

**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)

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

III. Ability Enhancement Courses

1. **Ability Enhancement Compulsory** 4 X 2=8 4X2=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

Semest-er	Core Course (DSC)=12 *Credits(DSC) Theory + Practical/Tutorial= 6 each	Ability Enhancement Course (AESCC) =2 *Credits (AECC)= 4 each	Skill Enhancement Course (SEC) = 4 *Credits(SEC) Theory + Practical/ Tutorial = 4 each	Elective: Discipline Specific (DSE)=6 *Credits(DSE) Theory + Practical/ Tutorial = 6 each	Total No. of courses per Semester	Total Credits earned per Semester
I	Core Course-I. Mechanics (4+4 Lab) Core Course-II. Differential Calculus (5+ 1 Tutorial) Core Course-III. Object Oriented Programming in C++ (4+4 Lab)	English/MIL communications / Environmental Science			DSC=3 AECC=1 <hr/> 3	DSC=3*6=18 AECC=1*4=4 <hr/> 22 Credits Earned by Computer Subjects=6
II	Core Course-IV. Electricity, Magnetism and EMT (4+4 Lab) Core Course-V. Differential Equations (5+ 1 Tutorial) Core Course-VI. Data Structures and File Processing (5+ 1 Tutorial)	English/MIL communications / Environmental Science			DSC=3 AECC=1 <hr/> 3	DSC=3*6=18 AECC=1*4=4 <hr/> 22 Credits Earned by Computer Subjects=6
III	Core Course-VII. Thermal Physics and Statistical (4+4 Lab) Core Course-VIII. Real Analysis (5+ 1 Tutorial) Core Course-IX. Numerical Computing (5+ 1 Tutorial)		SEC -1 [3/4 Theory +2 Lab/ 1 Tutorial]		DSC=3 SEC=1 <hr/> 4	DSC=3*6=18 SEC=1*4=4 <hr/> 22 Credits Earned by Computer Subjects=6
IV	Core Course-X. Waves and Optics (4+4 Lab) Core Course-XI. Algebra (5+ 1 Tutorial) Core Course-XII. Database Management Systems (4+4 Lab)		SEC -2 [3/4 Theory +2 Lab/ 1 Tutorial]		DSC=3 SEC=1 <hr/> 4	DSC=3*6=18 SEC=1*4=4 <hr/> 22 Credits Earned by Computer Subjects=6
V			SEC -3 <i>PHP Programming</i> OR <i>E-Commerce</i> [3/4 Theory +2 Lab/ 1 Tutorial]	DSE-1A. (4+4 Lab) DSE-2A. (5+1 Tutorial) DSE-3A <i>Operating Systems</i> OR <i>Web Technologies</i>	SEC=1 DSE=3 <hr/> 4	SEC=1*4=4 DSE=3*6=18 <hr/> 22 Credits Earned by Computer Subjects=10

VI			SEC -4 <i>Basics of Database Management System</i> OR <i>System Analysis and Design</i> [3/4 Theory +2 Lab/ 1 Tutorial]	DSE-1B. (4+4 Lab) DSE-2B. (5+1 Tutorial) DSE-3B. <i>Database Applications</i> OR <i>Computer Networks</i>	SEC=1 DSE=3 <hr/> 4	SEC=1*4=4 DSE=3*6=18 <hr/> 22 Credits Earned by Computer Subjects=10
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Total credits earned in all semesters (in all subjects) =22+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.
- Credits for Core Course Paper (DSC) = (i) **For Theory + Practical:** Theory [4 credits] (4 Period / week) + Practical [2 credit](4 Period / week)= Total Six (06) credits and Total Eight (8) periods/week.
(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.

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

	<i>and File Processing</i>						
Core course-VII	Thermal Physics and Statistical Mechanics	3		4	80	20	100
Core Course-VII Practical	Thermal Physics and Statistical Mechanics Lab			2	80	20	100
Core course-VIII	Real Analysis			6	80	20	100
<i>Core Course-IX</i>	<i>Numerical Computing</i>		BPHS301	6	80	20	100
SEC-1				4	80	20	100
Core course-X	Waves and Optics	4		4	80	20	100
Course-X Practical	Waves and Optics Lab			2	80	20	100
Core course-XI	Algebra			6	80	20	100
<i>Core course-XII</i>	<i>Design and Analysis of Algorithms</i>		BPHS401	6	80	20	100
SEC -2				4	80	20	100
SEC -3	PHP Programming	5	BPHS501	4	80	20	100
	OR		OR				
	E-Commerce		BPHS502	4	80	20	100
DSE-1A			6	80	20	100	
DSE-2A			6	80	20	100	
DSE-3A	Operating Systems		BPHS503	6	80	20	100
	OR		OR				
	Web Technologies		BPHS504	6	80	20	100
SEC -4	Basics of Database Management System	6	BPHS601	4	80	20	100
	OR		OR				
	System Analysis and Design		BPHS602	4	80	20	100
DSE-1B			6	80	20	100	
DSE-2B			6	80	20	100	
DSE-3B	Database Applications		BPHS603	6	80	20	100
	OR		OR				
	Computer Networks		BPHS604	6	80	20	100
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.

SEMESTER	COURSE OPTED	COURSE NAME	Credits
I	Ability Enhancement Compulsory Course-I	English/MIL communications/ Environmental Science	4
	Core course-I	Mechanics	4
	Core Course-I Practical/Tutorial	Mechanics Lab	2
	Core course-II	Differential Calculus	6
	Core Course-III	Object Oriented Programming in C++	6
II	Ability Enhancement Compulsory Course-II	English/MIL communications/ Environmental Science	4
	Core course-IV	Electricity, Magnetism and EMT	4
	Core Course-IV Practical/Tutorial	Electricity, Magnetism and EMT Lab	2
	Core course-V	Differential Equations	6
	Core Course-VI	Data Structures and File Processing	6
III	Core course-VII	Thermal Physics and Statistical Mechanics	4
	Core Course-VII Practical/Tutorial	Thermal Physics and Statistical Mechanics Lab	2
	Core course-VIII	Real Analysis	6
	Core Course-IX	Numerical Computing	6
	Skill Enhancement Course -1	SEC-1	4
IV	Core course-X	Waves and Optics	4
	Course-X Practical/Tutorial	Waves and Optics Lab	2
	Core course-XI	Algebra	6
	Core course-XII	Design and Analysis of Algorithms	6
	Skill Enhancement Course -2	SEC -2	4
V	Skill Enhancement Course -3	SEC -3	4
	Discipline Specific Elective -1	DSE-1A	6
	Discipline Specific Elective -2	DSE-2A	6
	Discipline Specific Elective -3	DSE-3A	6
VI	Skill Enhancement Course -4	SEC -4	4
	Discipline Specific Elective -4	DSE-1B	6
	Discipline Specific Elective -5	DSE-2B	6
	Discipline Specific Elective-6	DSE-3B	6
Total Credits			132

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)

1. Basics of Database Management System (Paper: BPHS601)
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

1. Operating Systems (Paper: BPHS503)
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:

- 1 Richard Johnson, “*An Introduction to Object-Oriented Application Development*”, Thomson Learning, 2006.
- 2 B. Stroustrup, “*The C++ Programming Language*”, Addison Wesley, 2004.

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:

1. M.T. Goodrich, R. Tamassia and D. Mount, “*Data Structures and Algorithms in C++*”, John Wiley and Sons, Inc., 2004.
2. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, “*Introduction to Algorithms*”, 2nd Ed., Prentice-Hall of India, 2006.
3. Robert L. Kruse and A.J. Ryba, “*Data Structures and Program Design in C++*”, Prentice Hall, Inc., NJ, 1998.
4. B. Stroustrup, “*The C++ Programming Language*”, Addison Wesley, 2004.
5. D.E. Knuth, “*Fundamental Algorithms (Vol. I)*”, Addison Wesley, 1997.

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:

1. K.E. Atkinson, W. Han, "*Elementary Numerical Analysis*", 3rd Ed., Wiley, 2003.
2. C. Xavier, S.S. Iyengar, "*Introduction to Parallel Algorithms*", Wiley-Interscience, 1998.
3. A. Kharab, R.B. Guenther, "*An Introduction to Numerical Methods: A MATLAB Approach*", 1st Ed., Chapman and Hall/CRC, 2001.
4. B. Bradie, "*A Friendly Introduction to Numerical Analysis*", Pearson Education, 2007.
5. S.R. Otto and J.P. Denier, "*An Introduction to Programming and Numerical Methods in MATLAB*", Springer, 2005.
6. M.K. Jain, S.R.K. Iyengar and R.K. Jain, "*Numerical Methods for Scientific and Engineering Computation*", 7th Ed., New Age International Publishers, 2007.

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:

1. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, “*Introduction to Algorithms*”, Prentice-Hall of India, 2006.
2. J. Kleinberg and E. Tardos, “*Algorithms Design*”, Pearson Education, 2006.
3. S. Baase, “*Computer Algorithms: Introduction to Design and Analysis*”, Addison Wesley, 1999.
4. A.V. Levitin, “*Introduction to the Design and Analysis of Algorithms*”, Pearson Education, 2006.

**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

1. *Steven Holzner, "PHP: The Complete Reference Paperback", McGraw Hill Education (India), 2007.*
2. *Timothy Boronczyk, Martin E. Psinas, "PHP and MYSQL (Create-Modify -Reuse)", Wiley India Private Limited, 2008.*
3. *Robin Nixon, "Learning PHP, MySQL, JavaScript, CSS & HTML5", 3rd Edition Paperback, O'reilly, 2014.*
4. *David Sklar, Adam Trachtenberg, "PHP Cookbook: Solutions & Examples for PHP Programmers", 2014.*

(SEC-3)
BPHS502: E- Commerce
Theory: 45 Lectures

UNIT – I

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

UNIT – II

WWW and E-Services: World Wide Web and E-Commerce, E-Services. **(11 LECTURE)**

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:

1. Herny Chah, Raymond Lee, Tharam Dillon, Elizabeth Chang “*E-Commerce, Fundamentals and Applications*”, John Wiley and Sons, Inc., 2001.
2. Kenneth C. Laudon, Carol Guercio Traver, “*E-Commerce Business, Technology, Society*”, Pearson Education, 2009.
3. Ruth Colvin Clark, Richard E. Mayer, “*E-Learning and the Science of Instruction*”, 3rd Edition, John Wiley and Sons, Inc., 2011.
4. Marc J. Rosenberg, “*E- Learning, Strategies for Delivering Knowledge in the Digital Age*”, McGraw-Hill, 2001.
5. Mahmood Shah, Steve Clarke, “*E- Banking Management: Issues, Solutions, and Strategies*”, Information Science Reference, IGI Global, 2009.
6. Mohammad Ali Sarlak, Asghar Abolhasani Hastiani, “*E-Banking and Emerging Multidisciplinary Process, Social Economical and Organizational Models*”, Business Science Reference, IGI Global, 2011

(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:

1. R. Elmasri, S.B. Navathe, “*Fundamentals of Database Systems*”, 5th Ed., Pearson Education. 2010.
2. A. Silberschatz, H.F. Korth, S. Sudarshan, “*Database System Concepts*”, 5th Ed., McGraw Hill. , 2013.
3. R. Ramakrishanan, J. Gehrke, “*Database Management Systems*”, 3rd Ed., McGraw-Hill.2002

(SEC4)

BPHS602: System Analysis and Design

Theory: 45 Lectures

UNIT – I

Planning Phase: Introduction, Development Life Cycle, Project Identification, Feasibility Analysis, Project Selection, Project Plan, Management and Control **(12 LECTURE)**

UNIT – II

Analysis Phase: Requirement Determination, Requirement and Analysis Techniques, Requirement Gathering Techniques, Use Cases. Process Modeling, Creating Data Flow Diagram, Data Modeling: E-R Diagram, Validating an ERD. **(11 LECTURE)**

UNIT – III

Design Phase: Transition from Requirement to Design, Influences on the Acquisition Strategy. Architecture Design: Elements of Architecture, Creating and Architecture Design, Hardware and Software Specification, Use Interface Design, Moving from Logical to Physical Process Models. **(11 LECTURE)**

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:

1. Alan Dennis, Barbara Haley Wixom, Roberta M. Roth, “*System Analysis Design*”, 4th Edition, John Wiley & Sons, Inc. 2005.
2. Jeffrey A. Hofer Joey F. George Joseph S. Valacich, Addison Weseley, “*Modern System Analysis and Design*”.

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

Introduction: System Software, Resource Abstraction, OS strategies, Types of operating systems - Multiprogramming, Batch, Time Sharing, Single user and Multiuser, Process Control & Real Time Systems. **(15 LECTURE)**

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:

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

(DSE-3A)

BPHS504: Web Technologies

Theory: 60 Lectures

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:

1. Ivan Bayross, “*Web Enabled Commercial Application Development Using Html, Dhtml, javascript*”, Perl CGI, BPB Publications, 2009.
2. Ivan Bayross, “*Web Enabled Commercial Application Development Using Html, Dhtml, javascript*”, Perl CGI, BPB Publications, 2009.
3. “*BIG Java Cay Horstmann*”, Wiley Publication , 3rd Edition., 2009.
4. David Flanagan, “*jQuery, Pocket Reference*”, O'Reilly, 2011. Jake Spurlock, “*Bootstrap*”, O'Reilly, 2013. JQuery Web Application Library, Tutorials Point (http://www.tutorialspoint.com/jquery/jquery_tutorial.pdf)

(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:

1. A. Silberschatz, H. Korth and S. Sudarshan, *Database System Concepts*, 5th Ed., Tata McGraw Hill, 2006.
2. J. Morrison, M. Morrison and R. Conrad, *Guide to Oracle 10g*, Thomson Learning, 2005.
3. Loney and Koch, *Oracle 10g: The Complete Reference*, Tata McGraw Hill, 2006.
4. David Flanagan, Java Script, *The Definitive Guide*, O'Reilly Media, 2006.
5. Marty Hall, Larry Brown, and Yaakov Chaikin, *Core Servlets and Java ServerPages: Core Technologies* (Vol. II), 2nd Ed., Sun Microsystems Press, 2006.
6. S.K. Singh, *Database Systems Concepts, Design and Applications*, Pearson Education 2006.

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

UNIT – I

Basic Concepts: Components of data communication, distributed processing, Line configuration, topology, transmission mode, and categories of networks. OSI and TCP/IP Models: Layers and their functions, comparison of models. Digital Transmission: Interfaces and Modems: DTE-DCE Interface, modems, cable modems.

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:

1. A.S. Tanenbaum, *Computer Networks*, 4th Ed., Pearson Education Asia, 2003.
2. Behrouz A. Forouzan, *Data Communication and Networking*, 2nd Ed., Tata McGraw Hill.
3. D. E. Comer, *Internetworking with TCP/IP*, Pearson Education Asia, 2001.
4. William Stallings, *Data and Computer Communications*, 7th Ed., Pearson education Asia, 2002.