

# Scheme for UG Syllabus

(Effective from 2018-19)

Under

**CHOICE BASED CREDIT SYSTEM (CBCS)**

In

Bachelor of Arts (Computer Applications)



Department of Computer Science  
Himachal Pradesh University  
Shimla-5

## **CHOICE BASED CREDIT SYSTEM (CBCS):**

The CBCS provides an opportunity for the students to choose courses from the prescribed courses comprising core, elective/minor or skill based courses. The courses can be evaluated following the grading system, which is considered to be better than the conventional marks system. Therefore, it is necessary to introduce uniform grading system in the entire higher education in India. This will benefit the students to move across institutions within India to begin with and across countries. The uniform grading system will also enable potential employers in assessing the performance of the candidates. In order to bring uniformity in evaluation system and computation of the Cumulative Grade Point Average (CGPA) based on student's performance in examinations, the UGC has formulated the guidelines to be followed.

### **Outline of Choice Based Credit System:**

1. **Core Course:** A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course.

2. **Elective Course:** Generally a course which can be chosen from a pool of courses and which may be very specific or specialized or advanced or supportive to the discipline/ subject of study or which provides an extended scope or which enables an exposure to some other discipline/subject/domain or nurtures the candidate's proficiency/skill is called an Elective Course.

2.1 **Discipline Specific Elective (DSE) Course:** Elective courses may be offered by the main discipline/subject of study is referred to as Discipline Specific Elective. The University/Institute may also offer discipline related Elective courses of interdisciplinary nature (to be offered by main discipline/subject of study).

2.2 **Dissertation/Project:** An elective course designed to acquire special/advanced knowledge, such as supplement study/support study to a project work, and a candidate studies such a course on his own with an advisory support by a teacher/faculty member is called dissertation/project.

3. **Ability Enhancement Courses (AEC)/Competency Improvement Courses/Skill Development Courses/Foundation Course:** The Ability Enhancement (AE) Courses may be of two kinds: AE Compulsory Course (AECC) and AE Elective Course (AEEC). "AECC" courses are the courses based upon the content that leads to Knowledge enhancement. They ((i) Environmental Science, (ii) English/MIL (Modern Indian Language) Communication are mandatory for all disciplines. AEEC courses are value-based and/or skill-based and are aimed at providing hands-on-training, competencies, skills, etc.

3.1 **AE Compulsory Course (AECC):** Environmental Science, English Communication/MIL Communication.

3.2 **AE Elective Course (AEEC):** These courses may be chosen from a pool of courses designed to provide value-based and/or skill-based instruction.

Project work/Dissertation is considered as a special course involving application of knowledge in solving / analyzing /exploring a real life situation / difficult problem. A Project/Dissertation work would be of 6 credits. A Project/Dissertation work may be given in lieu of a discipline specific elective paper.

**Scheme for Choice Based Credit System (CBCS) in Bachelor of Arts  
(Computer Applications) Effective from 2018-19 onwards  
Annual Pattern**

Year	Core Course (12)	Ability Enhancement Compulsory Course AECC (2)	Skill Enhancement Courses SEC (4)	Discipline Specific Elective DSE (6)	General Elective	Total Credits
<b>I</b>	Eng-1 = 6 Credit Skt/Hindi-1 = 6 Credit DSC-1A = 6 Credit DSC-1B = 6 Credit DSC-2A = 6 Credit DSC-2B = 6 Credit <b>Credits = 36</b>	Environmental Science = 4 Credit English / MIL Communication = 4 Credit (One out of three)  <b>Credits = 08</b>	NIL	NIL	NIL	<b>44</b>
<b>II</b>	Eng-2 = 6 Credit Skt/Hindi-2 = 6 Credit DSC-1C = 6 Credit DSC-1D = 6 Credit DSC-2C = 6 Credit DSC-2D = 6 Credit <b>Credits = 36</b>	NIL	SEC-1 = 4 Credit SEC-2 = 4 Credit  <b>Credits = 08</b>	NIL	NIL	<b>44</b>
<b>III</b>	NIL	NIL	SEC-3 = 4 Credit SEC-4 = 4 Credit  <b>Credits = 08</b>	DSE-1A = 6 Credit DSE-1B = 6 Credit DSE-2A = 6 Credit DSE-2B = 6 Credit  <b>Credits = 24</b>	GE-1 = 6 Credit GE-2 = 6 Credits  <b>Credits = 12</b>	<b>44</b>
<b>Total Credits in degree B.A. (Computer Applications) Degree Course = 44 × 3</b>						<b>132</b>

**Credits Split:**

**Theory = 04**

**Practical = 02**

**Theory = 06**

# **Annual Examination (A.E.) and Internal Assessment (I.A.) Scheme of Three years Degree of B.A. (Computer Applications)**

## **Scheme for Examination for each course**

- The medium of instructions and Examinations shall be English only.
- AE & Practical Examinations shall be conducted at the end of each year as per the Academic Calendar notified by H.P. University, Shimla-5, time to time.
- Each course of 4/6 credits (theory + Practicals) will carry 100 marks and will have following components:

### **(FOR COURSES WITHOUT PRACTICALS)**

<b>I.</b>	<b>Theory</b>	<b>marks</b>
	<b>Annual Examination (AE)</b>	<b>70 marks</b>
<b>II.</b>	<b>Internal Assessment (IA)</b>	<b>30 marks</b>
	a) Assignment/Class Test/Quiz/Seminar/Model	<b>10 marks</b>
	a) Mid-Term Examination (One Test)	<b>15 marks</b>
	b) Attendance	<b>05</b>

### **(FOR COURSES WITH PRACTICALS)**

<b>III.</b>	<b>Theory</b>	<b>marks</b>
	<b>Annual Examination (AE)</b>	<b>50 marks</b>
<b>IV.</b>	<b>Internal Assessment (IA)</b>	<b>30 marks</b>
	a) Assignment/Class Test/Quiz/Seminar/Model	<b>10 marks</b>
	c) Mid-Term Examination (One Test)	<b>15 marks</b>
	d) Attendance	<b>05</b>

**V. Practical**

**20 marks**

**Practical examination will have following components:**

- |  |                 |
|--|-----------------|
| a) Performing the two practical exercises assigned by the Examiner in terms of requirement of chemicals/Practical's/ Theory/reaction (if any) involved, procedure/scheme/ Observations/calculations and results. | 7.5 + 7.5 marks |
| b) Viva-voce examinations  | 5 marks         |
| c) Practical note book   | 5 marks         |
| d) Regularity during practical classes   | 5 marks         |

❖ **Minimum Pass Percentage in each component (AE, IA & Practical) shall be 40%, separately**

❖ **Criterion for Class-room attendance (05 marks) 75%**

**Attendance is minimum eligibility condition.**

- i) Attendance  $\geq 75\%$  but  $< 80\%$  1 mark
- ii) Attendance  $\geq 80\%$  but  $< 85\%$  2 marks
- iii) Attendance  $\geq 85\%$  but  $< 90\%$  3 marks
- iv) Attendance  $\geq 90\%$  but  $< 95\%$  4 marks
- v) Attendance  $\geq 95\%$  5 marks

**HIMACHAL PRADESH UNIVERSITY**  
**SYLLABUS AND SCHEME OF EXAMINATION FOR B.A.**  
**(COMPUTER APPLICATIONS) (Effective from 2018-19 onwards)**

COURSE OPTED	COURSE NAME	CREDITS	COURSE CODE	ESE	CC A	TOTAL MARKS
<b><i>1<sup>st</sup> YEAR</i></b>						
Ability Enhancement Compulsory Course-I	Eng/Hindi/Skt (One Out of Three)	4		70	30	100
Core course-I	Eng-1	6		70	30	100
Core Course-II	Skt/Hindi-1	6		70	30	100
Core Course-III	DSC-1A	6		70	30	100
Core Course-IV	DSC-1B	6		70	30	100
Core Course-V	DSC-2A Problem Solving Using Computer	4	COMP101TH	50	30	80
Core Course-V Practical	Software Lab Using Python	2	COMP101PR	20	-	20
Core Course-VI	DSC-2B Office Automation Tools	4	COMP102TH	50	30	80
Core Course-VI Practical	Office Automation Tools Lab	2	COMP102PR	20	-	20
Ability Enhancement Compulsory Course-II	Environmental Science	4		70	30	100
<b><i>2<sup>nd</sup> YEAR</i></b>						
Core course-VII	Eng-2	6		70	30	100
Core Course-VIII	Skt/Hindi-2	6		70	30	100
Core Course-IX	DSC-1C	6		70	30	100
Core Course-X	DSC-1D	6		70	30	100
Core Course-XI	DSC- 2C Computer System Architecture	6	COMP201TH	70	30	100
Core Course-XII	DSC-2D Database Management System	4	COMP202TH	50	30	80

	<b>Database Management System Lab</b>	2	COMP202PR	20	-	20
<b>SEC-1</b>		4		70	30	100
<b>SEC-2</b>	<b>PHP Programming</b>	4	COMP203TH	70	30	100
<b>3<sup>rd</sup> YEAR</b>						
<b>DSE-1A</b>		6		70	30	100
<b>DSE-2A</b>	<b>Operating System</b>	6	COMP301TH	70	30	100
<b>DSE-1B</b>		6		70	30	100
<b>DSE-2B</b>	<b>Data Structure and File Processing</b>	4	COMP302TH	50	30	80
	<b>Data Structure and File Processing Lab</b>	2	COMP302PR	20	-	20
<b>SEC-3</b>		4		70	30	100
<b>SEC-4</b>	<b>Anyone from either Computers or other subject</b>	4		70	30	100
<b>Generic Elective –1</b>	<b>GE-1- IT Fundamentals</b>	4	COMP309TH	50	30	80
	<b>GE-1- IT Fundamentals Lab</b>	2	COMP309PR	20	-	20
<b>Generic Elective –2</b>	<b>GE – 2 - Multimedia and Web Design</b>	4	COMP310TH	50	30	80
	<b>GE – 2 – Multimedia and Web Design Lab</b>	2	COMP310PR	20	-	20
<b>Total credits for B. A. (Computer Applications) Degree Course =44X3=132</b>						

<b>Sec-4 Anyone from either Computers or other subject</b>	<b>For B. A. (Computer Applications)</b>
	COMP308TH Software Engineering is to be taught.

## COMP101TH: DSC-2A Problem Solving using Computer

### Unit-I

**Computer Fundamentals:** 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.

### Unit-II

**Planning the Computer Program:** Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation.

**Techniques of Problem Solving:** Flowcharting, decision table, algorithms, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming.

### Unit-III

**Overview of Programming:** Structure of a Python Program, Elements of Python

**Introduction to 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, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator).

**Creating Python Programs:** Input and Output Statements, Control statements (Looping- while Loop, for Loop , Loop Control, Conditional Statement- if...else, Difference between break, continue and pass).

### Unit-IV

**Structures:** Numbers, Strings, Lists, Tuples, Dictionary, Date & Time, Modules, Defining Functions, Exit function, default arguments.

**Introduction to Advanced Python:** Objects and Classes, Inheritance, Regular Expressions, Event Driven Programming, GUI Programming.

### Reference Books:

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



## COMP101PR: Software Lab using Python

### Section: A ( Simple programs)

1. Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. WAP to calculate total marks, percentage and grade of a student. Marks obtained in each of the three subjects are to be input by the user. Assign grades according to the following criteria :  
Grade A: Percentage  $\geq 80$   
Grade B: Percentage  $\geq 70$  and  $< 80$   
Grade C: Percentage  $\geq 60$  and  $< 70$   
Grade D: Percentage  $\geq 40$  and  $< 60$   
Grade E: Percentage  $< 40$
3. Write a menu-driven program, using user-defined functions to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
4. WAP to display the first n terms of Fibonacci series.
5. WAP to find factorial of the given number.
6. WAP to find sum of the following series for n terms:  $1 - 2/2! + 3/3! - \dots - n/n!$
7. WAP to calculate the sum and product of two compatible matrices.

### **Section: B (Visual Python):**

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

1. Write a menu-driven program to create mathematical 3D objects I.  
Curve  
II. Sphere  
III. Cone IV. Arrow  
V. Ring  
VI. Cylinder
2. WAP to read n integers and display them as a histogram.
3. WAP to display sine, cosine, polynomial and exponential curves.
4. WAP to plot a graph of people with pulse rate p vs. height h. The values of p and h are to be entered by the user.
5. WAP to calculate the mass m in a chemical reaction. The mass m (in gms) disintegrates according to the formula  $m=60/(t+2)$ , where t is the time in hours. Sketch a graph for t vs. m, where  $t \geq 0$ .
6. A population of 1000 bacteria is introduced into a nutrient medium. The population p grows as follows:  
$$P(t) = (15000(1+t))/(15+ e)$$
where the time t is measured in hours. WAP to determine the size of the population at given time t and plot a graph for P vs t for the specified time interval.

## **COMP102TH: DCS-2B Office Automation Tools**

### **Unit-I**

**Introduction to open office/MS office/Libre office**

### **Unit-II**

**Word Processing:** Formatting Text, Pages, Lists, Tables

### **Unit-III**

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

### **Unit-IV**

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

### **Books Recommended:**

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

## COMP102PR: Office Automation Tools Lab

### Word Processing

1. Prepare a grocery list having four columns (Serial number, The name of the product, quantity and price) for the month of April, 06.
  - Font specifications for Title (Grocery List): 14-point Arial font in bold and italics.
  - The headings of the columns should be in 12-point and bold.
  - The rest of the document should be in 10-point Times New Roman.
  - Leave a gap of 12-points after the title.
2. Create a telephone directory.
  - The heading should be 16-point Arial Font in bold
  - The rest of the document should use 10-point font size
  - Other headings should use 10-point Courier New Font.
  - The footer should show the page number as well as the date last updated.
3. Design a time-table form for your college.
  - The first line should mention the name of the college in 16-point Arial Font and should be bold.
  - The second line should give the course name/teacher's name and the department in 14-point Arial.
  - Leave a gap of 12-points.
  - The rest of the document should use 10-point Times New Roman font.
  - The footer should contain your specifications as the designer and date of creation.
4. BPB Publications plans to release a new book designed as per your syllabus. Design the first page of the book as per the given specifications.
  - The title of the book should appear in bold using 20-point Arial font.
  - The name of the author and his qualifications should be in the center of the page in 16-point Arial font.
  - At the bottom of the document should be the name of the publisher and address in 16-point Times New Roman.
  - The details of the offices of the publisher (only location) should appear in the footer.
5. Create the following one page documents.
  - a. Compose a note inviting friends to a get-together at your house, Including a list of things to bring with them.
  - b. Design a certificate in landscape orientation with a border around the document.
  - c. Design a Garage Sale sign.
  - d. Make a sign outlining your rules for your bedroom at home, using a numbered list.
6. Create the following documents:
  - (a) A newsletter with a headline and 2 columns in portrait orientation, including at least one image surrounded by text.
  - (b) Use a newsletter format to promote upcoming projects or events in your classroom or college.

### Spread Sheet

1. Given the following worksheet

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
1	Roll No.	Name	Marks	Grade
2	1001	Sachin	99	
3	1002	Sehwag	65	
4	1003	Rahul	41	
5	1004	Sourav	89	

6 1005 Har Bhajan 56

Calculate the grade of these students on the basis of following guidelines:

If Marks	Then Grade
$\geq 80$	A+
$\geq 60 < 80$	A
$\geq 50 < 60$	B
$< 50$	F

2. Given the following worksheet

	A	B	C	D	E	F	G
1	<b>Salesman</b>		<b>Sales in (Rs.)</b>				
2	No.	Qtr1	Qtr2	Qtr3	Qtr4	Total	Commission
3	S001	5000	8500	12000	9000		
4	S002	7000	4000	7500	11000		
5	S003	4000	9000	6500	8200		
6	S004	5500	6900	4500	10500		
7	S005	7400	8500	9200	8300		
8	S006	5300	7600	9800	6100		

Calculate the commission earned by the salesmen on the basis of following Candidates:

If Total Sales	Commission
$< 20000$	0% of sales
$> 20000$ and $< 25000$	4% of sales
$> 25000$ and $< 30000$	5.5% of sales
$> 30000$ and $< 35000$	8% of sales
$\geq 35000$	11% of sales

The total sale is sum of sales of all the four quarters.

3. A company XYZ Ltd. pays a monthly salary to its employees which consists of basic salary, allowances & deductions. The details of allowances and deductions are as follows:

**Allowances**

HRA Dependent on Basic

30% of Basic if Basic  $\leq 1000$

25% of Basic if Basic  $> 1000$  & Basic  $\leq 3000$

20% of Basic if Basic  $> 3000$

DA Fixed for all employees, 30% of Basic

Conveyance Allowance Rs. 50/- if Basic is  $\leq 1000$

Rs. 75/- if Basic  $> 1000$  & Basic  $\leq 2000$

Rs. 100 if Basic  $> 2000$

Entertainment Allowance NIL if Basic is  $\leq 1000$

Rs. 100/- if Basic  $> 1000$

**Deductions**

Provident Fund 6% of Basic

Group Insurance Premium   Rs. 40/- if Basic is  $\leq 1500$   
                                      Rs. 60/- if Basic  $> 1500$  & Basic  $\leq 3000$   
                                      Rs. 80/- if Basic  $> 3000$

Calculate the following:

Gross Salary = Basic + HRA + DA + Conveyance + Entertainment

Total deduction = Provident Fund + Group Insurance Premium

Net Salary = Gross Salary – Total Deduction

### **Presentation Tool**

1. Apply the Banded Design theme to all slides.
2. On Slide 1, add your name in the subtitle text box; change the subtitle text font size to 36 pts.
3. Center align the title and subtitle on Slide 1; change the title text to Californian FB font, 54 pts., Italic.
4. Format the title text on Slide 2 to bold, text shadow effect, font size 48 pts.
5. On the Banded Slide Master, insert the picture “Logo” in the Computer Technology>PowerPoint folder on the student drive.
6. Resize the image to exactly 1 inch in width and position the image in the lower left corner of the slide so the border of the image rest on the bottom and lower left edges of the slide.
7. On the Title and Text Layout slide master, center align the text in the title placeholder. Close Slide Master view.
8. Change the slide layout of Slide 2 to Two Content. In the right placeholder, insert an appropriate online picture using the keyword computer.
9. Resize the image on Slide 2 to be 2.5 inches in height.

## **COMP201TH: DSC-2C Computer System Architecture**

### **Unit-I**

**Introduction:** Logic gates, Boolean algebra, combinational circuits, circuit simplification, flip-flops and sequential circuits, decoders, multiplexors, registers, counters and memory units.

**Data Representation and basic Computer Arithmetic:** Number systems, complements, fixed and floating point representation, character representation, addition, subtraction, magnitude comparison.

### **Unit-II**

**Basic Computer Organization and Design:** Computer registers, bus system, instruction set, timing and control, instruction cycle, memory reference, input-output and interrupt.

**Central Processing Unit:** Register organization, arithmetic and logical micro-operations, stack organization, micro programmed control.

### **Unit-III**

**Programming the Basic Computer:** Instruction formats, addressing modes, instruction codes, machine language, assembly language, input output programming.

### **Unit-IV**

**Input-output Organization:** Peripheral devices, I/O interface, Modes of data transfer, direct memory access.

### **Books Recommended:**

1. M. Mano, Computer System Architecture, Pearson Education 1992.
2. A. J. Dos Reis, Assembly Language and Computer Architecture using C++ and JAVA, Course Technology, 2004
3. W. Stallings, Computer Organization and Architecture Designing for Performance, 8th Edition, Prentice Hall of India ,2009
4. Digital Design, M.M. Mano, Pearson Education Asia, 1979

## **COMP202TH: DCS-2D Database Management System**

### **Unit-I**

**Introduction to Database Management Systems:** Characteristics of database approach, data models, DBMS architecture and data independence.

### **Unit-II**

**Entity Relationship and Enhanced ER Modeling:** Entity types, relationships, SQL- 99:Schema Definition , constraints, and object modeling.

### **Unit-III**

**Relational Data Model :** Basic concepts, relational constraints, relational algebra, SQL queries.

### **Unit-IV**

**Database design:** ER and EER to relational mapping functional dependencies, normal forms up to third normal form.

### **Books Recommended:**

1. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6<sup>th</sup> Edition, Pearson Education, 2010.
2. R. Ramakrishanan, J. Gehrke, Database Management Systems 3<sup>rd</sup> Edition, McGraw-Hill, 2002.
3. A. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6<sup>th</sup> Edition, McGraw Hill, 2010.
4. R. Elmasri, S.B. Navathe Database Systems Models, Languages, Design and application Programming, 6<sup>th</sup> Edition, Pearson Education, 2013.

## COMP202PR: Database Management System Lab

**Note: My Access/MySQL may be used.**

The following concepts must be introduced to the students:

### **DDL Commands**

- Create table, alter table, drop table

### **DML Commands**

- Select , update, delete, insert statements
- Condition specification using Boolean and comparison operators (and, or, not,=,<>,>,<,>=,<=)
- Arithmetic operators and aggregate functions(Count, sum, avg, Min, Max)
- Multiple table queries (join on different and same tables)
- Nested select statements
- Set manipulation using (any, in, contains, all, not in, not contains, exists, not exists, union, intersect, minus, etc.)
- Categorization using group by.....having

Arranging using order by



## COMP203TH: PHP Programming

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

### Unit-II

**Handling HTML form with PHP:** Capturing Form Data, GET and POST form methods, Dealing with multi value fields, Redirecting a form after submission

**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

### Unit-III

**PHP Functions:** 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

**Array:** Anatomy of an Array ,Creating index based and Associative array ,Accessing array, Looping with Index based array, with associative array using each() and foreach(), Some useful Library function.

### Unit-IV

**String Manipulation and Regular Expression:** 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

### 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.

## COMP301TH: Operating System

### 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.

### 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.

**Process Management :** System view of the process and resources, initiating the OS, process address space, process abstraction, resource abstraction, process hierarchy, Thread model

**Scheduling:** Scheduling Mechanisms, Strategy selection, non-pre-emptive and pre-emptive strategies.

### Unit-III

**Memory Management:** Mapping address space to memory space, memory allocation strategies, fixed partition, variable partition, paging, virtual memory

### Unit-IV

**Shell introduction and Shell Scripting:** shell and various type of shell, Various editors present in Linux, Different modes of operation in vi editor, What is shell script, Writing and executing the shell script, Shell variable (user defined and system variables), System calls, Using system calls

#### Text Book:

1. Silberschatz, Galvin “Operating System Concepts”, Addison Wesley Publishing Company, 1989.

#### Reference Books:

1. William Stallings, “Operating Systems”, Macmillan Publishing Company.

2. Deitel H.M., “An Introduction To Operating System”, Addison Wesley Publishing Company, 1984.

3. Tanenbaum, A.S., “Modern Operating System”, Prentice Hall of India Pvt. Ltd. 1995.

## COMP302TH: Data Structure and File Processing

### Unit-I

**Basic Data Structures:** Abstract data structures- stacks, queues, linked lists and binary trees. Binary trees, balanced trees.

### Unit-II

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

### 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.

### Unit-IV

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

### 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.

## **COMP302PR: Data Structure and File Processing Lab**

1. Write a program to implement PUSH and POP operations of stack using arrays.
2. Implement Singly Link List programs - for Insertion, Deletion, searching and traversing.
3. Write a program to implement PUSH and POP operations of stack using Link list.
4. Write a program to implement Binary Tree using Link List.
5. Write a program to count the number of nodes in a link list.
6. Implement Queue programs – for insertion and deletion using arrays.
7. Implement Queue programs – for insertion and deletion using Link List.
8. Write a program to delete duplicate elements from an array of 20 integers.
9. Write a program to implement linear search.
10. Write a program to implement binary search.

## **COMP308TH: Software Engineering**

### **Unit-I**

**Software Process:** Introduction, S/W Engineering Paradigm , life cycle models (water fall, incremental, spiral, evolutionary, prototyping, object oriented) , System engineering, computer based system, verification, validation, life cycle process, development process, system engineering hierarchy.

**Software requirements:** Functional and non-functional , user, system, requirement engineering process, feasibility studies, requirements, elicitation, validation and management, software prototyping, prototyping in the software process, rapid prototyping techniques, user interface prototyping, S/W document. Analysis and modeling, data, functional and behavioral models, structured analysis and data dictionary.

### **Unit-II**

**Design Concepts and Principles:** Design process and concepts, modular design, design heuristic, design model and document, Architectural design, software architecture, data design, architectural design, transform and transaction mapping, user interface design, user interface design principles. Real time systems, Real time software design, system design, real time executives, data acquisition system, monitoring and control system.

### **Unit-III**

**Software Configuration Management:** The SCM process, Version control, Change control, Configuration audit, SCM standards.

**Software Project Management:** Measures and measurements, S/W complexity and science measure, size measure, data and logic structure measure, information flow measure. Estimations for Software Projects, Empirical Estimation Models, Project Scheduling.

### **Unit-IV**

**Testing:** Taxonomy of software testing, levels, test activities, types of s/w test, black box testing testing boundary conditions, structural testing, test coverage criteria based on data flow, mechanisms, regression testing, testing in the large. S/W testing strategies, strategic approach and issues, unit testing, integration testing, validation testing, system testing and debugging.

**Trends in Software Engineering:** Reverse Engineering and Re-engineering – wrappers – Case Study of CASE tools.

### **Books Recommended:**

1. Roger S.Pressman, Software engineering- A practitioner's Approach, McGraw-Hill
2. Ian Sommerville, Software engineering, Pearson education Asia, 6th edition, 2000.
3. Pankaj Jalote- An Integrated Approach to Software Engineering, Springer Verlag, 1997.
4. James F Peters and Witold Pedrycz, "Software Engineering – An Engineering Approach", John Wiley and Sons, New Delhi, 2000.
5. Ali Behforooz and Frederick J Hudson, "Software Engineering Fundamentals", Oxford University Press, New Delhi, 1996.

## **COMP309TH: GE-1- IT Fundamentals**

### **Unit-I**

**Introduction:** Introduction to logical organization of computer, input and output devices (with connections and practical demo), keyboard, mouse, joystick, scanner, OCR, OMR, monitor, printer, plotter, primary memory, secondary memory, auxiliary memory.

### **Unit-II**

**User Interface:** Operating system as user interface, system tools, utility programs.

**Database:** Introduction to database, relational data model, Entity types, entity set, attribute and key, relationships, relation types, SQL queries: select, from, where, order.

### **Unit-III**

**Networks:** Definition of network, classification of network, LAN, MAN, WAN, distinction among the networks, Guided Media: Twisted pair, Coaxial cable, and Optical fiber. Unguided media: Microwave, Radio frequency propagation, Satellite, LAN Topologies: Ring, bus, star, mesh and tree topologies.

### **Unit-IV**

**Internet Applications:** Internet as a global network, Search Engine, Online education, Internet utilities – email, online banking, reservations etc.

**Use of Computers in Education and Research:** Data analysis, Heterogeneous storage, Library, Google Scholar, Domain specific packages such as SPSS, Mathematica etc.

#### **Reference Books:**

1. A. Goel, Computer Fundamentals, Pearson Education, 2010.
2. P. Aksoy, L. DeNardis, Introduction to Information Technology, Cengage Learning, 2006
3. P. K.Sinha, P. Sinha, Fundamentals of Computers, BPB Publishers, 2007

## COMP309PR: GE-1- IT Fundamentals Lab

1. Creation of a database and writing SQL queries to retrieve information from the database.
2. Performing Insertion, Deletion, Modifying, Altering, Updating and Viewing records based on conditions.
3. Creation of Views, Synonyms, Sequence, Indexes.
4. Write SQL statements for:
  - i. Creating a table student with following information: Name of table: **student**, columns and data types: rollno number(6), name varchar(20), branch varchar(20);
  - ii. Inserting data into the student table
  - iii. Altering table by adding new column class varchar(20)
  - iv. Deleting a row from the table
  - v. Drop column branch
  - vi. Alter table by changing the data type of rollno to number(8).
  - vii. Delete all the data from student table.
  - viii. Delete the table.
5. Write queries for the following:
  - i. Display the records of **emp** table.
  - ii. Display the records of **dept** table.
  - iii. Display the records of **emp** table who are working in department 20.
  - iv. Display the records of **emp** table in descending order of the salary.
  - v. Display the minimum, total, average salary of each dept.
  - vi. Display the count of different job's **emp** table.
  - vii. Display the minimum, total, average salary of each job.
  - viii. Display the details of employees working as 'CLERK'.
  - ix. Display the count of employees in each department.
  - x. Display the department which employees atleast 2 CLERK'S.
6. Write SQL statements for granting and revoking permissions.
7. Analyzing data using SPSS.
8. Check if a square matrix is diagonal using Mathematica.
9. Extracting matrix diagonals using Mathematica.
10. Using Goggle scholar for research and learning about the features present in Google scholar.
11. How to do online banking.
12. Learning about features of e-mail.
13. How to do online reservations of buses, hotels, trains etc.

## **COMP310TH: GE – 2 - Multimedia and Web Design**

### **Unit-I**

**Multimedia** : Definition, Components, uses, applications.

### **Unit-II**

**Multimedia Input/Output Devices:** scanner, camera, microphone, speaker, monitors, printers.

**Multimedia Storage Devices:** CD ROMs, DVDs, Blue ray disk.

### **Unit-III**

**Multimedia Tools:** Sound editor, video editor, animator, authoring tools.

**Web Designing:** Concept of website, website as a communication resource. Internet, intranet and extranet, basic concepts related to website designing.

### **Unit-IV**

**HTML:** Introduction to hypertext markup language (html) document type definition, creating web pages, graphical elements, lists, hyperlinks, tables, web forms, inserting images, frames, use of CSS

### **Reference Books:**

1. Scott Mitchell , Create your own website , SAMS Publication , 2008
2. Tay Vaughan, Multimedia : Making it work, Tata McGraw Hill, Seventh edition, 2006
3. J. Jeffcoate, Multimedia in Practice, Pearson Education, First Edition, 2007



## COMP310PR: GE – 2 - Multimedia and Web Design Lab

Practical exercises based on Open Office tools using presentation software, web design and development tools, image editing tools (Gimp) and animation tools such as Blender

1. Create an HTML document with the following formatting options:

- I. Bold
- II. Italics
- III. Underline
- IV. Headings (Using H1 to H6 heading styles)
- V. Font (Type, Size and Color)
- VI. Background (Colored background/Image in background)
- VII. Paragraph
- VIII. Line Break
- IX. Horizontal Rule
- X. Pre tag

2. Create an HTML document which consists of:

- I. Ordered List
- II. Unordered List
- III. Nested List
- IV. Image

3. Optional

Implement the followings using Blender -

1. Create an animation using the tools panel and the properties panel to draw the following – Line, oval, circle, rectangle , square, pencil , brush , lasso tool
2. Create an animation using text tool to set the font , size , color etc.
3. Create an animation using Free transform tool that should use followings Move
  - I. Objects Skew
  - II. Objects
  - III. Stretch Objects Rotate
  - IV. Objects
  - V. Stretch Objects while maintaining proportion
  - VI. Rotate Objects after relocating the center dot
4. Create an animation using layers having following features- Insert layer, Delete layer, guide layer, Mask layer.
5. Modify the document (changing background color etc. using the following tools
  - I. Eraser tool
  - II. Hand tool
  - III. Ink bottle tool Zoom tool
  - IV. Paint Bucket tool Eyedropper tool
6. Create an animation for bus car race in which both starts from the same point and car wins the race.

7. Create an animation in which text Hello gets converted into GoodBye (using motion/shape tweening).
8. Create an animation having five images having fade-in fade-out effect.
9. Create an scene to show the sunrise (using multiple layers and motion tweening)
10. Create an animation to show the ripple effect.
11. Create an animation (using Shape tweening and shape hints) for transforming one shape into another.
12. Create an animation for bouncing ball (you may use motion guide layer).