University of Kalyani

CBCS CURRICULUM FOR SEMESTERIZED UNDER-GRADUATE COURSE

IN

Computer Science (GENERAL)

WITH EFFECT FROM THE ACADEMIC SESSION

2018-19

CBCS CURRICULUM FOR SEMESTERIZED UNDER-GRADUATE COURSE IN Computer Science (PROGRAMME/GENERAL)

INTRODUCTION:

The University Grants Commission (UGC) has taken various measures by means of formulating regulations and guidelines and updating them, in order to improve the higher education system and maintain minimum standards and quality across the Higher Educational Institutions in India. The various steps that the UGC has initiated are all targeted towards bringing equity, efficiency and excellence in the Higher Education System of country. These steps include introduction of innovation and improvements in curriculum structure and content, the teaching-learning process, the examination and evaluation systems, along with governance and other matters. The introduction of Choice Based Credit System is one such attempt towards improvement and bringing in uniformity of system with diversity of courses across all higher education institutes in the country. The CBCS provides an opportunity for the students to choose courses from the prescribed courses comprising of core, elective, skill enhancement or ability enhancement courses. The courses shall be evaluated following the grading system, is considered to be better than conventional marks system. This will make it possible for the students to move across institutions within India to begin with and across countries for studying courses of their choice. The uniform grading system shall also prove to be helpful in assessment of the performance of the candidates in the context of employment.

Outline of the Choice Based Credit System being introduced:

1. **Core Course (CC):** 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 student's proficiency/skill is termed as an Elective Course.

2.1 **Discipline Specific Elective Course (DSEC):** Elective courses that are 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 **Generic Elective Course (GEC):** An elective course chosen generally from an unrelated discipline/subject, with an intention to seek exposure is called a Generic Elective.

3. Ability Enhancement Courses/ Skill Enhancement Courses:

3.1 **Ability Enhancement Compulsory Course (AECC):** Ability enhancement courses are the courses based upon the content that leads to Knowledge enhancement. They (i) Environmental Science, (ii) English Communication) are mandatory for all disciplines.

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

CBCS CURRICULUM FOR SEMESTERIZED UNDER-GRADUATE COURSE IN Computer Science (GENERAL)

A. TOTAL Number of courses in UG-CBCS (B.A./B.Sc. GENERAL):

Types of course	Core course (CC)	Elective course		Ability Enhncemnt Course		TOTAL
		Discipline specific elective course (DSE)	Generic elective course(GE)	Ability Enhancmnt compulsory course(AECC)	Skill Enhancmnt course (SEC)	
No. of course	12	6(BSc)/4(BA/B.Com)	2((BA/B.Com)	2	2	24
Credit/course	6	6	6	2	2	120

TABLE-1: DETAILS OF COURSES OF B.A./ B.SC. (GENERAL) UNDER CBCS

S. No.	Particulars of Course	Credit Point	
1.	**Core Course: 14 Papers**	**Theory + Practicl**	**Theory + Tutoril**
1.A.	Core Course: Theory (12 papers)	12x4 = 48	12x5 = 60
1.B.	Core Course (Practical/Tutorial)*(12 papers)	12x2 = 24	12x1 = 12
2.	**Elective Courses: (6 papers)**		
A.	DSE (6 papers for B.Sc./ 4 papers for B.A. & B.Com.)	6x4 = 24	4x5 = 20
B.	DSE(Pract./ Tutor.)* (6 papers for B.Sc./4 for B.A. &B.Com.)	6x2 = 12	4x1 = 4
C.	GE (Interdisciplinary) (2 papers for B.A. & B.Com.)	--	2x5 = 10
D.	GE (Pract./Tutor.)* (4 papers) (2 papers for B.A. & B.Com.)	--	2x1 = 2
#Optional Dissertation/ Project Work in place of* one *DSE paper (6 credits) in 6th semester			
3. Ability Enhancement Courses			
A.	AECC(2 papers of 2 credits each) ENVS, English Communication / MIL	2x2 = 4	2x2 = 4
B.	Skill Enhancement Course(SEC) (4 papers of 2 credits each)----------	4x2 = 8	4x2 = 8
	Total Credit:	**120**	**120**
## ***Wherever there is a practical, there will be no tutorial and vice- versa.***			

TABLE-2: SEMESTER WISE DISTRIBUTION OF COURSES & CREDITS IN B.A./B.SC. (GENERAL)

Courses / (Credits)	Sem-I	Sem-II	Sem-III	Sem-IV	Sem-V	Sem-Vi	Total No. of Courses	Total credit
CC-1,2,3 (6)	3 (1A,2A,3A)	3 (1B,2B, 3B)	3 (1C,2C, 3C)	3 (1D,2D, 3D)			12	72
DSE - 1,2,3 (6)	-	-	-	-	3 (1A,2A,3A)	3 (1B,2B,3B)	6	36
GE (6)	--	--	--	--	--	--	--	--
AECC (2)	1	1					2	04
SEC (2)			1	1	1	1	4	08
Total No. of Course/ Sem	4	4	4	4	4	4	24	--
Total Credit /Semester	**20**	**20**	**20**	**20**	**20**	**20**	**--**	**120**

TABLE-3: SEMESTER & COURSEWISE CREDIT DISTRIBUTION IN B.A./ B.SC.(GENERAL)
(6 Credit: 75 Marks)

University of Kalyani

Three-year Semister-wise **B.Sc. (General)** Courses of Studies in Computer Science effective from the Academic Session 2018-2019

Computer Science General Course
Course Structure

SEMESTER-I					
Course Code	**Course Title**	**Course Type**	**Credit**	**Full Marks**	**Remarks**
UG-G-CC-L-101A	Computer Fundamentals andProgramming using C(CC-1A)	Core Theory	4	75	
UG-G-CC-P-101A	Programming using C Lab (CC-1A/P)	Core Practical	2		
	CC-2A	Core	6	75	
	CC-3A	Core	6	75	
AECC-101	Environmental Science/English/MIL Communication (AECC-1)	AECC	2	50	
Total	**4 courses**	**Total**	**20**	**275**	
SEMESTER-II					
Course Code	**Course Title**	**Course Nature**	**Credit**	**Full Marks**	**Remarks**
UG-G-CC-L-201B	Computer System Architecture (CC-1B)	Core Theory	5	75	
UG-G-CC-T-201B	Computer System Architecture Tutorial(CC-1B/T)	Core Tutorial	1		
	CC-2B	Core	6	75	
	CC-3B	Core	6	75	
AECC-202	Environmental Science/English/MIL Communication(AECC-2)	AECC	2	50	
Total	**4 courses**	**Total**	**20**	**275**	
SEMESTER-III					
Course Code	**Course Title**	**Course Nature**	**Credit**	**Full Marks**	**Remarks**
UG-G-CC-L-301C	Analysis of Algorithms and Data Structures (CC-1C)	Core Theory	4	75	
UG-G-CC-P-301C	Analysis of Algorithms and Data Structures (CC-1C/P)	Core Practical	2		
	CC-2C	Core	6	75	
	CC-3C	Core	6	75	
UG-G-SEC-P-301	Any one of the following(SEC-1): 1. Office Automation Tools 2. System Administration and Maintainence	SEC Theory	2	50	
Total	**4 courses**	**Total**	**20**	**275**	
SEMESTER-IV					
Course Code	**Course Title**	**Course Nature**	**Credit**	**Full Marks**	**Remarks**
UG-G-CC-L-401D	Operating System (CC-1D)	Core Theory	5	75	
UG-G-CC-T-401D	Operating System Tutorial (CC-1D/T)	Core Tutorial	1		
	CC-2D	Core	6	75	
	CC-3D	Core	6	75	

UG-G-SEC-P-402	Any one of the following(SEC-2): 1. HTML Programming 2. XML Programming	SEC	2	50	
Total	**4 courses**	**Total**	**20**	**275**	
		SEMESTER-V			
Course Code	**Course Title**	**Course Nature**	**Credit**	**Full Marks**	**Remarks**
UG-G-DSE-L-501A	Database Management Systems (DSE-1A)	DSE Theory	4	75	
UG-G-DSE-P-501A	Database Management Systems Lab (DSE-1A/P)	DSE Practical	2		
	DSE-2A	DSE	6	75	
	DSE-3A	DSE	6	75	
UG-G-SEC-P-503	Any one of the following (SEC-3): 1. Programming in Visual Basic/GAMBAS 2. Multimedia And Applications	SEC	2	50	
Total	**4 courses**	**Total**	**20**	**275**	
		SEMESTER-VI			
Course Code	**Course Title**	**Course Nature**	**Credit**	**Full Marks**	**Remarks**
UG-G-DSE-PRO-601B	Project Work (DSE-1B)	DSE	6	75	
	DSE-2B	DSE	6	75	
	DSE-3B	DSE	6	75	
UG-G-SEC-P-604	Any one of the following (SEC-4): 1. MySQL Programming (using SQL/PL-SQL) 2. R Programming	SEC	2	50	
Total	**4 courses**	**Total**	**20**	**275**	
Total (All semesters)	***24 courses***	***Total***	**120**	**1650**	

Courses to be Offered by other Departments	
Core Courses	CC-2A
	CC-3A
	CC-2B
	CC-3B
	CC-2C
	CC-3C
	CC-2D
	CC-3D
Discipline Specific Electives	DSE-2A
	DSE-3A
	DSE-2B
	DSE-3B

No. of classes per week:

	L	T	P
Core Course	4	1	4
Discipline Specific Elective	4	1	4
Skill Enhancement Course	1	1	2

L: Theory; T: Tutorial; P: Practical/Lab

Note:
(1) At least 60 periods of classes must be taken for subjects with credits 4 or 5.
(2) Wherever there is a practical there will be no tutorial and vice-versa.
(3) In Tutorial no internal assessment examination will be conducted by the university.
(4) The size of the practical group for practical papers is recommended to be 10-15 students.
(5) The size of tutorial group for papers without practical is recommended to be 8-10 students.

TABLE- 2 for CORE Courses

Core Courses	Course Name	Course Code (Theory and Lab/Tutorial)	Credit	Full Marks (excluding IA)
CC-1A	Computer Fundamentals and Programming using C	UG-G-CC-L-101A	4	40
	Computer Fundamentals and Programming using C Lab	UG-G-CC-P-101A	2	20
CC-1B	Computer System Architecture	UG-G-GE-CC-201B	5	40
	Computer System Architecture Tutorial	UG-G-CC-T-201B	1	20
CC-1C	Analysis of Algorithms and Data Structures	UG-G-CC-L-301C	4	40
	Analysis of Algorithms and Data Structures Lab	UG-G-CC-P-301C	2	20
CC-1D	Operating System	UG-G-CC-L-401D	5	40
	Operating System Tutorial	UG-G-CC-T-401D	1	20

EVALUATION PROCESS FOR CC AND DSE PAPER WITH FULL MARKS 75:

Class Attendance cum Internal Assessment= 15

Marks distribution in question papers of theoretical subjects with credit 4 and 5 and full marks 40:

Semester end theoretical examination = 40

Group A: Answer any 5 questions out of 8 carrying 2 marks each (5 X 2 = 10)

Group B: Answer any 2 questions out of 4 carrying 5 marks each (2 X 5= 10)

Group C: Answer any 2 questions out of 4 carrying 10 marks each (2 X 10 = 20)

Marks distribution in question papers of practical subjects with credit 2 and full marks 20:

Semester end theoretical examination= 20

Experiment(s): 10;
Notebook: 5;
Viva: 5.

Marks distribution in question papers of tutorial subjects with credit 1 and full marks 20:
Class Attendance cum Internal Assessment= 0
Semester end tutorial examination conducted by college = 20

Evaluation process AECC Papers will same as per guidlines of Annexure-II of University of Kalyani

EVALUATION PROCESS FOR SEC PAPER (PRACTICAL) WITH FULL MARKS 50:
Class Attendance cum Internal Assessment= 10

Marks distribution in question papers of practical subjects with credit 2 and full marks 40:

Semester end practical examination = 40

Experiment(s) : 30
Viva : 10

Detail Course & Contents of Computer Science (General) syllabus

B.A./B.Sc.
Computer Science (GENERAL)
Full Marks-75

Detailed Syllabus Semester wise

Semester-I

Computer Fundamentals and Programming using C (UG-G-CC-L-101A)	**Credit 4**

C Language preliminaries:
C character set, Identifiers and keywords, Data types, Declarations, Expressions, statements and symbolic constants.

5L

Input-Output:
getchar, putchar, scanf, printf, gets, puts, functions.

4L

Pre-processor commands:
#include, #define, #ifdef

3L

Operators and expressions:
Arithmetic, unary, logical, bit-wise, assignment and conditional operators

6L

Storage types:
Automatic, external, register and static variables.

4L

Functions:
Defining and accessing, passing arguments, Function prototypes, Recursion, Library functions, Static functions

8L

Arrays:
Defining and processing, Passing arrays to a function, Multi dimensional arrays. 11. Strings: 6 Hrs Defining and operations on strings.

6L

Pointers:
Declarations, Passing pointers to a function, Operations on pointers, Pointer Arithmetic, Pointers and arrays, Arrays of pointers function pointers.

6L

Structures:
Defining and processing, Passing to a function, Unions, typedef, array of structure, and pointer to structure

6L

File structures:
Definitions, concept of record, file operations: Storing, creating, retrieving, updating Sequential, relative, indexed and random access mode, Files with binary mode (Low level), performance of Sequential Files, Direct mapping techniques: Absolute, relative and indexed sequential files (ISAM)

concept of index, levels of index, overflow of handling.

6L

File Handling: File operation: creation, copy, delete, update, text file, binary file.

6L

Recommended Books:

1. Kernighan, Brian W., and Dennis M. Ritchie.The C programming language. 2006.
2. Schildt, Herbert, and C. Turbo. "C: the complete reference, Osborne." (2000).
3. Balagurusamy, E. programming in ANSI C. Tata McGraw-Hill Education, 2002.
4. Kanetkar, Yashavant P. Let us C. BPB publications, 2016.

Programming using C Lab (UG-G-CC-P-101A)	**Credit 2**

Programs on the following topics:

Introduction: History, Basic Structure, Algorithms, Structured programming constructs.

C Programming elements: Character sets, Keywords, Constants, Variables, Data Types, Operators- Arithmetic, Relational, Logical and Assignment; Increment and Decrement and Conditional, Operator Precedence and Associations; Expressions, type casting. Comments, Functions, Storage Classes, Bit manipulation, Input and output.

C Preprocessor: File inclusion, Macro substitution.
Statements: Assignment, Control statements- if, ifelse, switch, break, continue, goto, Loops-while, do-while, for.

Functions: argument passing, return statement, return values and their types, recursion

Arrays: String handling with arrays, String handling functions.

Pointers: Definition and initialization, Pointer arithmetic, Pointers and arrays, String functions and manipulation, Dynamic storage allocation.

User defined Data types: Enumerated data types, Structures. Structure arrays, Pointers to Functions and Structures, Unions.

File Access: Opening, Closing, I/O operations.

Semester-II

Computer System Architecture (UG-G-CC-L-201B)	**Credit 6**

1. Introduction

Logic gates, boolean algebra, combinational circuits, circuit simplification, flip-flops and sequential circuits, decoders, multiplexers, registers, counters and memory units.

9L

2. Data Representation and Basic Computer Arithmetic

Number systems, complements, fixed and floating point representation, character representation, addition, subtraction, magnitude comparison, multiplication and division algorithms for integers

12L

3. Basic Computer Organization and Design

Computer registers, bus system, instruction set, timing and control, instruction cycle, memory reference, input-output and interrupt, Interconnection Structures, Bus Interconnection design of basic computer.

10L

4. Central Processing Unit

Register organization, arithmetic and logical micro-operations, stack organization, micro programmed control. Instruction formats, addressing modes, instruction codes, machine language, assembly language, input output programming, RISC, CISC architectures, pipelining and parallel architecture.

9L

5. Memory Organization

Cache memory, Associative memory, mapping.

10L

6. Input-Output Organization

Input / Output: External Devices, I/O Modules, Programmed I/O, Interrupt-Driven I/O, Direct Memory Access, I/O Channels.

10L

Recommended Books:

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. M.M. Mano , Digital Design, Pearson Education Asia,2013
5. Carl Hamacher, Computer Organization, Fifth edition, McGrawHill, 2012.

Semester-III

Database Management Systems (UG-G-CC-L-301C)	**Credit-4**

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

10L

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

15L

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

15L

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

20L

Recommended Books:

1. Henry F. Korth and Silberschatz Abraham, ―Database System Concepts‖, Mc.Graw Hill.
2. Elmasri Ramez and Novathe Shamkant, ―Fundamentals of Database Systems‖, Benjamin Cummings Publishing. Company.
3. Ramakrishnan: Database Management System , McGraw-Hill
5. Date C. J., ―Introduction to Database Management‖, Vol. I, II, III, Addison Wesley.
6. Ullman JD., ―Principles of Database Systems‖, Galgottia Publication.

Database Management Systems Lab (UG-G-CC-P-301C)	**Credit-2**

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

Office Automation Tools (UG-G-SEC-P-301)	**Credit-2**

MS Word:
Introduction, Windows 2007 Interface, Customizing the Word Application, Document Views, Basic Formatting in MS Word 2007, Advanced Formatting, Navigating through a Word Document, Performing a Mail Merge, A Quick Look at Macros, Printing Documents, Print Preview

13L

Excel 2007:
Introduction, Workbook, Worksheet, Formatting in excel, Advanced formatting in Excel, Working with formulas, Printing worksheets

14L

MS PowerPoint:
Introduction, Creating a Presentation, Basic Formatting in PowerPoint, Advanced Formatting, Using Templates, Inserting charts, Inserting tables, Printing presentations

14L

MS Access:
Access Basics, Design a Database, Build a Database, Work with Forms, Sort, Retrieve, Analyze Data, Work With Reports, Access with Other Applications, Manage an Access Database

14L

Security and Networking:
Introduction, Simple Fine Sharing, Internet Information Services, Peer to Peer Networking

5L

Recommended Books:

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

System Administration and Maintenance (UG-G-SEC-P-301)	Credit-2

Part I (Linux/Unix) (8L)

- Basics of operating system, services,
- Installation and configuration, maintenance
- What is linux/unix Operating systems, Kernel, API, cli, gui,
- Difference between linux/unix and other operating systems
- Features and Architecture
- Linux features, advantages, disadvantages

Part II(Windows) (8L)

- Windows as operating system, history, versions.
- PC hardware, BIOS, Devices and drivers,
- Kernal Configuration and building
- Application installation, configuration and maintenance
- Server services and Client services
- Difference between WindowsXP/windows7 and windows server 2003/2008

Software Lab Based on System Administration and Maintenance

Linux:

- Linux Desktop tour. Configuring desktop environment and desktop settings.
- **Basic Commands** :Terminal, shell,Cat, ls, cd, date, cal, man, echo, pwd, Mkdir, rm, rmdir Ps, kill
- **Package Installation** Synaptic package manager

Windows:

- Creating users – Admin and regular.
  - Path of their personal files. Adding and changing passwords.
  - Difference between workgroup and domain. Concept of roles.
  - user profiles – creating and roaming Concept of Active Directory. Creating active directory in windows 2003/2008.
- **Process and Disk management**
  - Windows Task manager. File systems – NTFS, FAT.
- **Services**
  - Control Panel
    C:/program Files, C:/system C:/windows Add /remove new hardware (like printer), Add/remove new programmes.
- **Network Administration**
  - Ipconfig,Ping, tracert, route, hostname, net, netstat, whoami Set manual IP address, check connectivity – ipv4, ipv6
- **Administrator Tools**

- Control Panel -> Administrative Tools
- Computer Management, Local security Policy, Performance Monitor, Task Scheduler, Antivirus and firewall.

- **Misc** Start->Accessories->System tools -> All options (Remote desktop, backup/restore etc.)
- **LAN** – sharing printer, files and folder over the network.

Semester-IV

Operating System (UG-G-CC-L-401D)	**Credit 6**

Introduction: System Software, Resource Abstraction, OS strategies.

2L

Types of operating systems - Multiprogramming, Batch, Time Sharing, Single user and Multiuser, Process Control & Real Time Systems.

2L

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.

10L

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

15L

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

12L

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

12L

Shell introduction and Shell Scripting:
What is 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, Pipes and Filters, Decision making in Shell Scripts (If else, switch), Loops in shell, Functions, Utility programs (cut, paste, join, tr , uniq utilities), Pattern matching utility (grep)

7L

Recommended Books:

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.

Operating System Tutorial (UG-G-CC-T-401D)	Credit 0

Tutorials will be given based on **UG-G-CC-L-401D.**

HTML Programming (UG-G-SEC-P-402)	Credit-2

- Unit-I: Introduction (1L)
- Unit-II: The Basics (2L)
  - The Head, the Body
  - Colors, Attributes
  - Lists, ordered and unordered
- Unit-III: Links (3L)
  - Introduction
  - Relative Links, Absolute Links
  - Link Attributes
  - Using the ID Attribute to Link Within a Document
- Unit-IV: Images (2L)
  - Putting an Image on a Page
  - Using Images as Links
  - Putting an Image in the Background
- Unit V: – Tables (4L)
  - Creating a Table
  - Table Headers
  - Captions
  - Spanning Multiple Columns
  - Styling Table
- Unit VI – Forms (3L)
  - Basic Input and Attributes
  - Other Kinds of Inputs
  - Styling forms with CSS
  - Where To Go From Here

Book Recommended:

1. Introduction to HTML and CSS -- O'Reilly , 2010
2. Jon Duckett, HTML and CSS, John Wiely, 2012

Software Lab Based on HTML:

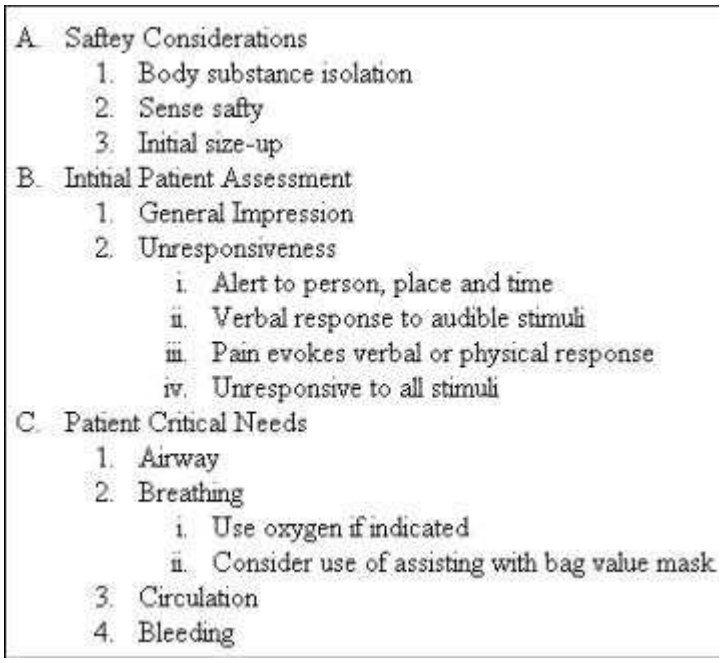
Q.1 Create an HTML document with the following formatting options:

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

Q.2 Create an HTML document which consists of:

I. Ordered List
II. Unordered List
III. Nested List

IV. Image



Q.3 Create an HTML document which implements Internal linking as well as External linking.

Q.4 Create a table using HTML which consists of columns for Roll No., Student‘s name and grade.

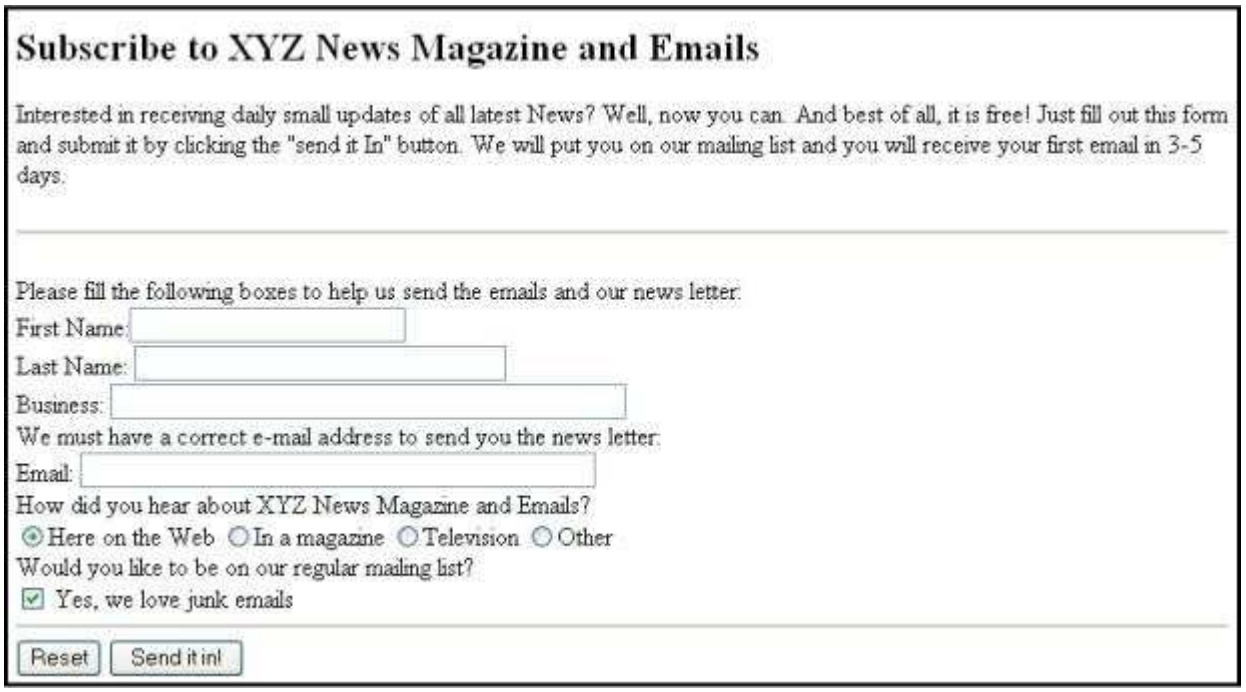
Result		
Roll No.	Name	Grade

Q.5 Create a Table with the following view:

			Place an image here	

Q.6 Create a form using HTML which has the following types of controls:

I. Text Box
II. Option/radio buttons
III. Check boxes
IV. Reset and Submit buttons



Q.7 Create HTML documents (having multiple frames) in the following three formats:

Frame 1
Frame 2

Frame 1	
Frame 2	Frame 3

XML Programming (UG-G-SEC-P-402)	**Credit-2**

Introduction:
Understanding Mark-up Languages, Introduction to XML and its Goals. (3L)

XML Basics:
XML Structure and Syntax, Document classes and Rules. (5L)

Other XML Concepts:
Scripting XML, XML as Data, Linking with XML. (4L)

XML with Style:
XSL –Style Sheet Basics, XSL basics, XSL style sheets. (3L)

Books Recommended

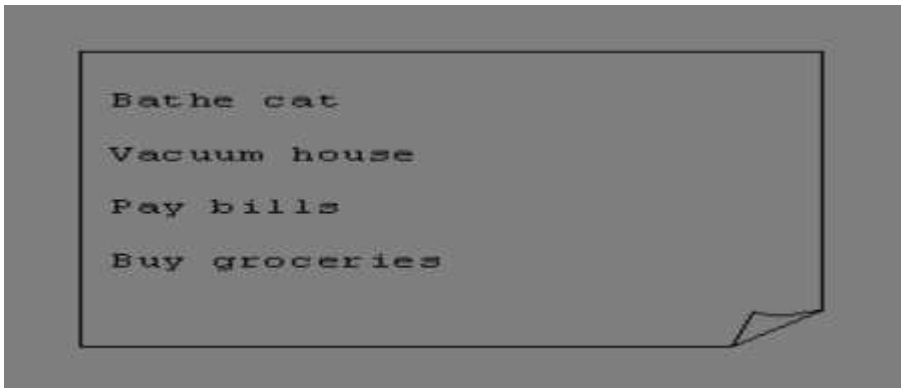
1. William J. Pardi , XML in action web technology, Microsoft Press, 1999
2. Michael J. Young ,Step by Step XML , Microsoft Press, 2002

Software Lab Based on XML:

Exercise #1 – Information Structure

In this exercise, student will practice identifying the structure of an information object.
For the sample document provided below:
Label the information structures you see, including containing structures.

12. Draw a tree representation of the structure.



Exercise 2# Deconstructing an XML Document

In this exercise, student will practice identifying the explicit structure within an XML document.

In a sense, this is the reverse of what you did in Exercise #1. For the sample XML markup below,
create a document-like representation (or a simple drawing) for the content contained within the
XML tags:

<book>

<coverInfo>

<title>The XML Handbook</title>

<author>Charles F. Goldfarb</author>

<author>Paul Prescod</author>

<edition>Second</edition>

<description>The definitive XML resource: applications, products, and technologies.

Revised

and expanded—over 600 new pages.

</description>

</coverInfo>

</book>

Exercise #3 – Creating XML Markup

In this exercise, create some XML markup based on the tree representation from Exercise #1 above, and the content from the original sample document.

Exercise #4 – Well-Formedness

This exercise checks your understanding of the constraints for well-formedness. Are the following document instances well-formed? Explain any NO answers.

<list><title>The first list</title><item>An item</list>

<item>An item</item><item>Another item</item>

<para>Bathing a cat is a <emph>relatively</emph> easy task as long as the cat is willing.</para>

<bibl><title>How to Bathe a Cat<author></title>Merlin Bauer<author></bibl>

Exercise #5-Well Formedness

This exercise is a bit more challenging than the previous example. Here is a fragment of an XML
document instance. Identify all the places where it fails to match the constraints for wellformedness.

<PROCEDURE><TITLEHow to Bathe a Cat</TITLE>
<OVERVIEW>
This procedure tells you how to bathe a cat. <WARNING></OVERVIEW>Cats don't like to take
baths. You could get hurt doing this. Be sure to obtain all the required protective gear before you

start. </WARNING><EQUIPEMENT><ITEM>Hockey Mask <ITEM>Padded Full-body Kevlar
Armor</ITEM><ITEM>Tub full of warm water</ITEM><ITEM>Towels
</ITEM><ITEM>First Aid kit</ITEM><ITEM>Cat Shampoo</ITEM>
<EQUIPMENT><INSTRUCTIONS> <STEP> Locate the cat, who by now is hiding under the
bed.</STEP><STEP>Place the cat in the tub of water.</STEP> <ITEM>Using the First Aid kit,
repair the damage to your head and arms.</STEP> <STEP>Place the cat back in the tub and hold
it down.</STEP> <STEP>Wash it really fast, then make an effort to dry it with the
towels.</STEP> <STEP>Decide not to do this again. </STEP> </INSTRUCTIONS>

Note: Cover more exercises based on XML Programming theory concepts.

Semester-V

Analysis of Algorithms and Data Structures (UG-G-DSE-L-501A)	**Credit-4**

Introduction

Basic Design and Analysis techniques of Algorithms, Correctness of Algorithm (4L)

Algorithm Design Techniques:

Iterative techniques, Divide and Conquer, Dynamic Programming, Greedy Algorithms. (6L)

Sorting Techniques:

Elementary sorting techniques-Bubble Sort, Insertion Sort, Merge Sort, Advanced Sorting techniques-Heap Sort, Quick Sort, Sorting in Linear Time-Bucket Sort, Radix Sort and Count Sort (10L)

Searching Techniques:

Linear and Binary search. (4L)

Complexity Analysis:

Medians & Order Statistics. (4L)

Data Structures:

1. Arrays (4 Lectures)
   Single and Multi-dimensional Arrays, Sparse Matrices

2. Stacks (5 Lectures)

Implementing stack using array and linked list, Prefix, Infix and Postfix expressions, Utility and conversion of these expressions from one to another;

3. Queues (5 Lectures)

Array and Linked representation of Queue, De-queue, Priority Queues

4. Linked Lists (5 Lectures)

Singly, Doubly and Circular Lists, representation of Stack and Queue as Linked Lists.

5. Recursion (5 lectures)

Developing Recursive Definition of Simple Problems and their implementation; Advantages and Limitations of Recursion;

6. Trees (5 Lectures)

Introduction to Tree as a data structure; Binary Trees, Binary Search Tree, (Creation, and Traversals of Binary Search Trees)

Recommended Books:

1. T.H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein-Introduction to Algorithms, PHI, 3rd Edition 2009.
2. Sarabasse & A.V. Gelder Computer Algorithm –Introduction to Design and Analysis,Publisher– Pearson 3rd Edition 1999.
3. Adam Drozdek, "Data Structures and algorithm in C++", Third Edition, Cengage Learning, 2012.
4. SartajSahni, Data Structures, "Algorithms and applications in C++", Second Edition, Universities Press, 2011.
5. Aaron M. Tenenbaum, Moshe J. Augenstein, YedidyahLangsam, "Data Structures Using C and C++:, Second edition, PHI, 2009.
6. Robert L. Kruse, "Data Structures and Program Design in C++", Pearson.
7. D.S Malik, Data Structure using C++,Second edition, Cengage Learning, 2010.

Analysis of Algorithms and Data Structures Lab (UG-G-DSE-P-501A)	**Credit-2**

1. Implement Insertion Sort (The program should report the number of comparisons)
2. Implement Merge Sort(The program should report the number of comparisons)
3. Implement Heap Sort (The program should report the number of comparisons)
4. Implement Randomized Quick sort (The program should report the number of comparisons)
5. Implement Radix Sort.
6. Implement Searching Techniques
7. Implementation of Recursive function.
8. Array and Linked list implementation of Stack and Queue.
9. Implementation of Single, Double and circular Linked List
10. Creation and traversal of Binary Search Tree.

Programming in Visual Basic/GAMBAS (UG-G-SEC-P-503)	Credit-2

GUI Environment:
Introduction to graphical user interface (GUI), programming language (procedural, object oriented, event driven), the GUI environment, compiling, debugging, and running the programs.

(2L)

Controls :
Introduction to controls textboxes, frames, check boxes, option buttons, images, setting borders and styles, the shape control, the line control, working with multiple controls and their properties, designing the user interface, keyboard access, tab controls, default & cancel property, coding for controls.

(4L)

Operations:
Data types, constants, named & intrinsic, declaring variables, scope of variables, val function, arithmetic operations, formatting data.

(2L)

Decision Making :
If statement, comparing strings, compound conditions (and, or, not), nested if statements, case structure, using if statements with option buttons & check boxes, displaying message in message box, testing whether input is valid or not.

(4L)

Forms Handling :
Multiple forms creating, adding, removing forms in project, hide, show method, load, unload statement, me keyword, referring to objects on a different forms.

(2L)

Iteration Handling:
Do/loops, for/next loops, using msgbox function, using string function.

(3L)

Book Recommended:
a.Programming in Visual Basic 6.0 by Julia Case Bradley, Anita C. Millispangh
(Tata Mcgraw Hill Edition 2000 (Fourteenth Reprint 2004)

Software Lab Based on Visual Basic:
Practical exercises based on concepts listed in theory using VB.
1. Write a VB application to compute the sum of two variables.
2. Write a VB application to compute the factorial of a number n.
3. Write a VB application to compute the Fibonacci series of a number n.
4. Write a VB application to compute the series of prime numbers till number n.
5. Write a VB application to compute the maximum of three numbers.
6. Write a VB application to compute the sum of odd numbers and even numbers in an array of n integers.
7. Write a VB application to compare the strings.
8. Write a VB application to make a calculator.
9. Write a VB application to choose your hobbies from a list.
10. Write a VB application to illustrate the use of color radio button.
11. Write a VB application to illustrate the use of color scroll bar form.
12. Write a VB application to illustrate the use of color scroll bar label text.
13. Write a VB application to illustrate the use of color text box.
14. Write a VB application to show a timer.

Multimedia and Applications (UG-G-SEC-P-503)	Credit-2

Multimedia:
Introduction to multimedia, Components, Uses of multimedia.

2L

Making Multimedia:
Stages of a multimedia project, Requirements to make good multimedia,
Multimedia Hardware - Macintosh and Windows production Platforms, Hardware peripherals - Connections, Memory and storage devices, Multimedia software and Authoring tools.

4L

Text:
Fonts & Faces, Using Text in Multimedia, Font Editing & Design Tools, Hypermedia &Hypertext.

2L

Images:
Still Images – Bitmaps, Vector Drawing, 3D Drawing & rendering, Natural Light & Colors, Computerized Colors, Color Palletes, Image File Formats.

3L

Sound:
Digital Audio, MIDI Audio, MIDI vs Digital Audio, Audio File Formats. (2L)
Video: How Video Works, Analog Video, Digital Video, Video File Formats, Video Shooting and Editing.

2L

Animation:
Principle of Animations. Animation Techniques, Animation File Formats.

2L

Books Recommended:

1. Tay Vaughan, ‑Multimedia: Making it work‖, TMH, Eighth edition. 2006
2. Ralf Steinmetz and Klara Naharstedt, ‑Multimedia: Computing, Communications Applications‖, Pearson,1995.
3. Keyes, ―Multimedia Handbook‖, TMH. 2000.
4. K. Andleigh and K. Thakkar, ‑Multimedia System Design‖, PHI,2000

Software Lab Based on Multimedia (FLASH as a multimedia S/W):

Practical exercises based on concepts listed in theory using Flash.

FLASH: Concept of Frame, Key frames, Frame rate, Timeline, Tween, Layers, Symbols, Embedding audio/video and embedding on the web page

1. Draw an animation to show a bouncing ball.
2. Draw an animation to show a moving stick man.
3. Draw an animation to show a fainting banana.
4. Draw an animation to show sunrise and sunset.
5. Draw an animation to show a disappearing house.
6. Draw an animation to show two boats sailing in river
7. Draw an animation to show a scene of cricket match.

8. Draw an animation to help teach a poem or a song
9. Draw an animation to show cartoon with a message
10. Make a movie showing Shape Tweening.
11. Make a movie showing Motion Tweening.
12. Add sound and button to the movie

Semester-VI

Project Work/Dissertation (UG-G-DSE-PRO-601B)	**Credit-6**

• This option is to be offered only in beginning of 6th Semester.
• The students will be allowed to work on any project based on the concepts studied in core/elective or skill based elective courses.
• The group size should be maximum of three (03) students.
• Each group will be assigned a teacher as a supervisor who will handle both their theory as well lab classes.
• A maximum of Four (04) projects would be assigned to one teacher.
• Theory classes will cover project management techniques.

MySQL Programming (using SQL/PL-SQL) (UG-G-SEC-P-604)	**Credit-2**

SQL Vs. SQL * Plus:

SQL Commands and Data types, Operators and Expressions, Introduction to SQL * Plus.

(2L)

Managing Tables and Data:

- Creating and Altering Tables (Including constraints)
- Data Manipulation Command like Insert, update, delete
- SELECT statement with WHERE, GROUP BY and HAVING, ORDER BY, DISTINCT, Special operator like IN, ANY, ALL BETWEEN, EXISTS, LIKE
- Join, Built in functions

(4L)

Other Database Objects

- View
- Synonyms, Index

(2L)

Transaction Control Statements

- Commit, Rollback, Savepoint

(2L)

Introduction to PL/SQL

- SQL v/s PL/SQL
- PL/SQL Block Structure
- Language construct of PL/SQL (Variables, Basic and Composite Data type, Conditions looping etc.)
- % TYPE and % ROWTYPE
- Using Cursor (Implicit, Explicit)

(5L)

Books Recommended:

1. Baron Schwartz , High Performance MySQL, O'Reilly, 2012.

2. Vikram Vaswani , The Complete Reference MySQL , McGraw Hill Educations, 2004.

Software Lab Based on MySQL (SQL/PL-SQL):

[SQL COMMANDS]

1) SQL* formatting commands
2) To create a table, alter and drop table.
3) To perform select, update, insert and delete operation in a table.
4) To make use of different clauses viz where, group by, having, order by, union and intersection,
5) To study different constraints.

[SQL FUNCTION]

6) To use oracle function viz aggregate, numeric, conversion, string function.
7) To understand use and working with joins.
8) To make use of transaction control statement viz rollback, commit and save point.
9) To make views of a table.
10) To make indexes of a table.

[PL/SQL]

11) To understand working with PL/SQL
12) To implement Cursor on a table.
13) To implement trigger on a table

R Programming (UG-G-SEC-P-604)	**Credit-2**

Introduction:

Overview and History of R, Getting Help, Data Types, Subsetting, Vectorized Operations, Reading and Writing Data.

(5L)

Control Structures, Functions, lapply, tapply, split, mapply, apply, Coding Standards.

(5L)

Scoping Rules, Debugging Tools, Simulation, R Profiler.

Reference Book

W. N. Venables, D. M. Smith, An Introduction to R, R-core team,2015

(5L)

Software Lab Based on R Programming:

1. Write a program that prints _Hello World‘ to the screen.
2. Write a program that asks the user for a number n and prints the sum of the numbers 1 to n
3. Write a program that prints a multiplication table for numbers up to 12.
4. Write a function that returns the largest element in a list.
5. Write a function that computes the running total of a list.
6. Write a function that tests whether a string is a palindrome.
7. Implement the following sorting algorithms: Selection sort, Insertion sort, Bubble Sort
8. Implement linear search.
9. Implement binary search.
10. Implement matrices addition , subtraction and Multiplication

END