**DEPARTMENT OF COMPUTER SCIENCE,**
**RABINDRANATH TAGORE UNIVERSITY, HOJAI: ASSAM**
*Computer Science Syllabus for UG courses, according to NEP2020 (CBCS)*

## Subject details For Third and Fourth Semester:

| *Class* | *Courses* | *Subject papers* | *Credits* |
|---|---|---|---|
| *SEM-III* | *CORE* | *Object Oriented in Programming Using C++* | *3*<br>*1* |
| | *SEC* | *BASIC OF PHOTOSHOP* | *1*<br>*2* |
| | | | *Total credit:7* |

| *CLASSES* | *COURSES* | *Subject papers* | *Credits* |
|---|---|---|---|
| *SEM- IV* | *CORE* | *OPERATING SYSTEM* | *3*<br>*1* |
| | *SEC* | *PHP PROGRAMMING* | *1*<br>*2* |
| | | | *Total credit:7* |

**Note:** *COR - Core; SE- Skill Enhancement.*

**Note**: Students who exits after first year will be awarded undergraduate certificate (in the field/discipline) if He/She completes a summer internship course of credit-4, in Second year.

## SEMESTER-III

## CORE COURSE

**MIN – CSC – 3.3 (OBJECT ORIENTED PROGRAMMING USING C ++)**

Total marks: 100 -- (Theory: 45, Internal Assessment: 30, Practical 25) Total credit: 4(L-3,P-1,T-4)

**Course objectives:** After going through the subject students will be able to learn

- Understand the basics of Computer and Programming
- Adopt algorithmic approach to solve problems using pseudocode and flowcharts.
- Understand and write programs in C++ to implement conditions, loops, functions
- Programming Constructs

**UNIT 1: Fundamentals of C++ : (Lectures: 07)**

Introduction to object oriented programming, user define types, polymorphism, and encapsulation.

Getting started with C++ syntax, data-type, variables, strings, functions, exceptions and statements,

Namespaces and exceptions, operators. Flow control, functions, recursion. Arrays and pointers, structures.

**UNIT 2: Classes, Objects and operator overloading (Lectures: 08 Prac: 06)**

C++ extension to structures, member access operators static members, array of objects, returning

Objects from functions, Friend functions, pointers to members, friend classes, stack class, default

Constructors, overloaded constructors, constructors with default arguments, copy constructors, dynamic

Constructor, destructor defining operator overloading, operator function as member function and friend

Function, overloading unary and binary operators, type conversions, function overloading.

**UNIT 3: Templates and Exception Handling:** **(Lectures : 09 Prac: 10)**

String template, instantiation, template parameters type checking, function template, template argument deduction, specifying template arguments, specialization, conversions. Function template ov overloading, default template arguments, specialization, conversations.

Error handling, grouping of exceptions, catching exceptions, catch all, re-throw, resource management, Auto pointer, exceptions in constructors, exception in destructors, uncaught exceptions, standard exceptions.

**UNIT 4: Inheritance, virtual Functions and Polymorphism: (Lectures: 09 Prac: 05)**

Types of inheritance, defining derived class, Access specifiers, public and private inheritance, Accessing base class members, ambiguity in multiple inheritance, virtual base classes, abstract Classes, derived class constructor with arguments, initialization lists in constructors, classes within Classes. Virtual functions, pure virtual functions, abstract classes, implementation of virtual functions, This pointer, static and dynamic binding, virtual functions in derived classes, object slicing, virtual Functions and constructors, calling virtual functions from destructors, virtual base classes, rules for Virtual functions.

**UNIT 5: File Handling: (Lectures: 07 Prac: 04)**

Basics of file handling in C++, classes for stream operations, operation on files, file opening modes, File pointer, error handling during file operations.

**Lectures - 40 Tutorials - 05 Prac: 25 Total Hours : 70**

## Practical using (C++):

*All the programs should be written using user defined functions, wherever possible.*

*One programming problem in C++ to be developed and tested in computer during the examination.*

- *Design problem solving codes using virtual functions and polymorphism*
- *Use templates to write generic programs*
- *Explain Object Oriented Programming concepts using the C++ language*
- *Construct C++ program to solve real life problems.*

**Internal Assessment: (30 marks)**

**Through the sessional examination, assignments, class test etc**

## Reference Books:-


1. Herbert, S., C ++: the complete Reference, 4th edition, McGraw Hill Education, 2017.

2. Kanetkar Y., Let Us C++ , BPB Publications; 14th edition, 2016

2. Thareja R., Object Oriented Programming with C ++, Oxford University Press, 2015.

3. Balagurusamy, E. 'Object Oriented Programming with C++',McGraw Hill Education, 6th edition, 2013.


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## SEC-III

*SEC-0303* **Basics Of Photoshop**

**Total marks: 75 (Theory 30, Practical 25, Internal 20) Total credit: 3 (L-1, P-2, T-3)**

**Course objectives: After going through the course the students will learn**

- Install and Photoshop software for various tasks.
- Format documents, create and use drawing tools to enhance their photo processing skills.
- To familiarize with importing and saving files in Photoshop.
- To provide an understanding of layers, masks, and selections in Photoshop.
- To introduce the basic retouching tools in Photoshop.
- To provide an understanding of color correction tools and text in Photoshop.

**Unit 1**: **Introduction to Photoshop Interface and Tools: (Lectures: 05 Prac : 02)**

Introduction to the Photoshop interface, Understanding the different tools and palettes, setting up a workspace.

**Unit 2**: **Importing and Saving Files: (Lectures : 05 Prac : 06)**

Importing files into Photoshop, Understanding file formats and resolutions, Saving Files in different formats.

**Unit 3: working with Layers, Masks and Selections: (Lectures : 05 Prac: 05)**

Understanding layers, and how to use them, Creating masks and selections, Understanding the difference between raster and vector graphics.

**Unit 4: Basic Retouching Tools: (Lectures: 05 Prac : 06)**

Using the spot healing brush tool, using the clone stamp tool, understanding The patch tool.

**Unit 5: Color Correction Tools and Text:** **(Lectures: 05 Prac: 06)**

Understanding color modes, using the curves tool, using the levels tool, Using the hue / saturation tool, creating text layers, formatting text, applying Effects to text.

**Lectures - 25 Tutorials - 05 Prac: 25 Total Hours: 55**

**Internal Assessment**: (**20 marks**)
**Through the Practical class, assignment, class test etc.**

## *Reference Books*


1. McCathren, S, " Photoshop for Beginners: the ultimate guide to learning Adobe Photoshop For beginners", Create Space Independent Publishing Platform,(2019)
2. Andrews, P., "Photoshop CC basics for Photographers: getting started with Photoshop CC", Create Space Independent Publishing Platform, (2017).
3. Addision, T. , "Photoshop CC Essentials: A beginners guide to Adobe Photoshop" creative Cloud. Independently published, (2018).
4. Evening M. , "Adobe Photoshop CC classroom in a book (2015 release)" Adobe Press.
5. Faulkner, A. , "Real World Adobe Photoshop CC for Photographers" , Peach pit press,(2018).


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## *SEMESTER-IV*

## *CORE COURSE*

## *MIN – CSC- 4.4 (OPERATING SYSTEM)*

**Total marks: 100 (Theory: 45, Internal Assessment: 25, Practical: 30)**
**Total credit: 4 (L-3,P-1,T-4),**

**COURSE OBJECTIVES:**

- To introduce the basic concepts, types, functions, general working, and evolution of Operating Systems.
- To explain the process management in Operating Systems and its various components.
- To discuss different scheduling mechanisms and strategies used in Operating Systems.
- To discuss memory management in Operating Systems and its various techniques.
- To introduce shell and various editors present in Linux.
- To explain shell scripting, decision making, loops, and functions in shell.

**UNIT-1: Introduction:** **(Lectures: 08 Prac: 05)**

Need and evolution of Operating Systems, types of Operating System, Functions of Operating System, general working of Operating Systems, general structure of Operating System.

**UNIT-2: Process Management:** **(Lectures: 08 Prac: 05)**

System view of the process and resources, initiating the OS, process address space, process Abstraction, resource abstraction, process hierarchy, thread model.

**UNIT 3: Scheduling:** **(Lectures: 06 Prac: 05)**

Scheduling mechanisms, strategy selection, non-pre-emptive and pre-emptive strategies.

**UNIT 4: Memory Management:** **(Lectures: 08 Prac : 05)**

Mapping address space to memory space, memory allocation strategies, fixed partition, Variable partition, paging, and virtual memory.

**UNIT 5**: **Shell Introduction and Shell Scripting:** **(Lectures: 10 Prac: 10)**

Shell and its types, various editors presents in Linux, modes of operation in vi editor, shell script, Writing and execution of the shell script, shell variable (user- defined and system variables), Systems calls, using systems calls, pipes and filters, decision making (if-else, switch), loops, and Functions in shell scripts, utility programs, (cut, paste, join, tr, inequalities), pattern matching utility (grep).

**Lectures - 40 Tutorials - 05 Prac: 30 Total Hours: 75**

**Internal Assessment :**( **25marks**)

Through sessional examination, assignment, class test etc

**Reference Books**:


- A Silberschatz, P.B. Galvin, G. Gagne, "Operating Systems Concepts", John Wiley Publictions, 2011.
- A.S. Tanenbaum, "Modern Operating Systems," 3rd Edition, Pearson Education, 2013.
- G.Nutt, "Operating Systems, Internals & Design Principles, " 5th Edition, Prentice Hall of India, 2015.


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# *SEC-IV*

## *SEC – 0404 PHP PROGRAMMING*

**Total marks: 75 (Theory 30, Practical 25, Internal 20) Total credit: 3 (L-1, P-2, T-3)**

**COURSE OBJECTIVES:**

**Unit 1:** **(Lectures: 05 Prac: 02)**

**PHP** introduction, inventions and versions, important tools and software requirements (like Web Server, Database, Editors etc), PHP with other technologies,scope of PHP Variables and contants, type of data in PHP, Expressions, scopes of a variables (Local global), PHP operators: Arithmetic, Assignment, Relational, Logical operators, Bitwise , ternary and MOD operator, PHP operator precedence and associativity.

**Unit 2:** **(Lectures: 02 Pac: 03)**

**Handling HTML form with PHP**

Capturing form data, GET and POST form methods, dealing with multi- value fields Redirecting a form after submission.

**Unit 3**: **PHP conditional events and loops:** **(Lectures: 03 Prac: 05)**

PHP IF Else conditional statements (Nested IF and Else), Switch case, While, For And Do While Loop. Goto, Break, Continue and Exit.

**Unit 4: PHP Functions:** **(Lectures: 05 Prac: 05)**

Function, Need of function, declaration and calling of a function, PHP Function with Arguments, default arguments in function, Function argument with call by value, call By reference, Scope of function Global and Local.

**Unit 5: String Manipulation and Regular Expression:** **(Lectures: 05 Prac: 05)**

Creating and accessing String, Searching & replacing string, Formatting, joining and Splitting string, string related library functions, Use and advantage of regular expression Over inbuilt function, Use of preg_ match (), preg_ replace (), preg_split() functions in Regular expression.

**Unit 6: Array:** **(Lectures: 05 Prac: 05)**

Anatomy of an array, creating index based and associative array, accessing array, looping With index based array, with associative array using each () for each (), some useful library Function.

**Lab on PHP:**

1. Create a PHP page using functions for comparing three integers and print the largest number.
2. Write a function to calculate the factorial of a number (non-negative integer). The function Accept the number as an argument.
3. WAP to check whether the given number is prime or not.
4. Create a PHP page which accepts string from user. After submission that page displays the Reverse of provided string.
5. Write a PHP function that checks if a string is all lower case.
6. Write a PHP script that checks whether a passed string is palindrome or not? ( A palindrome Is word, phrase, or sequence that reads the same backward as forward e.g., madam or nurses Run)
7. WAP to sort an array.
8. Write a PHP script that removes the whitespaces from a string.

**Sample string:** 'The quick ""brown fox'

**Expected output:** Thequick "" brownfox

9. Write a PHP that finds out the sum of first n odd numbers.
10. Create a login page having user name and password. On clicking submit, a welcome message Should be displayed if the user is already registered (i.e. name is present in the database) otherwise Error message should be displayed.
11. Write a PHP scripts that checks if a string contains another string.
12. Create a simple 'birthday countdown' script, the script will count the number of days between Current day and birth day.
13. Create a script to construct the following pattern, using nested for loops.

```
*
* *
* * *
* * * *
* * * * *
```

14. Write a simple PHP program to check that emails are valid.
15. WAP to print first n even numbers.
16. $color = array ('white', 'green', 'red')

    Write a PHP script which will display the colors in the following way:

Output: white, green, red

- green
- red
- white

17. Using switch case and dropdown list display a "Hello" message depending on the Language selected in drop down list.
18. Write a PHP program to print Fibonacci series using recursion.
19. Write a PHP script to replace the first 'the' of the following string with 'That'.

    **Sample:** 'the quick brown fox jumps over the lazy dog.'

    **Expected Result:** That quick brown fox jumps over the lazy dog.

**Lectures - 25 Tutorials - 05 Prac: 25 Total Hours: 55**

## INTERNAL ASSESSMENT: (20 Marks)

Through Practical class, assignment and class test etc...

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