TEACHING AND EXAMINATION SCHEME
B. Sc. Computer Science - I Year
W.E.F. 2019-2020

	Paper Name (Theory)	Lec	Exam Hours	MARKS	
				Min	Max
bcs-101	Computer Programming Fundamental	3	3	18	50
bcs-102	Digital Logic	3	3	18	50
bcs-103	Electronics	3	3	18	50
bcs-104	Data Structure	3	3	18	50
bcs-105	Relational Database Management Systems	3	3	18	50
bcs-106	Data Communications	3	3	18	50
			Total of Theory Marks		**300**

	Paper Name (Practical)	Pract Hours	Exam Hours	MARKS	
				Min	Max
bcs-107	Digital & Electronics Lab	3	3	18	50
bcs-108	RDBMS Lab	3	3	18	50
bcs-109	Programming& Data Structure Lab	3	3	18	50
			Total of Practical Marks		**150**

	Total of Theory & Practical Marks	**450**

B. Sc. (Computer Science)
Scheme of Examination

Theory:

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 each – 20 marks.
2. There will be an internal choice in each question.
3. Answer should not exceed 400 words

Practical & Projects:

Practical exams shall be conducted by one internal and one external examiner of a batch of 40 students in a day.

Duration of Practical exam is 3 hours.

A Laboratory Exercise File should be prepared by each student for each practical paper and should be submitted during practical examinations.

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

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

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.

Duration: 3 hours	Max Marks: 50

bcs-101Computer 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.

Duration: 3 hours	Max Marks: 50

bcs-102Digital Logic

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 to1TL 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.

Duration: 3 hours	Max Marks: 50

bcs-103Electronics

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.

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.

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.

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'sNorten's and Millman's theorems maximum power transfer theorem, reciprocity theorem, problem related to theorems idea of clipper and voltage doubler.

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

Duration: 3 hours	Max Marks: 50

bcs-104Data Structure

Definitions of Data Structure and Algorithm – Time and Space complexity- Algorithm notations.

Brute force and greedy algorithms, Divide and Conquer Strategy: Merge sort, quick sort, integer multiplication, matrix multiplication, exponentiation problem, convex hull problem, dynamic programming

Complexity theory: Decidability of problems: Halting problem, NP-class of problem, P class of problem, NP=P question, Polynomial reduction problem, Cook's theorem, NP hardness and NP completeness.

Control structures- Variables – Data types- Arrays- String processing – Sorting and Searching- Insertion-Selection-Merge- Radix-Binary Search- Linear Search-Hashing

Binary tree- Representation – Traversing – Threaded Binary tree- Binary Search tree- Insertion deletion into a binary search tree- Heap sort

Graph- Representation of Graph- Shortest path – Operation on Graphs- Traversing a Graph- Topological Sorting – Files

Duration: 3 hours	Max Marks: 50

bcs-105Relational Database Management System

Object of database systems, data abstraction, data definition language, data manipulation language, database administrator database model, database system architecture. Entity relationship model, entities and entity sets their relationship, mapping constraints, generalization, aggregation, use of ER model for the design of databases, sequential, random, index sequential file organization, relational algebra, normalization up to DKNF.

Object Oriented modeling, class, different types of attributes, generalization, inheritance, aggregation, encapsulation, distributed database design, architecture of distributed processing system, data communication concept, data placement, placement of DDBMS, and other components, concurrency control techniques, recovery, transaction management, need of recovery, recovery techniques, serializability, two-phase locking.

Query optimization and processing, algorithm for external sorting, select and join, object and set operations, heuristics in query optimization, temporal database concept, multi-media database, data-mining, association rule, classification, application, data-warehousing, need, architecture, characteristics, data layer, XML tree data model, document, DTD schema, query, database, data-warehousing verses view

Security and integrity of databases, security specifications in SQL, access control, flow control, encryption of public key infrastructure, cryptography and types.SQL*PLUS Data types, Constraints, Operators, DDL, DML, PL/SQL syntax, Data types, PL/SQL functions, Error handling in PL/SQL, package functions, package procedures, Oracle transactions. Stored procedures & functions, creation and execution of procedures, triggers

Duration: 3 hours	Max Marks: 50

bcs-106Data Communications

Introduction to Data communications and networking, protocols, standards and architecture, topology, transmission mode, OSI model, analog and digital signals, periodic and aperiodic signals, time and frequency domain, Fourier analysis concept.

Encoding digital to digital conversion, analog to digital conversion, digital to analog conversion, analog to analog conversion, transmission of digital data, DTE-DCE interface, EIA-232, EIA-449, X.21, modem, cable modem, guided and unguided, transmission media

Multiplexing, TDM, FDM, WDM, DSL, HDLC, error classification, types of errors, error detection, error correction, virtual redundancy check, longitudinal redundancy check, cyclic redundancy check.

Asynchronous transfer mode, protocol architecture, ATM cells, ATM layers, switches, circuit switching network and concepts, routing, packet switching, X.25, virtual circuit approach, point-to-point layers, link control protocol, network control protocol