum ,Cellular systems

Unit -3 **(8 Th.Hrs)**
Medium access control

Motivation for a specialized MAC - Hidden and exposed terminals , Near and far terminals SDMA , FDMA , TDMA - Fixed TDM , Classical Aloha , Slotted Aloha , Carrier sense multiple access , Demand assigned multiple access , PRMA packet reservation multiple access ,Reservation TDMA Multiple access with collision avoidance , Polling , Inhibit sense multiple access , CDMA - Spread Aloha multiple access , Comparison of S/T/F/CDMA

Unit-4 **(8 Th.Hrs)**
Telecommunication systems

GSM - Mobile services , System architecture , Radio interface Protocols , Localization and calling , Handover , Security , New data services ,Cellular Digital Packet Data, VOIP, GPRS Services, Wireless Local Loop-WLL system Bluetooth Technology

Unit-5 **(8 Th.Hrs)**

Mobility Management

Mobility Management, Signaling protocols, steps in formation of a call, location updates, MS-PSTN call, PSTN-MS call, MS-MS call, call handover. Functioning and types of PSTN networks .

Text/Reference Books :

- Yi Bing Lin, "Wireless and Mobile Networks Architecture", John Wiley.
- Schiller, "Mobile Communication" Pearson Education.
- Sandeep Singhal, Thomas Bridgman, " Wireless Application Protocol",PearsonEducation
- Asoke K Talukder -" Mobile Computing"TMH.
- Wrox " The Beginning WML and WML Script" Wrox Publication.

Semester-II

Paper Code: BAM202 Subject Name: Operating System & Network Security Total Lectures:40

Unit-1 **(8 Th.Hrs)**

Introduction

Introduction to OS, OS as extended machine, OS as resource manager, History of OS:-first to fourth generation (simple batch system , time - sharing systems, Real-time systems, parallel systems, distributed system), OS concepts (Process , Files, Shell), System calls

Process Management:

The process model, process states, PCB (process control block), Threads

Process Synchronization:

Interprocess communication (IPC), race condition, critical sections, mutual exclusion with busy waiting, sleep & wake-up, semaphores, event counters, monitors, message passing, classical IPC problems: Dining philosophers problem, Readers & Writers problems.

Unit-2 **(8 Th.Hrs)**

Process scheduling:

Round Robin scheduling, priority scheduling, multiple queues, shortest job first, policy driven scheduling, two level scheduling

Memory management:

Memory management without swapping or paging, use of multiprogramming.
Swapping: Multiprogramming with fixed and variable partitions, memory management with bitmaps, linked lists and buddy system. Allocation of swap space, Virtual Memory: Paging, segmentation.

Page Replacement Algorithms:

Optimal page replacement, Not-Recently used page replacement, Firstin-first -out, least recently used random page replacement.

Unit -3 **(8 Th.Hrs)**

Principles of I/O Hardware:

I/O devices, Device controlling.
Principle of I/O software: Goals of I/O software, Interrupt handlers, Device drivers, device -independent I/O software, user space I/O software.
Deadlocks: Resources, deadlock modeling, the Ostrich algorithm, detection & recovery, deadlock prevention, deadlock avoidance (Banker's Algorithm)

Unit-4 **(8 Th.Hrs)**

Overview:
Fundamentals, Types, Standards, Foundations of Cryptography and Security,Approaches and techniques used, Encryption schemes, Mathematical tools for Cryptography.

Unit-5 **(8 Th.Hrs)**

Digital signatures, Certificates and standards, setting and definitional issues, Length-restricted signature scheme, Constructions of signature schemes, planning techniques.

Maintenance:
Configuring secure access, Management, ongoing maintenance, standards development, ensuring site security.

Text/Reference Books:

- Andrew S. Tanenbaum, "Modern Operating Systems", Prentice Hall
- Andrew S. Tanenbaum, "Operating System Design & Implementation", Second edition, Pearson Education .
- Abraham Silberschatz, Peter Galvin, "Operating System Concepts", Fifth edition, Addison Wesley.
- Stallings, William, " Cryptography and Network Security : Principles and Practice"
- Vacca, " Guide to Wireless Network Security"

Semester-II

Paper Code:BAM203 **Subject Name: Programming In C++** **Total Lectures:40**

Unit -1 **(8 Th.Hrs)**

Introduction to C++ - Procedural Vs Object oriented programming, Features of object oriented programming. Classes and Objects – Class, Object, Class members, Access specifiers, Scope resolution operator, Static class members, Nested classes, Local Classes, passing an object to function, Returning an object to function, Dynamic memory allocation.

Unit -2 **(8 Th.Hrs)**

Constructors, Destructors, Function overloading, Types of constructors, Default function arguments, Function overloading and ambiguity.

Unit -3 **(8 Th.Hrs)**

Operator Overloading – Unary operators, Binary operators, Data conversion, Operator overloading using friend function, Special operators like [ ], [ ], ->, Pitfalls of operator overloading and conversion.

Unit -4 **(8 Th.Hrs)**

Inheritance – Derived class and base class, Constructor, Destructor, Overriding member function, Scope resolution, Access specifiers, Public & private inheritance, Levels of inheritance, multiple inheritance, Virtual base class, Containership.

Unit -5 **(8 Th.Hrs)**

Polymorphism – Virtual functions, pure virtual functions, Abstract class, Virtual destructors, Early Vs late binding. File I/O – Stream class hierarchy, Formatted file I/O, Character I/O, Binary I/O, File pointers. Exception Handling – Simple exceptions, multiple exceptions, throw.

Reference Books:

- Herbert Schildt: The Complete Reference C++, 4 th Edition, Tata McGraw Hill, 2003.

Semester-II

Paper Code:BAM204 **Subject Name: Digital Electronics** **Total Lectures:40**

Unit-1 **(8 Th.Hrs)**

Number Systems and Arithmetic

Decimal Number System & Binary Number System , Decimal to Binary conversion(Double-dabble method only) ,Binary to Decimal Conversion 1,Binary Arithmetic : Binary addition, subtraction, multiplication & division Hexadecimal number system , Hexadecimal to binary, binary to Hexadecimal, Hexadecimal to decimal conversion Hexadecimal arithmetic: Addition, subtraction, multiplication & division Binary subtraction using 1' complement, 2's complement method

Unit-2 **(8 Th.Hrs)**

Boolean Algebra and Logic Gates

Postulates of Boolean Algebra, Theorems of Boolean Algebra: Complementation , commutative, AND, OR, Associative, Distributive, Absorption laws , De Morgan's theorems Reducing Boolean expressions Logic Gates : AND, OR, NOT, Ex-OR, Ex-NOR NAND as Universal building block Logic diagrams of Boolean expressions Boolean expressions for logic diagrams

Unit-3 **(8 Th.Hrs)**

Minimization Techniques

Introduction, Minterms and Maxterms , K-Map, K-map for 2 variables ,K-map for 3 variables ,K-map for 4 variables.

Unit-4 **(8 Th.Hrs)**

Combinational and Arithmetic Logic Circuits

Half Adder & Full Adder 1,Binary parallel Adder 1,Half Subtractor, Full Subtractor 1 Adder/Subtractor in 2's complement system 1,BCD to Decimal decoder 1,2 : 4 ,demultiplexer 14 line to 1 line multiplexer 1

Unit-5 **(8 Th.Hrs)**

Flip Flops

Introduction : RS FF ,Clocked RS FF, D FF ,Triggering, preset and clear ,JK FF , T FF , Race around condition ,Master slave FF

Counters

Introduction : Asynchronous/ ripple counter ,Modulus Counter , MOD-12 counter Synchronous counter : Synchronous serial & synch parallel counter,BCD counter Ring counter ,Johnson counter ,7 Shift

Registers,Introduction, Buffer register Serial- in serial –out Serial-in parallel-out ,Parallel-in serial-out, parallel-in parallel-out .

Reference:

- Digital Electronics and Micro-Computers – R.K.Gaur , Dhanpat Rai Publication
- Digital Electronics and Logic Design – N.G.Palan, Technova Publication

Semester –II

Paper Code:BAM205 **Subject Name: Artificial Intelligence-I** **Total Lectures:40**

Unit-1 **(8 Th. Hrs)**

Introduction To Artificial Intelligence

Definition, AI Applications, AI representations, properties of internal Representations Heuristic Search Techniques, Best File Search, Mean and End Analysis, A* and AO* Algorithms

Unit-2 **(8 Th. Hrs)**

Game Playing & Predicate Logic

Minimax search procedure, Alpha-beta cut-offs, waiting for Quiescence, Secondary Search, Predicate Calculus, Predicate and arguments, ISA Hierarchy, Frame Notation, Resolution, Natural Deduction.

Unit-3 **(8 Th. Hrs)**

Knowledge Representations Using Non-Monotonic Logic

Truth Maintenance System, Statistical and Probabilistic Reasoning, Semanticnet Frames, Script, Conceptual Dependency.

Unit-4 **(8 Th. Hrs)**

Planning

Block world, strips, Implementation using goal stack, Non-linear planning using goal stacks, Hierarchical planning, List commitment strategy.

Unit-5 **(8 Th. Hrs)**

Neural Networks

Learning by training neural networks, Introduction to neural networks, Neural net architecture & applications, Natural language processing & understanding & paragmatic, Syntactic, Semantic, Qualities, finite state machines, RTN, ATN, understanding sentences

Expert Systems

Utilization and functionality, Architecture of expert systems, Knowledge representation, Two case studies on expert systems

Text Books

- Elain Rich and Kerin Knight, "Artificial Intelligance"
- Eugane. Charniak, Frew, "Introduction to Artificial Intelligance", McDermott
- Kishan Mehrotra, Sanjay Rawika, K. Mohan, "Arificial Neural Network"
- Rajendra Akerkar, "Introduction to Artificial Intelligance", Prentice Hall Publication

Semester-II

Paper Code:BAM206 **Subject Name: Mathematics-II** **Total Lectures:40**

Unit-1 **(8 Th.Hrs)**

Reduction formulae for sin and cos, Beta and gamma Functions, Relation between Beta and Gamma functions.

Unit-2 **(8 Th.Hrs)**

Multiple Integrals:
Double integration in Cartesian & polar coordinates, Evaluation of double integrals by changing the order of integration and changing to polar form, triple integration.

Unit-3 **(8 Th.Hrs)**

Applications of Integral Calculus:
To find Area by double integration, Surface Area & Volume of Solid of Revolution.Introduction of solid geometry: sphere, cone, cylinder (There should not be any question on solid geometry) Volume by triple integration, Mean value of function, Root Mean Square Values.

Unit-4 **(8 Th.Hrs)**

Fourier series:
Definition, Dirichlet's conditions, Full Range Fourier Series on $C \leq x \leq C+2L$, Fourier series for Even and Odd functions over the $-L \leq x \leq L$, Half Range Fourier series over the $0 \leq x \leq L$.

Unit-5 **(8 Th.Hrs)**

Matrices-I
Rank of a matrix, Normal form of a matrix, Consistency of the system of linear equations(homogeneous and non homogeneous equations).
Matrices-II:
Characteristic equation of Matrix, Eigen values and Eigen vectors,Cayley-Hamilton Theorem, Linear dependence and independence of vectors, Linear Transformations.Reduction of Quadratic form to Canonical form.

Text Books:

TEXT BOOKS:

- A Text Book of Engineering Mathematics (Volume-I, II), P. N. Wartikar and J. N. Wartikar, Pune Vidyarthi Griha Prakashan, Pune.
- Higher Engineering Mathematics by B. S. Grewal, Khanna Publications, New Delhi.
- Advanced Engineering Mathematics by H.K. Das, S. Chand & Company.
- Higher Engineering Mathematics by B.V. Ramana (Tata McGraw-Hill).
- Advanced Engineering Mathematics by Erwin Kreyszig, Wiley Eastern Ltd.
- Engineering Mathematics by Babu Ram, PEARSON
- Engineering Mathematics A Tutorial Approach by Ravish R Singh, Mukul Bhat ,Mc Graw Hill

Paper Code : BAM207 Subject Name : Mobile computing-I (Practical)

It will contain list of practical assignments based on Mobile Computing-I (BAM201)

Paper Code : BAM208 Subject Name : Operating System and Network Security (Practical)

It will contain list of practical assignments based on Operating System and Network Security (BAM202)

Paper Code : BAM209 Subject Name : Programming In C++ (Practical)

It will contain list of practical assignments based on Programming In C++ (BAM203)

Paper Code : BAM210 Subject Name : Digital Electronics (Practical)

It will contain list of practical assignments based on Digital Electronics (BAM204)