

**TEACHING AND EXAMINATION SCHEME**  
**B. Sc. Computer Science - II Year**  
**WEF 2021 - 2022**

Paper Name (Theory)		Lec	Exam Hours	MARKS	
				Min	Max
bcs-201	Computer Oriented Numerical Methods	3	3	18	50
bcs-202	Object Oriented Programming in C++	3	3	18	50
bcs-203	Computer Organization	3	3	18	50
bcs-204	Computer Networks	3	3	18	50
bcs-205	Operating Systems	3	3	18	50
bcs-206	Microprocessors and Assembly Language Programming	3	3	18	50
<b>Total of Theory Marks</b>					<b>300</b>
Paper Name (Practical)		Pract Hours	Exam Hours	MARKS	
				Min	Max
bcs-207	Operating Systems Lab	3	3	18	50
bcs-208	Electronics Practical Lab	3	3	18	50
bcs-209	C++ Programming & Data Structures	3	3	18	50
<b>Total of Practical Marks</b>					<b>150</b>
<b>Total of Theory &amp; Practical Marks</b>					<b>450</b>

## **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

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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.

**bcs-201Computer Oriented Numerical Methods**

Characteristics of Numerical Computation, Approximation, Significant Digit, Errors, Introduction to Matrix, Types of Matrix, Square, Row, Column, Diagonal, Unit, Null, Upper Triangular, Lower Triangular, Symmetric, Skew Symmetric, operation of matrix, trace, transpose, addition, subtraction, multiplication, determinant, inverse, Introduction to Linear Equations,

Bisection method, method of successive approximation, method of false position, Newton's iteration method, Newton Raphson method, Horner's method

Gauss Jordan method, Gauss Elimination method, Iterative methods, Jacobi method of iteration, Gauss Seidel Iteration method

Gregory Newton Forward and Backward interpolation Formula, Gauss Forward and backward difference interpolation formula, interpolation with unequal intervals.

### **bcs-202 Object Oriented Programming in C++**

Object Oriented Concepts, Tokens, Expressions and Control Structures Introduction: Basic Elements of Programming, Console I/O Operations.

Control Structures: Control and Looping Statements. Function: Function Prototyping, Call and Return by Reference, Inline Function, Default and Const Arguments, Function Overloading, Arrays, Manipulators and Enumeration.

Classes and Object, Object Oriented Methodology: Basic Concepts/Characteristics of OOP. Advantages and Application of OOP's, Procedural Programming Vs OOP

Classes and Objects: Specifying a Class, Creating Objects, Private & Public Data Members and Member Functions, Defining Inline Member Functions, Static Data Members and Member Functions. Arrays within Class, Arrays of Objects, Objects as Function Arguments, Returning Objects

Constructors, Destructors, Operators Overloading and Inheritance, Constructors and Destructors: Introduction, Parameterized Constructors, Multiple Constructors in A Class, Constructors With Default Arguments, Dynamic Initialization of Objects, Copy Constructors, Dynamic Constructors, Const Objects, Destructors Operators Overloading: Definition, Unary and Binary Overloading, Rules for Operator Overloading.

Inheritance: Defining Derived Classes, Types of Inheritance, Constructors and Destructors in Derived Classes.

Pointers Virtual & Friend functions and file handling Pointers: Pointer to Objects, this Pointer, New and Delete Operators, Virtual Function, Friend Functions. Opening, Closing a File, File Modes, File Pointers and their Manipulation, Sequential Input and Output Operations: Updating a File, Random Access, and Error Handling During File Operations, Command Line Arguments.

<b>Duration: 3 hours</b>	<b>Max Marks: 50</b>
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### **bcs-203Computer Organization**

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.

**bcs-204Computer Networks**

Introduction to wireless technologies: WAP services, Serial and Parallel Communication, Asynchronous and synchronous Communication, FDM,TDM, TFM, Spread spectrum technology  
Introduction to Bluetooth: Specification, Core protocols, Cable replacement protocol

Bluetooth Radio: Type of Antenna, Antenna Parameters, Frequency hoppingBluetooth Networking: Wireless networking, wireless network types, devices roles and states, adhoc network, scatternet  
Connection establishment procedure, notable aspects of connection establishment, Mode of connection, Bluetooth security, Security architecture, Security level of services, Profile and usage model: Generic access profile (GAP), SDA, Serial port profile, Secondary Bluetooth profile

Hardware: Bluetooth Implementation, Baseband overview, packet format, Transmission buffers,  
Protocol Implementation: Link Manager Protocol, Logical Link Control Adaptation Protocol, Host control Interface, Protocol Interaction with layers

**bcs-205 Operating Systems**

Introduction to Operating Systems, goals of OS, operation of OS, resource allocator and related functions, classes of OS, batch processing, multi-processing, time sharing, distributed, real time systems, system calls, system programs, structure of OS, layer design of DOS, Unix, virtual machine OS, kernel based OS, micro-kernel based OS, architecture of Window 2000.

Process concept, interacting process, threads, fundamental of scheduling, scheduling criteria, long medium short term scheduling, scheduling algorithms , structure of concurrent system, critical section, critical region, inter-process communication, monitor and semaphores, implementation and uses.

Logical versus physical address, swapping, contiguous allocation, segmentation, paging, segmentation with paging, kernel memory allocation, page replacement algorithm, virtual memory, virtual memory with paging, demand paging, dead lock, characterization, methods for handling dead locks, prevention, avoidance, thrashing, allocation of frame, virtual memory using segmentation,

Architecture of Distributed system, inter-process communication protocol, network OS, issues in distributed design, issues of distributed file system, network structure, distributed system structure, file system, coordination.

History of Linux, Linux architecture, Linux file System, file naming, types of files, directory command, file command, vi editor, locating files in Linux, filter pipe, shell variables, local and global variables, command substitution, if, while, for, shift, tar, basic networking commands in Linux.

**bcs-206 Microprocessors and Assembly Language Programming**

Introduction to microprocessor Basic features of 8085 microprocessors and its addressing modes, 8085 microprocessor architecture

Memory and I/O interfacing Address decoding, Address aliasing, Memory read and write operations, Timing diagrams, Memory mapped I/O and I/O mapped I/O

Programming of 8085 Instruction Set, Assembly Language Programming and Illustrative examples 8085 Interrupt Structure

Data Transfer Techniques Synchronous and Asynchronous modes of data transfer, Interrupt driven I/O,

DMA Peripheral Devices 8255 programmable peripheral interface, 8254 programmable counter, 8251 UART programmable communication interface, 8257 DMA Controller. 8259 Interrupt controller, 8279 Keyboard & display interface. Signal converter and their interfacing techniques- ADC 0809, DAC 0808.

Introduction to micro-controller 8051 as an example. Micro-controller architecture, bi-directional data ports, internal ROM and RAM, counters/timer s, oscillator and clock, serial communication. 8051-register set, memory organization – internal & external, program memory & data memory, bit addressable memory, and special function registers Introduction to instruction set of 8051 and assembly language programming

Introduction to advanced microprocessors 8086 as an example, 8086 Architecture and Internal Register Set, Brief discussion on Instruction Set, Min-Max mode, Concept of Co-processor and its interfacing, Brief studies on Important features of higher processor in the Intel 80X86 family.