III to VIII Semester B.E.
(Computer Engineering)

Prospectus No. **11178**

संत गाडगे बाबा अमरावती विद्यापीठ

SANT GADGE BABA AMRAVATI UNIVERSITY

(FACULTY OF ENGINEERING & TECHNOLOGY)

PROSPECTUS

PRESCRIBED FOR
FOUR YEAR DEGREE COURSE
BACHELOR OF ENGINEERING
COMPUTER ENGINEERING
III TO VIII SEMESTER
EXAMINATIONS, 2010-2011
SEMESTER PATTERN

2010

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SYLLABUS
PRESCRIBED FOR
FOUR YEAR DEGREE COURSE
B.E. COMPUTER ENGINEERING
EXAMINATIONS
SEMESTER PATTERN
THIRD SEMESTER

GENERAL INSTRUCTIONS

1) Students are encouraged to utilize web based resources from MIT USA's open course ware for the relevant and appropriate portion of their curriculum. This course ware is available at ocw.mit.edu

2) Instructors are adviced to undertake web based search for tutorial assignments, presentations, quizzes, articles including research papers as per their own teaching requirements. They can also try subscribing to web based course management tools. One such tool is made available on internet at www.pageout.net. At present this has free access to teachers from bonafide institutes as password protected account on subscription basis from McGraw Hill publishers. Instructors should encourage students to use such tools wherever possible.

3) For all mini and major project assignments the students should use open source code for studying best programming practices and present those in seminars/projects. Open source code is freely available on web. The industrious programming practices, data structure implementations should be studied from the open source code and used for software implementation of the projects from problem domain.

4) Students can use open source research papers from **www.citeseer.org** and **scolar.google.com** for literature survey requirements.

Inpalnt Training & Industrial Visit in the faculty of Engineering & Technology

1)
a) the inplant training shall not be compulsory,
b) the inplant training shall be taken by students strickly during Summer vacation. after IVth or VIth Semester examination and / or during Winter vacation after Vth or VIIth Semester examinations,
c) the inplant training shall not be part of examination system, however, student shall prepare and submit report after completion of training to the concerned Head of Department alongwith certificate issued by the industry,
d) the inplant training shall be of minimum two weeks duration,

e) there shall not be any liability whatsoever on the Institution with respect to implant training of the students,
f) students shall undertake inplant training on their own risk and cost. An undertaking in this regards signed by student and parents shall be submitted before proceding for training to the concerned Head of Department/ Head of Institution.
g) the students shall complete inplant training under the supervision of concerned person in the industry,
h) Institutes shall help students to organise inplant training by way of correspondance,

2) Industrial Visit : Industrial visit may be organised for the students. Students should prepare & submit the report on Industrial visit to the concerned Head of Department/Head of Institution.

3SRN1/3 SK 1 MATHEMATICS - III

SECTION-A

UNIT-I **Ordinary differential equations:-** Complete solution, Operator D,Rules for finding complementary function, the inverse operator, Rules for finding the particular integral, Method of variations of parameters, Cauchy's an Legendre's linear differential equations. (10 Hrs.)

UNIT-II **Laplace transforms:-** definition, standard forms, properties of Laplace transform, inverse Laplace transform,initial and final value theorem, convolution theorem, Laplace transform of impulse function, Unit step function, Laplace transforms of periodic function Solution of Linear differential equations, Simultaneous differential equation by Laplace transform method. (10 Hrs.)

UNIT-III a) **Difference equation:-** solution of difference equations of first order Solution of difference equations of higher order with constant co-efficients,

b) **Z-transform:-** Definition, standard forms, Z-transform of impulse function, Unit step functions, Properties of Z-transforms (linearity,shifting,multiplication by k, change of scale), initial and final values, inverse Z-transforms (by direct division and partial fraction), Solution of difference equation by Z-transforms. (10 Hrs.)

SECTION-B

UNIT-IV a) **Fourier transforms:-** Definition, standard forms,inverse Fourier trnasforms, properties of Fourier transforms, convolution theorem, Fourier sine and Fourier cosine transforms and integrals.

b) **Prtial differential equation of first order of following form:-**

(i) f(p,q)=0; (ii)f(p,q,z)=0; (iii) f(x,p)=g (y,q); (iv)Pp+Qq=R (Lagranges Form); (v) Z=px+qy+f(p,q) (Clairaut form)

(10 Hrs.)

UNIT-V **Complex Analysis :-** Functions of complex variables, Analytic function, Cauchy-Reimann conditions, Harmonic function, Harmonic conjugate functions, Milne's method conformal mappings (translation, rotation,magnification,and bilinear transformation),singular points, expansion of function in Tayler's and Laurent's series. (10 Hrs.)

UNIT -VI **Vector calculas:-** Scalar and vector point functions, Differentiation of vectors, Curves in space, Gradient of a scalar point function, Directional derivatives, Divergence and curl of a vector point function and their physical meaning, expansion formulae (with out proof), line, surface, volume integrals,irrotational and solenoidal vetor fields.
(10 Hrs.)

BOOKS RECOMMENDED:-

1) Elements of Applied Mathematics by P.N.Wartikar and J.N.Wartikar
2) A Text Book of Differential Calculas by Gorakh Prasad.
3) Engg. Mathematics by Chandrika prasad.
4) Advancing Engg. Mathematics by E.K.Kreyzig.
5) A Text Book of Applied Mathematics by P.N.Wartikar and J.N.Wartikar.
6) Higher Engg. Mathematics by B.S.Grewal.
7) Control System by Gopal and Nagrath.
8) Integral transforms by Goyal & Gupta.

3SRN2/3 SK 2 PROGRAMMING METHODOLOGY

SECTION-A

(8 Hrs./Unit)

Unit I: Introduction to Computer and Languages, OOPS and Software development: Software Engineering and SDLC. Java Basics: Program Components, Compilation cycle. Introduction to Applet and Application, Data types and Variables

UnitII : Operators: Arithmetic operators, relational operators, Assignment operators. Control statement: Selection statement: if, nested if, switch statement. Repetition statements: while, do-while, for, nested loops. Introduction to Math class. Arrays: Basics, One dimensional, Multidimensional, Array of Objects, Passing array to method.

Unit III: Introducing classes, class fundamentals, declaring objects, methods, class data,& instance data, constructor, this keyword, access control, Introduction to String and String Buffer classes

SECTION-B

Unit IV: Applet class and its methods, Introduction to AWT, AWT classes: Button, TextField, Label. Working with Graphics, Working with colors, AWT controls, Fundamentals: Adding and removing controls, responding to control.

Unit V: Event handling: Event handling mechanism, Delegation Event model, Event, EventListener: ActionListener, mouseListener, mouseMotionListener, windowListener, Using delegation Event model: Handling mouse events, Adapter classes, Inheritance, Polymorphism, Abstract classes and Interface, Packages

Unit VI: Java File I/O: File, FileDialog object, Low and High level File I/O, the Stream classes, Byte Stream: Input stream, Output stream, File Input stream, File Output stream, Data Input stream, Data Output stream, PrintWriter, Exception handling: Exception types, uncaught Exceptions using try and catch, throw, throws, finally. GUI objects programming: Frame class, menus and other GUI objects.

TEXT BOOKS:

1) Herbert Schildt : Java Complete References(McGraw Hill)
2) C.Thomas Wu: An Introduction to OOP with Java(McGraw Hill)

REFFERENCES

1) Liag: Java Programming(PHI)

LIST OF PROGRAMS

The sample list of program is given below. This list can be used as guide line for problem statements but the scope of the laboratory should not be limited to the same. Aim of the list is to inform about minimum expected outcomes.

Sr No Name of Program

1 Write a Java application to print a given format

```
* * * *
 * * *
  * *
   *
```

2 Design an Applet to Draw a String inside a Pentagon with specified font and color

3 Write an Java application for Loan Calculator

4 Write an Applet that accepts the user name via Text Field object.

When user presses the Enter Key the Applet
displays a "Welcome <user name>" with <user name> replaced with actual name en tered by user.

5 Write an Applet that displays a BMI of a person given his or her weight in Kilogram and height in Meters

6 Write an Application program in Java using Switch statement to print A-Z, a-z, 0-9 by inputting ASCII value of first character

7 Write an application in Java which reads a string from user as a command line argument and checks the string for vowels, and when the vowel encounters it append the word "egg" before each vowel

8. Write an application in Java to design "Simple Calculator"

9 Write an application in Java which creates an AddressBook class which manages collection of Person object and allows programmer to add, delete, search a Person object in the Address Book

10 Write an application in Java which reads and writes User defined Byte Array from and to a file using Low Level File I/O

11 Write an application in Java which creates a File menu on Frame with menuItem "DialogBox".
When user clicks on menuItem one Dialog Box will appear on the Frame with one TextField and two Buttons "OK" and "CANCEL". After entering the data in the TextField and clicking the OK Button Dialog Box closes and data will appear on a Frame Window and when presses CANCEL Button Dialog Box closes and control comes back on Frame Window

12 Write an application in Java which return current x,y coordinates when any mouse button is Pressed and draws freehand drawing when mouse is Dragged.

3SRN3/3 SK 3 DISCRETE STRUCTURE

SECTION 'A'

(8 Hrs./Unit)

UNIT I :- Mathematical Logic :
Statements & Notation,Connectives,Normal forms,The theory of inference for the statement calculus : Validity using truth tables, predicate calculus.

UNIT II :- Set Theory :
Basic concepts,Relation and ordering,Functions,Recursive function.Sets & Predicates.

UNIT III :- Algebraic Structures :
Semigroups and Monoids,Product & Quotients of semigroups,Grammers & Languages,Polish expression & their compilition, Groups, Product and Quotients of Groups.

SECTION 'B'

UNIT IV :- Lattice & Boolean Algebra:-
Lattices,Partially ordered sets,Boolean Algebra,Functions on Boolean Algebras, Boolean Functions as Boolean Polynomials,Minimization of Boolean Functions.

UNIT V:- Graph Theory :
Basic concepts,Paths,reachability & connectedness,Matrix representation of graphs,Trees:tree searching,Undirected trees,Minimal spanning trees.

UNIT VI:- Compultability theory:-
Finite state machines,Finite state acceptors and regular grammers.Turning, machines and partial recursive functions.

TEXT BOOK :-

1. J.P.Trembley,R.Manohar :"Discrete Mathematical Structures with application to Computer Science" 1988(MCG)

REFERENCE BOOKS:-

1. C.L.Lill : "Combinational Mathematies" Mc Graw Hill, 1988
2 Stanant "Discrete Structure"Prentice Hall.
3. C.L.Lill "Element of Discrete Mathematics" Second Edition McGraw Hill, 1987
4. Bernard Kolman,Robert C.Busby, Sharon Ross: "Discrete Mathematical Structures" Third Edition PHI

3 SRN 4/3 SK 4 ELECTRONIC DEVICES & CIRCUITS

SECTION-A

UNIT I : Diodes : Characteristics of semiconductor diodes,diode resistanse. Rectifying circuits & do power supplies,HWR,FWR,BR,comparison. Filter circuits for power supplies: Inductor, Capacitor, LC, IT Filters.

UNIT II : Concept of amplification,Ai,Av and Ap; Ri,Ro.Conversion efficiency. Basic transistor operation,Basic characteristics of transistor amplifier. Transistor input characteristics,CB amplifier CC amplifier.

UNIT III: The CE amplifier Graphical analysis, Input & output resistance, Input wave form consideration, Comparison of amplifiers. Transistor biasing : Stability Factor, CB bias , Emitter bias, Bias compensation.

SECTION-B

UNIT IV : Oscillatars : Effect of positive feedback. phase-shift oscillator, Wein-Bridge oscillator, RC Oscillator, Transistor as a switch, switching time in transistors, Multivibrators.

UNIT V : FET amplifiers: Advantages & disadvantages of FET. Principle of operation, characteristics, Comman source AC amplifier. Fixed Bias. Source follower, Frequency Response. Introduction is MOSFETS.

UNIT VI: Opto Electronic Devices : Fundamentals of light, photoconductive sensors, photodiodes, phototransistors, their principle of operation & applications.photovoltaic sensors.photoemiss ive sensors.Light emitters,Alphanumeric displays. photocouplers.

Text Books :

1. Malvino : Principles of Electronics (TMH)
2. Millmam & Halkias : Electronic Devices & Circuits (Mc Graw Hill)
3. Millmam & Halkias: Integrated Electronics (Mc Graw Hill)

3SR5/3 SK 5 OBJECT ORIENTED TECHNOLOGIES

SECTION-A

UNIT I. Objects & Classes in C++ : Declaring & using classes, Constructors, Objects as functions arguments, Copy Constructor, Static class data. Arrays of objects, C++ String class.

UNIT II. Operator overloading : Overloading unary & binary operators. Data conversion. Pitfalls of operator overloading. Pointers & arrays. Pointers & functions. new & delete operators. Pointers for objects.

UNIT III. Inheritance in C++ : Derived class & base class, Derived class constructors, Function overloading, class hierarchies, Public and private inheritance, Multiple inheritance. Containership : classes within classes.

SECTION-B

UNIT IV. Virtual functions concepts, Abstracts classes & pure virtual functions. Virtual base classes, Friend functions, Static functions, Assignment and copy initialization, the this pointer. Dynamic type information.

UNIT V. Streams & Files in C++ : Stream classes, stream errors, disk file I/O with streams, File pointers, Error handling in file I/O. File I/O with members functions, overloading the extractions & insertion operators, Memory as a stream object, command-line arguments. Multifile programs.

UNIT VI. Function Template, Class templates, Exception syntax, Multiple exceptions, exception with arguments. Introduction to the Standard Template Library. Algorithms, Sequential

Containers, Iterates, Specialized iterates, Associative containers. Function objects.

Text-Books :

1. Robert Lafore Object-Oriented Programming in C++ (Galgotia)
2. Herbert Schildt C++ : Complete Reference (TMH)

References :

1. Bjarne Stroustrupe C++ Programming Language (Addison-Wesley)
2. Venugopal Mastering C++ (TMH)
3. Lipmann C++ Primer (Addison-Wesley)

LIST OF PROGRAMS

The sample list of program is given below. This list can be used as guide line for problem statements but the scope of the laboratory should not be limited to the same. Aim of the list is to inform about minimum expected outcomes.

1 Write a C++ program to implement a stack with its constructor and two member functions PUSH and POP

2 Write a C++ program to find product of two same numbers from 0 to 9 stored in an object array of 10 objects and then free the memory space occupied by an object array

3 Write a C++ program to overload minus operator as an unary and binary operator

4 Write a C++ program using friend operator function to overload plus binary operator

5 Write a C++ program to calculate the circumference of an earth (subclass) after getting distance of it measured from sun from planet (super class)

6 Write a C++ program for an inventory that stores the name of an item, the number on hand, and its cost. Include an inserter and an extractor for this class

7 Write a C++ program that creates an output file, writes information to it, closes the file and open it again as an input file and read the information from the file

8 Write a C++ program that counts number of words in a file

9 Write a C++ program to create an abstract class area having an abstract function get Area which will find an area of derived classes rectangle and triangle

10 Write a C++ program to create a generic function that swaps the values of the two variables it is called with"

3 SR 6/3 SK 6 Computer Laboratory I

This Lab is based on Web publishing.The topics to be covered include :

1) Web Publishing
2) Web Page Design
3) Exposure to IE & NN browsers
4) Dynamic HTML

Each group of 2 students should prepare their own Website.

Text book :

M.Petrovsky:Dynamic HTML in Action(TMH)

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FOURTH SEMESTER

4 SRN 1/4SK1 DATA STRUCTURES

SECTION-A

(8 hrs/unit)

Unit I: Data structures basics, Mathematical /algorithmic notations & functions, Complexity of algorithms, Subalgorithms. String processing: storing strings, character data type, string operations, word processing, and pattern matching algorithms.

Unit-II : Linear arrays and their representation in memory, traversing linear arrays, inserting & deleting operations, Bubble sort, Linear search and Binary search algorithms. Multidemensional arrays, Pointer arrays. Record structures and their memory representation. Matrices and sprase matrices.

Unit-III : Linked lists and their representation in memory, traversing a linked list, searching a linked list. Memory allocation & garbage collection. Insertion deletion opeartions on linked lists. Header linked lists, Two- way linked lists.

Unit-IV : Stacks and their array representation. Arithmetic expressions: Polish notation. Quick sort, an application of stacks, Recursion. Tower of Hanoi problem. Implementation of recursive procedures by stacks, Queues. Deques. Priority queues.

Unit-V : Trees, Binary trees & and their representation in memory, Traversing binary trees. Traversal algorithms using stacks, Header nodes : threads. Binary search trees, searchng, inserting and deleting in binary trees. Heap and heapsort. Path length & Huffnan's algorithm. General trees.

Unit-VI : Graph theory, sequential representations of graphs, Warshalls' algorithm, Linked representation, operations & traversing the graphs. Posets & Topological sorting. Insertion Sort, Selection Sort. Merging & Merge-sort, Radix sort, Hashing.

Textbook :

Seymour Lipschutz : " Theory & Problems of Data Structures" Schaum's Outline series (Mc Graw-Hill) International Editions.

REFERENCES :

1. Ellis Horowitz, Sartaj Sahni – Fundamentals of Data Structures (CBS Publications)
2. Trembley, Sorenson:- An Introduction to Data Structures with Applications.
3. Aho Ullman : Analysis and Design of Algorithms.
4. Standish: Data Structures in Java
5. Bhagat Singh, Naps : Introduction to Data Structures.

DATA STRUCTURES- LABORATORY

The sample list of program is given below. This list can be used as guide line for problem statements but the scope of the laboratory should not be limited to the same. Aim of the list is to inform about minimum expected outcomes.

1. Write an application to implement Tower of Hanoi Problem Algorithm.
2. Write an application to implement Abstract data type stack
3. Write an program to evaluate Post fix expression using stack
4. Write a program to implement Abstract data type queue.
5. Write a program to implement singly linked list that performs various operation such as insertion, deletion, searching a node in linear linked list.
6. Write a program to implement Preorder Traversal of a binary tree.
7. Write a Program to search a given element using Binary Search.
8. Write a Program to implement Selection Sort.
9. Write a Program to implement Merge Sort.
10. Write a Program to Perform insertion or search in a specified level of a stack implemented tree- structured symbol table.

4 SK2 COMPUTER ORGANIZATION

Unit-I: Basic strucutre of computer: Hardware & software. Addressing methods. Program sequencing. concept of memory locations & address. Main memory operation. Instructions & instruction sequencing. Addressing modes. BasicI/O operations. Stacks. Queues & subroutines.

Unit-II: Processing Unit: fundamental concepts. execution of a comlete instruction. hardwired control, performance consideration. Microprogrammed control; microinstructions, microprogram sequencing, microinstruction prefetching, emulation.

Unit-III: I/O organizatiion: accessing I/O devices,interrupts, direct memory access:bus arbitration. I/O hardware:processor bus and interfacing circuiuts,standard I/O interfaces: SCSI bus, backplane bus standard.

Unit-IV: Memory Unit: basic concepts,semiconductor RAM memories,internal organization,static & dynamic RAMs, ROMs. speed, size & cost considerations.Cache memories: performance considerations. Virtual memories, address translation,memory management requirements.

Unit-V: Arithmetic; number representation. design of fast adders,signed addition and subtraction. Multiplication of positive numbers, Booths' algorithm, Integer division.Floating-point numbers and related operations.

Unit-VI: Computer Peripherals: Input-output devices like video displays,video terminals, graphics input devices,printers. Online storage devices: magnetic disks,magnetic tape systems, CD-ROM systems. Communication devies: Modems.

Text-Book:

V.Carl Hamacher & S. Zaky " Computer Organization" (4/e) McGraw-Hill(ISE).

References:

1. Stallings. W. " Computer Organization & Arcitecture" (5/e) (Pearson Education).
2. Tenanbaum A.S." Structured Computer Organization" (5/e) (Pearson Education).
3. Hayes J.P. "Computer Architecture & Organization' (4/e) (McGraw-Hill).

4 SK3 DIGITAL LOGIC CIRCUITS

Unit-I Definitions for Digital Signals, Digital Waveforms, Digital Logic, Moving and Storing Digital information, Digital Operations, The Basic Gates—NOT, OR, AND, Universal Logic Gates—NOR, NAND AND-OR-Invert GATES, Positive and Negative Logic.

Unit-II Combinational Logic circuits: Boolean Laws And Theorems,Sum-of-products Method, Truth Table to Karnaugh Map,Pairs, Quads, and Octets, Karnaugh Simplifications ,

Don't-care Conditions, Product-of-sums Method , Product-of-sums Simplification, Simplification by Quine-McClusky Method, Hazards and Hazard Covers.

Unit-III Data-processing circuits: Multiplexers, Demultiplexers, 1-of-16 Decoder, BCD-to-decimal Decoders Seven-segment Decoders,Encoders, Exclusive-or GATES, Parity Generators and Checkers ,Magnitude comparator ,Read-only Memory .

Unit-IV: Number systems and codes: Binary Number System, Binary-to-decimal Conversion , Decimal-to-binary Conversion, Octal Numbers, Hexadecimal Numbers , The ASCII Code, The Excess-3 Code, The Gray Code. Unsigned Binary Numbers, Sign-magnitude Numbers, 2'S Complement Representation.

Unit-V: Arithmetic circuits: Binary Addition, Binary Subtraction, 2'S Complement Arithmetic , Arithmetic Building Blocks, The Adder-subtracter , Fast Adder, Arithmetic Logic Unit , Binary Multiplication & Division.

Unit-VI: Clocks and Timers: Clock Waveforms, TTL Clock, Schmitt Trigger. Flip-Flops: RS Flip-flops, Gated Flip-flops, Edge-triggered RS Flip-flops , Edge-triggered *D* Flip-flops , Edge-triggered *JK* Flip-flops , Flip-flop Timing, *JK* Master-slave Flip-flops, Analysis of Sequential Circuits.

Text-Book :

Donald P Leach, Albert Paul Malvino,Goutam Saha, "Digital Principles & Applications" (6/e) (McGraw-Hill).

Reference books:

1. Mano M. & Kime "Logic & Computer Design Fundamentals" (2/e) (Pearson Education).
2. Taub & Schilling " Digital Integrated Electronics" (TMH).
3. Jain R.P. "Modern Digital Electronics" (TMH).
4. Mano M. & Kime "Logic & Computer Design Fundamentals" (2/e) (Pearson Education).
5. M.Morris Mano "Digtal Design" (2/e) (PHI).

4SK 3 Digital Logic Circuits Lab: Minimum 8 practical based on above syllabus, preferably uniformly distributed.

4SRULEIN4/4 SK 4 SOCIAL SCIENCES & ENGINEERING ECONOMICS

SECTION - A

(8 hrs/unit)

Unit I : Study of Social Science : Importance to Engineer, salient features of Indian constitution. Fundamental Rights and

Duties. Directive Principles of State Policy.

Unit II: Indian Parliament : composition and powers.
President of India : Election and Powers.
Council of Ministers and Prime Minister

Unit III: Impact of Science and Technology on culture and Civilization.
Human Society : Community Groups, Social Control : Meaning, Types and Agencies. Marriage and Family : Functions, Types and problems.

SECTION - B

Unit IV: Nature and scope of Economics : Special significance of Economics to Engineers.
Production : Factors of production, Laws of return, Various Economic systems, Forms of Business Organisation.

Unit V: Banking : Functions of Central and Commercial Banks.
Taxation : Principle of taxation, Direct and Indirect taxes.
Market : Forms, perfect and imperfect competition, pricing under perfect and imperfect competition, prices discrimination under monopoly.

Unit VI: Economics of Development : Meaning, Characterisitcs of under development, obstacles to Economic growth and vicious circle of poverty.
Economic Planning : meaning, objective and salient features of current five years plan of India.
Planning horizons, life structuring the alternatives.
Economics of comparision of different alternative projects.

Books Recommended :

1. Pylee M.V. : Constitutional Govt. in India, S.Chand and Co.
2. Joshi G.N. : The Constitution of India, Macmillan India Ltd.
3. Mahajan : The Constitution of India, S.Chand, New Delhi.
4. Maclaver and Page : Principle of Sociology.
5. Davis K. : Human Society
6. Dewett and Varma J.D. : Elementary Economic Theory, S.Chand and Co.
7. A.N.Agrawal : Indian Economy, Problem of Development and Planning (Wiley Eastern Ltd), New Delhi.
8. S.K.Mishra : Indian Economy, Its Development Experience. Himalaya Pub.House, Bombay.
9. Datt R.K. : Indian Economy, S.Chand and Comp. New Delhi P.M.Sundharam
10. Dhingra I.C. : Indian Economy
11. E.Kuper : Economics of W.R.Development, McGraw Hill Co.,
12. Jemes L.E., R.R.Lee : Economics of W.R.Planning, McGraw Hill Co.

4 SK5 ELECTRONICS COMMUNICATION

Unit I : Signal and Noise : - Audio signals, frequency range speech and music, sound intensity, loudness, level, frequency response, bandwidth, bandwidth requirement for different types of signals such as telegraph, telephone speech, music and video Noise: External and internal noise, noise figure, signal to noise ratio, noise figure measurement.

Unit II: Modulation Techniques : - Amplitude modulation theory, Frequency spectrum representation of AM, Modulation index side bands, power relations, current relations and voltage relation in the AM wave. Frequency modulation and phase modulation, frequency deviation, modulation index, frequency spectrum.

Unit III: AM Transmitters : - Principles of DSB-FC, DSB-SC, SSB-SC modulation and their comparison, Details of DSB-FC transmitter, Generation of DSB-SC by using balanced modulators (FET & Diodes), DSB-SC transmitter. Generation of SSB-SC by phase-shift method.

Unit IV : AM Receivers : - TRF receiver, superhetrodyne receiver, details of each block such as RF amplifier, Oscillator, IF amplifier, Diode detector, audio amplifier. Mixer: Principle, Need and type of AGC, Practical radio receiver circuit with AGC, characteristics such as selectivity, sensitivity, and fidelity communication receiver.

Unit V : FM Transmitter : - Circuits for direct FM generation using FET and varactor diode. Circuit & analysis of Indirect FM generation, Narrow band and wide band FM, their comparison, de-emphasis and pre-emphasis. FM transmitter & stereo FM transmitter.

Unit VI : FM Receivers :- Details of FM receiver, blocks such as RF amplifier, local oscillator, IF amplifier, Mixer, audio Ampl. AGC, limiter, FM discriminator, single slope and balanced slope detector, analysis of Foster seeley and ratio detectors, stereo FM receiver.

TEXT BOOK :-

1. Kennedy G.: Electronics Communication System, Tata McGraw Hill Co. New Delhi.

REFERENCE BOOKS :-

1. Young P.H.: Electronics Communication Techniques, A Bell and Howell Co. Indiana.
2. Martin James. : Telecommunication and the Computer, Prentice Hall Inc. New Jersey.

3. Roddey D. Coolen S.: Electronics Communication, Prentice Hall India Pvt. Ltd.
4. Beck, Robert and J.Schoen: Electronics Communication, Modulation and Transmission, A Bell and Howell Co.

4 SK 5 PRACTICALS :- Minimum 8 practical based on above syllabus, preferably uniformly distributed.

BOOKS:

1. W. A. Triebel & Avatar Singh : The 8088/8086 Microprocessors(4e) (PHI /Pearson Education)
2. Liu & Gibson: The 8088/8086 Microprocessor (2/e)(PHI)

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4 SK6 HARDWARE LABORATORY

This lab is based on PC organization, troubleshooting, maintenance and Assembly language programming.

(a) Student should study the following components of PC:

PC models, Inside the PC, Preventive maintenance,PC troubleshooting,Semiconductor memories,Power supplies & Power protection,Hard Disks: installing, configuring & maintenance,SCSI drives.Printers & their troubleshooting

Modems & serial interfaces, Keyboard, Mice, Multimedia interfaces.

Books :

1. Mark Minasi : Complete PC upgrade & Maintenance Guide (BPB)
2. Scott Mueller : Upgrading and Repairing PCs 12/e (Que)

(b) Assembly language programming.

8086 Instruction set overview, addressing modes. 8086 instruction formats. 8086 programming: Integer instructions and computations: data transfer, arithmetic, logical instructions. Shift and rotate instructions and their use in 8086 programming. Flag control instructions, compare instruction, control flow and jump instructions, subroutines and related instructions, Loops & loop handling instructions. 8086 programming using these instructions as given below.

This list can be used as guide line for problem statements but the scope of the laboratory should not be limited to the same. Aim of the list is to inform about minimum expected outcomes.

- Write a program in TASM to manipulate the two given operands with general arithmetic operators +, -, *, / and store the result at the given location 2000H to 2003H respectively.
- Write an instruction sequence that generates a byte size integer in the memory location defined as RESULT. The value of the integer is to be calculated from logical equation [RESULT] = [AL] * [NUM1] + [NUM2] * AL + BL
- Assume that all parameters are byte- sized. NUM1, NUM2 and RESULT are the offset addresses of the memory location in the current data segment.
- Given a number XY, write a program using TASM to store 0X in BX register and 0Y in CX register.
- Write a TASM program to sort the elements using Bubble Sort Algorithm.
- Write a program in TASM to search for a single item from a list of elements using Binary Search Algorithm. Show that if the element is found or not.
- Write a program in TASM to convert the given binary number into decimal number. The unsigned eight-bit value is stored in variable BINVAL; the three-digit ASCII result is stored in three memory locations HUN, TEN and ONE.
- Given 16-bit binary number in DX, write a program that converts it into its equivalent BCD number. If result is bigger than 16-bit, place all 1's in DX
- Write a program using TASM by using DOS INT 21H, function 09H to display string. The string to be displayed must have a '$' as its last character. The string address of the string must be loaded into register DX and the string must reside within current data segment.
- Write a program using TASM to echo command line text to the screen using INT 21H, function 02H.
- Write a program using TASM to read the date maintained by the system and return the following information using DOS INT 21H, function 2AH.
  DH = Month,
  DL = Day of month,
  CX=Year,
  AL=Day of the week
- Using DOS INT 21H function 08H write a program in TASM to obtain a secret Password from user. The password is not echoed to the screen. The password is stored in PWTXT and may be of any length, but must be terminated by a carriage return.
- Using DOS INT 21H, function 05H, write a program in TASM to output ASCII code contained within register DL to the printer.

BOOKS:

1. W. A. Triebel & Avatar Singh : The 8088/8086 Microprocessors (4e) (PHI /Pearson Education)
2. Liu & Gibson: The 8088/8086 Microprocessor (2/e)(PHI)

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ENVIRONMENTAL STUDIES

Total Marks : 100

PART-A

SHORT ANSWER PATTERN **25 Marks**

1. The Multidisciplinary nature of environmental studies
- . Definition, scope and importance.
- . Need for public awareness.

(2 lecture hours)

2. Social Issues and the Environment
- . From Unsustainable to Sustainable development
- . Urban problems related to energy
- . Water conservation, rain water harvesting, watershed management
- . Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- . Envionmental ethics : Issues and possible solutions.
- . Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- . Wasteland reclamation.
- . Consumerism and waste products.
- . Environment Protection Act.
- . Air (Prevention and Control of Pollution) Act.
- . Water (Prevention and Control of Pollution) Act.
- . Wildlife Protection Act.
- . Forest Conservation Act.
- . Issues involved in enforcement of environmental lesislation.
- . Public awareness. (7 lecture hours)

3. Human Population and the Environment
- . Population growth, variation among nations.
- . Population explosion - Family Welfare Programme.
- . Environment and human health.
- . Human Rights.
- . Value Education.
- . HIV / AIDS.
- . Women and Child Welfare.
- . Role of Information Technology in Environment and human health.
- . Case Studies. (6 lecture hours)

PART-B

ESSAY TYPE WITH INBUILT CHOICE **50 Marks**

4. Natural resources :
- . **Renewable and non-renewable resources :**
  - . Natural resources and associated problems.
    - - Forest resources : Use and over exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
    - - Water resources : Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
    - - Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
    - - Food resources : World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer - pesticide problems, water logging, salinity, case studies.
    - - Energy resources : Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources, Case studies.
    - - Land resources : Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
- . Role of an individual in conservation of natural resources.
- . Equitable use of resources for sustainable lifestyles.

(8 lecture hours)

5. Ecosystems
- . Concept of an ecosystem.
- . Structure and function of an ecosystem.
- . Producers, consumers and decomposers.
- . Energy flow in the ecosystem.
- . Ecological succession.
- . Food chains, food webs and ecological pyramids.
- . Introduction, types, characteristic features, structure and function of the following ecosystem :-
  - - Forest ecosystem
  - - Grassland ecosystem
  - - Desert ecosystem
  - - Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

(6 lecture hours)

6. Biodiversity and its conservation
- . Introduction - Definition : genetic, species and ecosystem diversity.
- . Biogeographical classification of India.
- . Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values.
- . Biodiversity at global, National and local levels.
- . India as a mega-diversity nation.
- . Hot-spots of biodiversity.

. Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
. Endangered and endemic species of India.
. Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity. (8 lecture hours)

7. Environmental Pollution

. Definition
. Causes, effects and control measures of :-
- Air pollution
- Water pollution
- Soil pollution
- Marine pollution
- Noise pollution
- Thermal pollution
- Nuclear hazards

. Solid Waste Management : Causes, effects and control measures of
. Role of an individual in prevention of pollution.
. Pollution case studies.
. Diaster management : floods, earthquake, cyclone and landslides.
(8 lecture hours)

PART-C

ESSAY ON FIELD WORK 25 Marks

8. Field work

. Visit to a local area to document environmental assets - river / forest / grass land / hill / mountain
. Visit to a local polluted site - Urban / Rural / Industrial / Agricultural
. Study of common plants, insects, birds.
. Study of simple ecosystems - pond, river, hill slopes, etc.
(5 lecture hours)

(**Notes :** i) Contents of the syllabys mentioned under paras 1 to 8 shall be for teaching for the examination based on Annual Pattern.
ii) Contents of the syllabys mentioned under paras 1 to 4 shall be for teaching to the Semester commencing first, and
iii) Contents of the syllabys mentioned under paras 5 to 8 shall be for teaching to the Semester commencing later.

LIST OF REFERENCES :-

1) Agarwal, K.C., 2001, Environmental Biology, Nidi Publ. Ltd., Bikaner.
2) Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad - 380 013, India, Email : mapin@icenet.net **(R)**
3) Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p.
4) Clark R.S., Marine Pollution, Clanderson Press Oxford **(TB)**

5) Cunningham, W.P.Cooper, T.H.Gorhani, E & Hepworth, M.T., 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p.
6) De A.K., Environmental Chemistry, Wiley Eastern Ltd.
7) Down to Earth, Certre for Science and Environment **(R)**
8) Gleick, H.P. 1993, Water in Crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press. 473p.
9) Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural Histroy Society, Mumbai **(R)**
10) Heywood, V.H. & Watson, R.T. 1995, Global Biodiversity Assessment, Ca mbridge Univ. Press 1140p
11) Jadhav, H & Bhosale, V.M. 1995, Environmental Protection and Laws, Himalaya Pub. House, Delhi. 284 p.
12) Mckinney, M.L. & Schoch, R.M. 1996, Environmental Science Systems & Solutions, Web Enhanced Edition. 639 p.
13) Mhaskar A.K., Matter Hazardous, Techno-Science Publications **(TB)**
14) Miller T.G.. Jr., Environmental Science, Wadsworth Publishing Co. **(TB)**
15) Odum, E.P., 1971, Fundamentals of Ecology, W.B.Saunders Co., U.S.A., 574p.
16) Rao M.N. & Datta A.K.,1987, Waste Water Treatment, Oxford & IBH Publ. Co. Pvt. Ltd. 345 p.
17) Sharma B.K., 2001, Environmental Chemistry, Goel Publ. House, Meerut.
18) Survey of the Environment, The Hindu **(M)**
19) Townsend C., Harper J., and Michael Begon, Essentials of Ecology, Blackwell Science **(TB)**
20) Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media **(R)**
21) Trivedi R.K. and P.K. Goel, Introduction to Air Pollution, Techno-Science Publications **(TB)**
22) Wagner K.D., 1998, Environmental Management, W.B.Saunders Co., Philadelphia, USA 499p.
23) डॉ. विठ्ठल घारपूरे : पर्यावरणशास्त्र- पिंपळापूरे ॲन्ड कंपनी पब्लीशर्स, नागपूर.**(R)**
24) Dr. Deshpande, A.P.Dr. Chudiwale, A.D., Dr. Joshi, P.P., Dr. Lad, A.B.: Environmental Studies, Pimpalapure & Co., Publishers, Nagpur. **(R)**
25) R.Rajagopalan : Environmental Studies, Oxford University Press, New Delhi, 2005 **(R)**

(M) Magazine
(R) Reference
(TB) Textbook

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SEMESTER : FIFTH

5 SK1 BUSINESS ORGANIZATION & MANAGEMENT

Unit I: Principles of Management:

Meaning of and differences among business, management, administration and organization, , functions of management, planning, direction, co-ordination, control, motivation, delegation , decentralization, communication, leadership ,decision making. Organization structure and relationships.

Unit II : Materials Management :

Classes of material, scope of material control, scope of purchasing department, purchasing procedures, order procedures, Material receipt and inspection procedures, Material planning and control. Inventory control techniques.

Unit III: Personnel Management :

Meaning and functions of personnel management, recruitment, selection, promotion, wages and salary administration,

Training and development, functions and scope of trade unions in Indian industries. Welfare of labor, Problems of labor turn over & retention.

Unit IV: Financial Management :

Financial planning. Sources of finance. Preparation of profit and loss statement and balance sheet, ratio analysis.

Principles of costing, cost sheet preparation, variance analysis, meaning and application of various budgets, types of budgets and their importance.

Unit V : Quality Management :

Concept of quality and quality control, elements of quality, factors controlling quality of design and conformance,

process control, inspection planning and scheduling, 7QC (Seven Quality Control) techniques, vendor inspection, sampling inspection, sampling plans, Quality audit system. ISO 9000 series.

Unit-VI: Project Management: Concepts and importance of project, Project report preparation, Project planning and implementation. International Management: Japanese vs. American Management. Managerial functions in international businesses.

TEXT BOOK :

1) Koontz H., O'Donnell C. and Whierich: Principles of Management, TMH Publishing Co. Ltd., New Delhi.

References :

1) Khanna O.P. : Industrial Engineering and Management.
2) Sherlekar S.A. : Business, Organisation and Management, Himalaya Pub. House Ltd., Mumbai.
3) Gupta P.B. & Sharma P.B. : Industrial Management & Managerial Economics, Ratnasagar Pvt. Ltd., New Delhi.

5 SK2 DIGITAL LOGIC DESIGN

UNIT-I: Combinational Logic Design:

Function of binary variables, Boolean Algebraic theorems, standard form of logical functions, K-map up to five variables, Quine Mcclusky method, Don't care conditions and it's effects, Synthesis using AND - OR gates.

UNIT-II : Combinational logic design using 74/54 series MSI chip series concerning to multiplexers, demultiplexers, decoders, encoders, comparators, code converters, priority encoders parity generator/ checker & BCD-Seven segment decoder.

UNIT-III : Combinational logic design using ROM array, PLA, PAL, preliminary design concepts using FPGA's N-bit binary adder using 7480, Look-ahead carry adder construction.

UNIT –IV : Design of counter and sequential networks: Analysis of clocked sequential networks, General models of sequential machines, Equivalence and minimization networks, Deviation of state graph and tables, reduction of state assignments, S.M.Chart.

UNIT-V : Analysis of asynchronous sequential networks, derivation and reduction of primitive flow tables, state assignments and realization of flow tables, hazards, asynchronous sequential network design.

UNIT-VI : Fault detection and location in combinational circuits : Path sensitizing method, Equivalent - Normal-Form (ENF) method, Two-level fault detection. Fault detection and location in sequential circuits using circuit test approach.

Practicals: Eight experiments should be based on above syllabus.

Text Book :

1. M. Mano. : "Digital Design" 3rd ed (Pearson Education)

REFERENCE BOOKS:

1. Charles H. Roth : "Fundamental of Logic Design" , 4th ed. Jaico Publication.
2. Lee S.C. : "Digital Circuit and Logic Design", Prentice Hall of India Pvt. Ltd., New Delhi
3. Jain R.P. : "Modern Digital Electronics Circuits and Systems", Macmillan Press, London
4. Fleatcher : An Engineering Approach to Digital System Design ",PHI.

5 SK2 Digital Logic Design Laboratory; Minimum Eight experiments based on the syllabus covering each unit.

5SK3 DATA COMMUNICATION

SECTION-A

Unit I: Introduction: Components, Networks, Protocols and standards, Basic Concepts: Line Configuration, Topology Transmission mode, analog and digital signals, periodic and aperiodic signals, analog signals, time and frequency domains, composite signals, digital signals.

Unit II: Encoding and modulating: digital –to- digital conversion, analog-to-digital conversion, digital to analog conversion, analog to analog conversion, digital data transmission, DTE-DCE interface, modems, cable modems, transmission media: guided media, unguided media , transmission impairment. Performance, wavelength, Shannon capacity, media comparison.

Unit III: Multiplexing: Many to one/ one to many, frequency division multiplexing, wave division multiplexing, TDM, multiplexing applications: the telephone system , Error detection and correction : types of errors, detection , VRC, Longitudinal redundancy check, cyclic redundancy check, checksum, error correction.

SECTION B

Unit IV: Data link Control : Line Discipline, flow control, error control, Data link Protocols : Asynchronous Protocols, synchronous protocols, character oriented protocols, bit - oriented protocols, link access procedures.

Unit V: Local Area Networks: Ethernet, other Ethernet networks, token bus, token ring, FDDI, Comparison, MAN: IEEE802.6 (DQDB) SMDS, Switching: circuit switching, packet switching,

message switching, integrated services digital networks (ISDN) : services, history, subscriber access to ISDN.

Unit VI: Frame relay: introduction, frame relay operation, frame relay layers, congestion control, leaky bucket algorithm, traffic control, and other features.

TEXT BOOKS:

1) Behrouz A. Forouzan: Data Communication and Networking, 2e (TMH)

2) William Stallings: Data & Computer Communications, 6/e, Pearson Education.

REFERENCES:

1) William L. Schweber : Data Communication, McGraw Hill.

2) J.Freey : Computer Communication & Networks, AEW Press.

3) D. Corner : Computer Networks & Internet, Pearson Education.

5SK4 FILE STRUCTURES & DATA PROCESSING

UNIT I. Introduction : File structure design, File processing operations : open, close, read, write, seek. Unix directory structure. Secondary storage devices: disks, tapes, CD-ROM. Buffer management. I/O in Unix.

UNIT II. File Structure Concepts : Field & record organization, Using classes to manipulate buffers, Record access, Record structures. File access & file organization. Abstract data models for file access. Metadata. Extensibility, Portability & standardization.

UNIT III. Data Compression, Reclaiming spaces in files, Introduction to internal sorting and Binary searching. Keysorting. Indexing concepts. Object I/O. Multiple keys indexing., Inverted lists, Selective indexes, Binding.

UNIT IV. Cosequential processing : Object-Oriented model, its application. Internal sorting : a second look. File Merging : Sorting of large files on disks. Sorting files on tapes. Sort-merge packages. Sorting and Cosequential processing in Unix.

UNIT V. Multilevel indexing : Indexing using Binary Search trees. OOP based B-trees. B-tree methods Search, Insert and others. Deletion, merging & redistribution. B*trees. Virtual B-trees. VL records & keys. Indexed sequential file access and Prefix B+trees.

UNIT VI. Hashing : Introduction, a simple hashing algorithm. Hashing functions and record distributions. Collision resolution. Buckets. Making deletions. Pattern of record access. External

hashing. Implementation. Deletion. Performance. Alternative approaches.

Text book :

Michael J.Folk, Bill Zoellick, Greg Riccard : File Structures : An Object-Oriented Approach using C++. (Addison-Wesley) (LPE)

References :

1. M.Loomis Data Management & File Processing (PHI)
2. O.Hanson Design of Computer Data Files McGraw-Hill (IE)

5SK4 Laboratory : Programing project as given in the textbook should be implemented for each unit, and a project report (journal) should be submitted. Programming project should span over Chapters 1,2,4,6,7,8,9,10 and 12. This lab should be based on Unix/Linux system.

5SK5 OPERATIONS RESEARCH

Unit I: Introduction, Classification of problems, OR mathematical modeling, Dynamic programming, Investment problem, Equipment replacement, stage coach.

Unit II: Linear Programming: Introduction, concept of linear programming model, development of LP model, simplex method, Big M method, Duality theory, dual simplex method, Two phase method

Unit III: Transportation & Assignment problem: Introduction to transportation problem, mathematical model, types of transportation problem, Optimization techniques for transportation problem , methods to find basic solution, Northwest Corner cell method, Least cost cell method, Vogal approximation method, Optimizing the basic feasible solution using U-V method. Assignment Problem: Introduction, zero-one programming model for Assignment problems, type of assignment problems.

Unit IV: Introduction to sequencing problem, Two machine, N job three machine sequencing problem, Introduction to Integer Programming, cutting plan Algorithm, branch & bound techniques, zero-one Implicit enumeration algorithm.

Unit V: Probability OR Model: Basic probability statistical concepts, Introduction to decision theory-minimax decision procedure, Bayes decision procedure with & without data, Regret function versus loss function

Unit VI: Introduction to Game Theory: minimax, maximum, pure strategies, mixed strategies & expected payoff, solution of 2x4 games, mx2 games, Brown's Algorithm. Introduction to PERT Network, ET, TE, TL ,SE, critical path, probability of completing events on schedule.

TEXT BOOKS :

1. B.E Gillelt "Introduction to Operation Research" TMH . New Delhi.
2. R.Panneerselvam "Operation Research " PHI New Delhi.

References :

1. S.S.Rao : Optimization - Theory & Application, Wiley Eastern Ltd.
2. L.S.Srinath : PERT and CPM Principles & Application, Affiliated East West Press., New Delhi.
3. Fredrick S.Hiller, Gerald J.L. Lieberman: Introduction Operations Research, TMH. New Delhi.
4. H.A.Taha : Operations Research, PHI, New Delhi.

5 SRKN 6 COMMUNICATION SKILLS

Unit I : Comprehension over an unseen passage.Comprehension - A - word study :- Synonym, antonym, meanings, matching words, adjectives, adverbs, prefix and suffix, correct forms of commonly misspelled words, understanding of the given passage.

Comprehension - B - Structure study :-Simple and compound sentences, types of conjunctions, singular and plural, tenses and their effect on verb forms. Use of - not only - but also, if clause, since, may, can, could,would, too etc.

Active and passive forms, negative and interrogative, punctuation and capitalization. (10)

Unit II : Theoretical background - importance of communication, its process, model of communication its components & barriers. Verbal communication, its significance, types of written communication, organization of a text (Titles, summaries, headings, sequencing, signaling, cueing etc.), Important text factors (length of paragraph, sentences, words, clarification and text difficulty). Evaluation of written communication for its effectivity and subject content. Non-verbal communication, types of graphics and pictoral devices. (10)

Unit III : Specific formats for written communication like – business correspondence, formal reports, technical proposals, research papers and articles, advertising and graphics. Format for dayto-day written communication like applications, notices, minutes, quotations, orders, enquiries etc. Oral

communications - Important objectives of interpersonal skills, (verbal and non-verbal), face to face communications, group discussion and personal interviews.

Methodology of conduction of meetings, seminars, symposia, conference and workshop. (10)

BOOKS RECOMMENDED:

1) Krishna Mohan, Meera Banerjee : Developing Communication Skills, MacMillan India Limited.
2) Chrissie Wright (Editor) : Handbook of Practical Communication Skills, Jaico Publishing House.
3) Raman Sharma "Technical Communication", Oxford University Press..
4) F.Frank Candlin : General English for Technical Students, University of London Press Ltd.

COMMUNICATION SKILLS LABORATORY

Objective : On completion of this laboratory the candidate should be able to demonstrate adequate skills in oral and written communication for technical English language, actively participate in group discussions and interviews and exhibit the evidence of vocabulary building. Candidates should be assessed through continuous monitoring and evaluation. The sample list of experiments is given below. This list can be used as guideline for problem statements but the scope of the laboratory should not be limited to the same. Aim of the list is to inform about minimum expected outcomes.

1. Assignments and tests for vocabulary building
2. Technical report writing
3. Group discussions
4. Interview techniques
5. Projects and tasks such as class news letter
6. Writing daily diaries and letters
7. Interactive language laboretory experiments.

Text Books : i. Norman Lewis : Word Power Made Easy

http://www.teachingenglish.org.uk

ii. Ghosh: "Technical Communication", Oxford University Press.

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SEMESTER : SIXTH

6 SK1 OPERATING SYSTEMS

(8 Hrs./Unit)

Unit-I : Introduction: Operating System(OS) definition, OS Evolution, OS Components and Services.
Process Concept, Process Scheduling, Operations on Processes, Cooperating Processes, Interprocess Communication, Threads Overview, Multithreading Models, Threading Issues, Java Threads.

Unit-II : CPU Scheduling Concepts, Scheduling Criteria and Algorithms. Process Synchronization:
The Critical-Section Problem, Synchronization Hardware, Semaphores, Monitors. Deadlocks: Definition & Characterization, Deadlocks Prevention, Avoidance, Detection and Recovery from Deadlock.

Unit-III : Memory Management Background, Swapping, Contiguous Memory Allocation Schemes, Paging, Segmentation.Virtual Memory Management: Background, Demand Paging scheme, Process Creation, Page Replacement Policies, Allocation of Frames, Thrashing.

Unit-IV: File-System Interface; Directory Structure, File-System Mounting, File Sharing & Protection. File-System Structure, File-System Implementation. Directory Implementation, Allocation Methods, Free-Space Management. File Recovery.

Unit-V : I/O Systems :Overview, I/O Hardware, Application I/O Interface, and Kernel I/O Subsystem. Transforming I/O to Hardware Operations. Disk Scheduling, Disk Management, Swap-Space Management, RAID Structure.

Unit-VI : The Linux System; History, Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, File Systems, Input and Output, Interprocess Communication, Network Structure & Security in Linux.

TEXT BOOK:

Avi Silberschatz , P.B.Galvin, G. Gagne: "Operating System Concepts" (Sixth Edition) John Wiley & Sons.

REFERENCES:

i. A.S Tanenbaum "Modern Operating Systems" Pearson Education.
ii. William Stallings "Operating Systems" Prentice-Hall.
iii. D M Dhamdhere "Operating Systems" Tata McGraw-Hill.
iv. M Milankovic "Operating Systems" McGraw-Hill.

6 SK1 Operating Systems Laboratory : Minimum Eight experiments based on the syllabus covering each unit.

6 SK2 **COMPUTER NETWORKS**

(8 Hrs./Unit)

UNIT – I Introduction: Brief history of computer networks & Internet, Layered architecture, Internet protocol stack, Network entities & layers, Application layer: Principles of protocols, HTTP, FTP, SMTP and DNS protocols.

UNIT – II Transport layer: services & principles, multiplexing & demultiplexing applications, UDP, principles of reliable data transfer, TCP details, principles of congestion control, TCP congestion control.

UNIT – III Network layer: network service model, routing principles, hierarchical routing, Internet Protocol (IP) & ICMP details, routing in the Internet, router internals, IPV6.

UNIT – IV Link layer: Introduction, services, multiple access protocol, LAN addresses & Address Resolution Protocol , CSMA / CD protocol and its performance, PPP details.

UNIT – V Network security: Basic issues, principles of cryptography, authentication and authentication protocol, version, integrity: digital signatures, message digests, hash function algorithm, key distribution & certification, secure e- mail .

UNIT – VI Network Management: Basic principles, infrastructure for network management, The Internet Network – management framework: SMI, MIB, SNMP details, security and administration.

TEXT BOOK:

1. James F. Kurose & K W Ross: Computer Networking, Pearson Education (LPE)

REFERENCES:

1. Douglas E. Comer: Computer Network & Internet, Addison Wesley.
2. Andrew S. Tanenbaum : Computer Networks, PHI (5E)
3. Leon Garcia & Widjaja: Communication Networks, TMH
4. William Stallings:Data & Computer Communication, Pearson Education

6 SK 3 **LINEAR INTEGRATED CIRCUITS**

Unit I: Operational Amplifier:Differential amplifier: gain expression using H parameters, transfer-characteristics, constant current source, level shifting, block diagram of op-amp, frequency response, frequency compensation methods, study of IC , measurement of parameters of op-amp, off set nulling and their importance.

Unit II : Linear Applications of Op-amp Inverting and non inverting amplifiers, voltage followers (ACDC), integrator, differentiator, Differential amplifier, bridge amplifier, Instrumentation amplifiers, precision rectifier, RMS to DC converter, voltage to current converter, sinusoidal RC oscillators, constant voltage sources, frequency to voltage and voltage to frequency converter.

Unit III : Non-Linear Applications of Op-Amp and Filter Circuits Clipping and clamping circuits, comparator, astable, monostable and bistable multivibrator, Schmitt Trigger, voltage sweep generator, active filters: Butterworth, Chebyshev filters using op-amp.

Unit IV : Voltage Regulators:Transistorized series and shunt voltage regulators, Block schematic of regulator IC 723, regulated power supply using IC 723, short circuit protection, switch mode power supply, IC 317.

Unit V : Timers: Block schematic of regulator IC 555, application of timer 555 as astable, monostable and bistable multivibrator, Delayed timer, sawtooth generators, function generator using 8038, Sample & Hold circuit

Unit VI : Phase Locked Loops Operation of phase lock loop system, transfer characteristics, lock range and capture range, study of PLL IC-LM 565 and its application as AM detector, FM detector and Frequency translator.

Text Book:

1. Gayakwad R.A. : Op-Amps and Linear Integrated Circuits, PHI.New Delhi (2nd edition)

Reference Books :

1. Robert F. Coughlin and F.F.Driscoll : Operational Amplifiers & Linear Integrated Circuits, Pearson Education
2. Sedra/Smith : Microelectronics Circuits, 5e, Oxford University Press
3. Milliman J. and Grabel A. : Microelectronics, McGraw Hill Book Co., New Delhi, 1985.
4. Tobey J.E. and Grame J.E. : Operational Amplifier Design and Applications, International Student Edition, 1983.

6 SK 3 Linear Integrated Circuits Practical :

Minimum Eight practical based on the above syllabus, preferably uniformly distributed.

6 SK4 DATABASE MANAGEMENT SYSTEMS

Unit-I: Database System Applications, Database Systems versus File Systems, View of Data, Data Models, Database Languages, Database Users and Administrators, Transaction Management, Database System Structure, Application architectures, History of Database Systems. Entity-Relationship Model, Basic Concepts, Constraints, Keys, Design Issues, Entity-Relationship Diagram, Weak Entity Sets, Extended E-R Features, Design of an E-R Database Schema, Reduction of an E-R Schema to Tables.

Unit-II: RelationalModel: Structure of Relational Databases,The Relational Algebra, Extended Relational-Algebra Operations, Modification of the Database, Views, The Tuple Relational Calculus, The Domain Relational Calculus, SQL: Basic Structure, Set Operations, Aggregate Functions, Null Values, Nested Subqueries, Views.

Unit-III: Integrity and Security, Domain Constraints, Referential Integrity, Assertions, Triggers, Security and Authorization, Authorization in SQL, Encryption and Authentication, Relational-Database Design:, First Normal Form, Pitfalls in Relational-Database, Design, Functional Dependencies, Decomposition, BCNF, Third, Fourth and more Normal Forms, Overall Database Design Process.

Unit-IV: Query Processing: Overview, Measures of Query Cost, Selection Operation, Sorting, Join Operation, Other Operations, Evaluation of Expressions, Query Optimization: Overview, Estimating Statistics of Expression Results, Transformation of Relational Expressions, Choice of Evaluation Plans, Materialized Views.

Unit-V: Transaction Management: Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Execution, Serializability, Recoverability, Implementation of Isolation, Transaction Definition in SQL, Testing for Serializability.

Unit-VI: Concurrency Control: Lock-Based Protocols, Timestamp-Based Protocols, Validation-Based Protocols, Multiple Granularities, Multiversion Schemes, Deadlock Handling, Insert and Delete Operations Weak Levels of Consistency, Concurrency in Index Structures. Recovery System, issues & solutions.

TEXT BOOK :

Korth, and Sudarshan : Database System Concept , McGraw Hill, 4th Edition.

REFERENCES:

1. Raghu Ramkrishnan :"Database System". McGraw Hill
2. C.J.Date : "Database System", 7th ed. (Pearson Education)
3. Connolly & Begg, : Database System,Low Price Ed.
4. Nawathe & Al-Masseri " Database Systems" (Pearson Education)

6SK4 Database Management Systems Laboratory

The sample list of programs based on ORACLE or MY SQL is given below. This list can be used as guideline for problem statements but the scope of the laboratory should not be limited to the same. Aim of the list is to inform about minimum expected outcomes.

1. Consider the employee database, where the primary keys are underlined & Write the Queries using following clauses & also retrieve the data from the given database.
   Employee (employee-name,street,city)
   Works (employee-name,company-name,salary)
   Company (company-name,city)
   Manages(employee-name,manager-name)
   I) Order By II) Between III) Group By IV) Having
2. Consider the above database & perform the different Join Operations which are as follows.
   I) Inner Join II) Left Outer Join III) Right Outer Join
   IV) Full Outer Join
3. Consider the above database & Perform the different Set Operations which are as follows.
   I) Union II) Intersect III) Except/Minus
4. Consider the above database & perform the all Aggregate Functions.
5. Write an assertion for the bank database to ensure that the assets value for the 'perryridge' branch is equal to the sum of all amountslent by the 'perryridge' branch.
   Customer (customer-name, customer-street, customer-city)
   Branch (branch-name, branch-city, asstes)

Loan (loan-number,branch-name,amount)

Borrower (customer-name,loan-number)

Depositor (customer-name, account-number)

Account (account-number,branch-name,balance)

6. Write an SQL trigger to carry out the following action: On delete of an account, for each owner of the account, check if the owner has any remaining accounts, and if she does not, delete her from the depositor relation.

7. Consider the above Bank database & write the SQL queries for the following views: I) A view containing the account numbers the customer names for all accounts at the deer park branch.

II) A view containing the names and addresses of all customers who have an account with the bank, but do not have a loan.

8. Mini Project Using Oracle 9i.

6SK5 SIGNALS AND SYSTEMS

Unit I : Continuous time and discrete time signals, transformation of the independent variable, exponential and sinusoidal signals, unit impulse and unit step functions, operations on signals like folding, time-shifting, amplitude scaling and time-scaling, mixing of signals and modulation.

Unit-II: Continuous time and discrete time systems, basic system properties, discrete time LTI systems, Continuous time LTI systems, Properties of linear time invariant systems, Causal LTI systems described by differential and difference equations, Singularity functions.

Unit II I: Fourier Series representation of periodic signals: Response of LTI systems to complex exponentials, Fourier representation of continuous time periodic signals, convergence of the Fourier series, Properties of continuous time Fourier series, Fourier series representation of discrete –time periodic signals, properties of discrete time Fourier series, Fourier series and LTI systems, filtering.

Unit IV : Continuous –Time Fourier Transform: Development of the Fourier transform representation of an aperiodic signal,the Fourier transform for periodic signals, properties of the continuous time Fourier transform, the convolution property, multiplication property, Linear constant coefficient differential equations.

Unit V: Sampling: Representation of continuous time signals by its samples, reconstruction of a signal from its samples, aliasing, discrete time processing of continuous time signals, sampling of discrete time signals.

Unir VI : Z- Transform: Z- transform, the region of convergence for the z-transform, Inverse z- transform, properties of Z transform, analysis and characterization of LTI systems using z transforms, System function algebra and block diagram representations, the unilateral z –transform.

Text-book :

Oppenheim, Willsky, Nawab 'Signals and Systems', Pearson Education.

References :

1. Fred Taylor 'Principles of Signals and Systems',TMH.
2. Nagrath, Sharan, Ranjan Rakesh and Kumar Sukhbinder : 'Signals and Systems', TMH
3. Sudhakar 'Signals and Systems', TMH
4. Proakis & Monalokis " Digital signal Processing" PHI.

6 SK 6 Programming Laboratory

This laboratory shall be based on (i) MFC using VC++, OR (ii) Dot NET programming using VB.NET, OR (iii) Advanced Java Programming.

If the laboratory facilities are available these three may be also offered as lab electives to different batches.)

(i) For MFC using VC++, minimum eight programs based on the following:

i) MFC application creation
ii) Using dialog boxes
iii) Windows common controls
iv) Document / View architecture
v) Printing with MFC

REFERENCE:

J. Prosise: Programming Windows with MFC (Microsoft Press).

(ii) For Dot NET programming using VB.NET, minimum eight programs based on the following:

i) Introduction to .NET, VB.NET, and Visual Studio .NET

ii) Language Fundamentals: Console IO, Comments and Documenting,

iii) Common Language Runtime, Base Class Library, Namespaces

iv) Syntax comparison of VB.NET. Type Hierarchy; Object and Basic types,

L : Theory Lecture
T : Tutorial
P : Practical
D : Drawing / Design

APPENDIX-B
FOUR YEAR DEGREE COURSE
BRANCH : COMPUTER ENGINEERING
SEMESTER PATTERN
SEMESTER : THIRD

ABBRIVATIONS :-
S - Semester
K - Computer Engg.
R - Computer Sc. & Engg.
U - Electronics & Tele.
L - Industrial Electronics
E - Electrical Engg.
I - Instrumentation

Sr. No.	Sub. Code No.	SUBJECT	Teaching Scheme L	T	P/D	Examination Scheme									
						Theory						Practical			
						Total Hours/ Week	Duration of Papers (Hrs)	Max. Marks Theory Papers	Maximum Marks College Assessment	Total	Min. Pass Marks	Max. Marks External	Max. Marks Internal	Total Marks	Mininum Pass Marks
1.	3SRN/13SK1	Mathematics-III	5	-	-	5	3	80	20	100	40	—	—	—	—
2.	3SRN2/3SK2	Programming Methodology	4	-	2	6	3	80	20	100	40	25	25	50	25
3.	3SRN/33SK3	Discrete Structures	4	1	-	5	3	80	20	100	40	—	—	—	—
4.	3SRN4/3SK4	Electronic Devices & Ckt.	4	-	2	6	3	80	20	100	40	25	25	50	25
5.	3SR5/3SK5	Object Oriented Technologies	4	-	2	6	3	80	20	100	40	25	25	50	25
6.	3SR6/3SK6	Computer Laboratory-I	-	-	2	2	-	-	-	-	-	25	25	50	25
		TOTAL	21	1	8	30				500				200	

GRAND TOTAL : 700

SEMESTER : FOURTH

Sr. No.	Sub. Code No.	SUBJECT	Teaching Scheme L	T	P/D	Examination Scheme									
						Theory						Practical			
						Total Hours/ Week	Duration of Papers (Hrs)	Max. Marks Theory Papers	Maximum Marks College Assessment	Total	Min. Pass Marks	Max. Marks External	Max. Marks Internal	Total Marks	Mininum Passing Marks
1.	4SRN1/4SK1	Data Structures	4	-	2	6	3	80	20	100	40	25	25	50	25
2.	4SK2	Computer Organization	4	1	-	5	3	80	20	100	40	—	—	—	—
3.	4SK3	Digital Logic Circuits	4	-	2	6	3	80	20	100	40	25	25	50	25
4.	4SRULEIN4/4SK4	Social Sciences and Engineering Economics	4	-	-	4	3	80	20	100	40	—	—	—	—
5.	4SK5	Electronics Communication	4	-	2	6	3	80	20	100	40	25	25	50	25
6.	4SK6	Hardware Laboratory	-	1	2	3	-	-	-	-	-	25	25	50	25
		TOTAL	20	2	8	30				500				200	

GRAND TOTAL : 700

L: Theory Lecture
T: Tutorial
P: Practical
D: Drawing/ Design

APPENDIX-C
FOUR YEAR DEGREE COURSE
BRANCH : COMPUTER ENGINEERING
SEMESTER PATTERN
SEMESTER: FIFTH

ABBREVIAIONS :-
S – Semester
K- Computer Engineering,
R- Comp. Science & Engineering,
N- Information Technology

Sr. No.	Sub. Code No.	SUBJECT	Teaching Scheme L	T	P/D	Examination Scheme Theory Total Hours/ Week	Duration of Papers (Hrs)	Max. Marks Theory Papers	Maximum Marks College Assessment	Practical Total	Min. Pass Marks	Max. Marks External	Max. Marks Internal	Total Marks	Minimum Pass Marks
1.	5SK1	Business Organisation & Management	4	-	-	4	3	80	20	100	40	-	-	-	-
2.	5SK2	Digital Logic Design	4	-	2	6	3	80	20	100	40	25	25	50	25
3.	5SK3	Data Communication	4	-	-	4	3	80	20	100	40	-	-	-	-
4.	5SK4	File Structure & Data Processing	4	-	2	6	3	80	20	100	40	25	25	50	25
5.	5SK5	Operations Research	4	-	-	4	3	80	20	100	40	-	-	-	-
6.	5SRNK6	Communication Skills	2	2	2	6	2	40	10	50	20	25	25	50	25
		TOTAL	22	2	6	30				550				150	

GRAND TOTAL : 700

SEMESTER: SIXTH

Sr. No.	Sub. Code No.	SUBJECT	Teaching Scheme L	T	P/D	Examination Scheme Theory Total Hours/ Week	Duration of Papers (Hrs)	Max. Marks Theory Papers	Maximum Marks College Assessment	Practical Total	Min. Pass Marks	Max. Marks External	Max. Marks Internal	Total Marks	Minimum Pass Marks
1.	6SK1	Operating Systems	4	-	2	6	3	80	20	100	40	25	25	50	25
2.	6SK2	Computer Networks	4	-	-	4	3	80	20	100	40	-	-	-	-
3.	6SK3	Linear Integrated Circuits	4	-	2	6	3	80	20	100	40	25	25	50	25
4.	6SK4	Database Processing	4	-	2	6	3	80	20	100	40	25	25	50	25
5.	6SK5	Signals & Systems	4	1	-	5	3	80	20	100	40	-	-	-	-
6.	6SK6	Programming Laboratory	-	-	2	2	-	-	-	-	-	25	25	50	25
		TOTAL	20	1	8	29				500				200	

GRAND TOTAL : 700

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI
* ORDINANCE NO. 42 OF 2005

Examination in Environmental Studies leading to Bachelor Degree, Ordinance, 2005

Whereas it is expedient to frame an Ordinance relating to Examination in Environmental Studies leading to Bachelor Degree level, hereinafter appearing, the Management Council is hereby pleased to make the following Ordinance.

1. This Ordinance may be called "Examination in Environmental Studies leading to Bachelor Degree, Ordinance, 2005."

2. This Ordinance shall come into force from the Academic session 2005-06.

3. In this Ordinance and in other ordinances relating to the examination, unless there is anything repugnant in the subject or context :-

   (i) "Academic session" means a session commencing on such date and ending with such date of the year following as may be appointed by the Management Council.
   (ii) "Admission to an examination" means the issuance of an admission card to a candidate in token of his having complied with all the conditions laid down in the relevant ordinance, by a competant officer of the University.
   (iii) "Applicant" means a person who has submitted an application to the University in the form prescribed for admission to an examination.
   (iv) "Candidate" means a person who has been admitted to an examination by the University.
   (v) "Regular Candidate" means an applicant who has applied for admission to a Univeristy examination through an affiliated college, Department or Institute in which he/she has prosecuting a regular course of study.
   (vi) "Examinee" means a person who present himself/herself for an examination to which he/she has been admitted.
   (vii) "Examination" means an examination prescribed by the University under the relevant Ordinance.
   (viii) "External Candidate" means a candidate who is allowed to take a University examination in accordance with the provision of Original Ordinance No. 151.
   (ix) " Non-Collegiate Candidate" means a candidate who is not a collegiate candidate.

* As amended vide Ordinance Nos. 7 of 2006 & 10 of 2007.

   (x) An "Ex-student" is a person who having once been admitted to an examination of this University, is again required to take the same examination by reason of his failure or absence thereat and shall include a student who may have joined a college, Department or Institute again in the same class.
   (xi) "Bachelor Degree Examination" means a examination leading to Bachelor Degree of the University.
   (xii) "Previous Year" means a year following by final year of Bachelor Degree.

4. Save as otherwise specifically provided, the conditions prescribed for admission to the examination under this Ordinance shall apply to all persons who wish to take the examination to the Degrees of the University mentioned in para 5 below.

5. The conditions prescribed for admission to examination under this Ordinance shall apply to following degrees of the University :-
   1) Bachelor of Arts
   2) Bachelor of Performing Arts
   3) Bachelor of Fine Arts
   4) Bachelor of Mass Communication
   5) Bachelor of Social Work
   6) Bachelor of Commerce
   7) Bachelor of Business Administration
   8) Bachelor of Science
   9) Bachelor of Computer Science
   10) Bachelor of Computer Applications
   11) Bachelor of Pharmacy
   12) Bachelor of Science (Home Science)
   13) Bachelor of Technology (Cosmetics)
   14) Bachelor of Engineering
   15) Bachelor of Engineering (Part Time) (Civil)
   16) Bachelor of Textile
   17) Bachelor of Technology (Chemical Technology)
   18) Bachelor of Technology (Chemical Engg.)
   19) Bachelor of Architecture, and
   20) Bachelor of Laws (Five Year Course)

6 i) Environmental Studies shall be a compulsory subject for a previous year examination of the following Bachelor Degrees of the University,
   1) Bachelor of Arts
   2) Bachelor of Performing Arts
   3) Bachelor of Fine Arts
   4) Bachelor of Mass Communication

5) Bachelor of Social Work
6) Bachelor of Commerce
7) Bachelor of Business Administration
8) Bachelor of Science
9) Bachelor of Computer Science
10) Bachelor of Computer Applications
11) Bachelor of Pharmacy
12) Bachelor of Science (Home Science)
13) Bachelor of Technology (Cosmetics)
14) Bachelor of Engineering (Part Time) (Civil)

ii) Environmental Studies shall be a compulsory subject for IIIrd & IVth Semester of the following Bachelor Degrees of the University,
1) Bachelor of Engineering
2) Bachelor of Textile
3) Bachelor of Technology (Chemical Technology)
4) Bachelor of Technology (Chemical Engineering)
5) Bachelor of Architecture, and

iii) Environmental Studies shall be a compulsory subject for Vth & VIth Semester of the Degree of Bachelor of Laws (Five Year Course)

iv) Students admitted to Second Year/Third Year/IVth Semester/ VIth Semester of various degree examination courses in different Faculties in the academic session 2005-06 or thereafter shall have to appear for examination in the subject Environmental Studies.

7. The main examination leading to Environmental Studies shall be held in Summer and supplementary examination in Winter every year, at such places and on such dates as may be appointed by Board of Examinations.
Explanation:- Examination shall be conducted on the basis of one common question paper for all Bachelor Degree Examination courses irrespective of annual or semester pattern.

8. Scope of the subject for annual pattern examination and or semester pattern examination shall be as provided under the syllabus.

9. Common question paper for all courses covered under this Ordinance alongwith answer books shall be supplied by the University to the Colleges, Departments and Institutes for conducting the examination of the subject.

10. Valuation of the answer books relating to this subject shall be done at College/Department/Institution level only. Remuneration for valuation of answer books shall not be paid by the University.

Provided that prescribed evaluation fee for evaluation of each answer book/s of an external examinee/s appeared from the examination centre shall be paid to each examination centre.

11. It shall be obligatory on the part of the College/Department/Institute to submit candidate wise following information to the University on or before the date as may be prescribed by the University :-

Sr. No.	Grade/Category	Marks secured
1.	"A"	- 60 and above
2.	"B"	- 45 to 59
3.	"C"	- 35 to 44
4.	"D"	- 25 to 34
5.	"Fail"	- 24 and below
6.	"Absent"	

12. For the purposes of teaching, learing and examination, the Committee consisting of three teachers shall be appointed by the Principal/ Head of the Department/Head of the Institution under his/her Chairmanship/ Chairpersonship. While appointing three teachers on the said committee, the Principal shall take care that the teachers to be appointed on the committee, if necessary, shall be from different faculty.

13. i) Duration of theory examination of this subject shall be three hour.
ii) For all Bachelor Degree examinations, common question paper of 100 marks shall be provided by the University.
iii) Distribution of these 100 marks shall be as follows :-
a) Part-A, Short Answer Pattern - 25 Marks
b) Part-B, Essay type with inbuilt choice - 50 Marks
c) Part-C, Essay on Field Work - 25 Marks

14. Medium of instruction shall be English or Marathi or Hindi. Question paper shall be supplied in English and Marathi and Hindi. A candidate shall have option to write answers in English or Marathi or Hindi.

15. Examination for the subject Environmental Studies shall be compulsory for external candidates appearing as a fresh candidate at Winter and/or summer examination.

16. For teaching of the subject, there shall be atleast two hour per week. For teaching the subject to the regular candidates, a full time approved teacher of the University and or a person having Postgraduate Degree in any faculty with second class shall be considered elligible.

17. For teaching of the subject, additional fee to be charged to regular candidate shall be as prescribed by the University.

18. Every College/ University Teaching Department shall charge additional fee of Rs. 100/- to every Student of the subject Environmental studies. Out of this Rs. 100/-, the College/University Teaching Department shall have to pay Rs. 25/- to the University as an examination fee of each candidate for the subject environmental studies.

19. The Grade secured by an examinee in the examination of this subject shall not be considered for providing the facility of A.T.K.T. in next higher class.

20. The provisions of Ordinance No. 18/2001 shall not be applicable for securing a grade or higher grade in the examination of this subject.

21. Result of the Final Year of the respective Degree shall not be declared of an examinee unless he/she secures any one of the grade in the examination of subject.

    Provided an examinee admitted to Five Year LL.B. course desiring not to continue his/her education beyond Sixth Semester of the said course shall have to secure any one of the grade in the examination of the subject otherwise his/her result of Sixth Semester for awarding B.A. degree shall not be declared.

22. Certificate shall be issued, to the successful examinees in the subject Environmental Studies, after the examination.

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REGULATION NO. 12 OF 2009

Examinations leading to the Degree of Bachelor of Engineering (Computer Engineering) (Four Year Degree Course.... Semester Pattern) Regulation, 2009

Whereas it is expedient to frame the Regulation in respect of Examinations leading to the Degree of Bachelor of Engineering (Computer Engineering) (Four Year Degree Course.....Semester Pattern) for the purposes hereinafter appearing the Management Council is hereby pleased to make a following Regulation.

1. This regulation may be called "Examinations leading to the Degree of Bachelor of Engineering (Computer Engineering) (Four Year Degree Course....Semester Pattern) Regulation, 2009.

2. This Regulation shall come into force w.e.f. from the Academic session-

   i) 2007-08 for Ist & IInd Semester B.E.,
   ii) 2008-09 for IIIrd & IVth Semester B.E.,
   iii) 2009-10 for Vth & VIth Semester B.E., and
   iv) 2010-11 for VIIth & VIIIth Semester B.E.

3. The Schemes of Teachings and Examinations for Firsr, Second, Third and Fourth year in respect of Bachelor of Engineering (Computer Engineering) (Four Year Degree Course.... Semester Pattern) shall be as per Appendices A, B, C, and D appended with this Regulation respectively.

*****

v) References and Values, Boxing Language Features

vi) Object Oriented Programming, Inheritance, Polymorphism, Garbage Collection,

vii) Iteration and Flow of Control, Arrays, Exception Handling, Interfaces

viii) Windows Application Development;, WinForms, Event Model, Controls and Menus

ix) .NET Framework; File Handling, Event Handling, Thread pool and synchronization

REFERENCE:

Microsoft Press "VB.Net Programming".

(iii) Advanced Java Programming

i) Multithreading in Java

ii) Networking in Java

iii) Swing classes and GUI

iv) Built-in Data Structure and Java utilities

v) Object Serialization and RMI

vi) Java Database Connectivity

Reference

Herbert Scheldt: Java Complete References (McGraw Hill).

****

SEVENTH : SEMESTER

7 SK1 DIGITAL SIGNAL PROCESSING

(8 Hrs./Unit)

Unit I : Discrete –Time Signals and Systems:

Introduction to DSP, Advantages, basic elements of DSP system, sampling theorem, A/D, D/A conversion, quantization. Elementary discrete-time sequences. Discrete-time systems: description, representation, classification (linear, time-invariant, static, casual, stable)

Unit II : Analysis of DTLTI systems:

The convolution sum, properties of convolution, Analysis of causal LTI systems, stability of LTI systems, step response of LTI systems, difference equation, recursive & non recursive discrete-time systems, solution of difference equations, Impulse response of LTI recursive system. Correlation of discrete time signals.

Unit III: z- Transform and Analysis of LTI Systems:

Definition of z- Transform, properties, rational z-Transforms, evaluation of the inverse z- Transforms, analysis of linear time invariant systems in z-domain, transient and steady-state responses, causality, stability, pole-zero cancellation, the Schur-Cohn stability test

Unit IV: Fourier Transforms, the DFT and FFT:

Definition & properties of Fourier transform, relation with z-transform. Finite duration sequences and the discrete Fourier transform(DFT), properties, circular convolution, Fast algorithms for the computation of DFT: radix-2 and radix-4 FFT algorithms

Unit V : Design of Digital Filters:

Classification of filters: LP, HP, BP, FIR and IIR filters, filter specifications. Design of FIR filters using Windows and by Frequency sampling methods. Design of IIR filters from Analog filters using approximation of derivatives, Impulse invariant transformation, Bilinear transformation and Matched z-Transformation, Commonly used Analog filters and IIR Filter design example

Unit VI: Realization of Discrete-Time systems:

Structures for realization of Discrete-Time systems, realization of FIR systems: Direct Form, Cascade Form, Frequency sampling and Lattice structures. Realization of IIR filters: Direct Form, Signal flow graph and Transposed structures, Cascade form, Lattice and Lattice-ladder. Realization for IIR systems.

TEXT BOOK :

J G Prokis and D G Manolokis, "Digital Signal Processing: Principles Algorithms and Applications (Pearson Education)

REFERENCES:

1. S K Mitra: "Digital Signal Processing: A Computer-Based Approach" (McGraw Hill)
2. E C Ifeacthor and B W Jervis "Digital Signal Processing A Practical Approach" (Pearson Education)
3. A V Oppenheim, R W Schafer with J R Buck "Discrete Time Signal Processing"(PHI)

7SK1 D.S.P. LABORATORY

Minimum 12 examples based on above syllabus. Design may be implemented using C-programs or SciLab/MatLab/TMS320C25 SDK or combination thereof.

7SK2 COMPILER DESIGN

(8 Hrs. /Unit)

Unit I : Introduction to Compiling: The phases of a compiler, Lexical Analysis: The role of lexical analyzer, input buffering, specification of tokens, recognition of tokens, and language for specifying lexical analysis, lex and yacc tools for lexical analysis.

Unit II : Syntax Analysis: The role of the parser, Review of context free grammar for syntax analysis. Top down parsing: recursive descent parsing, predictive parsers, Transition diagrams for predictive parsers, Non recursive predictive parsing, FIRST and FOLLOW, Construction of predictive parsing tables, LL (1) grammars. Error recovery in predictive parsing

Unit III: Bottom up parsing: Handle pruning, Stack implementation of Shift Reduce Parsing, conflicts during shift reduce parsing, LR parsers: LR parsing algorithm, Construction of SLR parsing table, canonical LR parsing tables and canonical LALR parsing tables. Error recovery in LR parsing.

Unit IV: Syntax Directed Translation: Syntax directed definitions, attributes, dependency graphs, construction of syntax trees. Syntax directed definition for constructing syntax trees, directed acyclic graphs for expressions. Bottom up evaluation of s-attributed definitions, L-attributed definition. Top down translation, Design of a predictive translator.

Unit V: Run Time Environments: Source language issues: Activation trees, control stacks, storage organization, subdivision of run time memory, activation records, Storage allocation

strategies, static allocation, stack allocation, dangling references. Symbol table: Entries, Storage allocation, Hash tables, Scope information.

Unit VI: Code Generation: Intermediate languages, Translation of Declarations & Assignments statements. Design issues of a Code generator, Target machine, Runtime storage management, Basic blocks and flow graphs. Introduction to code optimization, principal sources of optimization.

TEXT BOOK:

A V Aho, R Sethi, J D Ullman "Compilers Principles, Techniques and Tools", Pearson Education (LPE).

REFERENCES:

1. D. M. Dhamdhere, Compiler Construction—Principles and Practice, (2/e), Macmillan India
2. Andrew Appel, Modern Compiler Implementation in C, Cambridge University press
3. K C. Louden "Compiler Construction—Principles and Practice" India Edition, CENGAGE
4. Bennett J.P., "Introduction to Compiling Techniques", 2/e (TMH).

7SK3 MICROPROCESSORS & INTERFACING

(8 Hrs. /Unit)

UNIT – I Pin configuration of 8086, Functions of various pins, Register organization. Physical memory organization and segmentation, General bus organization, I/O addressing, 8086 minimum mode system and timings.

UNIT – II 8086 Instruction set: Addressing modes of 8086. Group of instructions: data transfer group, arithmetic/logic group, branch group, machine control & I/O group of instructions. 8086 Programming using these instructions.

UNIT – III 8086 I/O address space. I/O instructions & bus cycle. 8255 PPI, pin diagram, internal organization, modes of operation, strobbed modes, interrupt driven mode, BSR mode. 8086 & I/O Interfacing through 8255.

UNIT-IV 8086 interrupt signals & system. Priority & Interrupt Vector table. Programmable Interrupt Controller 8259, pin diagram, ICWs, OCWs, modes of operation and interfacing details, cascaded mode, SFNM, polled mode, SMM.

UNIT-V Programmable Timer Counter 8254, pin diagram, internal architecture, modes of operation. Interfacing 8254 with 8086. Memory types. Interfacing memory with 8086: Static RAM and Dynamic RAM interfacing examples.

UNIT – VI DMA controller 8237, pin diagram, internal architecture, transfer modes and interfacing with 8086 processor. USART 8251, pin diagram, internal architecture, modes of operation synchronous and asynchronous modes and interfacing with 8086.

TEXT BOOK:

John P Uffenbeck, 8086/8088 Families: Designing, Programming and Interfacing (Prentice- Hall)

Reference books:

1. Liu & Gibson " 8086/8088 Microprocessors" (PHI)
2. Douglas Hall " 8086 Microprocessors & Interfacing" (McGraw-Hill)
3. Barry B Bray " The Intel Microprocessors" (9/e) (PHI).
4. Triebel & A Singh " The 8086/8088 Microprocessors" 4/e (PHI).

MICROPROCESSOR & INTERFACING LAB.

Minimum eight programs based on each unit of the syllabus. The program should cover interfacing of various peripherals with Intel 8086 processor.

7SK4 MOBILE COMPUTING

Unit-I : Mobile radio propagation: Radio waves, propagation mechanisms, path loss, slow and fast fading, Doppler effect, delay spread, inter symbol interference, coherence bandwidth. Channel coding & error control: linear block and cyclic codes, CRC, convolutional and turbo codes, ARQ techniques.

Unit-II : Cellular concept: cell area, signal strength & cell parameters, cell capacity, frequency reuse, cluster forming, co channel interference, cell splitting & sectoring. Multiple radio access: multiple radio access protocols, contention based protocols: Pure ALOHA, slotted ALOHA, CSMA, CSMAlCD, CSMAICA.

Unit-III: Multiple Division techniques: FDMA, TDMA, CDMA, OFDM, SDMA, their comparison. Modulation techniques: AM, FM, FSK, PSK, QPSK, Pi/4QPSK, QAM, 16QAM. Channel Allocation: Fixed, Dynamic, Hybrid channel allocation schemes. Allocation in specialized system structures. System modeling.

Unit-IV: Mobile communication systems: cellular system structure, registration, handoff parameters, roaming support, multicasting, security & privacy, firewalls. Existing wireless systems: AMPS, IS-41, GSM, PCS, IS-95, IMT -2000.

Unit-V: Satellite systems: types, characteristics and satellite system infrastructure, call setup, GPS: limitations & beneficiaries. A-GPS and E911. Network protocols: seven layers of OS I model.

TCP/IP protocol, TCP over wireless, Internet protocol version IPv6.

Unit-VI: Ad Hoc & Sensor Networks: characteristics ofMANETs, routing, table-driven protocols, source-initiated on-demand routing, and hybrid protocols, wireless sensor networks, fixed wireless sensor networks. Wireless personal area networks (WPANs).

Text Book:

Agrawal D.P., Zeng Q, A, "Introduction to Wireless & Mobile Systems" *(2/e)* CENGAGE Learning.

Reference Books:

1. Rajkamal "Mobile Computing" Oxford Press.
2. William Stallings "Wireless Communication & Networks" (Pearson Education)
3. Veronica A Williams "Wireless Computing Primer" (M & T Publishers)
4. Asoke Talukdar, Roopa Yavagal, "Mobile Computing" (Oxford)

7SK 5 ELECTIVE-I (I) COMPUTER GRAPHICS

Unit I : An overview of Computer Graphics and Graphics System : Video display devices, Raster-Scan systems, Random-Scan systems, Graphics monitors and workstations, input devices, hard copy devices, Graphics software.

Unit II : Output primitives : Point and Lines, Line drawing algorithms, loading the frame buffer, line function, circle and ellipse generating algorithms, curves, parallel curves algorithms, Pixel addressing, filled-area primitives , functions, Cell array, character generation.

Unit III: Attributes of output primitives : Line and curve attributes, color and grayscale levels, area fill attributes. Character attributes, bundled attributes, antialiasing.

Unit IV: 2-D geometric transformations : basic transformations, matrix representations,composite transformations, other transformations, transformations between coordinate systems, affine transformations, transformation functions,Raster methods for transformations. Two-Dimensional viewing : viewing coordinates, Window-to-viewport coordinate transformation, viewing functions, clipping : point, line, polygon, curve, text, exterior.

Unit V : Structures and hierarchical modeling : concepts, editing structures, basic modeling concepts, hierarchical modeling, GUI and interactive input methods : the user dialogue, input of graphical data, functions, initial values for input device

parameters, interactive picture - construction techniques, virtual reality environments.

Unit VI: Three dimensional concepts : display methods, graphics, Bezier curves and surfaces, B-spline curves and surfaces, Beta-splines, three dimensional geometric and modeling transformations : translation, rotation, scaling, three dimensional viewing : viewing pipeline, viewing coordinates, projections.

TEXT BOOK :

D. Hearn, M.P.Baker: Computer Graphics, (2/e) (Pearson Education)

REFERENCES:

1) F.S.Hill : Computer Graphics Using Open GL, II edition (Pearson Education)

2) W.M.Newman & R.F.Sproul : Principles of Interactive Computer Graphics, 2/e, (McGraw Hill)

5) Harrington : Computer Graphics (McGraw Hill)

7SK 5 ELECTIVE-I (II) Artificial Intelligence

UNIT I Introduction to Artificial Intelligence: Overview of Artificial Intelligence. Knowledge: General concept, Introduction to LISP: Syntax and numerical functions. Basic list manipulation functions in LISP. Functions, predicates and conditional Input, output and local variables, iteration and recursion. Property list and arrays.

UNIT II Knowledge representation - I: Syntax and semantics for propositional logic. Syntax and semantics for FOPL. Properties of Wffs. Conversion to clausal form. Inference fuels. The resolution principle, No deductive inference methods. Representation using rules.

UNIT III Knowledge representation - II: Truth maintenance system. Default reasoning and closed world assumption. Predicate completion and circumscription, model and temporal logics. Overview of object oriented systems, object classes messages and methods, simulation examples using OOS program.

UNIT IV Knowledge organization and manipulation: Preliminary concept, Examples of search problems, Uniformed and blind search. Informed search. Searching AND-OR graphs, structure used in matching. Measures for matching: distance matrices, qualitative measures, similarity measures. Partial matching, Indexing and retrieval technique, integrating knowledge in memory. Memory organization system.

UNIT V Knowledge Acquisition: General concept in knowledge acquisition, learning by induction. Analogical and explanation based learning: Analogical learning and reasoning, Explanation and learning.

UNIT VI Expert system: Expert system architectures : Introduction, Rules based system architecture. Nonproductive system architecture, Dealing with uncertainty. Knowledge acquisition and validation. Knowledge system building tools.

Text Book:

Patterson "Introduction to Artificial Intelligence & Expert Systems" (PHI)

Reference Books :

1. P.H.Winston, "Artificial Intelligence," Addison- Wesley Publication Company (2/e), 1984.

2. F.Holtz, "LISP-The language of Artificial Intelligence," TAB Books Inc. 1985.

3. D.W.Rolston, "Principles of Artificial Intelligence & Expert Systems Development," McGraw Hill, 1988.

4. E.Rich, K.K.Knight, "Artificial Intelligence," Tata McGraw Hill, New Delhi, 1991.

7SK 5 ELECTIVE-I (III) DESIGN & ANALYSIS OF ALGORITHMS

(8 Hrs./Unit)

Unit-I: Introduction to elementary algorithmic, problems & instances, Efficiency of algorithms, Average & worst-case analysis, Efficiency considerations. Elementary operations. Asymptotic notation, conditional asymptotic notation.

Unit-II : Analysis of algorithms: control structuresanalysis; sequencing,'for' loops,recursive calls, while & repeat loops, Average-case analysis, amortized analysis. Solving recurrences.

Unit-III: Advanced data structures: Heap, Binomial heaps, disjoint structures. Greedy algorithms:general characteristics. Graphs:minimum spanning trees, Kruskals' algorithm, Prims' algorithm, Shortest-path algorithms, Knapsack Problem.Scheduling.

Unit-IV: Divide-and-Conquer: Introduction, Multiplying integers, general template, binary search, Sorting : Merge-sort, Quick-sort.Insertion sort, Heap sort, Finding median, Matrix multiplication,Exponentiation, Cryptography.

Unit V: Exploring Graphs: Traversing trees; Depth-first search for undirected & directed graphs. Breadth-first

search.Backtracking. Branch-and-bound. The minimax problem, Hashing.

Unit VI: Dynamic programming; Binomial coefficients & wolrd series examples. Principle of optomality, Knapsack problem,Shortest-paths,chained matrix multiplication,Using recursion. Memory functions.Introduction to NP-completeness; class N & NP.Polynomial reduction. NP-complete problems.

Text-Book :

1. Aho, Hopcroft & Ullman " The Design & Analysis of Computer Algorithms' (Addison-Wesley)

References :

1. Horowitz & Sahani ' Fundamental Algorithms' (Galgotia)
2. Cormen, T.H, Lierson & Rivest " Introduction to Algorithms" (Mcgraw-hill)
3. Donald E. Knuth ' Fundamental Algorithms" (Addison-Wesley).
4. G.Brassard, P.Bratley " Fundamentals of Algorithmics" (PHI)

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EIGHTH SEMESTER

8 SKI EMBEDDED SYSTEMS

Unit-I Introduction: Embedded systems design, Embedded system architecture, Embedded systems model, An Overview of Programming Languages and Examples of Their Standards, Standards and Networking, Multiple Standards-Based Device Example: Digital Television (DTV).

Unit-II Embedded Hardware Building Blocks and the Embedded Board, powering the hardware, Instruction Set Aarciteture (ISA) architecture model, internal processor design and its performance.

Unit-III: Memory: ROM, RAM and auxiliary memory, Memory Management of Extemal Memory , Performance of memory .I/O : Managing Data: Serial vs. Parallel I/O , Interfacing the I/O Components ,I/O performance.Buses: arbitration, timing and performance.

Unit-IV: Device Drivers: Device Drivers for Interrupt-Handling, Memory Device Drivers, On-board Bus Device Drivers, Board I/O Driver. Embedded OS: Multitasking and Process Management, Memory Management ,.

Unit-V: Embedded OS : I/O and File System Management ,OS Standards: POSIX, OS Performance Guidelines. Middleware :

meaning and examples. Application layer software: meanings and examples.

Unit-VI: Embedded system design & implementation: Defining the System-Creating the Architecture and Documenting the Design, Stages in creating an Embedded System Architecture. Implementing the Design. Quality Assurance and Testing of the Design.

Text Book:

Tammy Noergaard "Embedded Systems Architecture" Elsevier Newnes Publication.

References:

1. Rajkamal , "Embedded Systems, Architecture, Programming & Design" TMH.
2. Jane W. S. Liu 'Real Time Systems", Pearson Education
3. Vahid & Givargis "Embedded System Design" John Wiley & Sons P Ltd.
4. Peter Marwedel "Embedded Systems Design" Springer, Netherland.

8 SK2 SOFTWARE ENGINEERING

UNIT I. Evolving role of Software. Software crises & myths. Software engineering. Software process & process models : Linear sequential, prototyping, RAD, Evolutionary Product & Process. Project management concepts : People, Product, Process, Project. WSHH principle, critical practice.

UNIT II. Measures, Metrics & Indicators. Metrics in process & project domains-software measurment, Metrics for software quality, small organization. Software projects Planning : Scope, resources, estimation, decomposition technique, Tools. Software risks : identification, risk projection,refinement & RMMM plan.

UNIT III. Project Scheduling : Concepts. Peoples Efforts. Task set, Task network. Scheduling. EV analysis, Project Plan. Software quality concepts. SQ Assurance, Software reviews, technical reviews, software reliability, ISO 900 L, SQA Plan. SCM process. Version control. SCM standard.

UNIT IV. System engineering : Hierarchy, Business Process & Product engineering : Overviews. Requirement engineering, System modeling. Requirement analysis. Analysis principles. Software prototyping. Specification. Design Process. Design Principles & Concepts. Effective modular design. Design model & documentation.

UNIT V. Software architecture, Data Design, Architectural styles,

Requirement mapping. Transform & Transaction mappings. User-interface design : Golden Rule. UTD, Task analysis & modeling, ID activities, Tools, design evaluation. Component level design : Structure programming, Comparison of design notation.

UNIT VI. Software testing fundamentals ; test case design, Whitebox testing. Basis path, control structure-, Blackbox-Testing, & for specialized environments. Strategic approach to S/W testing. Unit testing, integration testing, validation testing, system testing. Debugging. Technical metrics for software.

Textbook :

Pressman Roger. S. : Software Engineering, A Practitioner's Approach TMH.

References :

1. Somerville : Software Engineering (Addison-Wesley) (5/e)
2. Fairly R. : Software Engineering (McGraw Hill)
3. Davis A. : Principles of Software Development (McGraw Hill)
4. Shooman, M.L. : Software Engineering (McGraw-Hill)

8 SK3 HUMAN COMPUTER INTERFACES

UNIT I: Human factors of interactive software: Goals of system engineering & User-interface design, motivation for human factors, accommodation of human diversity, High level theories, Object-Action interface model, Recognition of the diversity, Eight golden rules of interface design, Preventing errors, Guidelines for data display and data entry, Balance of automation and human control.

UNIT II: Managing design process, Organizational design to support usability, the three pillars of design, Development methodologies, ethnographic observation, Participatory Design, Scenario Development, Social impact statement for early design review, legal issues, Software tools: specification methods, Interface-Building tools, Evaluation and Critiquing tools.

UNIT III: Direct manipulation and virtual environments, example of direct manipulation system, Explanations of direct manipulation, OAI model, Visual thinking and icons, direct manipulation programming, home automation, Remote Direct manipulation, Virtual environments.

UNIT IV: lnteraction devices: Keyboards and function keys, Pointing devices, Speech recognition , digitization and generation, Image and Video Displays, Printers. Response time and Display rate: Theoretical foundations, Expectations and

attitudes, User Productivity, Variability.

UNIT V: Multiple window strategies, Individual windows design, Multiple window design, Coordination by tightly coupled windows, Image browsing and tightly coupled windows, Personal role management and elastic windows. Computer supported cooperative work: Goals of cooperation, Asynchronous interaction, Synchronous distributed and face-to-face, Applying CSCW to education.

UNIT VI: lnformation search and visualization, Database Query and phrase search in textual documents, multimedia documents searches, Information visualization, advanced filtering. Hypermedia and the World Wide Web, Genres and goals and designers, Users and their tasks, Object action interface model for web site design.

Text Book

Ben Shneiderman "Designing the User Interface" (Pearson Education)

Reference Books:

1. R. Beale, A.J. Dix, J. E. Finlay, G. D. Abowd "Human-Computer Interaction" (Prentice-Hall).
2. Joann Hackos, Janice Redish, "User and Task Analysis for Interface Design" (Wiley).
3. Jeff Raskin, "The Humane Interface" (pearson Education).
4. Jesse James Garrett, 'The Elements of User Experience" (New Riders)

8SK4 ELECTIVE-II (I) MULTIMEDIA TECHNOLOGIES

UNIT I. Multimedia Authoring and Data Representations: Components of Multimedia. Hypermedia and Multimedia. Multimedia Authoring, VRM. Graphics Image Data Representations: 8-Bit Gray-Level Images, 24-Bit Color Images, 8-Bit Color Images, Popular Image File Formats.

UNIT II. Color in Image and Video Color Science, Color Models in Images, Color Models in Video. Fundamental Concepts in Video: Types of Video Signals, Component Video, Composite Video, S- Video, Analog Video, NTSC Video, PAL Video, SECAM Video, Digital Video.

UNIT III. Basics of Digital Audio: Digitization of Sound, Digitization, Nyquist Theorem,Signal-to-Noise Ratio (SNR), Signal-to-Quantization-Noise Ratio (SQNR), MIDI: Musical Instrument Digital Interface. Hardware Aspects of MIDI, Structure of MIDI Messages, MIDI-to- W A V Conversion.

UNIT IV. Multimedia Data Compression: Lossless Compression Algorithms: Run-Length Coding, Variable-Length Coding, Dictionary-Based Coding, Lossy Compression Algorithms: Distortion Measures, Quantization, Uniform and Non-uniform Scalar Quantization, Image Compression Standard: The JPEG Standard.

UNIT V. Basic Video Compression Techniques: Introduction, Video Compression Based on Motion Compensation, Search for Motion Vectors, H.261 Encoder and Decoder, MPEG-l, Motion Compression in MPEG-l, MPEG-2, Supporting Interlaced Video, MPEG-2 Scalabilities.

UNIT VI. Basic Audio Compression Techniques: ADPCM in Speech Coding, Vocoders, Phase Insensitivity, Channel Vocoder, Format Vocoder, Linear Predictive Coding. Audio Compression: Equal-Loudness Relations, Frequency Masking, Temporal Masking, MPEG Audio, MPEG Layers, MPEG Audio Compression Algorithm.

Text Book:

Ze-Nian, Li, Mark S. Drew "Fundamentals of Multimedia" (Pearson Education)

References:

1. Rajan Parekh "Principles of Multimedia " (Tata McGraw-Hill)
2. S.J. Gobbs & D.C. Tsichritzis "Multimedia Programming". Addison Wesley 1995
3. P.W. Agnew & A.S. Kellerman "Distributed Multimedia"., Addison Wesley 1996
4. F. Fluckiger," Understanding Networked Multimedia". Prentice-Hall 1995

8SK4 ELECTIVE-II (II) EXPERT SYSTEMS

Unit I: Introduction to Expert System: Advantages, General Concepts and Characteristics of Expert System, Development of Expert system technology, Expert systems applications and domains, Language, Shells, Tools. Elements of Expert system, Production system, Procedural and non-procedural paradigms.

Unit II: Knowledge Representation-Introduction, Productions, Semantic Nets, Object -Attribute-Value nets, Schemata, Frames, Logic and Sets, Propositional Logic, The First Order Predicate Logic, The Universal Quantifier, The Existential Quantifier, Quantifiers and Sets, Limitation of Predicate Logics.

Unit III: Inference: Introduction, Trees, Lattices and Graphs, State and Problem Spaces, AND-OR Trees and Goals, Deductive

Logic and Syllogisms, Rules of Inference, Limitation of Propositional logic, First-Order Predicate logic, Resolution systems and Deduction, Shallow and Causal Reasoning, Forward and Backward Chaining, Meta-knowledge, Hidden Markov Models.

Unit IV: Reasoning under Uncertainty: Uncertainty, Types of Error, Errors and induction, Classical Probability, Experimental & Subjective Probabilities, Compound & Conditional Probabilities, Hypothetical Reasoning & Backward Induction, Temporal Reasoning & Markov Chains, The Odds of Belief, Sufficiency & Necessity, Uncertainty in Inference Chains, The combination of Evidence, Inference Nets, The Propagation of Probabilities.

Unit V: Inexact Reasoning: Introduction, Uncertainty and Rules, Certainty factors, Dempster-Shafer Theory, Approximate Reasoning, The state of Uncertainty, Application of Fuzzy logic. , Design of Expert Systems: Problem Selection, Stages in Development of an expert system, Errors in Development Stages

Unit VI: Design of Expert Systems: Software Engineering and Expert Systems, The expert system life cycle, Detailed Life Cycle Model. Expert System design examples involving certainty factors, decision trees and backward chaining.

Text Book:

J. C. Gairratan & Gary D. Riley 'Expert Systems Principles and Programming" Cengage Learning.

Reference Books:

1. Peter Jackson, "Introduction to Expert Systems, "Addison-Wesley, 1986.
2. D.W.Rolston, "Principles of Artificial Intelligence & Expert Systems" McGraw Hill.
3. E.Rich, & K.K.Knight, "Artificial Intelligence," Tata McGraw Hill, New Delhi, 1991.
4. W. Siller & J. J. Suckly" Fuzzy Expert Systems" Wiley Interscience 2004.

8SK4 **ELECTIVE-II (III) MODELING & SIMULATION**

(8 Hrs./Unit)

UNIT – I System Models and System studies: Basic concepts of systems and system modeling static and dynamic/physical and mathematical models-principles used in modeling.Corporate models- analysis, design and postulation of system.

UNIT – II Basic Concepts and continuous system : Techniques used-

distributed log models and cobweb models continuous system Model- Analytical equations and methods of obtaining solutions –analog and hybrid computers and simulations CSSLS examples of different continuous system

UNIT – III System dynamics, probability concepts and basic principles of discrete simulation Growth and decay models system dynamics diagrams examples-stochastic Process-probability functions and their evaluation-random number generation–rejection method-comparison of Monte-Carlo method and stochastic simulation-examples.

UNIT – IV Simulation of Queuing System: Simulation of Queuing system: Rudiments of queuing theory, simulation of a single server queue, simulation of a two server queue, simulation of more general queues.

UNIT-V Simulation of a PERT Network: Network model of a project, Analysis of an activity network, critical path. Inventory Control and Forecasting Elements of inventory theory, more Complex inventory models

UNIT – VI Design and Evaluation of Simulation Experiments: simulation example=1, Generation of Poison and Erlanger variates, Simulation example- 2, Forecasting and regression Analysis. Length of Simulation runs, variance reduction techniques, Experimental layout, Validation.

TEXT BOOKS:

1. Groffrey Gordon "System Simulation", II Edition, PHI Pvt.Ltd., New Delhi- 1987.

REFERENCES:

1. Shannon R.E.,"System Simulation:The Art of Science" Prentic Hall,Englewood Cliffs,NY,1975.
2. Hugh j. Wston, John H.Blackstone,Jr., "Computer Simulation" Iind Edition, John Wiley & Sons.
3. James A. Payne "Introduction to Simulation: Programming Techniques and Methods of Analysis" McGraw Hill.
4. Narsingh Deo, "System Simulation with Digital Computers" PHI. New Delhi.

8SK5 PROJECT & SEMINAR

1. Students should use open source code for studying best programming practices and present those in seminars and projects.
2. Students can use open source recent papers from www.citeseer.org and Google-Scholar for their projects.

3. Use of open source software like Linux, Apache, MySQL, Python, gcc, yacc, LEX tools etc. shall be encouraged.
4. Projects topics must belong to core computer engineering discipline and shall **not** be from applications areas.
5. External examiners for project shall ensure that the projects implementation reflects the computer engineering core areas like computer architecture, embedded systems, operating system design, compiler design, human-computer interface design, algorithm design for computer engineering, computer networks protocol design etc.

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APPENDIX-D
FOUR YEAR DEGREE COURSE
BRANCH : COMPUTER ENGINEERING
SEMESTER PATTERN
SEMESTER: SEVENTH

ABBREVIAIONS :-
S – Semester
K- Computer Engineering

Teaching Scheme				Examination Scheme								Grand Total
T	P/D			Theory				Practical				
			Total Hours/ Week	Duration of Papers (Hrs)	Max. Marks Theory Papers	Maximum Marks College Assessment	Total	Min. Pass Marks	Max. Marks External	Max. Marks Internal	Total Marks	Minimum Pass Marks	
4	-	2	6	3	80	20	100	40	25	25	50	25	
4	-	2	6	3	80	20	100	40	25	25	50	25	
4	-	2	6	3	80	20	100	40	25	25	50	25	
4	-	-	4	3	80	20	100	40	-	-	-	-	
4	-	-	4	3	80	20	100	40	-	-	-	-	
-	-	2	2	-	-	-	-	-	-	-	-	-	
20	-	8	28				500				150		650

ial Intelligence (iii) Design & Analysis of Algorithms

SEMESTER: EIGHTH

4	-	2	6	3	80	20	100	40	25	25	50	25	
4	1	-	5	3	80	20	100	40	-	-	-	-	
5	-	2	7	3	80	20	100	40	25	25	50	25	
4	-	-	4	3	80	20	100	40	-	-	-	-	
-	-	6	6	-	-	-	-	-	75	75	*150	75	
17	1	10	28				400				250		650

Expert Systems (iii) Modelling & Simulation

- 25, University Oral – 75

DIRECTION

No. 44/2010 Date : /0 /2010

Subject :Examinations leading to the Degree of Bachelor of Engineering (Computer Engineering) (Four Year Degree Course ..... Semester Pattern)

Whereas, the Regulation No. 12 of 2009 in respect of Examinations leading to the Degree of Bachelor of Engineering (Computer Engineering) (Four Year Degree Course ..... Semester Pattern) Regulation, 2009 is in existence in the University,

AND

Whereas, the Chairman, Board of Studies in Computer Science & Engineering has recommended that in Appendix-D appended with the Regulation No. 12 of 2009, the subject title at Sr. No. 1, '7 SK 1 Digital Image Processing' appear in the scheme of VII Semester B.E. Computer Engineering be substituted by the title "7 SK 1 Digital Signal Processing" ,

AND

Whereas, the above substitution was accepeted by the Hon'ble Vice-Chancellor under Section 14 (7) of the M.U. Act, 1994 on behalf of Board of Studies in Computer Science & Engineering, Faculty of Engineering & Technology and the Academic Council on 21/6/2010,

AND

Whereas, the substitution in the schemes of teaching & examinations of VII Semester Bachelor of Engineering (Computer Engineering) is required to be regulated by the amending the respective Regulation,

AND

Whereas, the process of amending the Regulation is likely to take some time,

AND

Whereas, the schemes of teaching & examinations of VII & VIII Semesters B.E. (Computer Engineering) course are to be implemented from the academic session 2010-2011,

AND

Whereas, syllabus for VII & VIII Semesters B.E. (Computer Engineering) course is to be sent for printing.

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

1) This Direction shall be called "Examinations leading to the Degree of Bachelor of Engineering (Computer Engineering) (Four Year Degree Course ..... Semester Pattern), Direction, 2010"

2) This Direction shall come into force from the date of its issuance.

3) In Appendix-D appended with the Regulation No. 12 of 2009 in respect of Examinations leading to the Degree of Bachelor of Engineering (Computer Engineering) (Four Year Degree Course ..... Semester Pattern) the subject title at Sr. No. 1, '7 SK 1 Digital Image Processing' appear in the scheme of VII Semester B.E. Computer Engineering be substituted by the title "7 SK 1 Digital Signal Processing".

Sd/-
(Kamal Singh)
Vice-Chancellor

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