TEACHING & EXAMINATION SCHEME
For the Examination -2015

COMPUTER SCIENCE

B.Sc. Part-I

THEORY

			Pd/W (45mts.)	Exam. Hours	Max. Marks
					150
CS.101	Paper I	Computer Oriented Numerical Methods and FORTRAN	2	3	50
CS.102	Paper II	Database Management System	2	3	50
CS.103	Paper III	Digital Electronics and Computer Organisation	2	3	50
PRACTICAL					75
		(a) Digital Electronics Lab.	3(1 day)	} 5	37
		(b) Software Lab.	3(1day)		38
			Total		**225**

B.SC. PART-I

PAPER – 1

COMPUTER ORIENTED NUMERICAL METHODS AND FORTRAN

Note: The question paper for the examination will be divided in three parts i.e., Section – A, Section – B and Section – C.

Section – A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited upto 30 words. Each question will carry 1 mark.

Section – B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited upto 250 words. Each question carry 3.5 marks.

Section – C: Will consist of total 05 questions. The paper setter will set one question from each Unit and students will answer any 03 questions and answer of each question shall be limited upto 500 words. Each question will carry 7.5 marks.

UNIT 1:
Language FORTRAN: Numerical constants, Variable names, Type statements, Arithmetic operations, Arithmetic expressions, Mixed Mode, Built in mathematical functions, unformatted input out-put, Formatted input out-put, Field specifications, output field specifications, literal field, records, Repetition factors.

UNIT 2:
Transfer of control: Unconditional and conditional transfer, relational expressions, Logical IF statement & computed GOTO statement, Do Loops : Use of Do Statements , Exit from Do loop, Continue statement, and Nested Do loops, Arrays : Declaration of arrays, Linear and multidimensional arrays, Input /Output Statement for arrays and Implied Do loops.

UNIT 3 :
Function and Subroutine : Subprogram declaration and calling a function subprogram, Arithmetic statement functions, subroutines, difference between function and subroutine, Logical constants and Logical variables, Logical operators and Logical expressions, Type statement, IMPLICIT Statements, Double precision, Unlabelled Common Statement, Labeled Common Statement, Equivalence Statements.

UNIT 4:
Computer Arithmetic: Floating point representation of numbers, arithmetic operations with normalized floating point numbers and their consequences, Errors in number representations.
Iterative Methods for solving Equations: Successive approximation, Bisection, false position and Newton Raphson methods; Convergence of iterative methods.

UNIT 5:
Solution of simultaneous and ordinary differential equations: Taylor's series and Euler's method, Runge-Kutta methods and predictor –corrector method. Newton's and Lagrange's interpolation formula. Numerical differentiation, Numerical Integration: Newton cote's quadrature formula, Trapezoidal rule and Simpson's rule, Curve fitting by the method of least squares.

PAPER II

DATA BASE MANAGEMENT SYSTEM

Note: The question paper for the examination will be divided in three parts i.e., Section – A, Section – B and Section – C.

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Section – B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited upto 250 words. Each question carry 3.5 marks.

Section – C: Will consist of total 05 questions. The paper setter will set one question from each Unit and students will answer any 03 questions and answer of each question shall be limited upto 500 words. Each question will carry 7.5 marks.

UNIT 1:
Data: Definition, uses, need, purpose of data base system, data abstraction, data models, data independence, data definition language, data manipulation language, data base manager, data base administrator, data base users, over all system structure, implementation and trade-offs of files.

UNIT 2:
Entity-Relationship Model: Entities and entities sets, relationships and relationship sets, attributes, mapping constraints, keys, E-R diagrams, reducing E-R diagrams to tables, generation, aggregation design of an E-R data base scheme.

UNIT 3:
Structure of relational databases, relational algebra, the tuple relational calculus, the domain relational calculus, modifying the database, relational commercial languages: SQL, Query-by-example.

UNIT 4:
RDBMS: Database file creation, updating, indexes, constants and functions and operators, logical functions, relational operators, logical operators, FOR and WHILE clauses.

UNIT 5 :
Report generation, design of report form, page layout, grouping, use of RQBE, understanding relational data bases, one to many relations, many to many and one to one relations, the RQBE window, the Select command.

PAPER III
DIGITAL ELECTRONICS AND COMPUTER ORGANISATION

Note: The question paper for the examination will be divided in three parts i.e., Section – A, Section – B and Section – C.

Section – A: Will consist of 10 compulsory questions. There will be two questions from each unit and answer of each question shall be limited upto 30 words. Each question will carry 1 mark.

Section – B: Will consist of 10 questions. Two questions from each unit will be set and students will answer one question from each Unit. Answer of each question shall be limited upto 250 words. Each question carry 3.5 marks.

Section – C: Will consist of total 05 questions. The paper setter will set one question from each Unit and students will answer any 03 questions and answer of each question shall be limited upto 500 words. Each question will carry 7.5 marks.

UNIT 1:
Logic fundamentals and Boolean algebra: Binary, Octal, Decimal and Hexadecimal numbers and their inter conversion, BCD, ASCII and Gray codes, logic gates: DTL and TTL circuits. Boolean algebra, De Morgan's theorems and their applications to logic circuit analysis and synthesis, formulation of minimization problem prime implicants, Karnaugh map.

UNIT 2:
Arithmetic and logic elements: logical construction and analysis of half adder, full adder, adder-subtractor, multiplexers, demultiplexer, Flip Flops: RS latches; level clocking, D-latches, edge triggered D-Flip Flop, JK Flip Flop, JK master slave Flip Flop,

UNIT 3:
Registers and Counters: Buffer register, Shift register: Shift-Left, Shift-Right and ring counter, Counters: Asynchronous & synchronous counter, Mod counters, Divide by N counters, sequential counters and BCD counters.

UNIT 4:
Data Representation: Sign magnitude representation, Fixed-point representation, Floating point representation. Comparison and subtraction of unsigned binary numbers: 4-bit magnitude comparator using logic gates, 4-bit adder-subtractor. Error detection and correction: Parity generator-checker, Hamming codes (1-bit detection-correction).

UNIT 5:
IC Fabrication: Basic monolithic IC, epitaxial growth, photo masking, etching, diffusion of impurities, isolation techniques. Fabrication of: resistance, capacitance, diodes, transistors and FET devices. Advantages of IC technology.

Books Suggested:

Lipschutz, S And Poe, A.: Programming With FORTRAN, Schaum's Outline Series, Mcgraw Hill
Rajaraman, V. : Computer Oriented Numerical Methods, Prentice Hall Of India.
Rajaraman, V. : Computer Programming In FORTRAN, Prentice Hall Of India.
Malvino : Digital Computer Electronics – Introduction To Micro-Computers, Tata Mcgraw Hill.
Malvino : Digital Principles and Application, Tata Mcgraw Hill.
Mottershed : Electronic Devices and Circuits, PHI
Korth, H.P. and Silberschatz, A: Data Base System Concepts, McGraw Hill
Martin, J.: An Introduction to Database System, Vol. I, Narosa Publishing House.
Ulman, J.D.: Principles of Database Management System, (Second Edition), Galgotia Publishers Pvt. Ltd.
Sze S.M. Physics of Semiconductor Devices: Physics & Technology. Wiley Eastern.

EXPERIMENTS FOR PRACTICAL WORK

DIGITAL ELECTRONICS

1. To study the function of Basic Logic Gates and verify their truth table. AND, OR, NOT, NAND, NOR, X-OR.
2.To study the application of AND, OR, NAND, X-OR gates for gating digital signals.
3. (a) To study the different Logical Expression and their simplifications.
   (b) To familiarize and verify the Boolean algebraic theorems.
4.To study the different arithmetic circuits using logic gates:
   (a) Half adder and Half subtractor.
   (b)Full adder.
5.To study the BCD to Binary and Binary to BCD code converter.
6.To study the Binary to Gray and Gray to Binary code converter.
7.Study of Encoder circuits:
   (a) Decimal to BCD encoder.
   (b)Octal to Binary encoder.
8. Study of Decoder circuits:
   (a)BCD to Decimal decoder.
   (b)BCD to 7 segments decoder.
9.To study the Flip-Flop circuits using gates:
   (a) R-S Flip-Flop.
   (b) J-K Flip-Flop.
   (c) Master slave J-K Flip-Flop.
   (d) D Flip-Flop.
10. To study the R-S, J-K and D Flip-Flop ICs.
11. Study the Registers and Counters:
   (a) Study of Shift Registers.
   (b) Study of Ring Counter.
12. To study the Asynchronous counter using Flip-Flop ICs
13. To study the Asynchronous counter ICs
14. To study the Synchronous counter using Flip-Flops ICs
15. To study the Synchronous counter ICs

SOFTWARE LABORATORY

1. To write the program to show use of arithmetic operations with different data types.
2. To write the program to show use of Input and Output statements.
3. To write the program to show use of arithmetic expression using build-in functions.
3. To write the program using arithmetic IF statement.
4. To write the program using logical IF statement.
5. To write the program using DO loops.
7. To write the program using Arrays.
8. To write the program using function sub program.
9. To write the program using subroutine sub program.
10. To write the program using COMMON Statements.

11. Write a program to find solution of quadratic equation.
12Write a program to find root of an equation by Bisection method.
13. Write a program to find root of an equation by Secant method.
14. Write a program to find transpose of matrix.
15. Write a program to solve the set of simultaneous equations by Gauss elimination method.
16. Write a program to evaluate a polynomial by nested multiplication method.
17. Write a program to solve the set of simultaneous equations by Gauss-Seidal elimination method.
18. Solution of a differential equation by Euler's method.
19. Solution of a differential equation by Predictor-Corrector's method.
20. Numerical integration using Trapezoidal Rule.