

2020-2021

|                         |                                                |
|-------------------------|------------------------------------------------|
| <b>Title</b>            | <b>Syllabus Distribution</b>                   |
| <b>Session</b>          | 2020-21 (Odd Semester)                         |
| <b>Department</b>       | B.Sc General in Computer Science               |
| <b>Institution Name</b> | Hiralal Bhakat College, Nalhati, Birbhum, W.B. |
| <b>Coordinator</b>      | Sk Abdul Hanif, SACT in Computer Science       |

### Details of Courses of B.Sc. General under CBCS

| Sl. | Course                                                                          | Credit                                     |                                           | Marks                |
|-----|---------------------------------------------------------------------------------|--------------------------------------------|-------------------------------------------|----------------------|
| 1.  | Core Course (12 Papers)<br>4 core papers each in 3 disciplines of choice        | Theory+Practical<br>$12 \times (4+2) = 72$ | Theory+Tutorial<br>$12 \times (5+1) = 72$ | $12 \times 75 = 900$ |
| 2.  | Elective Course DSE<br>( 6 Papers)                                              | $6 \times (4+2) = 36$                      | $6 \times (5+1) = 36$                     | $6 \times 75 = 450$  |
| 3   | Ability Enhancement Core Course (AECC)<br>AECC-1 (ENVS)<br>AECC-2 (English/MIL) | $4 \times 1 = 4$<br>$2 \times 1 = 2$       | $4 \times 1 = 4$<br>$2 \times 1 = 2$      | 100<br>50            |
| 4.  | SEC (4 Papers)                                                                  | $4 \times 2 = 8$                           | $4 \times 2 = 8$                          | $4 \times 50 = 200$  |
|     | <b>Total Credit:</b>                                                            | <b>122</b>                                 | <b>122</b>                                | <b>1700</b>          |

## *B.Sc. Computer Science General Course Structure*

| Semester | Course Course (CC)                                          | Discipline Specific Elective (DSE)                             | Ability Enhancement Course |                                                         |
|----------|-------------------------------------------------------------|----------------------------------------------------------------|----------------------------|---------------------------------------------------------|
|          |                                                             |                                                                | AECC (2)                   | SEC (4)                                                 |
| I        | CC1A (Mathematics)<br>CC2A (Physics)<br>CC3A (Computer Sc.) |                                                                | AECC-1                     |                                                         |
| II       | CC1B (Mathematics)<br>CC2B (Physics)<br>CC3B (Computer Sc.) |                                                                | AECC-2                     |                                                         |
| III      | CC1C (Mathematics)<br>CC2C (Physics)<br>CC3C (Computer Sc.) |                                                                |                            | SEC-1<br>(Mathematics)<br>or<br>SEC-1<br>(Computer Sc.) |
| IV       | CC1D (Mathematics)<br>CC2D (Physics)<br>CC3D (Computer Sc.) |                                                                |                            | SEC-2<br>(Mathematics)<br>or<br>SEC-2 (Computer Sc.)    |
| V        |                                                             | DSE1A (Mathematics)<br>DSE2A (Physics)<br>DSE3A (Computer Sc.) |                            | SEC-3<br>(Computer Science)<br>or<br>SEC-3<br>(Physics) |
| VI       |                                                             | DSE1B (Mathematics)<br>DSE2B (Physics)<br>DSE3B (Computer Sc.) |                            | SEC-4<br>(Computer Science)<br>or<br>SEC-4<br>(Physics) |

## Semester-I

### Core Course (CC 3A): Problem Solving using Computer

#### SEMESTER – I

| Course code | Course title                   | Credit  | No of Hours |   |   |
|-------------|--------------------------------|---------|-------------|---|---|
|             |                                |         | L           | T | P |
| CC-1A       | Problem solving Using Computer | 4-0-2=6 | 4           | 0 | 4 |
|             | Discipline 2                   | 6       |             | - |   |
|             | Discipline 3                   | 6       |             |   |   |
|             | AECC1:Environmental studies    | 4       |             |   |   |
|             |                                | 22      |             |   |   |

| Syllabus                                                                                                                                                                                                                                                                                                                                                                                                                      | Number of Lecture | Course    | Name of Teacher |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------|-----------------|
| Introduction to Computers: Characteristics of Computers, Uses of computers, Types and generations of Computers. Basic Computer Organization: Units of a computer, CPU, ALU, memory hierarchy, registers, I/O devices. Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation.                                                                               | 10 L              | CC        | Sk Abdul Hanif  |
| Flowcharting, decision table, algorithms, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming. Structure of a Python Program, Elements of Python. Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators (Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, | 16L               |           |                 |
| Input and Output Statements, Control statements (Looping- while loop, for loop , loop Control, Conditional Statement, if...else , Difference between break, continue and pass). Numbers, Strings, Lists, Tuples, Dictionary, Date & Time, Modules, Defining Functions, Exit function, default arguments.                                                                                                                      | 20 L              |           |                 |
| Objects and Classes, Inheritance, Regular Expressions, Event Driven Programming, GUI Programming.                                                                                                                                                                                                                                                                                                                             | 14L               |           |                 |
| <b>Section: A (Simple programs).</b><br><b>Section: B (Visual Python):</b>                                                                                                                                                                                                                                                                                                                                                    |                   | Practical | Sk Abdul Hanif  |

#### Reference Books:

1. P. K. Sinha & Priti Sinha , —Computer Fundamentals||, BPB Publications, 2007.
2. Python Programming- Reema Thareja
3. Dr. Anita Goel, Computer Fundamentals, Pearson Education, 2010.
4. T. Budd, Exploring Python, TMH, 1st Ed, 2011
5. Python Tutorial/Documentation [www.python.org](http://www.python.org) 2010
6. Allen Downey, Jeffrey Elkner, Chris Meyers , How to think like a computer scientist : learning with Python , Freely available online.2012
7. <http://docs.python.org/3/tutorial/index.html>
8. <http://interactivepython.org/courselib/static/pythonds>
9. <http://www.ibiblio.org/g2swap/byteofpython/read/>

## **Semester-III**

### Core Course (CC 3C) : Operating Systems

#### SEMESTER – III

| Course code                    | Course title                                                                     | Credit  | No of Hours |   |   |
|--------------------------------|----------------------------------------------------------------------------------|---------|-------------|---|---|
|                                |                                                                                  |         | L           | T | P |
| CC-1C                          | Operating Systems                                                                | 4-0-2=6 | 4           | 0 | 4 |
|                                | Discipline 2                                                                     | 6       |             |   |   |
|                                | Discipline 3                                                                     | 6       |             |   |   |
| SEC-1<br>(Computer<br>Science) | Office Automation Tools<br><b>OR</b><br>System Administration and<br>Maintenance | 1-0-1=2 | 1           | 0 | 2 |
|                                |                                                                                  | 20      |             |   |   |

| Syllabus                                                                                                                                                                                                                                                                                                                                                                                                                                              | Number of Lecture | Course           | Name of Teacher       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------|-----------------------|
| <p><b>Introduction:</b> System Software, Resource Abstraction, OS strategies. Types of operating systems - Multiprogramming, Batch, Time Sharing, Single user and Multiuser, Process Control &amp; Real Time Systems.</p> <p><b>Operating System Organization:</b> Factors in operating system design, basic OS functions, implementation consideration; process modes, methods of requesting system services – system calls and system programs.</p> | <b>14 L</b>       | <b>CC</b>        | <b>Sk Abdul Hanif</b> |
| Process Management : System view of the process and resources, initiating the OS, process address space, process abstraction, resource abstraction, process hierarchy, Thread model                                                                                                                                                                                                                                                                   | <b>15 L</b>       |                  |                       |
| <b>Scheduling:</b> Scheduling Mechanisms, Strategy selection, non-pre-emptive and pre-emptive strategies. Memory Management: Mapping address space to memory space, memory allocation strategies, fixed partition, variable partition, paging, virtual memory                                                                                                                                                                                         | <b>24 L</b>       |                  |                       |
| <b>Shell introduction and Shell Scripting (7L)</b>                                                                                                                                                                                                                                                                                                                                                                                                    | <b>7 L</b>        |                  |                       |
| <p>Software Lab based on Operating Systems</p> <p>1. Usage of following commands:<br/>ls, pwd, tty, cat, who, who am I, rm, mkdir, rmdir, touch, cd.</p> <p>2. Usage of following commands:<br/>cal, cat(append), cat(concatenate), mv, cp, man, date.</p> <p>3. Usage of following commands: chmod, grep, tput (clear, highlight), bc.</p> <p>4. Shell script programs</p>                                                                           |                   | <b>Practical</b> | <b>Sk Abdul Hanif</b> |

#### **Books Recommended:**

1. A Silberschatz, P.B. Galvin, G. Gagne, Operating Systems Concepts, 8th Edition, John Wiley Publications 2008.
2. Operating Systems: Internals and Design Principles - Willim Stalling
3. A.S. Tanenbaum, Modern Operating Systems, 3rd Edition, Pearson Education 2007.
4. G. Nutt, Operating Systems: A Modern Perspective, 2nd Edition Pearson Education 1997.
5. W. Stallings, Operating Systems, Internals & Design Principles , 5th Edition, Prentice Hall of India. 2008.
6. M. Milenkovic, Operating Systems- Concepts and design, Tata McGraw Hill 1992.

## SEC-1 : Office Automation Tools

### SEC-1 : Office Automation Tools

Theory: 20 Lectures

Credit: 2

**Introduction to open office/MS office/Libre office** (2L)

**Word Processing:** Formatting Text, Pages, Lists, Tables (6L)

**Spreadsheets:** Worksheets, Formatting data, creating charts and graphs, using formulas and functions, macros, Pivot Table (6L)

**Presentation Tools:** Adding and formatting text, pictures, graphic objects, including charts, objects, formatting slides, notes, hand-outs, slide shows, using transitions, animations (6L)

#### Books Recommended:

1. Sushila Madan , Introduction to Essential tools,JBA,2009.
2. Anita Goel, Computer Fundamentals, Pearson, 2012

## Semester-V

### DSE-3A : Programming in Java

#### SEMESTER – V

| Course code                    | Course title                                                | Credit  | No of Hours |   |   |
|--------------------------------|-------------------------------------------------------------|---------|-------------|---|---|
|                                |                                                             |         | L           | T | P |
| DSE 1A                         | Programming in Java<br><b>OR</b><br>Software Engineering    | 4-0-2=6 | 4           | 0 | 4 |
| DSE 2A                         | Discipline 2                                                | 6       |             |   |   |
| DSE 3A                         | Discipline 3                                                | 6       |             |   |   |
| SEC-3<br>(Computer<br>Science) | MySQL / PL-SQL<br><b>OR</b><br>Concepts of Software Testing | 1-0-1=2 | 1           | 0 | 2 |
|                                |                                                             | 20      |             |   |   |

| Syllabus                                                                                                                                                                                                                                                                                                                                                                                                              | Number of Lecture | Course           | Name of Teacher |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------|-----------------|
| Introduction to Java: Features of Java, JDK Environment.Object Oriented Programming Concept Overview of Programming, Paradigm, Classes, Abstraction, Encapsulation, Inheritance, Polymorphism, Difference between C++ and JAVA.Java Programming Fundamental :Structure of java program, Data types, Variables, Operators, Keywords, Naming Convention, Decision Making (if, switch),Looping(for, while) ,Type Casting | 21 L              | DSE              | Sk Abdul Hanif  |
| Classes and Objects: Creating Classes and objects, Memory allocation for objects, Constructor, Implementation of Inheritance, Implementation of Polymorphism, Method Overloading, Method Overriding, Nested and Inner classes.Arrays and Strings: Arrays, Creating an array, Types of Arrays, String class Methods, String Buffer methods                                                                             | 16 L              |                  |                 |
| Abstract Class, Interface and Packages: Modifiers and Access Control, Abstract classes and methods, Interfaces, Packages Concept, Creating user defined packages. Exception Handling: Exception types, Using try catch and multiple catch, Nested try, throw, throws and finally, Creating User defined Exceptions.                                                                                                   | 12 L              |                  |                 |
| File Handling: Byte Stream, Character Stream, File IO Basics, File Operations, Creating file, Reading file, Writing File. Applet Programming: Introduction, Types Applet, Applet Life cycle, Creating Applet, Applet tag                                                                                                                                                                                              | 11 L              |                  |                 |
| <b>Software Lab based on Java</b>                                                                                                                                                                                                                                                                                                                                                                                     |                   | <b>Practical</b> | Sk Abdul Hanif  |

## SEC-3 : Concepts of Software Testing

### SEC – 3: Concepts of Software Testing

(1+2 Labs)

**Theory:** 20 Lectures

Credit: 2

#### Introduction

(5L)

Strategic Approach to Software Testing, Test Strategies for Conventional Software, Validation Testing, System Testing, Basic Terminologies, V Shaped Software Lifecycle Model

#### Functional Testing\ Black-box Testing

(7L)

Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing

#### Structural Testing\ White-box Testing

(8L)

Basis Path Testing: Program Graph, DD Path graph, Cyclomatic Complexity, Graph Matrices, Control Flow Testing: Statement Coverage, Branch Coverage, Condition Coverage, Path Coverage

#### Books Recommended:

1. Roger S. Pressman, Software Engineering: A Practitioner's Approach, Seventh Edition, Mc Graw Hill Education.2009.
2. Yogesh Singh, Software Testing, Cambridge University Press,2011.



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