

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 VI SEMESTER
EXAMINATIONS, 2009-2010
SEMESTER PATTERN



2009

visit us at www.sgbau.ac.in

Price Rs. 12/-

-
- © "या अभ्यासक्रमिकेतील (Prospectus) कोणताही भाग संत गाडगे बाबा अमरावती विद्यापीठाच्या पूर्वानुमती शिवाय कोणासही पुनर्मुद्रित किंवा प्रकाशित करता येणार नाही ."
- © "No part of this prospectus can be reprinted or published without specific permission of Sant Gadge Baba Amravati University.

**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 advised 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 scholar.google.com for literature survey requirements.

Inplant 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 strictly 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 inplant 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 proceeding 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 transforms, properties of Fourier transforms, convolution theorem, Fourier sine and Fourier cosine transforms and integrals.

b) **Partial 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) $Pp+Qq=R$ (Lagrange's 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 Taylor's and Laurent's series. (10 Hrs.)

UNIT-VI **Vector calculus:-** 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 vector fields. (10 Hrs.)

BOOKS RECOMMENDED:-

- 1) Elements of Applied Mathematics by P.N. Wartikar and J.N. Wartikar
- 2) A Text Book of Differential Calculus 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

Unit II: 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, ActionListener: 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)

REFERENCES

- 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
<pre style="margin-left: 200px;">* * * * * * * * * *</pre> |
| 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 entered 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 compilation, 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:- Computability theory:-
Finite state machines, Finite state acceptors and regular grammars. Turing, 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 Mathematics" 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 resistance. Rectifying circuits & dc power supplies, HWR, FWR, BR, comparison. Filter circuits for power supplies: Inductor, Capacitor, LC, IT Filters.
- UNIT II : Concept of amplification, A_i , A_v and A_p ; R_i , R_o . 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 : Oscillators : 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, Common source AC amplifier. Fixed Bias. Source follower, Frequency Response. Introduction to MOSFETS.
- UNIT VI: Opto Electronic Devices : Fundamentals of light, photoconductive sensors, photodiodes, phototransistors, their principle of operation & applications. photovoltaic sensors. photoemissive sensors. Light emitters, Alphanumeric displays. photocouplers.

Text Books :

1. Malvino : Principles of Electronics (TMH)
2. Millman & Halkias : Electronic Devices & Circuits (Mc Graw Hill)
3. Millman & 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, Abstract 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 extraction & 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 Stroustrup 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 a 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 a 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)

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. Multidimensional arrays, Pointer arrays. Record structures and their memory representation. Matrices and sparse matrices.
- Unit-III: Linked lists and their representation in memory, traversing a linked list, searching a linked list. Memory allocation & garbage collection. Insertion deletion operations 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, searching, inserting and deleting in binary trees. Heap and heapsort. Path length & Huffman'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 a 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 structure of computer: Hardware & software. Addressing methods. Program sequencing. concept of memory locations & address. Main memory operation. Instructions & instruction sequencing. Addressing modes. Basic I/O operations. Stacks. Queues & subroutines.

- Unit-II: Processing Unit: fundamental concepts. execution of a complete instruction. hardwired control, performance consideration. Microprogrammed control; microinstructions, microprogram sequencing, microinstruction prefetching, emulation.
- Unit-III: I/O organization: accessing I/O devices, interrupts, direct memory access; bus arbitration. I/O hardware: processor bus and interfacing circuits, 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 devices: Modems.

Text-Book:

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

References:

1. Stallings. W. "Computer Organization & Architecture" (5/e) (Pearson Education).
2. Tenenbaum 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-subtractor , 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 "Digital 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

- Unit II: Duties. Directive Principles of State Policy.
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, Characteristics 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 comparison 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. James 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)

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)

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.
- . Environmental 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 legislation.
- . 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)

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.
 - . Disaster 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, Centre 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 History Society, Mumbai (R)
 - 10) Heywood, V.H. & Watson, R.T. 1995, Global Biodiversity Assessment, Cambridge 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 घारपुरे : पर्यावरणशास्त्र- पिंपळापूरे अॅन्ड कंपनी पब्लिशर्स, नागपूर.(R)
 - 24) Dr. Deshpande, A.P.Dr. Chudiwale, A.D., Dr. Joshi, P.P., Dr. Lad, A.B.: Environmental Studies, Pimpalapur & Co., Publishers, Nagpur. (R)
 - 25) R.Rajagopalan : Environmental Studies, Oxford University Press, New Delhi, 2005 (R)

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

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.

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, Vogel 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 Gillet "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 Hours)
- 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 pictorial devices. (10 Hours)
- Unit III: Specific formats for written communication like – business correspondence, formal reports, technical proposals, research papers and articles, advertising and graphics. Format for day-to-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 Hours)

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 laboratory experiments.

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

<http://www.teachingenglish.org.uk>

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

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 Dhamdhare “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: Relational Model: 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 amounts lent 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 III: 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.
- Unit 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. Prosize: 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,

- 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).

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

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

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

Sr. No.	Sub. Code	SUBJECT	Teaching Scheme			Examination Scheme									
			L	T	P/D	Theory					Practical				
No.						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
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	SUBJECT	Teaching Scheme			Examination Scheme									
			L	T	P/D	Theory					Practical				
No.						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 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

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

Sr. No.	Sub. Code	SUBJECT	Teaching Scheme				Examination Scheme								
			L	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			
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

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 competent 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 University examination through an affiliated college, Department or Institute in which he/she has prosecuted a regular course of study.
 - (vi) "Examinee" means a person who presents 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 an 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, learning 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 eligible.

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.

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 First, 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.
