MAHARSHI DAYANAND SARASWATI UNIVERSITY, AJMER

पाठ्यक्रम

SYLLABUS

SCHEME OF EXAMINATION AND COURSES OF STUDY

FACULTY OF SCIENCE

B.Sc. Computer Science

I Year Examination (w.e.f. 2015-16)

II Year Examination (w.e.f. 2016-17)

III Year Examination (w.e.f. 2017-18)

महर्षि दयानन्द सरस्वती विश्वविद्यालय, अजमेर

NOTICE

1. Change in Statutes/Ordinances/Rules/ Regulations Syllabus and Books may, from time to time, be made by amendment or remaking, and a candidate shall, except in so far as the University determines otherwise comply with any change that applies to years he has not completed at the time of change. **The decision taken by the Academic Council shall be final.**

सूचना

1. समय-समय पर संशोधन या पुन: निर्माण कर परिनियमों/ अध्यादेशों/नियमों / विनियमों / पाठ्यक्रमों व पुस्तकों में परिवर्तन किया जा सकता है, तथा किसी भी परिवर्तन को छात्र को मानना होगा बशर्ते कि विश्वविद्यालय ने अन्यथा प्रकार से उनको छूट न दी हो और छात्र ने उस परिवर्तन के पूर्व वर्ष पाठ्यक्रम को पूरा न किया हो। **विद्या परिषद द्वारा लिये गये निर्णय अन्तिम होंगे।**

TEACHING AND EXAMINATION SCHEME FOR B. Sc (Computer Science) I Year

Paper Name (Theory)	Lec	Exam Hours	Min Marks	Max Marks
BSCCS - 01 Computer Programming Fundamental	3	3	18	50
BSCCS - 02 Digital Computer Organization	3	3	18	50
BSCCS - 03 Electronics I	3	3	18	50
BSCCS - 04 Electronics II	3	3	18	50
BSCCS - 05 Computer Maintenance I	3	3	18	50
BSCCS - 06 Computer Maintenance II	3	3	18	50
		Total of Theory		300
Paper Name (Practicals)	**Pract Hours**	**Pract Exam**	**Min Marks**	**Max Marks**
BSCCS - 07 Computer Lab (Digital)	3	3	18	50
BSCCS - 08 Electronics Practical Lab	3	3	18	50
BSCCS - 09 Programming Lab	3	3	18	50
		Total of Practicals		150
		Grand Total (Theory + Practicals)		450

Note: 1. The question paper will be divided into 3 parts:

Part A:

1. 10 Question of 1.5 mark each - 15 marks
2. Answer should not exceed more than 50 words
3. All questions are compulsory

Part B:

1. 5 Questions of 3 marks each - 15 marks
2. Answer should not exceed more than 50 words
3. All questions are compulsory

Part C:

1. 3 Questions of 7 + 7 + 6 marks - 20 marks. There will be an internal choice in each question.
2. Answer should not exceed 400 words
3. All questions are compulsory.

2. A Laboratory Exercise File should be prepared by each student for each practical paper and should be submitted during practical examinations.
3. One internal and one external examiner shall conduct two practical exams, in a day, of a batch of 40 students.
4. Duration of practical exam is 3 hours.
5. Practical of 50 marks distribution is as under:
   a. 30 marks for practical examination exercise for 3 questions.
   b. 10 marks for Viva-voce
   c. 10 marks for Laboratory Exercise File.

B. Sc. (Computer Science)
Scheme of Examination

The number of paper and the maximum marks for each paper are shown against each subject separately. It will be necessary for a candidate to pass in the theory part as well as the practical part of a subject/paper, wherever prescribed, separately.

Classification of successful candidates shall be as follows:

First Division	60%	of the aggregate marks prescribed at (a) Part I Examination, (b) Part II Examination,
Second Division	48%	(c) Part III Examination, taken together

All the rest shall be declared to have passed the examination, if they obtain the minimum pass marks in each subject viz. 36% no division shall be awarded at the Part I and Part II examination.

Note:

Eligibility for admission in First year of B. Sc. (CS) is 10+2 with Science examination of any board with at least 50% marks. As regards admission on reserved category seats government rules will be applicable.

BSCCS - 01 COMPUTER PROGRAMMING FUNDAMENTAL

C Programming Practical Laboratory

Different data types and sizes, variable names, constants, Declaration, Type conversion,

Arithmetic, operations, Relation and Logical operators, Increment and Decrement operators, Bitwise and Logical operators, Assignment operators and Expressions, Precedence and order of Evaluation.

Statement and Blocks, if-else, else, switch, while, for, do-while loops, break, continue, go to and labels, function and Program structures, function structures, Function Arguments, External, Static, Register variables, Scope rules, structure, initialization, Recursion.

Pointer and Addresses, Pointers and Function arguments, Pointer and Arrays, address arithmetic, character Pointers and functions, Multidimensional Arrays Pointer arrays, Pointers to Pointers, Initialization of pointer arrays, pointers v/s Multidimensional arrays, command line arguments, Pointer to functions.

Structure and function, Arrays of structures Pointers to Structures, Self- Referential structures, Table lookup, Fields, Union, Typedef.

Standard input and Output Formatting input & output, in memory format conversion, File access, Error Handling, Line I/O.

BSCCS - 02 DIGITAL COMPUTER ORGANIZATION

Representation of Information: Numeric and Nonnumeric, Number Integer and Real Binary, Octal, Hexadecimal, Positive and Negative Numbers Arithmetic in Number systems. Ten's complements, 1's and 2's complements, Binary multiplication and Division. characters: ASCII and EBCDC codes, Error detection and Correction Codes: concept, Minimum Distance 3code, Hamming Code.

Basic Logic Design; Logic Gates; AND, OR, Not, BNOR, NAND, EXOR, Introduction to ITL Gates, Truth Table, Boolean , Algebra: Boolean Relational, Sums, Algebraic, Simplification and Minimization of Boolean Full Adder, Decoder, Demultiplexer Encoder, Multiplexers.

Sequential Logic Circuit: Flip-flop: RS Clocked, D, JK, Master Salve Flip flop, Shift register, Shift Left, Shift Right, Bidirectional Shift, Counter: Ripple, Synchronous, RingUp, Down, Memory, type of memory, RAM, Rom, and their Specifications, Secondary Memory Device: Tape, Dist, Floppy, drum, Optical, CD ROM, Magnetic Bubble Memory and charge coupled Devices.

ALU, Register Unit, Control and Timing unit, System Bus, Address bus, Data Bus, Control Bus and utility lines, Accumulator, Generals purpose registers, Special purpose register program counter(PCP, stack Pointer(SP) Status register, Instruction register, index register, memory Address register (MAR) and Memory Buffer Register(MBR).

Input devises: Keyboard, Mouse, Light pen, Joystick, Trackball, Scanner, Voice Input System Output devices: CRT, Printer, Dot matrix, Letter quality, Nonimpack, Inkjet, Laser, Line and Page printers, plotter, Microfilm and microfiche, voice output system. IO Architecture: properties of simple 10 devices and their controller. Transfer of information between I/O device, CPU and Memory, Program controlled and interrupts controlled information transfer.

BSCCS - 03 ELECTRONICS - I

Passive component: Resistors: Symbol, types: carbon, metal filament, wire wound, thin film, Fixed and variable, potentiometers and presets, log and linear type specifications, color code, testing of resistors area of applications problems related to joule heating tolerance temperature coefficient applications in potential dividers coazrse AND FINE PRESETS ETC. Inductors Symbol, type air core iron core, ferrite core frequency response of an inductor specifications measurement of inductance choke AF and RF, their uses and area of applications nagaoka formula for fabrication a single layer coil inductance multi layer coil formula Problems related to a. C. impedance angle between current and voltages power factor. Transformers Principle types (single phase) auto and main transformers Design of mains and step down transformers Simple Idea of AF, IF, RF driver transformers.

Capacitors: Symbol, code, types: mica, paper, ceramic tantalum poly styrene their construction, working and uses, specifications, testing of condenser, area of applications, problems related to electrical en energy stored design of capacitors phase lag resonance in series and parallel to inductor, leakage effects Relays their types Microphones Loudspeakers their types combinations specifications testing and uses in various field problems and exercises related to lout speakers outputs relay currents phase lag maximum switching rates etc. Switches SPDT, DPDT, Band, switches touch switches thumb wheel switches micro switches specifications and application areas ideal voltage and current source NICD cells.

A.C. Circuits: A.C. current and voltages. RMS and mean value, operator LR, CR, LCR Circuits series and parallel resonance circuits, factor band with coupling circuits coefficients of coupling choke coils, problems and numerical related to power factor, phase relationship between land through band across L at different frequency B, W and Q calculations, variation of 1,V and as a function of frequency.

Circuit Theory: Thevenin's Norten's and Millman's theorems maximum power transfer theorem, reciprocity theorem, problem related to theorems idea of clipper and voltage doubler.

BSCCS - 04 ELECTRONICS - II

Basics of Semiconductors and p-n junction: Conductor, Semiconductors and Insulators, their classification on the basis of Band theory. Intrinsic and extrinsic semiconductors, Fermi level in semiconductors N type and Ptype , current in semiconductors, drift and diffusion-N junction forward and reverse of diode , concept of recombination of carriers temperature variation of forward current and reverse current through the p-n junction. The Rectifier equation, the temperature coefficients, dynamic and junction, the Rectifier equation, the temperature coefficients, dynamic and static resistances, voltage dependent junction capacitance of a p-n junction.

Zener diode characteristics, Zener diode applications, Schottky Barrier hot carrier diodes, Varactor diodes, power diodes, tunnel diodes photo diodes, photoconductive cells. IR emitters, light emitting diode solar cells, thermostats, problems related to nominal voltage of Sneer diode at a certain temperature, Maximum wattage rating. Sneer as regulator range of input voltages for sneer in ON states, capacitance, temperatures coefficient of varactor, its high frequency impedance. Photon energy and coefficient of varactor, its high frequency impedance, photons energy and forward and backward currents in photodiode, thermistor, resistance Chan change solar cell output, relative efficiency of LED, conversion efficiency of solar cell etc.

BJT, their characteristics in different configurations of comparative merits and demerits Biasing of transistors, different methods, Load liner Q-point thermal stability, Transistor as a ON/OFF switch. Transistor as an amplifier in CE, CB, CC and their relations, relativ merits and demerits of each configuration. Current gain, power gain, voltage gain (decibel unit), Analysis of CE amplifier on the basis of input impedance, power gain, emitter follower, Darlington pair and their advantages.

Single stage RC couple amplifier, frequency response class A, class B, class AB, class C, push-pull amplifier, efficiency of class A, B, AB and C amplifier. Applications of these input V/S output waveform analysis in this amplifier, related problems cascading of the amplifier.

Introduction to Silicon Controller Rectifier (SCR) SCR characteristics and ratings, SCR construction and terminal identification's application, Silicon controlled switch, gate turn off, light activated SCR, shockely diode, DIAC, TRIAC,

injunction transistor, its construction and characteristics, symbol and its uses as relaxation oscillator

BSCCS - 05 COMPUTER MAINTENACE - I

Electonic Components (Passive Elements)

Working Principles, Symbols, Types, Technical Specifications, Partmeter Value Identification/Measurements Techniques and Application areas for resistors, Indutors, Capacitors, Transformers, Relays, Switches, Cables, Batteries, PCBS, Fuses etc.

Network Theorems: Kirchhoffs Current and Voltage Laws, Maximum Power Transfer Theorem Super Position, Theorem Thevenin's and Norton's theorems.LCR and Wave shaping Circuits: Series and Parallel LCR Resonance Circuits, Low Pass, High Pass, Banc Pass and Band Reject Filters, Clipping and Clamping Circuits, Charging and Discharging of Capacitor in a RC Circuit Concept of Time Constant.

Electronic Components (Active Elements) : Working Principles, Symbols, Types, Technical specifications, Parameter Value Identification and Applications area for PN Junction Diodes-Linear, Varactor, Photodiode, LED, Zener Diode, Opto-Isolators, BIT - Characteristics, Basic Configurations, Biasing, Operating Point, Load Line, Biasing for Stabilization of Operating. Point, UJT, JEET, MOSFET, SCR Dias, Triac.

Amplifiers: Different terms used with Amplifiers, such as Signal, Source, Input, Output, Voltage and Current Gain. Power Gain, Decibel Input Output, Impedance, Classification According to Frequency Response Biasing Point.

Operational Amplifiers: Basic idea of an OPAMP with black box concept, inverting and no inverting inputs, virtual ground, OPAMP parameters, qualitative description of OPAMP applications such as inverting, non inverting summing and difference amplifier, comparator and linear integrator.

BSCCS - 06 COMPUTER MAINTENANCE - II

Generation of Computers (From mechanical to Integrated Circuits), Types of Computers, Digital, Analog, Micro, Mini computers, Main Frames, Working of Computers (Batch Processing System Time Sharing System, On line System, Real Time system), Real Speed of Processors (Mips, Flops, Mhz), Application of Computers (Metrology, Communication, Arts and Cultures etc.).

Introduction to Memory, memory Organization, Types of Memory (RAM, ROM, EPROM, EEPROM), Overview to Floppy disk, Tracks, Sectors, DSDD, DSHD, Calculation of capacity of Disk Introduction to Hard Disk Drive, Magnetic Tape Drives, Disk Operating System (DOS), Introduction to Batch Files, Configuration Files, Com, Exe, Sys, Bin and TXT File. Internal commands (COPY CON, TYPE, DATE, TIME RENAME, CLS, PATH, COPY, MD, CD, RD) External Commands (FORMAT, TREE, MODE, DISKCOPY, CHKDSK, MORE, FDISK, XCOPY, UNDELETE, UNFORMAT).

UNIX: Introduction to UNIX Operation System, Characteristics of UNIX, Dif-

ference between DOS and UNIX Operating System, Command MKDIR, REMDIR, CP, LPR, LS, MAIL, WALL, PS, KILL, BANNER, Introduction to VI Editor, ED Editor, Advanced VI Editor.

Introduction to Real Time System, Characteristics of Real time Systems. Introduction to Multimedia, Multimedia Requirements, Introduction to CD-ROM, Introduction to MIDI, and Characteristics of Sound Blaster.

Uses of Computer N/Ws, N/W, I+W Products, Design Issues for Layers, Interfaces and Services, Connection-oriented and Connectionless Services, Primitives, OSI Reference Model, TCP/IP Reference Mode, Comparison of OSI and TCP/IP Model, Knowledge of LAN, S/W used now a days.

LABORATORY

BSCCS-07 COMPUTER LABORATORY

Practical exercise on programming fundamentals:

1. Simple C programs for exchanging value of Two Variable summation of a set of numbers, Factorial computation.
2. C Program of or Sine function computation, Generation of Fibonacci Sequence, Reversing the digits of an Integer.
3. C program finding of square root of a number, GCD computation, generation of Prime numbers.
4. C program for Computing the Prime Factor of an Integer, Generation of pseudo-random Number, Computing the nth Fibonacci number.
5. C Program for partitioning of an array with reference to a given elements. Finding the kth smallest element finding the Longest Monoton subsequence in an array.
6. C program for Binary Search
7. C programs for TEXT line length adjustment, Right and Left Justification of TEXT.
8. C Program for keyword searching in Text, Text line editing Linear Pattern Search.
9. Introduction to Shell Programming for File creation, File merging, files copying.
10. Introduction to Shell Programming in Unix-illustrated by Summation N number, Variable Exchange. Use of IF-THEN Structure, Factorial computation, G.C.D, Computation, Exchanging the Digit of an Integer Comparison of Three Number.

Practical Exercise on Digital Computer Organization Fundamentals:

1-7 Study of Logic Gates AND, OR, NOT, XOR, AND, NOT, XOR.
8-10 Study of JK, FF, D-FF and Tiffs.
11-15 Study of Synchronous, Asynchronous, up, down Counters.
16-20 Study of Demultiplexers, encoder and decoder

BSCCS-08 ELECTRONICS PRACTICAL LAB

Suggested Experiments

1. To study the sensitivity CRO and their uses.

2. Study the characteristics of Si and Ge diode and determination of bulk resistances. Using high impedance of OP-Amp, based meters.
3. To study the forward and reverse characteristics of Zener diode and determination of its parameters using high Impedance of Op-Amp, based meters.
4. To study half wave and full wave unregulated power supply in the light of its ripple factor and regulation.
5. Study of Zener regulated power supply.
6. Study of I.E. regulated power supply of fixes and variables volts.
7. To study the characteristics of PNP transistor in CB and CE configuration and determination of h-parameters from characteristics.
8. To study the characteristics of NPN transistor in CB and CE configuration and determination of h-parameters form characteristics.
9. Measurements of h-Parameters of transistor by direct method.
10. To study the Emitter Follower.
11. To study the characteristics of SCR and one of its uses
12. To study the integrating and Differentiating Circuits.
13. To study the characteristic of UIT and one of its uses.
14. To fabricate the Transformers with and without Core and compare observed characteristics with the expected values.
15. To study the charging and discharging of condenser in an RC circuit as well as in an RL circuit.

BSCCS-09 COMPUTER MAINTENANCE LABORATORY

Suggested Experiments Electronics:

1. To study the Horizontal Sensitivity of CRO.
2. To study the Vertical Sensitivity of CRO.
3. Wave shape studies using a CRO.
4. Voltage Measurements using a CRO.
5. To Study half wave and full wave unregulated power supply in the light of its ripple factor and regulation.
6. Study of I.C regulated power supply and Battery.
7. Study of Step Down Transformer.
8. To fabricate Transformers with and without Core and compare observed characteristics with the expected values.
9. To study the charging and discharging of condenser in an RC circuit as well as in an RL circuit.
10. Testing of faulty components using multi meter.
11. To study of LCR resonance circuit and determination of Q factor and band width in both series and parallel cases.
12. Determination of internal resistance of a battery as function of time during its discharge.
13. Kirchoff's Law verification.

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TEACHING AND EXAMINATION SCHEME FOR
B. Sc (Computer Science) II Year

Paper Name (Theory)	Lec	Exam Hours	Min Marks	Max Marks
BSCCS - 10 Computer Oriented Statistical Methods	3	3	18	50
BSCCS - 11 C++ Programming & Data Structures	3	3	18	50
BSCCS - 12 Business Data Processing	3	3	18	50
BSCCS - 13 Computer Architecture	3	3	18	50
BSCCS - 14 Microprocessor Interfacing and Computer Hardware - I	3	3	18	50
BSCCS - 15 Microprocessor Interfacing and Computer Hardware - II	3	3	18	50
		Total of Theory		300

Paper Name (Practicals)	Pract Hours	Pract Exam	Min Marks	Max Marks
BSCCS - 16 Computer Lab (Digital)	3	3	18	50
BSCCS - 17 Electronics Practical Lab	3	3	18	50
BSCCS - 18 C++ Programming & Data Structures	3	3	18	50
Total of Practicals	150			
	Grand Total (Theory + Practicals)			450

Note:

1. The question paper will be divided into 3 parts:

Part A:

1. 10 Question of 1.5 mark each - 15 marks
2. Answer should not exceed more than 50 words
3. All questions are compulsory

Part B:

1. 5 Questions of 3 marks each - 15 marks
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Part C:

1. 3 Questions of 7 + 7 + 6 marks - 20 marks.
   There will be an internal choice in each question.
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3. One internal and one external examiner shall conduct two practical exams, in a day, of a batch of 40 students
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c. 10 marks for Laboratory Exercise File.

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All the rest shall be declared to have passed the examination, if they obtain the minimum pass marks in each subject viz. 36% no division shall be awarded at the Part I and Part II examination.

BSCCS - 10 COMPUTER ORIENTED STATISTICAL METHODS

Frequency distribution measures of central tendency, mean, mode, partition values(quartiles); measures of dispersion, range, interquartile range, mean , deviation, standard deviation, moments, skew ness and kurtosis.

Probability, event, sample space, probability of an event, addition and multiplication theorems. Random variable, mathematical expectations, expectation of sum and product of random variables, moment generating function.

Theoretical distribution, binomial, geometric, negative binomial, uniform, poison, norma, rectangular and exponential, and gamma distribution, their properties and uses.

Methods of least squares, curve fitting correlation and regression. Introduction of multiple and partial correlation.(up to three variable only).

Elementary theory of testing of hypothesis. Errors of first and second kinds critical region, level of significance based on Chi-square t and f statistics.

BSCCS - 11 C++ PROGRAMMING & DATA STRUCTURES

Data types, operator, input-output, control statements, loops, arrays, strings and string functions, functions, structure and union, Introduction to OOPS,

object oriented analysis and design, class, declaring object, member function, data hiding, parameter passing, friend function and class, empty static, overloading, constructor, type of constructor, destructor, recursive constructor, calling constructor and destructor, overloading unary operator, binary operator with friend function, rule of overloading.

Inheritance, derive and base class, overriding, base and derive constructor, type of inheritance, virtual base class, abstract class, qualifier class and inheritance, pointer, pointer to class, pointer to object, pointer to derived class and base class, pointer to member, pointer to array, accessing private member and direct access to private member, new delete operator, dynamic memory,

Binding in C++, virtual function, rule for virtual function, pointer to derive class object, pure virtual function, constructor and virtual functions, polymorphism, file, file operator and commands, use in C++, templates.

Single linked lists, double linked list, circular list, sparse table, stack, queue, d-queue list, priority queue, graph, prefix, postfix, infix, sorting, insertion, selection, bubble, algorithm of quick, merge, radix, heap.

Searching, binary, linear, tree, Binary Tree, Binary search tree, tree traversal, breadth - first, depth - first, AVL tree, B-tree, in-order, pre-order, post-order graph, BFS, DFS, shortest path, algorithm of Kruskal, prim.

BSCCS - 12 BUSINESS DATA PROCESSING

Introduction to Business Organization & System Investigation: Production, inventory, Sales and purchases order processing and accounting.

System Analysis and design: Project selection, Feasibility analysis, Facts, gathering, System design, impersonation & evaluation, Data Capture and Validation, documentation and its importance's design.

Overview of COBOL Programming structure: COBOL as a structured language. COBOL data description fields, records, files, working storage definition, data editing facility, data movement arithmetic, input, output conditional and sequence control verbs, table handling, single and multidimensional arrays, character handling.

COBOL: Subroutines and Modular Programming: efficiency in COBOL. Perform: Simple and times, until options, concept of structured program.

Business Files: Master files and transaction files, logical file organization, sequential, indexed sequential, direct, relative, inverted file organization, Buffering and blacking, directory structure single level tree structure, file operations sort, merge, opening, closing, backup procedure and recovery.

Introduction to FoxPro: Creating a New file, Opening an existing file, Saving/ Backup procedure Viewing the concept of adding records to a file. Editing/ Deleting a record,

Different Command for FoxPro: Append, Read, Average, Sum, Edit, Browse,

Box drawing, clear, close, Copy file structure count, create, delete, insert, Do, Erase, Sort, index, Locate, if then, else, Dimension and different functions

FoxPro programming: if else, do end do, memory variables, do cases, Accept, input, say, and get, constructs.

File Organization: modifying file structure, deleting sorting, indexing files, updating file with other files, report generation, printing and form generation.

BSCCS - 13 COMPUTER ARCHITECTURE

Evolution of computer system, current trend in computing, Von Reumann stored programmed concept, functional components of computer with the case study of casting computing facilities.

Architectural classification schemes like SISD, SIMD, MISD, MIND models, memory and input output subsystems like I/O Channels and peripherals processors.

Instruction formats and addressing modes - direct, indirect, register indirect, relative and indexed, Microprogramming concepts.

Hierarchical memory structures and concept of virtual memory, characteristics of cache memories, operations design aspects and cache bandwidths. Interrupt mechanism and interrupt controllers.

An Introductory overview of architecture of 8088 microprocessor, Instruction set and timing cycles of 8088, machine language program development.

BSCCS - 14 MICROPROCESSOR INTERFACING AND COMPUTER HARDWARE - 1

Overview of earlier 8088/86 system, middle age 80486 system and new Pentium, Pentium MMX and Pentium -II based computers and their basic capabilities. Ear thing Concept, site preparation, wiring diagram and control of earth to neutral voltage.

Hardware- BIOS-DOS interaction, between the boxes, inside the system BOX, SMPS, Mother Board, Mother Board Components, Power connection to Mother Board, PCB edge connectors, mode switches form Panel indicators and controls. EPROM/ROM types FD and HD drives, CDROM drives, Mother Board logic, Memory space and I/O port addresses

Data communication fundamentals Asynchronous and synchronous communication serial and current loop interface, RS232C, RS232C signal levels and Pins, serial port in PC UART, 8250,RS232, interface chips, serial port basic circuit, Real time clock and counter, Magnetic tape subsystems, LAN, memory expansion options, Professional Image Board,

Digital interfacing of PC, Printer controller and parallel ports Centronics interface, Printer cable list, programming sequence, Data buffer, Hardware overview of print controller: I/O port decoder, Printer, Printer Mechanisms, New Generation Printer Controllers

Floppy Disk Controller:

Error detection Techniques of parity check, Multiple bit error detection scheme, CRC, ECC floppy disk controller overview, Disk format, FDC system interface, FDD interface, Floppy cables, overall operation of Floppy Disk subsystem, FDC IC block diagram, Read Data command, write data command, Read deleted data command, write deleted data command, Read ID commands, format tracks command, seek and other commands, sector interleaving FDC logic functional block diagram

BSCCS - 15 MICROPROCESSOR INTERFACING AND COMPUTER HARDWARE - 11

Display Adapter:

CRT display, display adapters MGA, CGA, EGA, PGA, VGA, SVGA, color Monitor, CRT interface, composite video. CTT controller interface, Principal character generator, video process logic, screen memory arbitration, interfaced, Memory access, video attributes, timing chain, CRTC, CGA circuit blocks

Hard Disk Controller:

Overview of HDC organization, HDC specifications and features, disk drives and interfaces, HDC connectors, controller Port specifications, HDC commands and command block and commands summary, commands completion and status Hardware Components and ICs in PC:

Discrete Components, ICs Pulse circuits wave forms, positive and negative logic, special Gates, Comparison of TTL, and CMOS logic, IC families, MOA ICs in a PC, CMOS to TTL, TTL to CMOS interfacing.

Support chips in Motherboard:

Dumb & Smart chips, Bus controller interrupt controllers, Programmable interval Timers.

Programmable Peripheral Interface DMA Controller. Installation and preventing Maintenance and Pre installation Planning, installation practice, Removing a Motherboard, Removing and Replacing daughter board, Removing and FDD Mounting on FDD, Routine, check, special configuration memory up gradation, HDC & HDD models, DOS & software, Preventive maintenance, General Precaution systems usage

BSCCS - 16 COMPUTER LABORATORY

(a) Practical for Computer Oriented statistical Method:

Following is list of practical to be performed during the session. All programs are to be written in C++.

1. Construction of frequency distribution and its graphical representation.
2. Measures of central Tendency
3. Measure of Dispersion.
4. Computation of Moments (Ungrouped and grouped data)
5. Measure of Skew ness and Kurtosis.
6. Computation of coefficient of correlation (Ungrouped data)

7. Fitting of binomial and Poison distribution.,
8. Fitting of lines of regression (Ungrouped data)
9. Fitting of degree and exponential curves.
10. Fitting of multiple regression plan and computation of multiple and practical correlation coefficient.
11. Fitting of normal distribution.
12. Large Sample Test for Means and proportions.
13. Test Based on Chi Square Distribution.
14. Test Based on F-distribution.
15. Test Based on t-statistics.

(b) Practical Related to Data Structures:

16. Arrays Declarations for the Mark Sheet in Examination.
17. Records Declaration for the marks obtained in m subjects by a group on N examinees.
18. Stack implementation of record of a student in class.
19. Programming Example of 2 stacks in a common array.
20. Programming Example of reversal of values in a stack.
21. Programming Example of interchange of interchange of 2 stacks.
22. Programming Example of Queues, addition and deletion into queues.
23. Programming Example of a general list and traverse, before, insert after, replace and retrieve procedures.
24. Programming Example on use of pointers.
25. Programming Example of Linked list of the terms of a polynomial.
26. Programming Example of Addition, Subtraction and Multiplication of Polynomials stored in a linked list.
27. Programming Example of Search and sorting.

(c) Practical for Business data Processing:

Following is the list of practical to be performed during the session. All program are to be written in COBOL:

28. Write a program to create Mark sheet.
29. Write programs using different Perform statements.
30. File creation program for sequential files.,
31. Record updation program for sequential file.
32. File creation program for indexed file,
33. Program to sort sequential file
34. Program on concept of data validation.
35. Program on concept of writing data entry program.
36. Program to generate report using sequential file.
37. Merging of two sequential files.

38. Table Handling (one Dimensional)
39. Table Handling (Two Dimensional)
40. Program to search element in one dimensional, Two-dimensional table. Following is the list of practical to performed during the session. All program are to be written in FoxPro.
41. Program to create Mark sheet.
42. Program to create Pay slip for Employee.
43. Program to create file for student data in typical college.
44. Program to modify records in file.
45. Program to generate reports from a file.
46. Program for saving Bank transactions (using Master file & transaction file)

BSCCS - 17 ELECTRONICS PRACTICAL LABORATORY

1. Study of three pin IC Regulator 78XX, 317Cs.
2. Operational Amplifier as inverting and Non-Inverting and buffer Amplifier.
3. Op-Amp as comparator and also voltage comparator like, IC 710, LM 311 etc, and the applications
4. Op-Amp as integrator and differentiator.
5. Wein Bridge Oscillator with Op-Amp.
6. Frequency response of CE Amplifier.
7. Logical levels and gate studies (NAND, EXOR and invertors) verification of De-Morgan's theorem and logical equation.
8. JK Flips-Flops, D and T Flip-flops.
9. Studies of counters and Shift Registers.
10. Study of Timer IC 555 (Monostable & Astable Application.)
11. Multiplexer and demultiplexers.
12. Study to Decoder and encoders.
13. Analog to Digital Converters
14. Digital to analog Converters.
15. Frequency response of FET Amplifier (CS,CD Configuration)
16. Study to Schmitt triggers and its application.
17. Study of RC phase shift oscillator based upon OP-Amp and Study of Op-AMP based phase shifter.
18. Study of precision Rectifier with OP-AMP.
19. Study of FET as a switch.
20. Study of two stages RC coupled Amplifier.
21. Study of Hartley and Colpitts oscillators.
22. Study of Crystal oscillator circuit.

23. Study of half adder and full adder.
24. Study of the digital and analog multi-meters and digital frequency meter working in different settings.
25. Understanding of Seven segment displays.
26. Determination of CMRR in differential amplifier.
27. Study of MOSFET characteristics.
28. Study of ring counter, ripple counter
29. Binary to Grey code Converter and Grey to Binary converter.
30. Transistorized Bistable, Monostable and Astable and Multivibrator.

BSCCS - 18 C++ PROGRAMMING & DATA STRUCTURES

1. Write C++ code to create a class date. Using this class, calculate the age of a person as on the current date.
2. Write a program to read and display information about employees and managers. Employee is a class that contains employee-no, name and address. Manager class contains all the information of the employee class and the list of employees working under the manager
3. Write a C++ program to accept a 5 digit number and report whether it is divisible by 3, 5, 7, 9 or nor.
4. Write a program that accepts two strings as argument and reports whether the first string is part of second or not. In case first string occurs multiple times in the second string, it reports the number of times it occurs in second.
5. Create a class Complex and implement the following:
   * define suitable constructors and destructors
   * overload the operators + and -
   * write a friend function sum which adds the real and imaginary parts of a complex object
6. Write a program in C++ to demonstrate the concept of a virtual function.
7. Write a program to add 2 distances using friend function expressed in meters & cm and feet & inches.
8. Write a C++ program that throws an arithmetic exception whenever the result of arithmetic computation becomes odd.
9. Design and implement a class 'stack' using pointers. The class should include necessary constructors and destructor and the functions for addition and deletion of elements. It should also check whether a stack is full or empty. Make any assumption, if required.
10. Write a template function for exchanging (swapping) the values between two variables. Use this function in main() for int, double and char type of variables.

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TEACHING AND EXAMINATION SCHEME FOR
B. Sc (Computer Science) III Year

Paper Name (Theory)	Lec	Exam Hours	Min Marks	Max Marks
BSCCS - 19 Java Programming	3	3	18	50
BSCCS - 20 Algebra	3	3	18	50
BSCCS - 21 Financial Management	3	3	18	50
BSCCS - 22 Electronics III	3	3	18	50
BSCCS - 23 Digital Design Using VHDL	3	3	18	50
BSCCS - 24 Embedded Systems and Applications	3	3	18	50
		Total of Theory		300

Paper Name (Practicals)	Pract Hours	Pract Exam	Min Marks	Max Marks
BSCCS - 25 Java Programming	3	3	18	50
BSCCS - 26 Electronics Practical Lab	3	3	18	50
BSCCS - 27 Digital Design Using VHDL	3	3	18	50
BSCCS - 28 Project	3	3	18	50
		Total of Practicals		200
		Grand Total (Theory + Practicals)		500

Note: 1. The question paper will be divided into 3 parts:

Part A:

1. 10 Question of 1.5 mark each - 15 marks
2. Answer should not exceed more than 50 words
3. All questions are compulsory

Part B:

1. 5 Questions of 3 marks each - 15 marks
2. Answer should not exceed more than 50 words
3. All questions are compulsory

Part C:

1. 3 Questions of 7 + 7 + 6 marks - 20 marks.
2. There will be an internal choice in each question.
3. Answer should not exceed 400 words

2. A Laboratory Exercise File should be prepared by each student for each practical paper and should be submitted during practical examinations.
3. One internal and one external examiner shall conduct two practical exams,

in a day, of a batch of 40 students.

4. Duration of practical exam is 3 hours.
5. Practical of 50 marks distribution is as under:

a. 30 marks for practical examination exercise for 3 questions.
b. 10 marks for Viva-voce
c. 10 marks for Laboratory Exercise File.

B. Sc. (Computer Science)
Scheme of Examination

The number of paper and the maximum marks for each paper are shown against each subject separately. It will be necessary for a candidate to pass in the theory part as well as the practical part of a subject/paper, wherever prescribed, separately.

Classification of successful candidates shall be as follows:

First Division 60% of the aggregate marks prescribed at (a) Part I Examination, (b) Part II Examination,

Second Division 48% (c) Part III Examination, taken together

All the rest shall be declared to have passed the examination, if they obtain the minimum pass marks in each subject viz. 36% no division shall be awarded at the Part I and Part II examination.

BSCCS - 19 JAVA PROGRAMMING

Introduction to Java, history, characteristics, Object Oriented Programming, data types, variables, arrays, difference between Java and C++

Control statements: Selection, iteration, jump statements, operators

Introduction to classes, class fundamentals, constructor, methods, stack class, inheritance, creating multilevel hierarchy, method over riding

Packages and interfaces, exception handling, multi-threaded programming, I/O applets

Java Library, string handling, string comparison, string buffer, utility classes, vector stack dictionary, applet class, introduction to AWT, working with frame windows.

Java Beans, beans architecture, AWT components, advantage of Java Beans, beans serialization, JDBC, class and methods, API components, JDBC components, driver, connectivity to database processing result and interfaces, RMI, comparison of distributed and non-distributed Java programs, interfaces, RMI architecture layer, ODBC, CORBA, CORBA services and products, CGI, structure of CGI.

Reference books:

1. Introduction to Java Programming, E Balaguruswamy, PHI.
2. Patrick Naughton, Java Complete Reference, Tata McGraw Hill.
3. The Java Handbook, Patrick Naughton, Tata McGraw Hill.

BSCCS - 20 ALGEBRA

Groups & Rings: Introduction to semi-groups, monoiods, groups, generators, cosets, normal subgroups, Langrange's Theorem, homomorphism, rings, polynomial rings, and fields.

Lattices: Introduction to partial orders, semi-lattices, and lattices.

Vector spaces: vector spaces, linear combinations, convex sets, linear independence, dimension, the column rank and row rank of a matrix.

Linear Mappings: linear mappings and vector space of linear maps, the kernel and the image of a linear map, orthogonal complement of a subspace, the vector space of homogeneous system of linear equations, set of solutions of a non-homogeneous system of linear equations, matrix associated with a linear map, change of bases, composition of linear maps, inverse of a linear map.

Scalar products on vector spaces, norm, Schwartz's inequality, Bessel's inequality, orthogonal bases, bilinear maps and matrices, determinants, the rank of a matrix and sub-determinant, Cramer's rule, determinants as areas and volumes, Eigen vectors and Eigen values, Eigen space, The characteristic polynomial, Eigen values and Eigen vectors of a symmetric matrix, diagonalisation of a symmetric linear map

Classification of conic sections and quadric surfaces

Books Recommended:

1. A.M. Cohen. H. Cuypers, H. Sterk, Algebra Interactive: Learning Algebra in an Exciting Way, Springer Verlag
2. T. Banchoff, J. Werner, Linear Algebra through Geometry, Springer Verlag
3. S. Lang, Introduction to Linear Algebra, Sipringe Velag.

BSCCS - 21 FINANCIAL MANAGEMENT

Introduction: Objectives and functions of financial management, time value of money, concept of risk and return.

Capital Budgeting: Data requirements; evaluation techniques - pay back, internal rate of return, net present value, capitalization & capital structure, computation of specific and weighted - cost of capital.

Working capital management: determination of working capital cash management, receivables management and inventory management.

Financial Decision: Relationship between dividend policy and value of a firm, dividend policy in practice, factors affecting dividend policy, legal and procedural aspects of dividend policy.

Reference Books:

P. Chandra, Financial Management, Tata McGraw Hill,

BSCCS - 22 ELECTRONICS III

Power Supplies: Rectifiers- Halfwave, fullwave and bridge rectifiers- Efficiency- Ripple factor- Regulation - Harmonic components in rectified output - Types of filters- Choke input (inductor) filter- Shunt capacitor filter- L section and ? section filters - Block diagram of regulated power supply - Series and shunt regulated power supplies - Three terminal regulators (78XX and 79XX) - Principle and working of switch mode power supply (SMPS).

RC Coupled Amplifier: Analysis and frequency response of single stage RC coupled CE amplifier.

Feedback: Positive and negative feedback- Effect of feedback on gain, band width, noise,input and output impedances.

Operational Amplifiers: Differential amplifier- Block diagram of Op-Amp- Ideal characteristics of Op-Amp- Op-Amp parameters- Input resistance- Output resistance-Common mode rejection ratio (CMMR)- Slew rate- Offset voltages - Input bias current-Basic Op-Amp circuits- Inverting Op-Amp- Virtual ground-Non-inverting Op-Amp-Frequency response of Op-Amp. Interpretation of Op-Amp data sheets.

Applications of Op-Amps: Summing amplifier- subtractor- Voltage follower-Integrator-Differentiator - Comparator- Logarithmic amplifier- Sine wave [Wein Bridge] and squarewave [Astable] generators- Triangular wave generator-Monostable multivibrator- Solving simple second order differential equation. Basic Op-Amp series regulator and shunt regulator.

Communications: Need for modulation-Types of modulation- Amplitude, Frequency and Phase modulation. Amplitude modulation-side bands- modulation index- square law diode modulator-Demodulation- diode detector.

Frequency modulation working of simple frequency modulator- Ratio detection of FM waves- Advantages of frequency modulation. AM and FM radio receivers [block diagram approach].

Reference Books:

1. Electronic Devices and Circuits-Millman and Halkias- Tata Mc Graw Hill (TMH)
2. Microelectronics- J. Millman and A. Grabel - TMH
3. Operational Amplifiers and Linear Integrated Circuits- Ramakant A. Gayakwad- Prentice Hall of India (PHI).

4. Operational Amplifiers and Linear Integrated Circuits- K. Lalkishore - Pearson Education
5. Analog Electronics- L.K. Maheswari and M.M.S. Anand- PHI
6. Applied Electronics- R.S.Sedha- S Chand &Co
7. Principles of Electronics- V.K. Mehta and Rohit Mehta - S Chand &Co
8. A first Course in Electronics - A.A.Khan & K.K. Dey - PHI
9. Electronic Comm nication Systems - George Kennedy & Bernard Davis - TMH.
10. Electronic Communication -D. Roddy & J. Coolen- PHI
11. Principles of Electronic Communication Systems -Louis E. Frenzel -TMH

BSCCS - 23 DIGITAL DESIGN USING VHDL

Introduction & Behavioural Modelling

Introduction to HDLs: Difference between HDL and other software languages - Different HDLs in vogue. Overview of digital system design using HDL

Basic VHDL Language Elements: Identifiers, Data objects, scalar and composite data types, Operators

Behavioural Modeling with examples: Entity declaration, Architecture body, Process statement and sequential statements. Inertial and transport delay models, creating signal waveforms, signal drivers, effect of transport and inertial delays on signal drivers.

Data Flow and Structural Modeling

Data Flow Modeling with examples: Concurrent signal assignment statement, Concurrent versus sequential signal assignment, Delta delays, Multiple drivers, Conditional signal assignment statement, selected signal assignment statement, concurrent assertion statement.

Structural Modeling with examples: Component declaration, Component instantiation and examples, direct instantiation of component.

Subprograms and Packages

Subprograms and Overloading: Functions and procedures with simple examples -subprogram overloading, Operator overloading.

Packages and Libraries: Package declaration, package body, design file, design libraries, order of analysis, implicit visibility, explicit visibility, library clause and use clause.

Advanced Features: Entity statements, Generate statements, Attributes, Aggregate targets, ports and their behaviour.

Simulation and Hardware modeling

Model Simulation: Simulation - Writing a Test Bench for a Half and a Full adder.

Hardware Modeling Examples: Modeling entity interfaces, Modeling simple elements,

Different styles of modeling, Modeling regular structures, Modeling delays, Modeling conditional operations, Modeling a clock divider and a pulse counter.

Reference Books

1. A VHDL Primer - By J.Bhasker ., 3rd edition - PHI, New Delhi, 2007
2. Circuit design with VHDL by Volnei . Pedroni - PHI, New Delhi, 2007
3. Digital Systems Design using VHDL by Charles H.Roth Jr.- PWS Pub., 1998
4. Introductory VHDL: From Simulation to Synthesis - by Sudhakar Yalamanchili.- Pearson Education Asia, 2001
5. VHDL Programming by Example - By Douglas L.Perry.- 4th Ed - TMH., 2002
6. Fundamentals of Digital Logic with VHDL Design - by Stephen Brown & Zvonko Vranesic - TMH. 2002
7. VHDL - Analysis & Modeling of Digital Systems - By Zainalabedin Navabi- 2nd Ed - TMH, 1998
8. The Designer's Guide to VHDL - By Peter J. Ashenden -2nd Ed., 1st Indian Reprint- Harcourt India Pvt. Ltd., 2001.

BSCCS - 24 EMBEDDED SYSTEMS AND APPLICATIONS

The 8051 Microcontroller

Introduction to microcontrollers and embedded systems: Overview and block diagram of 8051. Architecture of 8051, Program counter and memory organisation, Data types and directives, Flag bits and PSW Register, Register banks and Stack; Pin diagram, Port organisation, I/O Programming, Bit manipulation. Interrupts and timer.

Addressing modes, instruction set and assembly language programming of 8051

Addressing modes and accessing memory using various addressing modes. Instruction set

Arithmetic, Logical, Single Bit, Jump, Loop and Call Instructions and their usage. Time Delay Generation and Calculation; Timer/Counter Programming. Programming examples: Addition, multiplication, subtraction, division, arranging a given set of numbers in ascending / descending order, picking the smallest / largest number among a given set of numbers, Accessing a specified port terminal and generating a rectangular waveform.

Interfacing of peripherals to Microcontroller

Interfacing of - PPI 8255, DAC, ADC, Serial communication- modes and protocols

Applications of Embedded Systems

Temperature measurement, displaying information on a LCD, Control of a Stepper Motor, Interfacing a keyboard and generation different types of waveforms.

Reference Books:

1. The 8051 Microcontrollers and Embedded Systems - By Muhammad Ali Mazidi and
   Janice Gillispie Mazidi- Pearson Education Asia, 4th Reprint, 2002
2. Microcontrollers - Theory and applications by Ajay V. Deshmukh-Tata McGraw-Hill
3. The 8051 Microcontroller - architecture, programming & applications By Kenneth J.
   Ayala- Penram International Publishing, 1995
4. Programming and Customizing the 8051 Microcontroller - By Myke Predko-TMH,
   2003
5. Design with Microcontrollers By - J B Peatman- TMH.
6. The 8051 Microcontroller - Programming, interfacing and applications by Howard
   Boyet and Ron Katz - (MII) Microprocessors Training Inc.
7. The concepts & features of Microcontrollers by Rajkamal - Wheeler Pub.

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