Proposed Syllabus and Scheme of Examination

for

B. SC. PHYSICAL SCIENCE
(PHYSICS, MATHEMATICS,
COMPUTER SCIENCE)

Under

Choice Based Credit System

Department of Computer Science
Himachal Pradesh University
Shimla
## Details of Courses Under Undergraduate Program B.Sc. (Physical Science)

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory + Practical</td>
<td>12X4= 48</td>
</tr>
<tr>
<td>Theory + Tutorials</td>
<td>12X5=60</td>
</tr>
<tr>
<td>I. Core Course</td>
<td></td>
</tr>
<tr>
<td>(12 Papers)</td>
<td></td>
</tr>
<tr>
<td>04 Courses from each of the</td>
<td></td>
</tr>
<tr>
<td>03 disciplines of choice</td>
<td></td>
</tr>
<tr>
<td>Core Course Practical / Tutorial*</td>
<td>12X2=24</td>
</tr>
<tr>
<td>(12 Practical / Tutorials*)</td>
<td>12X1=12</td>
</tr>
<tr>
<td>04 Courses from each of the</td>
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</tr>
<tr>
<td>03 Disciplines of choice</td>
<td></td>
</tr>
<tr>
<td>II. Elective Course</td>
<td>6x4=24</td>
</tr>
<tr>
<td>(6 Papers)</td>
<td>6X5=30</td>
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<tr>
<td>Two papers from each discipline of choice</td>
<td></td>
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<tr>
<td>including paper of interdisciplinary nature.</td>
<td></td>
</tr>
<tr>
<td>Elective Course Practical / Tutorials*</td>
<td>6 X 2=12</td>
</tr>
<tr>
<td>(6 Practical / Tutorials*)</td>
<td>6X1=6</td>
</tr>
<tr>
<td>Two Papers from each discipline of choice</td>
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<tr>
<td>including paper of interdisciplinary nature</td>
<td></td>
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</table>
III. Ability Enhancement Courses

1. Ability Enhancement Compulsory  4 X 2=8  4 X2=8
(2 Papers of 4 credits each)
   Environmental Science
   English/MIL Communication

2. Skill Enhancement Course  4 X 4=16  4 X 2=16
(Skill Based)
(4 Papers of 4 credits each)

__________________  __________________
Total credit= 132    Total credit= 132

*wherever there is practical there will be no tutorials and vice -versa
## PROPOSED SCHEME FOR CHOICE BASED CREDIT SYSTEM IN

### B. Sc. Physical Science

<table>
<thead>
<tr>
<th>Semester</th>
<th>Core Course</th>
<th>Ability Enhancement Course (AESCC)</th>
<th>Skill Enhancement Course (SEC)</th>
<th>Elective: Discipline Specific (DSE)</th>
<th>Total No. of courses per Semester</th>
<th>Total Credits earned per Semester</th>
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<tbody>
<tr>
<td>I</td>
<td>DSC=12</td>
<td>4 each</td>
<td>4 each</td>
<td>4</td>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Core Course-I. Mechanics (4+4 Lab)</td>
<td>English/MIL communications / Environmental Science</td>
<td></td>
<td>DSC=3 AECC=1</td>
<td>DSC=3<em>6=18 AECC=1</em>4=4</td>
<td>22 Credits Earned by Computer Subjects=6</td>
</tr>
<tr>
<td>II</td>
<td>DSE=3</td>
<td>4 each</td>
<td>4 each</td>
<td>4</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Core Course-IV. Electricity, Magnetism and EMT (4+4 Lab)</td>
<td>SEC -1 [ 3/4 Theory +2 Lab/ 1 Tutorial]</td>
<td></td>
<td>SEC=1</td>
<td>SEC=1*4=4</td>
<td>22 Credits Earned by Computer Subjects=6</td>
</tr>
<tr>
<td>III</td>
<td>DSE=3A</td>
<td>4 each</td>
<td>4 each</td>
<td>4</td>
<td>4</td>
<td>18</td>
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<tr>
<td></td>
<td>Core Course-VII. Thermal Physics and Statistical (4+4 Lab)</td>
<td>DSE=2A. (5+1 Tutorial)</td>
<td></td>
<td>DSE=3</td>
<td>DSE=3*6=18</td>
<td>22 Credits Earned by Computer Subjects=6</td>
</tr>
<tr>
<td>IV</td>
<td>DSE=1A.</td>
<td>4 each</td>
<td>4 each</td>
<td>4</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Core Course-X. Waves and Optics (4+4 Lab)</td>
<td>SEC -2 [ 3/4 Theory +2 Lab/ 1 Tutorial]</td>
<td></td>
<td>SEC=1</td>
<td>SEC=1*4=4</td>
<td>22 Credits Earned by Computer Subjects=6</td>
</tr>
<tr>
<td>V</td>
<td>DSE-3A.</td>
<td>4 each</td>
<td>4 each</td>
<td>4</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Core Course-XI. Algebra (5+1 Tutorial)</td>
<td>Operating Systems OR Web Technologies</td>
<td></td>
<td>DSE=3</td>
<td>DSE=3*6=18</td>
<td>22 Credits Earned by Computer Subjects=10</td>
</tr>
<tr>
<td></td>
<td>Core Course-XII. Database Management Systems (4+4 Lab)</td>
<td></td>
<td></td>
<td>SEC=1</td>
<td>DSE=3</td>
<td>4</td>
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</table>

- 4 Credit Systems
- Each system: 6+4 Credits
- Total 22 Credits
- 10 Computer Subjects
VI

<table>
<thead>
<tr>
<th>COURSE OPTED</th>
<th>COURSE NAME</th>
<th>SEME - STER</th>
<th>COURSE CODE</th>
<th>CR-EDITS</th>
<th>ESE (THEORY)</th>
<th>CCA IA</th>
<th>TOTAL MARKS</th>
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<tbody>
<tr>
<td>Ability Enhancement Compulsory Course-I</td>
<td>English/MIL communications/ Environmental Science</td>
<td>1</td>
<td></td>
<td>4</td>
<td>80</td>
<td>20</td>
<td>100</td>
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<tr>
<td>Core course-I</td>
<td>Mechanics</td>
<td>1</td>
<td></td>
<td>4</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>Core course-I Practical</td>
<td>Mechanics Lab</td>
<td>2</td>
<td></td>
<td>2</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>Core course-II</td>
<td>Differential Calculus</td>
<td>6</td>
<td></td>
<td>6</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>Core Course-III</td>
<td>Object Oriented Programming in C++</td>
<td>BPHS101</td>
<td>4</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Core Course-III Practical</td>
<td>Object Oriented Programming in C++ LAB</td>
<td>BPHS101 (P)</td>
<td>2</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Ability Enhancement Compulsory Course-II</td>
<td>English/MIL communications/Environmental Science</td>
<td>4</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Core course-IV</td>
<td>Electricity, Magnetism and EMT</td>
<td>4</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Core course-IV Practical</td>
<td>Electricity, Magnetism and EMT Lab</td>
<td>2</td>
<td>2</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Core course-V</td>
<td>Differential Equations</td>
<td>6</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Core course-VI</td>
<td>Data Structures</td>
<td>BPHS201</td>
<td>6</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Total credits earned in all semesters (in all subjects) =22+22+22+22+22=132 credits
Total credits earned through Computer Science in all semesters=6+6+6+6+10+10=44 credits
Total credits earned through Computer Science in odd semesters (I+III+V) =6+6+10=22 credits
Total credits earned through Computer Science in even semesters (II+IV+VI) = 6+6+10=22 credits

=> Number of Assistant Prof. (Computer Application) required to run the course=02

- Practical / Tutorial are with every core and discipline specific papers.
- Whenever there is practical there will be no tutorials and vice versa.
- No. of Practical=4 periods / week for Practical of 2 credits. No. of Tutorial=1 Period / week for Tutorial of 1 credit.
  (ii) For Theory + Tutorial: Theory [5 credits] (5 Period / week) +Tutorial [1 credit] (1 Period / week) = Total Six (06) credits and Total Six (6) periods/week.
- The size of the practical group for practical papers is recommended to be 12-15 students.
<table>
<thead>
<tr>
<th>Course</th>
<th>Subject</th>
<th>Credits</th>
<th>Theory</th>
<th>Practical</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Core course-VII</td>
<td>Thermal Physics and Statistical Mechanics</td>
<td>4</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>Core Course-VII Practical</td>
<td>Thermal Physics and Statistical Mechanics Lab</td>
<td>2</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>Core course-VIII</td>
<td>Real Analysis</td>
<td>6</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>Core Course-IX</td>
<td>Numerical Computing</td>
<td>BPHS301</td>
<td>6</td>
<td>80</td>
<td>20</td>
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<tr>
<td>SEC-1</td>
<td></td>
<td></td>
<td>4</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>Core course-X</td>
<td>Waves and Optics</td>
<td>BPHS302</td>
<td>4</td>
<td>80</td>
<td>20</td>
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<tr>
<td>Course-X Practical</td>
<td>Waves and Optics Lab</td>
<td>2</td>
<td>80</td>
<td>20</td>
<td>100</td>
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<tr>
<td>Core course-XI</td>
<td>Algebra</td>
<td>BPHS303</td>
<td>6</td>
<td>80</td>
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<tr>
<td>Core course-XII</td>
<td>Design and Analysis of Algorithms</td>
<td>BPHS401</td>
<td>6</td>
<td>80</td>
<td>20</td>
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<tr>
<td>SEC-2</td>
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<td></td>
<td>4</td>
<td>80</td>
<td>20</td>
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<tr>
<td>SEC-3</td>
<td>PHP Programming</td>
<td>BPHS501</td>
<td>4</td>
<td>80</td>
<td>20</td>
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<tr>
<td>OR</td>
<td>E-Commerce</td>
<td>BPHS502</td>
<td>4</td>
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<tr>
<td>DSE-1A</td>
<td>Operating Systems</td>
<td>BPHS503</td>
<td>6</td>
<td>80</td>
<td>20</td>
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<tr>
<td>DSE-2A</td>
<td>Web Technologies</td>
<td>BPHS504</td>
<td>6</td>
<td>80</td>
<td>20</td>
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<tr>
<td>DSE-3A</td>
<td>Basics of Database Management System</td>
<td>BPHS601</td>
<td>4</td>
<td>80</td>
<td>20</td>
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<tr>
<td>OR</td>
<td>System Analysis and Design</td>
<td>BPHS602</td>
<td>4</td>
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<tr>
<td>DSE-1B</td>
<td>Database Applications</td>
<td>BPHS603</td>
<td>6</td>
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<tr>
<td>DSE-2B</td>
<td>Computer Networks</td>
<td>BPHS604</td>
<td>6</td>
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<tr>
<td>DSE-3B</td>
<td></td>
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</tbody>
</table>

Total Credits: 132

The passing marks for each component (ESE- Theory/Practical and CCA- Theory/Practical) will be 45% and the candidate has to qualify each component separately to be declared successfully qualified.
<table>
<thead>
<tr>
<th>SEMESTER</th>
<th>COURSE OPTED</th>
<th>COURSE NAME</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Ability Enhancement Compulsory Course-I</td>
<td>English/MIL communications/ Environmental Science</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Core course-I</td>
<td>Mechanics</td>
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</tr>
<tr>
<td></td>
<td>Core Course-I Practical/Tutorial</td>
<td>Mechanics Lab</td>
<td>2</td>
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<tr>
<td></td>
<td>Core course-II</td>
<td>Differential Calculus</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Core Course-III</td>
<td>Object Oriented Programming in C++</td>
<td>6</td>
</tr>
<tr>
<td>II</td>
<td>Ability Enhancement Compulsory Course-II</td>
<td>English/MIL communications/ Environmental Science</td>
<td>4</td>
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<td>Core course-IV</td>
<td>Electricity, Magnetism and EMT</td>
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<td>Core Course-IV Practical/Tutorial</td>
<td>Electricity, Magnetism and EMT Lab</td>
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<td>Core course-V</td>
<td>Differential Equations</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Core Course-VI</td>
<td>Data Structures and File Processing</td>
<td>6</td>
</tr>
<tr>
<td>III</td>
<td>Core course-VII</td>
<td>Thermal Physics and Statistical Mechanics</td>
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<td>Core Course-VII Practical/Tutorial</td>
<td>Thermal Physics and Statistical Mechanics Lab</td>
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<td>Core course-VIII</td>
<td>Real Analysis</td>
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<td>Core Course-IX</td>
<td>Numerical Computing</td>
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<td>Skill Enhancement Course -1</td>
<td>SEC-1</td>
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<td>IV</td>
<td>Core course-X</td>
<td>Waves and Optics</td>
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<td>Course-X Practical/Tutorial</td>
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<td>Core course-XI</td>
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<td>V</td>
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<td>132</td>
</tr>
<tr>
<td>Credits</td>
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</tr>
</tbody>
</table>
COMPUTER SCIENCE

Skill Enhancement Course (SEC)

SEC 1

* Paper from other discipline of choice

SEC 2 (choose one)

* Paper from other discipline of choice

SEC 3 (choose one from COMPUTER SCIENCE)

1. PHP Programming (Paper: BPHS501)
2. Electronic Commerce (Paper: BPHS502)

SEC 4 (choose one from COMPUTER SCIENCE)

2. Web Technologies (Paper: BPHS602)

Discipline Specific Electives (DSE)

* Six DSE papers in all.
* Two each from each discipline of choice (Physics, Mathematics and Computer Science)

1. DSE 1A
2. DSE 1B
   * (choose 2 Papers from the discipline of PHYSICS)
   * (One paper in 5th Semester and one in 6th Semester)

3. DSE 2A
4. DSE 2B
   * (choose 2 Papers from the discipline of MATHEMATICS)
   * (One paper in 5th Semester and one in 6th Semester)
5. **DSE 3A (choose one from the discipline of COMPUTER SCIENCE)**
   * Paper in 5th Semester
   2. Web Technologies (Paper: BPHS504)

6. **DSE 3B (choose one from the discipline of COMPUTER SCIENCE)**
   * Paper in 6th Semester
   1. Database Applications (Paper: BPHS603)
   2. Computer Networks (Paper: BPHS604)
BPHS101: Object Oriented Programming in C++
Theory: 60 Lectures

UNIT – I

Programming Concepts: Algorithm and its characteristics, pseudo code / flow chart, program, identifiers, variables, constants, primitive data types, expressions, structured data types, arrays, compilers and interpreters (15 LECTURE)

UNIT – II

Object Oriented Concepts: Abstraction, encapsulation, objects, classes, methods, constructors, inheritance, polymorphism, static and dynamic binding, overloading. Program Development: Object oriented analysis, design, unit testing & debugging, system testing & integration, maintenance. (15 LECTURE)

UNIT – III

Introduction to structured programming: Data types- simple data types, floating data types, character data types, string data types, arithmetic operators and operator precedence, variables and constant declarations, expressions, input using the extraction operator >> and cin, output using the insertion operator << and cout, preprocessor directives, increment (++) and decrement operations (–). (15 LECTURE)

UNIT – IV

Creating a C++ program: Input/output, relational operators, logical operators and logical expressions, if and if … else statement, switch and break statements. “for”, “while” and “do – while” loops, break and continue statement, nested control statement, value returning functions, void functions, value versus reference parameters, local and global variables, static and automatic variables, enumeration type. (15 LECTURE)

Books Recommended:

BPHS101P: Object Oriented Programming in C++ LAB
Practical: 60 Lectures
BPHS201: Data Structures and File Processing

Theory: 60 Lectures

UNIT - I

Basic Data Structures: Abstract data structures- stacks, queues, linked lists and binary trees. Binary trees, balanced trees (15 LECTURE)

UNIT - II

Searching: Internal and external searching. Memory Management: Garbage collection algorithms for equal sized blocks, storage allocation for objects with mixed size (15 LECTURE)

UNIT - III

Physical Devices: Characteristics of storage devices such as disks and tapes, I/O buffering. Basic File System Operations: Create, open, close, extend, delete, read-block, write-block, protection mechanisms. (15 LECTURE)

UNIT - IV

File Organizations: Sequential, indexed sequential, direct, inverted, multi-list, directory systems, Indexing using B-tree, B+ tree. (15 LECTURE)

Books Recommended:

BPHS301: Numerical Computing
Theory: 60 Lectures

UNIT – I

Solution to Transcendental and Polynomial Equations: Iterative methods, bisection method, secant method, Newton-Raphson method, fixed point iteration, methods for finding complex roots. (15 LECTURE)

UNIT – II

Interpolation: Polynomial interpolation, Newton-Gregory, Stirling’s, Bessel’s and Lagrange’s interpolation formula, Newton’s divided differences interpolation formulae. (15 LECTURE)

UNIT – III

Numerical Differentiation and Integration: Numerical differentiation and errors in numerical differentiation, Newton-Cotes formulae, trapezoidal rule, Simpson’s rule, Gaussian integration. (15 LECTURE)

UNIT – IV

Numerical Solutions of Ordinary Differential Equations: Picard’s and Taylor’s series, Euler’s and Runge-Kutta (RK) methods. (15 LECTURE)

Books Recommended:

BPHS401: Design and Analysis of Algorithms
Theory: 60 Lectures

UNIT – I

Introduction: RAM model, O (log n) bit model. Review of data structures: Balanced trees, Mergeable sets. Algorithm Design Techniques: Iterative techniques, Divide and conquer, dynamic programming, greedy algorithms. (15 LECTURE)
UNIT – II

Searching and Sorting Techniques: Review of elementary sorting techniques—selection sort, bubble sort, insertion sort, more sorting techniques—quick sort, heap sort, merge sort, shell sort, external sorting. (15 LECTURE)

UNIT – III

Lower bounding techniques: Decision Trees, Adversaries, String Processing: KMP, Boyre-Moore, Robin Karp algorithms. (15 LECTURE)

UNIT – IV

Introduction to randomized algorithms: Random numbers, randomized Qsort, randomly Built BST Number Theoretic Algorithms: GCD, Addition and Multiplication of two large numbers.

Graphs: Analysis of Graph algorithms Depth-First Search and its applications, minimum Spanning Trees and Shortest Paths. (15 LECTURE)

Books Recommended:

Skill Enhancement Courses (any two) (Credit: 04 each) –
SEC1 to SEC4 Theory: 03, Labs: 02/01 Tutorial

(SEC-3)
BPHS501: PHP Programming
Theory: 45 Lectures

UNIT – I

Introduction to PHP: PHP introduction, inventions and versions, important tools and software requirements (like Web Server, Database, Editors etc.), PHP with other technologies, scope of PHP, Basic Syntax, PHP variables and constants, Types of data in PHP, Expressions, scopes of a variable (local, global). (12 LECTURE)

UNIT – II

PHP Operators: Arithmetic, Assignment, Relational, Logical operators, Bitwise, ternary, and MOD operator. PHP operator Precedence and associativity(11 LECTURE)

UNIT – III

Handling HTML form with PHP: Capturing Form Data, GET and POST form methods, Dealing with multi value fields, Redirecting a form after submission. (11 LECTURE)

UNIT – IV

PHP conditional events and Loops: PHP IF Else conditional statements (Nested IF and Else), Switch case, while, For and Do While Loop, Goto, Break, Continue and exit. (11 LECTURE)

Books Recommended

2. Timothy Boronczyk, Martin E. Psinas, "PHP and MYSQL (Create-Modify -Reuse)", Wiley India Private Limited, 2008.
BPHS502: E-Commerce Theory: 45 Lectures

UNIT – I

Electronic Commerce: Introduction, types, Advantages, Challenges, Business Oriented, Business Models. (12 LECTURE)

UNIT – II


UNIT – III

E-Learning: Introduction, E-Courses, Learning from E-Learning, Revolution, Benefits. (11 LECTURE)

UNIT – IV

E-Banking: Introduction, Evolution of E-Banking, Importance Role of ICT in Banking, Challenges, Models, Future, Opportunities, Strategies. (11 LECTURE)

Books Recommended:
(SEC-4)
BPHS601: Basics of Database Management Systems
Theory: 45 Lectures

UNIT - I

Introduction to Database Management Systems: Characteristics of database approach, data models, DBMS architecture and data independence. (12 LECTURE)

UNIT – II

Entity Relationship and Enhanced ER Modeling: Entity types, relationships, SQL: Schema Definition, constraints. (11 LECTURE)

UNIT – III

Relational Data Model: Basic concepts, relational constraints, SQL queries. (11 LECTURE)

UNIT – IV

Database design: ER and EER to relational mapping, functional dependencies, normal forms up to third normal form. (11 LECTURE)

Books Recommended:

(SEC4)

BPHS602: System Analysis and Design
Theory: 45 Lectures

UNIT – I


UNIT – II


UNIT – III


UNIT – IV

Implementation Phase: System Implementation, Training and Supporting Users, Coding, Testing, Program Test, System Test, System Implementation, Maintenance. Audit of computer system usage, Audit trails, Threat to computer system and control measures, Disaster recovery and contingency planning (11 LECTURE)

Books Recommended:
Discipline Specific Elective Papers: (Credit: 06 each) (2 papers to be selected in Computer Science) –

(DSE-3A)
BPHS503: Operating Systems
Theory: 60 Lectures

UNIT – I


UNIT – II

Operating System Organization: Factors in operating system design, basic OS functions, implementation consideration; process modes, methods of requesting system services –system calls and system programs. (15 LECTURE)

UNIT – III

Process Management: System view of the process and resources, initiating the OS, process address space, process abstraction, resource abstraction, process hierarchy, Thread model. (15 LECTURE)

UNIT – IV

Scheduling: 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. (15 LECTURE)

Books Recommended:

UNIT – I

Introduction to Web Design: Introduction to hypertext markup language (HTML) document type definition, creating web pages, graphical elements, lists, hyperlinks, tables, web forms, inserting images, Divisions, Sections. (15 LECTURE)

UNIT – II

Customized Features: Cascading style sheets, (CSS) for text formatting and other manipulations, Types, Introduction to DHTML (15 LECTURE)

UNIT – III

JavaScript: Data types, operators, functions, control structures, events and event handling. JQuery: Introduction, Basics, Selectors, Attributes. (15 LECTURE)

UNIT – IV

Bootstrap: Introduction, Environment, a simple web page using bootstrap template, Designing tables, forms, buttons (15 LECTURE)

Books Recommended:
(DSE-3B)

**BPHS 603: Database Applications**
**Theory:** 60 Lectures

**UNIT – I**

**Application Design and Development:** User interfaces and tools, web interfaces to Databases Web Fundamentals: HTML, static vs. dynamic web pages, client (Java script/VB) and server side scripting (JSP/ASP/PHP/VB), web servers and sessions, two level & three level architecture, Real Life Application (15 LECTURE)

**UNIT – II**

**Development using Popular DBMS:** SQL, procedures & functions, exception handling, triggers, large objects, user defined data types, collection types, bulk loading of data. (15 LECTURE)

**UNIT – III**

**Query Optimization:** Query Processing, query tree, query plans, measures of query cost, estimates of basic operations, equivalent relational algebra expressions, evaluation of expressions (15 LECTURE)

**UNIT – IV**

**Authorizations in SQL:** System and user privileges, granting and revoking privileges, roles, authorization on views, functions and procedures, limitations of SQL authorizations, audit trails Application Security: Encryption techniques, digital signatures and digital certificates. (15 LECTURE)

**Books Recommended:**

(DSE-3B) BPHS604: Computer Networks
Theory: 60 Lectures

UNIT – I


Transmission Media: Guided and unguided, Attenuation, distortion, noise, throughput, propagation speed and time, wavelength, Shannon Capacity. (15 LECTURE)

UNIT – II

Telephony: Multiplexing, error detection and correction, Many to one, one to many, WDM, TDM, FDM, circuit switching, packet switching and message switching. Data Link control protocols: Line discipline, flow control, error control, synchronous and asynchronous protocols overview. ISDN: Services, historical outline, subscriber’s access, ISDN, Layers, and broadband ISDN. (15 LECTURE)

UNIT – III

Devices: Repeaters, bridges, gateways, routers, The Network Layer, Design Issues, Network Layer Addressing and Routing concepts (Forwarding Function, Filtering Function);Routing Methods (Static and dynamic routing, Distributed routing, Hierarchical Routing);Distance Vector Protocol, Link State protocol. (15 LECTURE)

UNIT – IV

Transport and upper layers in OSI Model: Transport layer functions, connection management, Functions of session layers, Presentation layer, and Application layer. (15 LECTURE)

Books Recommended: