SCHEME AND SYLLABUS

For

BCA COURSE

(w.e.f Session 2017-2018)

FACULTY OF ENGINEERING AND TECHNOLOGY

YMCA UNIVERSITY OF SCIENCE AND TECHNOLOGY FARIDABAD

YMCA UNIVERSITY OF SCIENCE AND TECHNOLOGY
FARIDABAD

SYNOPSIS OF
SCHEME OF STUDIES & EXAMINATIONS
3 YEARS BCA SEMESTER I-VI (w.e.f 2017)

Total Credits: 145
Total Theory Subjects: 24
Total MOOC Subject : 01
Total Audit Subject : 01
Total General Elective: 01
Total Labs (including Seminars, workshops & Projects): 8

Total Teaching Schedule (In one week in whole programme):

Lectures	Practical	Major Project	Total
124	36	6	166

Total Marks:

Sessional/Internals	End Term	Total
745	2140	2885

Itemized Break-up:

	No.	Hours	Marks	Credits
Theory Subjects	24	92	2300	114
MOOC Subject	1	4	Qualifying	04
Environment Science	1	3	Qualifying	No Credit
Audit Course	1	2	Qualifying	No Credit
Labs	6	36	360	18
General elective	1	5	100	3
Seminar	1	2	25	2
Projects	1	6	100	4
Total	31	150	2885	145

CHOICE BASED CREDIT SYSTEM SCHEME

Discipline Core Courses (DCC)			
Sr. No.	**Name of the subject**	**No. of Lectures +Tutorials**	**No of Credits**
1.	Computer & Programming Fundamentals	5	5
2.	PC Software	5	5
3.	Mathematics	5	5
4.	Logical Organization of Computer-I	5	5
5.	'C' Programming	5	5
6.	Logical Organization of Computer-II	5	5
7.	Mathematical Foundations of Computer Science	5	5
8.	Structured System Analysis and Design	5	5
9.	Introduction to Operating System	5	5
10.	Data Structures	5	5
11.	Database Management System	5	5
12.	Communication skills (English)	4	4
13	Environmental Science	3	-
14.	Web Designing	5	5
15.	E-Commerce	5	5
16.	Object Oriented Programming Using C++	5	5
17.	Software Engineering	5	5
18.	Object Technologies & Programming using Java	5	5
19.	Computer Graphics	5	5
20.	Data Communication and Networking	5	5

21.	VB.NET	5	5
22.	Mobile Application Development	5	5
23.	Software Testing	5	5
24.	Artificial Intelligence	5	5
		Total Credits	**114**

General Elective Course(Courses offered by the Department/Programme)*					
Sr. No	**Code**	**Name the Subject**	**Internal**	**External**	**Credit**
1	GEC-1 (BCA-17-308)	Artificial Intelligence	Uniform with other UG programmes of the University		3
2	GEC-2	Cyber laws and Security			3
3	GEC-3	Soft Computing			3
4	GEC-4	Web Technology and Information Retrieval			3
5	GEC-5	Intellectual Property and Rights			3

*In case there is no other programme offering the general elective course in a Institute/University teaching department, The Institute or teaching department can opt/take an elective course from the above list except, Artificial Intelligence.

Mandatory Audit Course(MAC) (Mandatory to Qualify)			
Sr. No	**Code**	**Name the Subject**	**No. of contact hours**
1.	AUD01	German-1	2
2.	AUD02	German-2(With German-1 as prerequisite)	2
3.	AUD03	French-1	2
4	AUD04	French-2(With French-1 as prerequisite)	2
5	AUD05	Sanskrit-1	2
6	AUD06	Sanskrit-2(With Sanskrit-1 as prerequisite)	2
7	AUD07	Personality Development	2
8	AUD08	Interview and Group discussion skills	2
9	AUD09	Yoga and Meditation	2
10	AUD10	Art of living/Living Skills	2
11	AUD11	Contribution of NSS towards Nation/role of NSS	2
12	AUD12	Physical Education	2

MOOC Subject (List is provided by the Svayam Portal of UGC

Paper Code	**Course**	**Course Requirements (Hrs)**	**Credits**	**University Exams**	**Internal Assessments**	**Total**	**Course Type**
	MOOC*	4	4				

Note: Any one subject from the list of MOOC subject is to be *qualified during the Semester-1 to Semester-V* through Svayam Portal of UGC. For this subject, the Institute or the Department concerned will appoint a coordinator to track the activities of the student and will ensure that all students of the programme have qualified the MOOC subject in the specified time period.

	LABS & PROJECTS		
Sr. No.	**Name of the lab**	**No. of contact Hours**	**Credits**
1	PC-Software Lab-Word, Excel and Power Point (Based on BCA-17-102)	6	3
2	C Programming Lab (Based on BCA-17-106)	6	3

3	Data Structure and SQL Programming Lab(Based on BCA-17-202 & BCA-17-203)	6	3
4	HTML and C++ Programming Lab (Based on BCA-17-206 & BCA-17-208)	6	3
5	Java & VB.NET Lab (Based on BCA-17-301 & BCA-17-304)	6	3
6	MAD and AI Programming Lab (Based on BCA-17-306 & BCA-17-308)	6	3
7.	Major Project	6	4
		Total Credits	**22**

YMCA University of Science and Technology, Faridabad
BCA Scheme of Studies / Examination
Semester – I

Course No.	Course Title	Schedule				Sessional Marks / Internal	Marks for End Term Examination		Total Marks	Credits
		L	T	P	Total		Theory	Practical		
BCA-17-101	Computer & Programming Fundamentals	5		-	5	25	75	-	100	5
BCA-17-102	PC Software	5		-	5	25	75	-	100	5
BCA-17-103	Mathematics	5		-	5	25	75	-	100	5
BCA-17-104	Logical Organization of Computer-I	5		-	5	25	75	-	100	5
BCA-17-105	PC Software Lab (Word, Excel and Powerpoint)	-		6	6	30	-	70	100	3
	Total				**26**	**130**	**300**	**70**	**500**	**23**

Note: Exam duration will be as under

(a)Theory exams will be of 3 hours duration

(b)Practical exams will be of 3 hours duration

YMCA University of Science and Technology, Faridabad
BCA Scheme of Studies / Examination
Semester – II

Course No	Course Title	Teaching Schedule				Sessional Marks/ Internal	Marks For End Term Examination		Total Marks	Credits
		L	T	P	Total		Theory	Practical		
BCA-17-106	'C' Programming	5		-	5	25	75	-	100	5
BCA-17-107	Logical Organization of Computer-II	5		-	5	25	75	-	100	5
BCA-17-108	Mathematical Foundations of Computer Science	5		-	5	25	75	-	100	5
BCA-17-109	Structured System Analysis and Design	5		-	5	25	75	-	100	5
BCA-17-110	'C' Programming Lab	-		6	6	30	-	70	60	3
	Total				**26**	**130**	**300**	**70**	**500**	**23**

Note: Exam duration will be as under

(a)Theory exams will be of 3 hours duration

(b)Practical exams will be of 3 hours duration

YMCA University of Science and Technology, Faridabad
BCA Scheme of Studies / Examination
Semester – III

Course Code	Course Title	Teaching Schedule				Sessional Marks/ Internal	Marks for End Term Examination		Total Marks	Credits
		L	T	P	Total		Theory	Practical		
BCA-17-201	Introduction to Operating System	5	-	-	5	25	75	-	100	5
BCA-17-202	Data Structures	5	-	-	5	25	75	-	100	5
BCA-17-203	Database Management System	5	-	-	5	25	75	-	100	5
BCA-17-204 (A)	Communication skills	4	-	-	4	25	75	-	100	5
BCA-17-204 (B)	Environment Science (No credit just qualifying)	3			3		50		Marks will not be added in total	No credit just qualifying
BCA-17-205	Data Structure And Sql Lab	-	-	6	6	30	-	70	100	3
	Total				**28**	**130**	**300**	**70**	**500**	**23**

Note: Exam duration will be as under

(a)Theory exams will be of 3 hours duration

(b)Practical exams will be of 3 hours duration

YMCA University of Science and Technology, Faridabad
BCA Scheme of Studies / Examination
Semester – IV

Course Code	Course Title	Teaching Schedule				Sessional Marks/ Internal	Marks for End Term Examination		Total Marks	Credits
		L	T	P	Total		T	P		
BCA-17-206	Web Designing	5	-	-	5	25	75	-	100	5
BCA-17-207	E-Commerce	5	-	-	5	25	75	-	100	5
BCA-17-208	Object oriented Programming Using C++	5	-	-	5	25	75	-	100	5
BCA-17-209	Software Engineering	5	-	-	5	25	75	-	100	5
As per list above	Audit Course (No credit just qualifying)	2			2				Marks will not be added in total	(No credit just qualifying)
BCA-17-210	HTML and C++ Lab	-	-	6	6	30	-	70	100	3
BCA-17-211	Seminar			2	2	25			25	2
	Total				**30**	**155**	**300**	**70**	**525**	**25**

Note: Exam duration will be as under

(a)Theory exams will be of 3 hours duration

(b)Practical exams will be of 3 hours duration

YMCA University of Science and Technology, Faridabad
BCA Scheme of Studies / Examination
Semester – V

Course No	Course Title	Teaching Schedule				Sessional Marks/Internal	Marks for End Term Examination		Total Marks	Credits
		L	T	P	Total		Theory	Practical		
BCA-17-301	Object Technologies & Programmig g using Java	5	-	-	5	25	75	-	100	5
BCA-17-302	Computer Graphics	5	-	-	5	25	75	-	100	5
BCA-17-303	Data communication and networking	5	-	-	5	25	75	-	100	5
BCA-17-304	VB.NET	5	-	-	5	25	75	-	100	5
As per list above	General Elective	5			5	25	75		100	3
BCA-17-305	Java & VB.NET Lab	-	-	6	6	30	-	70	100	3
	Total				**31**	**155**	**375**	**70**	**600**	**26**

Note: Exam duration will be as under

(a)Theory exams will be of 3 hours duration

(b)Practical exams will be of 3 hours duration

YMCA University of Science and Technology, Faridabad
BCA Scheme of Studies / Examination
Semester – VI

Course No	Course Title	Teaching Schedule				Marks Sessional / Internal	Marks for End Term Examination		Total Marks	Credits
		L	T	P	TOTAL		Theory	Practical		
BCA-17-306	Mobile Application Development	5	-	-	5	25	75	-	100	5
BCA-17-307	Software Testing	5	-	-	5	25	75		100	5
BCA-17-308	Artificial Intelligence	5	-	-	5	25	75	-	100	5
BCA-17-309	Major Project		-	6	6	30	-	70	100	4
BCA-17-310	MAD & AI Lab	-		6	6	30	-	70	100	3
	Total				**27**	**135**	**225**	**140**	**500**	**22**

Note: Exam duration will be as under

(a)Theory exams will be of 3 hours duration

(b)Practical exams will be of 3 hours duration

BCA-17-101: COMPUTER & PROGRAMMING FUNDAMENTALS
BCA I Semester

No. of Credits: 5		Sessional:	25 Marks
L T P Total		Theory:	75 Marks
5 0 0 5		Total :	100 Marks
		Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT - I Computer Fundamentals: Generations of Computers, Definition, Block Diagram along with its components, characteristics & classification of computers, Limitations of Computers, Human-Being VS Computer, Applications of computers in various fields.

Memory: Concept of primary & secondary memory, RAM, ROM, types of ROM, Cache Memory, flash memory, Secondary storage devices: Sequential & direct access devices viz. magnetic tape, magnetic disk, optical disks i.e. CD, DVD, virtual memory.

UNIT - II Computer hardware & software: I/O devices, definition of software, relationship between hardware and software, types of software.

Overview of operating system: Definition, functions of operating system, concept of multiprogramming, multitasking, multithreading, multiprocessing, time-sharing, real time, single-user & multi-user operating system.

Computer Virus: Definition, types of viruses, Characteristics of viruses, anti-virus software.

UNIT - III **Computer Languages:** Analogy with natural language, machine

language, assembly language, high-level languages, forth generation languages, compiler, interpreter, assembler, Linker, Loader , characteristics of a good programming language, Planning the Computer Program: Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming, Advantages and disadvantages of Structured programming.

UNIT - IV **Overview of Networking:** An introduction to computer networking, Network types (LAN, WAN, MAN), Network topologies, Modes of data transmission, Forms of data transmission, Transmission channels(media), Introduction to internet and its uses, Applications of internet, Hardware and Software requirements for internet, Intranet, Applications of intranet.

Text Books/ Reference Books:

1. Gill Nasib Singh: Computing Fundamentals and Programming in C, Khanna Books Publishing Co., New Delhi.
2. Balagurusamy E, Computing Fundamentals and C Programming, Tata McGraw Hill.
3. Norton, Peter, Introduction to Computer, McGraw-Hill
4. Leon, Alexis & Leon, Mathews, Introduction to Computers, Leon Tech World
5. Rajaraman, V., Fundamentals of Computers, PHI
6. Ram, B., Computer Fundamentals, Architecture & Organization, New Age International
   (P) Ltd.
7. Chhillar, Rajender Singh: Application of IT to Business, Ramesh Publishers, Jaipur.
8. Gill, Nasib Singh: Essentials of Computer and Network Technology, Khanna Books Publishing Co., New Delhi

Note: Latest and additional good books may be suggested and added from time to time.

BCA-17-102: PC SOFTWARE

BCA I Semester

No. of Credits: 5		Sessional:	25 Marks
L T P Total		Theory:	75 Marks
5 0 0 5		Total :	100 Marks
		Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT – I **MS-Windows:** Operating system-Definition & functions, basics of Windows. Basic components of windows, icons, types of icons, taskbar, activating windows, using desktop, title bar, running applications, exploring computer, managing files and folders, copying and moving files and folders. Control panel – display properties, adding and removing software and hardware, setting date and time, screensaver and appearance. Using windows accessories.

UNIT – II **Documentation Using MS-Word:** Introduction to word processing interface, Toolbars, Menus, Creating & Editing Document, Formatting Document, Finding and replacing text, Format painter, Header and footer, Drop cap, Auto-text, Autocorrect, Spelling and Grammar Tool, Document Dictionary, Page Formatting, Bookmark, Previewing and printing document, Advance Features of MS-Word-Mail Merge, Macros, Tables, File Management, Printing, Styles, linking and embedding object, Template.

UNIT – III **Electronic Spread Sheet using MS-Excel:** Introduction to MS-

Excel, Cell, cell address, Creating & Editing Worksheet, Formatting and Essential Operations, Moving and copying data in excel, Header and footer, Formulas and Functions, Charts, Cell referencing, Page setup, Macros, Advance features of MS-Excel-Pivot table & Pivot Chart, Linking and Consolidation, Database Management using Excel-Sorting, Filtering, Validation, What if analysis with Goal Seek, Conditional formatting.

UNIT – IV **Presentation using MS-PowerPoint:** Presentations, Creating, Manipulating & Enhancing Slides, Organizational Charts, Excel Charts, Word Art, Layering art Objects, Animations and Sounds, Inserting Animated Pictures or Accessing through Object, Inserting Recorded Sound Effect or In-Built Sound Effect.

Text Books/ Reference Books:

1. Microsoft Office – Complete Reference – BPB Publication
2. Learn Microsoft Office – Russell A. Stultz – BPB Publication
3. Courter, G Marquis (1999). Microsoft Office 2000: Professional Edition. BPB.
4. Koers, D (2001). Microsoft Office XP Fast and Easy. PHI.
5. Nelson, S L and Kelly, J (2002). Office XP: The Complete Reference. Tata McGraw-Hill.

Note: Latest and additional good books may be suggested and added from time to time.

BCA-17-103: MATHEMATICS
BCA I Semester

No. of Credits: 5		Sessional:	25 Marks
L T P Total		Theory:	75 Marks
5 0 0 5		Total :	100 Marks
		Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT - I **Sets:** Sets, Subsets, Equal Sets Universal Sets, Finite and Infinite Sets, Operation on Sets, Union, Intersection and Complements of Sets, Cartesian Product, Cardinality of Set, Simple Applications.

Determinants: Definition, Minors, Cofactors, Properties of Determinants, Applications of determinants in finding area of triangle, Solving a system of linear equations.

Matrices: Definition, Types of Matrices, Addition, Subtraction, Scalar Multiplication and Multiplication of Matrices, Adjoint, Inverse, solving system of linear equation Cramer's Rule.

UNIT - II **Relations and functions:** Properties of Relations, Equivalence Relation, Partial Order Relation Function: Domain and Range, Onto, Into and One to One Functions, Composite and Inverse Functions.

Limits & Continuity: Limit at a Point, Properties of Limit, Computation of Limits of Various Types of Functions, Continuity of a function at a Point, Continuity Over an Interval, Sum, product and quotient of continuous functions, Intermediate Value Theorem, Type of Discontinuities.

UNIT - III **Differentiation:** Derivative of a function, Derivatives of Sum, Differences, Product & Quotient of functions, Derivatives of polynomial, trigonometric, exponential, logarithmic, inverse trigonometric and implicit functions, Logarithmic Differentiation, Chain Rule and differentiation by substitution.

UNIT - IV **Integration:** Indefinite Integrals, Methods of Integration by Substitution, By Parts, Partial Fractions, Integration of Algebraic and Transcendental Functions, Reduction Formulae for simple and Trigonometric Functions, Definite Integral as Limit of Sum, Fundamental Theorem of Integral Calculus, Evaluation of definite integrals by substitution, using properties of definite integral.

Text Books/ Reference Books:

1. C.L.Liu: Elements of Discrete Mathematics, McGraw Hill.
2. Lipschutz, Seymour: Discrete Mathematics, Schaum's Series
3. Babu Ram: Discrete Mathematics, Vinayek Publishers, New Delhi.
4. Trembley, J.P & R. Manohar: Discrete Mathematical Structure with Application to Computer Science, TMH.
5. Kenneth H. Rosen: Discrete Mathematics and its applications, TMH.
6. Doerr Alan & Levasseur Kenneth: Applied Discrete Structures for Computer Science, Galgotia Pub. Pvt. Ltd.
7. Gersting: Mathematical Structure for Computer Science, WH Freeman & Macmillan.
8. Hopcroft J.E, Ullman J.D.: Introduction to Automata theory, Languages and Computation, Narosa Publishing House, New Delhi.

Note: Latest and additional good books may be suggested and added from time to time.

BCA-17-104: LOGICAL ORGANIZATION OF COMPUTER-I
BCA I Semester

No. of Credits: 5		Sessional:	25 Marks
L T P Total		Theory:	75 Marks
5 0 0 5		Total :	100 Marks
		Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT – I **Information Representation:** Number Systems, Binary Arithmetic, Fixed-point and Floating-point representation of numbers, BCD Codes, Error detecting and correcting codes, Character Representation – ASCII, EBCDIC, Unicode

UNIT – II **Binary Logic:** Boolean Algebra, Boolean Theorems, Boolean Functions and Truth Tables, Canonical and Standard forms of Boolean functions, Simplification of Boolean Functions – Venn Diagram, Karnaugh Maps.

UNIT – III **Digital Logic:** Introduction to digital signals, Basic Gates – AND, OR, NOT, Universal Gates and their implementation – NAND, NOR, Other Gates – XOR, XNOR etc. NAND, NOR, AND-OR-INVERT and OR-AND-INVERT implementations of digital circuits, Combinational Logic – Characteristics, Design Procedures, analysis procedures, Multilevel NAND and NOR circuits.

UNIT – IV **Combinational Circuits:** Half-Adder, Full-Adder, Half-Subtractor, Full-Subtractor, Parallel binary adder/subtractor,

Encoders, Decoders, Multiplexers, Demultiplexers, Comparators, Code Converters, BCD to Seven-Segment Decoder.

Text Books/ Reference Books:

1. Gill, Nasib Singh and Dixit J.B.: Digital Design and Computer Organisation, University Science Press (Laxmi Publications), New Delhi.
2. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India Pvt. Ltd.
3. V. Rajaraman, T. Radhakrishnan, An Introduction to Digital Computer Design, Prentice Hall of India Pvt. Ltd.
4. Andrew S. Tanenbaum, Structured Computer Organization, Prentice Hall of India Pvt. Ltd.
5. Nicholas Carter, Schaum's Outlines Computer Architecture, Tata McGraw-Hill

Note: Latest and additional good books may be suggested and added from time to time.

BCA-17-105: PC SOFTWARE LAB- WORD, EXCEL AND POWER POINT
BCA I Semester

No. of Credits: 3		Sessional:	30 Marks
L T P Total		Practical:	70 Marks
0 0 6 6		Total :	100 Marks
		Duration of Exam:	3 Hours

List of Experiments:

PC Hardware:

1. Set date and time of the windows and change screensaver and appearance.
2. Manage files and folders.
3. To study parts of keyboard and mouse
4. To assemble a PC.
5. To remove, study and replace floppy disk drive, hard disk and CD ROM drive.

PC Software:

1. To prepare your CV using MS Word.
2. Create a mail merge letter using MS Word.
3. Create a macro for inserting a picture and formatting the text.
4. Create a simple presentation to list simple dos commands, hardware, software using MS Power Point.
5. Add text, pictures, sounds, movies, and charts to your presentations.
6. Set up slide shows and rehearse timings for your slides.
7. Create a worksheet with 4 columns, enter 10 records and find the sum of all columns using MS Excel.
8. Create a student result sheet.
9. Create a simple bar chart to highlight the sales of a company for 3 different periods.
10. Create, record and use macro in MS Excel.
11. Sorting and filtering of data
12. Create pivot tables and pivot charts.

BCA-17-106: 'C' PROGRAMMING
BCA II Semester

No. of Credits: 5		Sessional:	25 Marks
L T P Total		Theory:	75 Marks
5 0 0 5		Total :	100 Marks
		Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT - I **Overview of C:** History of C, Importance of C, Elements of C: C character set, identifiers and keywords, Data types, Constants and Variables, Assignment statement, Symbolic constant, Structure of a C Program, printf(), scanf() Functions, Operators &

Expression: Arithmetic, relational, logical, bitwise, unary, assignment, shorthand assignment operators, conditional operators and increment and decrement operators, Arithmetic expressions, evaluation of arithmetic expression, type casting and conversion, operator hierarchy & associativity.

UNIT - II **Decision making & branching:** Decision making with IF statement, IF-ELSE statement, Nested IF statement, ELSE-IF ladder, switch statement, goto statement.

Decision making & looping: For, while, and do-while loop, jumps in loops, break, continue statement, Nested loops.

UNIT - III **Functions:** Standard Mathematical functions, Input/output: Unformatted & formatted I/O function in C, Input functions viz. getch(), getche(), getchar(), gets(), output functions viz., putch(), putchar(), puts(), string manipulation functions.

User defined functions: Introduction/Definition, prototype, Local

and global variables, passing parameters, recursion.

UNIT - IV **Arrays, strings and pointers:** Definition, types, initialization, processing an array, passing arrays to functions, Array of Strings. String constant and variables, Declaration and initialization of string, Input/output of string data, Introduction to pointers.

Storage classes in C: auto, extern, register and static storage class, their scope, storage, & lifetime.

Algorithm development, Flowcharting and Development of efficient program in C.

Text Books/ Reference Books:

1. Gottfried, Byron S., Programming with C, Tata McGraw Hill
2. Gill Nasib Singh: Computing Fundamentals and Programming in C, Khanna Books Publishing Co., New Delhi.
3. Balagurusamy, E., Programming in ANSI C, 4E, Tata McGraw-Hill
4. Jeri R. Hanly & Elliot P. Koffman, Problem Solving and Program Design in C, Addison Wesley.
5. Yashwant Kanetker, Let us C, BPB.
6. Rajaraman, V., Computer Programming in C, PHI.
7. Yashwant Kanetker, Working with C, BPB.

Note: Latest and additional good books may be suggested and added from time to time.

BCA-17-107: LOGICAL ORGANIZATION OF COMPUTER-II

BCA II Semester

No. of Credits: 5		Sessional:	25 Marks
L T P Total		Theory:	75 Marks
5 0 0 5		Total:	100 Marks
		Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT – I **Sequential Logic:** Characteristics, Flip-Flops, Clocked RS, D type, JK, T type and Master-Slave flip-flops. State table, state diagram and state equations. Flip-flop excitation tables

UNIT – II **Sequential Circuits:** Designing registers – Serial Input Serial Output (SISO), Serial Input Parallel Output (SIPO), Parallel Input Serial Output (PISO), Parallel Input Parallel Output (PIPO) and shift registers. Designing counters – Asynchronous and Synchronous Binary Counters, Modulo-N Counters and Up-Down Counters

UNIT – III **Memory & I/O Devices:** Memory Parameters, Semiconductor RAM, ROM, Magnetic and Optical Storage devices, Flash memory, I/O Devices and their controllers.

UNIT – IV **Instruction Design & I/O Organization:** Machine instruction, Instruction set selection, Instruction cycle, Instruction Format and Addressing Modes. I/O Interface, Interrupt structure, Program-controlled, Interrupt-controlled & DMA transfer, I/O Channels, IOP.

Text Books/ Reference Books:

1. Gill, Nasib Singh and Dixit J.B.: Digital Design and Computer Organisation, University Science Press (Laxmi Publications), New Delhi.
2. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India Pvt. Ltd.
3. V. Rajaraman, T. Radhakrishnan, An Introduction to Digital Computer Design, Prentice Hall of India Pvt. Ltd.
4. Andrew S. Tanenbaum, Structured Computer Organization, Prentice Hall of India Pvt. Ltd.
5. Nicholas Carter, Schaum's Outlines Computer Architecture, Tata McGraw-Hill.

Note: Latest and additional good books may be suggested and added from time to time.

BCA-17-108: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
BCA II Semester

No. of Credits: 5		Sessional:	25 Marks
L T P Total		Theory:	75 Marks
5 0 0 5		Total:	100 Marks
		Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT - I **Basic Statistics**: Measure of Central Tendency, Preparing frequency distribution table, Mean, Mode, Median, Measure of Dispersion: Range, Variance and Standard Deviations, Correlation and Regression.

UNIT - II **Algorithm:** Algorithms, merits and demerits, Exponentiation, How to compute fast exponentiation. Linear Search, Binary Search, "Big Oh" notation, Worst case, Advantage of logarithmic algorithms over linear algorithms, complexity.

Graph Theory: Graphs, Types of graphs, degree of vertex, sub graph, isomorphic and homeomorphic graphs, Adjacent and incidence matrices, Path Circuit ; Eulerian, Hamiltonian path circuit.

UNIT - III **Tree:** Trees, Minimum distance trees, Minimum weight and Minimum distance spanning trees.

Recursion: Recursively defined function. Merge sort, Insertion sort, Bubble sort, and Decimal to Binary.

UNIT - IV **Recurrence Relations:** LHRR, LHRRWCCs, DCRR. Recursive procedures.

Number Theory: Principle of Mathematical induction**,** GCD,

Euclidean algorithm, Fibonacci numbers, congruences and equivalence relations, public key encryption schemes.

Text Books/ Reference Books:

1. Gupta S.P. and Kapoor, V.K., Fundamentals of Applied statistics, Sultan Chand & Sons, 1996.
2. Gupta S.P. and Kapoor, V.K., Fundamentals of Mathematical statistics, Sultan Chand and Sons, 1995.
3. Graybill, Introduction to Statistics, McGraw.
4. Anderson, Statistical Modelling, McGraw.
5. Babu Ram : Discrete Mathematics

Note: Latest and additional good books may be suggested and added from time to time.

BCA-17-109: STRUCTURED SYSTEMS ANALYSIS AND DESIGN
BCA II Semester

No. of Credits: 5	Sessional:	25 Marks
L T P Total	Theory:	75 Marks
5 0 0 5	Total :	100 Marks
	Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT - I Introduction to system, Definition and characteristics of a system, Elements of system, Types of system, System development life cycle, Role of system analyst, Analyst/user interface, System planning and initial investigation: Introduction, Bases for planning in system analysis, Sources of project requests, Initial investigation, Fact finding, Information gathering, information gathering tools, Fact analysis, Determination of feasibility.

UNIT - II **Structured analysis, Tools of structured analysis:** DFD, Data dictionary, Flow charts, Gantt charts, decision tree, decision table, structured English, Pros and cons of each tool, Feasibility study: Introduction, Objective, Types, Steps in feasibility analysis, Feasibility report, Oral presentation, Cost and benefit analysis: Identification of costs and benefits, classification of costs and benefits, Methods of determining costs and benefits, Interpret results of analysis and take final action.

UNIT - III **System Design:** System design objective, Logical and physical design, Design Methodologies, structured design, Form-Driven methodology(IPO charts), structured walkthrough, Input/Output and form design: Input design, Objectives of input design, Output

design, Objectives of output design, Form design, Classification of forms, requirements of form design, Types of forms, Layout considerations, Form control.

UNIT - IV **System testing:** Introduction, Objectives of testing, Test plan, testing techniques/Types of system tests, Quality assurance goals in system life cycle, System implementation, Process of implementation, System evaluation, System maintenance and its types, System documentation, Forms of documentation.

Text Books/ Reference Books:

1. Systems Analysis and design BY e.m. aWAD Galgotia Pub.(P) Ltd.
2. Data Management and Data Structures by Loomis (PHI)
3. System Analysis and Design by Elias Awad.
4. Introductory System analysis and Design by Lee Vol. I & II

Note: Latest and additional good books may be suggested and added from time to time.

BCA-17-110: C PROGRAMMING LAB
BCA II Semester

No. of Credits: 3	Sessional: 30 Marks
L T P Total	Practical: 70 Marks
0 0 6 6	Total : 100 Marks
	Duration of Exam: 3 Hours

List of Experiments:

1. Write a program to add, subtract, multiply and divide two numbers using menu driven program.
2. Write a program to find the largest of three numbers. (if-then-else)
3. Write a program to find the largest of ten numbers. (for statement)
4. Write a program to find the average mail height & average female heights in the class (input is in the form of gender code, height).
5. Write a program to find roots of a quadratic equation using functions and switch statements.
6. Write a program to calculate sum of n numbers using do-while loop.
7. Write a program using arrays to find the largest and second largest number out of given 50 numbers.
8. Write a program to multiply two matrices.
9. Write a program to read a string and write it in reverse order.
10. Write a program to concatenate two strings of different lengths.
11. Write a program to transpose a given matrix.
12. Write a program to swap two numbers using pointers.
13. Write a program to check that the input string is a palindrome or not
14. Write a program to find factorial of a number using function.
15. Write a program to calculate a^b using function.
16. Write a program to print Fibonacci series using recursion.

BCA-17-201: INTRODUCTION TO OPERATING SYSTEM

BCA III Semester

No. of Credits: 5				Sessional:	25 Marks
L	T	P	Total	Theory :	75 Marks
5	0	0	5	Total :	100 Marks
				Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT – I Fundamentals of Operating system: Introduction to Operating System, its need and operating System services, Early systems, Structures - Simple Batch, Multi programmed, timeshared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems.

Process Management: Process concept, Operation on processes, Cooperating Processes, Threads, and Inter-process Communication.

UNIT-II CPU Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms: FCFS, SJF, Round Robin & Queue Algorithms.

Deadlocks: Deadlock characterization, Methods for handling deadlocks, Banker'sAlgorithm.

UNIT-III Memory Management: Logical versus Physical address space, Swapping, Contiguous allocation, Paging, Segmentation.

Virtual Memory: Demand paging, Performance of demand paging, Page replacement, Page replacement algorithms, Thrashing.

UNIT-IV File management: File system Structure, Allocation methods:

Contiguous allocation, Linked allocation, Indexed allocation, Free space management: Bit vector, Linked list, Grouping, Counting.

Device Management: Disk structure, Disk scheduling: FCFS, SSTF, SCAN, C-SCAN, LOOK, C-LOOK.

Text Books/ Reference Books:

1. Abraham Silberschatz, Peter B. Galvin, " Operating System Concepts", Addison Wesley publishing. Co., 7th. Ed., 2004.
2. Nutt Gary, "Operating Systems", Addison Wesley Publication, 2000.
3. Andrew S. Tannenbaum, "Modern Operating Systems", Pearson Education Asia, Second Edition, 2001.
4. William Stallings, "Operating Systems, "Internals and Design Principles", 4th Edition, PH, 2001.
5. Ekta Walia, "Operating Systems Concepts", Khanna Publishes, New Delhi, 2002.

Note: Latest and additional good books may be suggested and added from time to time.

BCA 17-202: DATA STRUCTURES
BCA III Semester

No. of Credits: 5		Sessional:	25 Marks
L T P Total		Theory :	75 Marks
5 0 0 5		Total :	100 Marks
		Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT–I **Introduction:** Elementary data organization, Data Structure definition, Data type vs. data structure, Categories of data structures, Data structure operations, Applications of data structures, Algorithms complexity and time-space tradeoff, Big-O notataion.

Strings: Introduction, Storing strings, String operations, Pattern matching algorithms, Liner search, binary search.

UNIT – II **Arrays:** Introduction, Linear arrays, Representation of linear array in memory, address calculations, Traversal, Insertions, Deletion in an array, Multidimensional arrays, Parallel arrays, Sparse arrays.

Linked List: Introduction, Array vs. linked list, Representation of linked lists in memory, Traversal, Insertion, Deletion, Searching in a linked list, Header linked list, Circular linked list, Two-way linked list, Threaded lists, Garbage collection, Applications of linked lists.

UNIT – III **Stack:** Introduction, Array and linked representation of stacks, Operations on stacks, Applications of stacks: Polish notation, Recursion.

Queues: Introduction, Array and linked representation of queues,

Operations on queues, Deques, Priority Queues, Applications of queues.

UNIT – IV Tree: Introduction, Definition, Representing Binary tree in memory, Traversing binary trees, Traversal algorithms using stacks.

Graph: Introduction, Graph theory terminology, Sequential and linked representation of graphs, Warshall's algorithm for shortest path, Dijkstra algorithm for shortest path, Operations on graphs, Traversal of graph.

Text Books/ Reference Books:

1. Seymour Lipschutz, "Data Structure", Tata-McGraw-Hill
2. Horowitz, Sahni & Anderson-Freed, "Fundamentals of Data Structures in C", Orient Longman.
3. Trembley, J.P. And Sorenson P.G., "An Introduction to Data Structures With Applications", Mcgrraw- Hill International Student Edition, New York.
4. Mark Allen Weiss Data Structures and Algorithm Analysis In C, Addison- Wesley, (An Imprint Of Pearson Education), Mexico City.Prentice- Hall Of India Pvt. Ltd., New Delhi.
5. Yedidyan Langsam, Moshe J. Augenstein, and Aaron M. Tenenbaum, "Data Structures Using C", Prentice- Hall of India Pvt. Ltd., New Delhi.

Note: Latest and additional good books may be suggested and added from time to time.

BCA -17-203: DATABASE MANAGEMENT SYSTEM

BCA III Semester

No. of Credits: 5		Sessional:	25 Marks
L T P Total		Theory :	75 Marks
5 0 0 5		Total :	100 Marks
		Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT – I Basic Concepts: Data, Information, Records and files. Traditional file –based Systems-File Based Approach-Limitations of File Based Approach, Database Approach-Characteristics of Database Approach, advantages and disadvantages of database system, components of database system, Database Management System (DBMS), Components of DBMS Environment, DBMS Functions and Components, DBMS users, Advantages and Disadvantages of DBMS, DBMS languages.

Roles in the Database Environment - Data and Database Administrator, Database Designers, Applications Developers and Users.

UNIT – II Database System Architecture – Three Levels of Architecture, External, Conceptual and Internal Levels, Schemas, Mappings and Instances.

Data Independence – Logical and Physical Data Independence, Classification of Database Management System, Centralized and Client Server architecture to DBMS .

Data Models: Records- based Data Models, Object-based Data Models, Physical Data Models and Conceptual Modeling.

UNIT – III Entity-Relationship Model – Entity Types, Entity Sets, Attributes Relationship Types, Relationship Instances and ER Diagrams, abstraction and integration.

Basic Concepts of Hierarchical and Network Data Model, Relational Data Model - Brief History, Relational Model Terminology-Relational Data Structure, Database Relations, Properties of Relations, Keys, Domains, Integrity Constraints over Relations.

UNIT – IV Relational algebra, Relational calculus, Relational database design: Functional dependencies, Modification anomalies, Ist to 3^{rd} NFs, BCNF, 4^{th} and 5^{th} NFs, computing closures of set FDs, SQL: Data types, Basic Queries in SQL, Insert, Delete and Update Statements, Views, Query processing: General strategies of query processing, query optimization, query processor, concept of security, concurrency and recovery.

Text Books/ Reference Books:

1. Elmasri & Navathe, "Fundamentals of Database Systems", 5th edition, Pearson Education.
2. Thomas Connolly Carolyn Begg, "Database Systems", 3/e, Pearson Education
3. C. J. Date, "An Introduction to Database Systems", 8^{th} edition, Addison Wesley N. Delhi.

Note: Latest and additional good books may be suggested and added from time to time.

BCA-17-204 (A): COMMUNICATION SKILLS (ENGLISH)

BCA III Semester

No. of Credits: 5				Sessional:	25 Marks
L	T	P	Total	Theory :	75 Marks
4	0	0	4	Total :	100 Marks
				Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT-I Introduction to Basics of Communication: Communication and its various definitions, features/characteristics of the communication, process of communication, communication model and theories, barrier to effective communication.

UNIT-II Improving LSRW: introduction, verbal and nonverbal communication, listening process, group discussion, forms of oral presentation, self-presentation, dyadic communication, 5C's of communication, Developing dialogues, soft skill.

UNIT-III Basic vocabulary: how to improve vocabulary, prefix/suffix, synonyms/antonyms, one word substitution, spellings

Developing fluency: Grammar(conjunction, auxiliaries, prepositions, articles, tenses……), language games.

UNIT-IV Proper use of Language: The Communication Skills, The effective Speech.

Effective self-presentation & facing interview: The interview process & preparing for it, The presentation skills.

Text Books/ Reference Books:

1. Vik, Gilsdorf, “Business Communication”, Irwin
2. K K Sinha, “Business Communication”, Himalaya Publishing House / Galgoria Publication
3. Bovee, “Business Communication”, Pearson ‘ PHI
4. Mohan, Banerjee, Business Communication, Mac million
5. Raman, Singh – Business communication – Oxford Press

Note: Latest and additional good books may be suggested and added from time to time.

BCA-17-204 (B): ENVIRONMENT SCIENCE

BCA III Semester

No. of Credits: 0				Sessional:	NIL
L	T	P	Total	Theory :	50 Marks
3	0	0	3	Total :	50 Marks
				Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 10 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 10 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT-I **The Multidisciplinary Nature of Environmental Studies:** Definition, scope and importance. Need for public awareness.

Natural Resources: Renewable and Non-Renewable Resources: Natural resources and associated problems: Forest resources, Water resources, Mineral resources, Food resources, Energy resources, Land resources, Role of an individual in conservation of natural resources.

UNIT-II **Ecosystems:** Concept of an ecosystem. Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem: a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

Biodiversity and its Conservation: Introduction – Definition: genetic, species and ecosystem diversity, bio geographical classification of India, India as a mega-diversity nation, Hot-spots of biodiversity, threats to biodiversity, Conservation of biodiversity: insitu and ex-situ conservation of biodiversity.

UNIT-III Environmental Pollution: Definition, Causes, effects and control measures of: Air pollution b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution f) Thermal pollution g) Nuclear hazards.

Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Disaster management: floods, earthquake, cyclone and landslides.

UNIT-IV Social Issues and the Environment: From Unsustainable to Sustainable development Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people; its problems and concerns. Case studies.

Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies. Wasteland reclamation. Consumerism and waste products.

Text Books/ Reference Books:

1. Perspectives in Environmental Studies by A. Kaushik and C. P. Kaushik, New age international publishers.
2. Environmental Studies by Benny Joseph, Tata McGraw Hill Co, New Delhi.
3. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
4. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela 2008 PHI Learning Pvt Ltd.

Note: Latest and additional good books may be suggested and added from time to time.

BCA-17-205: DATA STRUCTURE AND SQL LAB
BCA III Semester

No. of Credits: 3				Sessional:	30 Marks
L	T	P	Total	Theory :	70 Marks
0	0	6	6	Total :	100 Marks
				Duration of Exam:	3 Hours

List of Experiments:

Data Structure Lab

1. Write a program to print sum of digits of a number.
2. Write a program to print Fibonacci series.
3. Write a program to calculate factorial of a number using recursion.
4. Write a program to check whether the number is prime or not.
5. Write a program to find sum of two 2-D arrays
6. Write a program to multiply two 2-D arrays.
7. Write a program to perform various operations on Stack.
8. Write a program to perform various operations on queues.
9. Write a program to perform various operations on Linked List.
10. Write a program to perform various operations on Binary Tree.

SQL Lab

1. Introduction to SQL.
2. Write a program to create a table in SQL.
3. Write a program to perform various operations like Drop, Alter and Truncate on a table.
4. Write a program to perform various queries in SQL.
5. Write a program to perform Selection, Projection and Join Operations on tables.

BCA -17-206: WEB DESIGNING
BCA IV Semester

No. of Credits: 5		Sessional:	25 Marks
L T P Total		Theory :	75 Marks
5 0 0 5		Total :	100 Marks
		Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT – I Introduction to Internet and World Wide Web: Evolution and History of World Wide Web; Basic features; Web Browsers; Web Servers; Hypertext Transfer Protocol, Overview of TCP/IP and its services; URLs; Searching and Web-Casting Techniques; Search Engines and Search Tools;

UNIT – II Web Publishing: Hosting your Site; Internet Service Provider; Web terminologies, Phases of Planning and designing your Web Site; Steps for developing your Site; Choosing the contents; Home Page; Domain Names, Front page views, Adding pictures, Links, Backgrounds, Relating Front Page to DHTML.

Creating a Website and the Markup Languages (HTML, DHTML);

UNIT – III Web Development: Introduction to HTML; Hypertext and HTML; HTML Document Features; HTML command Tags; Creating Links; Headers; Text styles; Text Structuring; Text colors and Background; Formatting text; Page layouts;

UNIT – IV Images: Ordered and Unordered lists; Inserting Graphics; Table Creation and Layouts; Frame Creation and Layouts; Working with

Forms and Menus; Working with Radio Buttons; Check Boxes; Text Boxes;

DHTML: Dynamic HTML, Features of DHTML, CSSP (cascading style sheet positioning) and JSSS (JavaScript assisted style sheet), Layers of netscape, The ID attributes, DHTML events.

Text Books/ Reference Books:

1. Douglas E. Comer : Computer Networks and Internets.
2. Raj Kamal, "Internet and Web Technologies", Tata McGraw-Hill.
3. Thomas A. Powell, "Web Design: The Complete Reference" , 4/e, Tata McGraw-Hill.
4. Wendy Willard, "HTML Beginners Guide", Tata McGraw-Hill.
5. Deitel and Goldberg, "Internet and World Wide Web, How to Program", PHI.

Note: Latest and additional good books may be suggested and added from time to time.

BCA-17-207: E-COMMERCE
BCA IV Semester

No. of Credits: 5				Sessional:	25 Marks
L	T	P	Total	Theory :	75 Marks
5	0	0	5	Total :	100 Marks
				Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT - I **Electronic Commerce:** Overview of Electronic Commerce, Scope of Electronic Commerce, Traditional Commerce vs. Electronic Commerce, Impact of E-Commerce, Electronic Markets, Internet Commerce, e-commerce in perspective, Application of E Commerce in Direct Marketing and Selling, Obstacles in adopting E-Commerce Applications; Future of E-Commerce.

UNIT - II Value Chains in electronic Commerce, Supply chain, Porter's value chain Model, Inter Organizational value chains, Strategic Business unit chains, Industry value chains.

Security Threats to E-commerce: Security Overview, Computer Security Classification, Copyright and Intellectual Property, security Policy and Integrated Security, Intellectual Property Threats, electronic Commerce Threats, Clients Threats, Communication Channel Threats, server Threats.

UNIT - III **Implementing security for E-Commerce:** Protecting E-Commerce Assets, Protecting Intellectual Property, Protecting Client Computers, Protecting E-commerce Channels, Insuring Transaction Integrity, Protecting the Commerce Server.

Electronic Payment System: Electronic Cash, Electronic Wallets, Smart Card, Credit and Change Card.

UNIT - IV **Business to Business E-Commerce:** Inter-organizational Transitions, Credit Transaction Trade Cycle, a variety of transactions. Electronic Data Interchange (EDI): Introduction to EDI, Benefits of EDI, EDI Technology, EDI standards, EDI Communication, EDI Implementation, EDI agreement, EDI security.

Text Books/ Reference Books:

1. R.Kalakota and A.B.Whinston,Readings in Electronic Commerce, Addison Wesley.
2. David Kosiur, Understanding E- Commerce, Microsoft Press, 1997.
3. Soka, From EDI to Electronic Commerce , McGraw Hill, 1995.
4. David whitely, E-commerce Strategy, Technology and application, Tata McGraw Hill.
5. Gary P. Schneider and Jame Perry, Electronic Commerce Thomson Publication.
6. Doing Business on the Internet E-COMMERCE S. Jaiswal;Galgotia Publications.
7. E-Commerce An Indian Perspective; P.T.Joseph; S.J.; PHI.
8. E-Commerce; Efrain Turbon; Jae Lee; David King; H.Michael Chang.

Note: Latest and additional good books may be suggested and added from time to time.

BCA-17-208: Object Oriented Programming Using C++

BCA IV Semester

No. of Credits: 5		Sessional:	25 Marks
L T P Total		Theory :	75 Marks
5 0 0 5		Total :	100 Marks
		Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT-I Object Oriented Programming Concepts: Procedural Language and Object Oriented approach, Characteristics of OOP, user defined types, polymorphism and encapsulation. Getting started with C++: syntax, data types, variables, string, function, namespace and exception, operators, flow control, recursion, array and pointer, structure.

UNIT-II Abstracting Mechanism: classes, private and public, Constructor and Destructor, member function, static members, references;

Memory Management: new, delete, object copying, copy constructer, assignment operator, this input/output

UNIT-III Inheritance and Polymorphism: Derived Class and Base Class, Different types of Inheritance, Overriding member function, Abstract Class, Public and Private Inheritance, Ambiguity in Multiple inheritance, Virtual function, Friend function, Static function.

UNIT-IV Exception Handling: Exception and derived class, function exception declaration, unexpected exception, and exception when handling exception, resource capture and release.

Template and Standard Template Library: Template classes, declaration, template functions, namespace, string, iterators, hashes, iostreams and other types.

Text Books/ Reference Books:

1. Bjarne Stroustrup: The C++ Programming Language, Pearson.
2. Herbert Scheldt's: C++ - The Complete Reference, Tata McGraw Hill Publications.
3. Balaguruswamy : Object Oriented Programming and C++, TMH.
4. Robert Lafore; Object Oriented Programming in C++.
5. Shah & Thakkar: Programming in C++, ISTE/EXCEL.
6. Johnston: C++ Programming Today, PHI.
7. Object Oriented Programming and C++, Rajaram, New Age International.
8. Samantha: Object Oriented Programming with C++ & JAVA, PHI.

Note: Latest and additional good books may be suggested and added from time to time.

BCA-17-209: Software Engineering

BCA IV Semester

No. of Credits: 5				Sessional:	25 Marks
L	T	P	Total	Theory :	75 Marks
5	0	0	5	Total :	100 Marks
				Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT – I Introduction: Software Crisis, Software Processes & Characteristics, Software life cycle models, Waterfall, Prototype, Evolutionary and Spiral Models.

Software Requirements Analysis & Specifications: Requirement engineering, requirement elicitation techniques like FAST, QFD, requirements analysis using DFD, Data dictionaries & ER Diagrams, Requirements documentation, Nature of SRS, Characteristics & organization of SRS .

UNIT – II Software Project Management Concepts: The Management spectrum, The People, The Problem, The Process, The Project.

Software Project Planning: Size Estimation like lines of Code & Function Count, Cost Estimation Models, COCOMO, Risk Management.

UNIT – III Software Design: Cohesion & Coupling, Classification of Cohesiveness & Coupling, Function Oriented Design, Object Oriented Design, Software Metrics: Software measurements: What & Why, Token Count, Halstead Software Science Measures, Design Metrics, Data Structure Metrics

Software Implementation: Relationship between design and

implementation, Implementation issues and programming support environment, Coding the procedural design, Good coding style.

UNIT – IV Software Testing: Testing Process, Design of Test Cases, Types of Testing, Functional Testing, Structural Testing, Test Activities, Unit Testing, Integration Testing and System Testing, Debugging Activities.

Software Maintenance: Management of Maintenance, Maintenance Process, Reverse Engineering, Software Re-engineering, Configuration Management, Documentation.

Text Books/ Reference Books:

1. Pressman : Software Engineering, TMH.
2. K.K Aggarwal & Yogesh Singh: Software Engineering, New Age International Publishers.
3. Jalote, Pankaj : An Integrated Approach to Software Engineering, Narosa Publications.
4. Ghezzi, Carlo : Fundaments of Software Engineering, PHI.
5. Fairely, R.E. : Software Engineering Concepts, McGraw-Hill.
6. Lewis, T.G.: Software Egineering, McGraw-Hill.
7. Shere : Software Engineering & Management, Prentice Hall.

Note : Latest and additional good books may be suggested and added from time to time.

BCA-17-210: HTML AND C++ LANGUAGE LAB

BCA IV Semester

No. of Credits: 3		Sessional:	30 Marks
L T P Total		Theory :	70 Marks
0 0 6 6		Total :	100 Marks
		Duration of Exam:	3 Hours

List of Programs:

HTML Lab

1. Introduction to HTML
2. Write a program to print a simple message in HTML.
3. Write a program to formatting tags like heading tags, font style, color tags.
4. Write a program to create hyperlinks in HTML.
5. Write a program to create various types of list.
6. Write a program to create chess board and time table using table tag.
7. Write a program to create frames.
8. Write a program to use various tags in HTML.
9. Write a program to use CSS in HTML.
10. Program to create a webpage using HTML.

C++ Language Lab

1. Write a program to print a message in C++.
2. Write a program to implement the concept of Structures.
3. Write a program to create a class.
4. Write a program to create various constructors and destructors of a class.
5. Write a program to implement the concept of various inheritance techniques in class.
6. Write a program to create friend function and friend class.
7. Write a program to implement the concept of exception handling in C++.
8. Write a program to create Templates.
9. Write a program to implement the concept of polymorphism.
10. Write a program to implement the concept of virtual function.

BCA-17-301: OBJECT TECHNOLOGIES & PROGRAMMING USING JAVA

BCA V Semester

No. of Credits: 5		Sessional:	25 Marks
L T P Total		Theory :	75 Marks
5 0 0 5		Total :	100 Marks
		Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT - I **Object Oriented Methodology-1:** Paradigms of Programming Languages, Evolution of OO Methodology, Basic Concepts of OO Approach, Comparison of Object Oriented and Procedure Oriented Approaches, Benefits of OOPs, Introduction to Common OO Language, Applications of OOPs .

Object Oriented Methodology-2: Classes and Objects, Abstraction and Encapsulation, Inheritance, Method Overriding and Polymorphism.

UNIT - II **Java Language Basics*:*** Introduction to Java, Basic Features, Java Virtual Machine Concepts, Primitive Data Type and Variables, Java Operators, Expressions, Statements and Arrays.

Object Oriented Concepts: Class and Objects-- Class Fundamentals, Creating objects , Assigning object reference variables; Introducing Methods, Static methods, Constructors , Overloading constructors; This Keyword; Using Objects as Parameters, Argument passing, Returning objects , Method overloading, Garbage Collection, The Finalize ( ) Method.

Inheritance and Polymorphism: Inheritance Basics, Access Control, Multilevel Inheritance, Method Overriding, Abstract Classes, Polymorphism, Final Keyword

UNIT - III **Packages:** Defining Package, CLASSPATH, Package naming, Accessibility of Packages, using Package Members.

Interfaces: Implementing Interfaces, Interface and Abstract Classes, Extends and Implements together.

Exceptions Handling: Exception, Handling of Exception, Using try-catch, Catching Multiple Exceptions, Using finally clause, Types of Exceptions, Throwing Exceptions, Writing Exception Subclasses.

UNIT - IV **Multithreading:** Introduction, The Main Thread, Java Thread Model, Thread Priorities, Synchronization in Java, Inter thread Communication.

I/O in Java : I/O Basics, Streams and Stream Classes ,The Predefined Streams, Reading from, and Writing to, Console, Reading and Writing Files , The Transient and Volatile Modifiers , Using Instance of Native Methods.

Strings and characters: Fundamentals of Characters and Strings, the String Class, String Operations, Data Conversion using Value Of ( ) Methods, String Buffer Class and Methods.

Text Books/ Reference Books:

1. E Balagurusamy: Programming in Java.
2. Herbert Schildt: The Complete Reference JAVA, TMH Publication.
3. Begining JAVA, Ivor Horton, WROX Public.
4. Stephen Potts: JAVA 2 UNLEASHED, Tech Media Publications.
5. Patrick Naughton and Herbertz Schildt, "Java-2 The Complete Reference", 1999,TMH.

Note: Latest and additional good books may be suggested and added from time to time.

BCA-17-302 COMPUTER GRAPHICS

BCA V Semester

No. of Credits: 5		Sessional:	25 Marks
L T P Total		Theory :	75 Marks
5 0 0 5		Total :	100 Marks
		Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT - I **Graphics Primitives:** Introduction to computer graphics, Basics of Graphics systems, Application areas of Computer Graphics, overview of graphics systems, video-display devices, and raster-scan systems, random scan systems, graphics monitors and workstations and input devices.

Output Primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary fill and flood-fill algorithms.

UNIT - II **2-D Geometrical Transforms:** Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

2-D Viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm.

UNIT - III **3-D Object Representation:** Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline

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curves, Bezier and B-Spline surfaces. Basic illumination models, polygon-rendering methods.

UNIT - IV **3-D Geometric Transformations:** Translation, rotation, scaling, reflection and shear transformations, composite transformations.

3-D Viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

Text Books/ Reference Books:

1. Donald Hearn and M. Pauline Baker: Computer Graphics, PHI Publications.
2. Plastock : Theory & Problem of Computer Gaphics, Schaum Series.
3. Foley & Van Dam: Fundamentals of Interactive Computer Graphics, Addison-Wesley.
4. Newman: Principles of Interactive Computer Graphics, McGraw Hill.
5. Tosijasu, L.K.: Computer Graphics, Springer-Verleg.

Note: Latest and additional good books may be suggested and added from time to time.

BCA-17-303 DATA COMMUNICATION AND NETWORKING
BCA V Semester

No. of Credits: 5				Sessional:	25 Marks
L	T	P	Total	Theory:	75 Marks
5	0	0	5	Total:	100 Marks
				Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT - I **Introduction to Computer Communications and Networking Technologies:** Uses of Computer Networks; Network Devices, Nodes, and Hosts; Types of Computer Networks and their Topologies; Network Software: Network Design issues and Protocols; Connection-Oriented and Connectionless Services; Network Applications and Application Protocols; Computer Communications and Networking Models: Decentralized and Centralized Systems, Distributed Systems, Client/Server Model, Peer-to-Peer Model, Web-Based Model, Network Architecture and the OSI Reference Model, TCP/IP reference model, Example Networks: The Internet, X.25, Frame Relay, ATM.

UNIT - II **Analog and Digital Communications Concepts:** Concept of data, signal, channel, bid-rate , maximum data-rate of channel, Representing Data as Analog Signals, Representing Data as Digital Signals, Data Rate and Bandwidth, Capacity, Baud Rate; Asynchronous and synchronous transmission, data encoding techniques, Modulation techniques, Digital Carrier Systems; Guided and Wireless Transmission Media; Communication Satellites; Switching and Multiplexing; Dialup Networking; Analog Modem Concepts; DSL Service.

UNIT - III **Data Link Layer:** Framing, Flow Control, Error Control: Error Detection and Correction; Sliding Window Protocols; Media Access Control: Random Access Protocols, Token Passing Protocols; Token Ring; Introduction to LAN technologies: Ethernet, switched Ethernet, VLAN, fast Ethernet, gigabit Ethernet, token ring, FDDI, Wireless LANs; Bluetooth; Network Hardware Components: Connectors, Transceivers, Repeaters, Hubs, Network Interface Cards and PC Cards, Bridges, Switches, Routers, Gateways.

UNIT - IV **Network Layer and Routing Concepts:** Virtual Circuits and Datagrams; Routing Algorithms: Flooding, Shortest Path Routing, Distance Vector Routing; Link State Routing, Hierarchical Routing; Congestion Control Algorithms; Internetworking;

Network Security Issues: Security threats; Encryption Methods; Authentication; Symmetric – Key Algorithms; Public-Key Algorithms.

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Text Books/ Reference Books:

1. Michael A. Gallo, William M. Hancock, “Computer Communications and Networking Technologies”, CENGAGE Learning.
2. Andrew S. Tanenbaum, “Computer Networks”, Pearson Education.
3. James F. Kurose, Keith W. Ross, “Computer Networking”, Pearson Education
4. Behrouz A Forouzan, “Data Communications and Networking”, McGraw Hill

Note: Latest and additional good books may be suggested and added from time to time.

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BCA-17-304 VB.NET
BCA V Semester

No. of Credits: 5	Sessional: 25 Marks
L T P Total	Theory : 75 Marks
5 0 0 5	Total : 100 Marks
	Duration of Exam: 3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT - I **Introduction to .Net Framework:** Introduction to .NET: The origin of .NET, Basics of .Net Framework & its Key design goals, 3-tier architecture, managed code, assemblies, CLR, Execution of assemblies code, IL, JIT, .NET framework class library, common type system, common language specification, metadata; Interoperability with unmanaged code.

Net Framework Base Classes: System Namespaces; the System Types; System.object class; System. Exception Class; System. Collections.

UNIT - II **Understanding the Development Environment: .NET Integrated Development Environment** : Projects & Solutions, User Interface Elements, The Visual Studio Start Page; Visual Studio.Net work area; Navigational Features, Understanding Window Forms; Viewing and changing properties; Adding controls to the form.

Designing Visual Components: Using the task list.

UNIT - III **Introduction to VB .Net**: Data Types, Operators, Methods, Handling Strings, Jagged Array, Array list, Indexer (one Dimension) and property, Interfaces, Constructors, Destructors.

User Interface: Procedures in VB.NET, Garbage Collection, Message boxes; Dialog boxes; Menus and Toolbars.

UNIT - IV **Working with Database:** Architecture of ADO.Net, Comparison with ADO, ADO.Net Object Model, Net Data provider, Data Adapter, Data Set, Data Row, Data Column, Data Relation, command, Data Reader, Connecting to Database, Accessing & Manipulating Data and Performing Data Updates.

Text Books/ Reference Books:

1. Jeffrey Richter, Francesco Balena : Applied .Net Framework.
2. Prog. In MS VB. Net, TMH Publications.
3. Michael Halvorsan : Microsoft Visual Basic.NET step by step,PHI Publication.
4. Rebecca M.Riordan: Microsoft ADO.NET Step By Step , PHI Publication.

Note: Latest and additional good books may be suggested and added from time to time.

BCA-17-305: JAVA & VB.NET LAB
BCA V Semester

No. of Credits: 3	Sessional: 30 Marks
L T P Total	Practical: 70 Marks
0 0 6 6	Total : 100 Marks
	Duration of Exam: 3 Hours

List of Experiments:

Java Lab

1. Write a Java program that prints all real solutions to the quadratic equation ax2 + bx + c = 0. Read in a, b, c and use the quadratic formula. If the discriminant b2 - 4ac is negative, display a message stating that there are no real solutions.
2. Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer.
3. Write a Java program to multiply two given matrices.
4. Write a Java Program that reads a line of integers, and then displays each integer, and the sum of all the integers(Use StringTokenizer class of java.util)
5. Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.
6. Write a Java program for sorting a given list of names in ascending order.
7. Write a Java program to make frequency count of words in a given text.
8. Write a Java program that reads a file name from the user, then displays information about whether the file exists,whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.
9. Write a Java program that reads a file and displays the file on the screen, with a line number before each line.
10. Write a Java program that displays the number of characters, lines and words in a text file.
11. Develop an applet that displays a simple message.
12. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the+, -,*, % operations. Add a text field to display the result.
13. Write a Java program for handling mouse events.

14. Develop an applet that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named “Compute” is clicked.

VB.NET Lab

1. Program to create and validate login form.
2. Program to implement inheritance.
3. Program to implement the concept of polymorphism.
4. Program to create an interface in VB.NET.
5. Program to use Advance Controls.
6. Program to implement various properties in VB.NET.
7. Program to use common dialogue controls in VB.NET.
8. Program to create menus n toolbars in VB.NET.
9. Program to show record from database using data grid control.
10. Program to insert, delete, update, search record from database.

BCA -17-306: MOBILE APPLICATION DEVELOPMENT
BCA VI Semester

No. of Credits: 5				Sessional:	25 Marks
L	T	P	Total	Theory :	75 Marks
5	0	0	5	Total :	100 Marks
				Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT – I What is Android?, Setting up development environment, Dalvik Virtual Machine & .apk file extension, Fundamentals: Basic Building blocks - Activities, Services, Broadcast Receivers & Content providers, UI Components - Views & notifications, Components for communication - Intents & Intent Filters, Android API levels (versions & version names), Application Structure (in detail), AndroidManifest.xml, uses-permission & uses-sdk, Resources & R.java, Assets, Layouts & Drawable Resources, Activities and Activity lifecycle.

UNIT – II Emulator-Android Virtual Device, Launching emulator, Editing emulator settings, Emulator shortcuts, Logcat usage, Introduction to DDMS, Second App:- (switching between activities) , Develop an app for demonstrating the communication between Intents, Basic UI design, Form widgets, Text Fields, Layouts, [dip, dp, sip, sp] versus px.

UNIT – III Preferences, Shared Preferences, Preferences from xml, Examples, Menu, Option menu, Context menu, Sub menu, menu from xml, menu via code, Examples, Intents (in detail), Explicit Intents, Implicit intents, Examples, Content Providers. SQLite

Programming, Introduction to SQL DML & DDL Queries in brief. SQLiteOpenHelper, SQLiteDatabse, Cursor, Reading and updating Contacts, Reading bookmarks, Example: Develop an App to demonstrate database usage.

UNIT – IV Adapters:- ArrayAdapters, BaseAdapters, ListView and ListActivity, Custom listview, GridView using adapters, Gallery using adapters, Broadcast Receivers, Services and notifications, Toast, Alarms, Examples, Threads,Threads running on UI thread (runOnUiThread),Worker thread,Handlers & Runnable, AsynTask (in detail), Examples.

Text Books/ Reference Books:

1. https://developer.android.com/training/index.html
2. Android Programming: The Big Nerd Ranch Guide (Big Nerd Ranch Guides) by Bill Philips & Brian Hardy.
3. Android Design Patterns: Interaction Design Solutions for Developers by Greg Nudelman.
4. Programming Android by Zigurd Mednieks, Laird Dornin, G. Blake Meike & Masumi Nakamura.

Note: Latest and additional good books may be suggested and added from time to time.

BCA-17-307: SOFTWARE TESTING
BCA V Semester

No. of Credits: 5				Sessional:	25 Marks
L	T	P	Total	Theory :	75 Marks
5	0	0	5	Total :	100 Marks
				Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT - I **Testing terminology and Methodology**: Definition of testing, goals, psychology, model for testing, effective testing, limitations of testing, Importance of Testing, Definition of Failure, faults or bug, error, incident, test case, test ware, life cycle of bug, bug effects, bug classification, test case design, testing methodology, development of test strategy, verification, validation,

Verification and validation: Verification activities, verification of requirements, verification of HL design, verification of data design, verification of architectural design, verification of UI design, verification of LL design, introduction to validation activities.

UNIT – II **Dynamic testing: White Box testing:** Boundary value analysis, equivalence class portioning, state table based testing, decision table based, error guessing.

Black Box Testing: Logic coverage criteria, basic path testing, graph matrices.

UNIT - III **Validation Testing:** Unit testing, drivers , stubs, integration testing, methods, functional testing, system testing, recovery testing, security testing, stress testing, performance testing, usability testing.

Regression Testing: Objective of regression testing, Regression test process, Regression testing techniques.

Static testing: Inspection ,Review and Walkthrough, dynamic testing, testing life cycle model, testing techniques, testing principles, Testing Metrices.

UNIT – IV **Test Automation and debugging:** S/w measurement and testing, testing metrics and tools Case Study: Testing for Object-oriented and web-based systems.

Object-Oriented Testing: Use-case based testing; Class testing, Testing Exception handling.

Text Books/ Reference Books:

1. G.J Myers, The Art of Software Testing, John Wiley & Sons, 1979.
2. Naresh Chauhan, Software Testing Principles and Practices,OXFORD University Press.

Note: Latest and additional good books may be suggested and added from time to time.

BCA-17-308 ARTIFICIAL INTELLIGENCE

BCA VI Semester

No. of Credits: 5				Sessional:	25 Marks
L	T	P	Total	Theory :	75 Marks
5	0	0	5	Total :	100 Marks
				Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT - I **Overview of A.I:** Introduction to AI, Importance of AI, AI and its related field, AI techniques, Criteria for success.

Problems, problem space and search: Defining the problem as a state space search, Production system and its characteristics, Issues in the design of the search problem.

Heuristic search techniques : Generate and test, hill climbing, best first search technique, problem reduction, constraint satisfaction

UNIT - II **Knowledge Representation**: Definition and importance of knowledge, Knowledge representation, various approaches used in knowledge representation, Issues in knowledge representation.

Using Predicate Logic: Represent ting Simple Facts in logic, representing instances and is-a relationship, Computable function and predicate.

UNIT - III **Natural language processing:** Introduction syntactic processing, Semantic processing, Discourse and pragmatic processing.

Learning: Introduction learning, Rote learning, learning by taking advice, learning in problem solving, learning from example-induction, Explanation based learning.

UNIT - IV **Expert System:** Introduction, Representing using domain specific knowledge, Expert system shells.

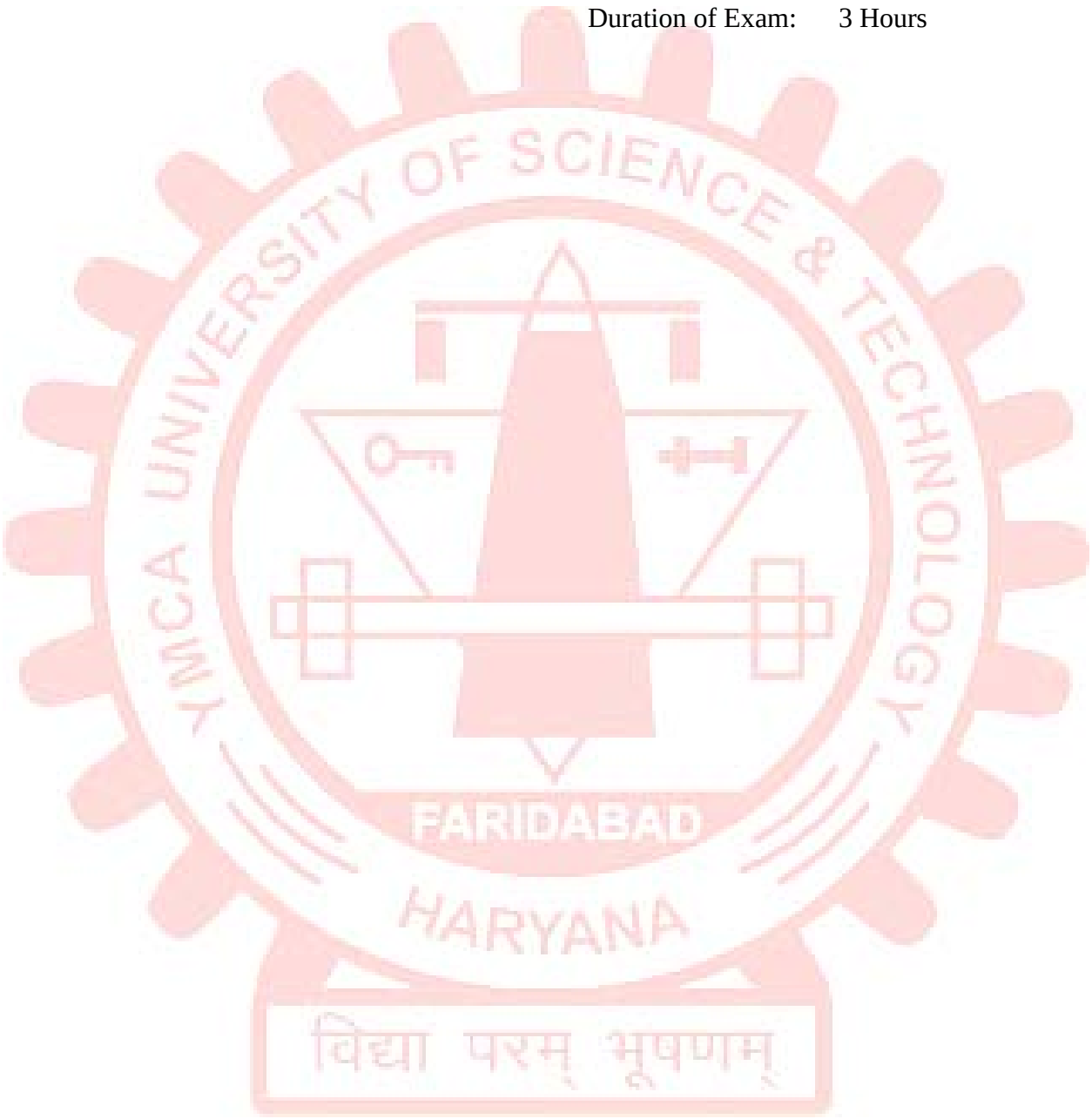
Text Books/ Reference Books:

1. Elaine Rich, Kevin Knight: Artificial Intelligence, Tata McGraw Hill.
2. David W. Rolston: Principles of Artificial Intelligence and Expert System Development, McGraw Hill Book Company.
3. D.W. Patterson, "Introduction to AI and Expert Systems", PHI, 1999.
4. Nils J Nilsson, “Artificial Intelligence -A new Synthesis" 2nd Edition (2000), Harcourt Asia Ltd.

Note: Latest and additional good books may be suggested and added from time to time.

BCA-17-309: MAJOR PROJECT
BCA VI Semester

No. of Credits: 4		Sessional:	30 Marks
L T P Total		Theory :	70 Marks
0 0 6 6		Total :	100 Marks
		Duration of Exam:	3 Hours



BCA-17-310: MAD & AI LAB
BCA VI Semester

No. of Credits: 3		Sessional:	30 Marks
L T P Total		Practical:	70 Marks
0 0 6 6		Total :	100 Marks
		Duration of Exam:	3 Hours

List of Experiments:

MAD Lab

1. Develop an application that uses GUI components, Font and Colors.
2. Develop an application that uses Basic UI design, Form widgets.
3. Develop an application that uses Layout Managers and event listeners.
4. Develop a native calculator application.
5. Develop an application that draws basic graphical primitives on the screen.
6. Develop an application that makes use of database.
7. Develop an app for demonstrating the communication between Intents.

AI Lab

8. Program to implement member, subset, factorial, Count the number of Occurrence, append, delete an element.
9. To Find Reverse of a list.
10. To find factorial of a number.
11. Write a program to print Fibonacci series.
12. To implement Relation using Prolog.
13. A Program to find the distance using roadmap.
14. To sort the list using Merge Sort.
15. To implement quick sort using recursion.
16. Write a Program to show union and Intersection of two lists.
17. Write a program to concatenate two strings of different lengths.
18. A Program to find whether two lists are equal or not if they are in same or different order.
19. A program to replace one element with another in a list.
20. A Program to implement selection sort.
21. A Program to sort a list using insertion sort algorithm.

22. A Program to find whether a string is palindrome or not.

GEC-2 CYBER LAWS AND SECURITY

No. of Credits: 3				Sessional:	25 Marks
L	T	P	Total	Theory :	75 Marks
5	0	0	5	Total :	100 Marks
				Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT - I History of Information Systems and its Importance, basics, Changing Nature of Information Systems, Need of Distributed Information Systems, Role of Internet and Web Services, Information System Threats and attacks, Classification of Threats and Assessing Damages Security in Mobile and Wireless Computing- Security Challenges in Mobile Devices, authentication Service Security, Security Implication for organizations, Laptops Security Basic Principles of Information Security, Confidentiality, Integrity Availability and other terms in Information Security, Information Classification and their Roles.

UNIT - II Security Threats to E Commerce, Virtual Organization, Business Transactions on Web, E Governance and EDI, Concepts in Electronics payment systems, E Cash, Credit/Debit Cards. Physical Security- Needs, Disaster and Controls, Basic Tenets of Physical Security and Physical Entry Controls, Access Control- Biometrics, Factors in Biometrics

Systems, Benefits, Criteria for selection of biometrics, Design Issues in Biometric Systems, Interoperability Issues, Economic and Social Aspects, Legal Challenges.

UNIT – III Model of Cryptographic Systems, Issues in Documents Security, System of Keys, Public Key Cryptography, Digital Signature, Requirement of Digital Signature System, Finger Prints, Firewalls, Design and Implementation Issues, Policies Network Security- Basic Concepts, 89 Dimensions, Perimeter for Network Protection, Network Attacks, Need of Intrusion Monitoring and Detection, Intrusion Detection Virtual Private Networks- Need, Use of Tunneling with VPN, Authentication Mechanisms, Types of VPNs and their Usage, Security Concerns in VPN.

UNIT - II Security metrics- Classification and their benefits Information Security & Law, IPR, Patent Law, Copyright Law, Legal Issues in Data mIning Security, Building Security into Software Life Cycle Ethics- Ethical Issues, Issues in Data and Software Privacy Cyber Crime Types & overview of Cyber Crimes.

Text Books/ Reference Books:

1. Godbole,“ Information Systems Security”, Willey
2. Merkov, Breithaupt, “ Information Security”, Pearson Education
3. Yadav, “Foundations of Information Technology”, New Age, Delhi
4. Schou, Shoemaker, “ Information Assurance for the Enterprise”, Tata McGraw Hill
5. Sood,“Cyber Laws Simplified”, Mc Graw Hill
6. Furnell, “Computer Insecurity”, Springer 7. IT Act 2000

Note: Latest and additional good books may be suggested and added from time to time.

GEC-3 SOFT COMPUTING

No. of Credits: 3				Sessional:	25 Marks
L	T	P	Total	Theory :	75 Marks
5	0	0	5	Total :	100 Marks
				Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT - I **Neural Networks:** History, overview of biological Neuro-system, Mathematical Models of Neurons, ANN architecture, Learning rules, Learning Paradigms-Supervised, Unsupervised and reinforcement Learning, ANN training Algorithms-perceptions, Training rules, Delta, Back Propagation Algorithm, Multilayer Perception Model, Hopfield Networks, Associative Memories, Applications of Artificial Neural Networks.

UNIT - II **Fuzzy Logic:** Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, Fuzzy rule generation.

Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Aggregation Operations.

UNIT – III **Fuzzy Arithmetic:** Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations.

UNIT - IV **Fuzzy Logic:** Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers, Linguistic Hedges.

Uncertainty based Information: Information & Uncertainty, Nonspecificity of Fuzzy & Crisp Sets, Fuzziness of Fuzzy Sets.

Genetic Algorithms: Scope & application areas, solution of 0-1Knapsack problem using GA.

Text Books/ Reference Books:

1. "Fuzzy sets and Fuzzy Logic: Theory and applications",G.J. Klir,B.Yuan, PHI
2. "Introduction to Fuzzy sets and Fuzzy Logic", M.Ganesh , PHI
3. "An Introduction to Fuzzy Control", D Driankov, H Hellendoorn, M Reinfrank, Narosa Publishing Company
4. " Neural Networks: A classroom approach", Satish Kumar , Tata McGraw Hill
5. Haykin S., "Neural Networks-A Comprehensive Foundations", Prentice-Hall International, New Jersey, 1999.
6. Anderson J.A., "An Introduction to Neural Networks", PHI, 1999

Note: Latest and additional good books may be suggested and added from time to time.

GEC-4 WEB TECHNOLOGY AND INFORMATION RETRIEVAL

No. of Credits: 3		Sessional:	25 Marks
L T P Total		Theory :	75 Marks
5 0 0 5		Total :	100 Marks
		Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT - I **Web Server Technology:** Web's Robot global access to information, HTML, HTTP, Accessing a web server, publishing on web server, secure HTTP, Secure Sockets Layer, WWW Proxies, IIS, Case study of apache web server.

UNIT - II **Web Search Basics:** Background and history, Anatomy of WWW, Web characteristics, Spam, The web graph, The Web Search Users, search engines, architecture of search engines, search tools, DNS resolution, The URL frontier, Link analysis, PageRank.

Web Crawlers: Basics of Web crawling, Various crawling techniques, incremental crawler, parallel crawler, distributed crawlers, focused crawler, agent based crawler, Hidden web Crawler.

UNIT – III **Introduction to Information Retrieval:** Information retrieval problem, an inverted index, Processing Boolean queries, The extended Boolean model versus ranked retrieval, an inverted index, Bi-word indexes, Positional indexes, Combination schemes.

UNIT - IV **Index construction:** Hardware basics, Blocked sort-based indexing, Single-pass in-memory indexing, Distributed indexing, Dynamic indexing, Other types of indexes Index compression: Statistical properties of 93 terms in information retrieval, Heaps' law: Estimating the number of terms, Zipf's law: Modeling the distribution of terms, Dictionary compression, Dictionary as a string, Blocked storage, Postings file compression.

Text Books/ Reference Books:

1.

Note: Latest and additional good books may be suggested and added from time to time.

GEC-5 INTELLECTUAL PROPERTY AND RIGHTS

No. of Credits: 3				Sessional:	25 Marks
L	T	P	Total	Theory :	75 Marks
5	0	0	5	Total :	100 Marks
				Duration of Exam:	3 Hours

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. Examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions from Part II.

Syllabus:

UNIT - I **Introduction to Intellectual Property:** Concept of Intellectual Property, Kinds of Intellectual Property, Economic Importance of Intellectual Property.

Indian Theory on Private Property: Constitutional Aspects of Property, Constitutional Protection of Property and Intellectual Property, Economic Development and Intellectual Property Rights Protection.

UNIT - II **Introduction to Patents:** Overview, Historical Development, Concepts: Novelty, Utility.

Patentable Subject-matter: Patent Act, 1970- Amendments of 1999, 2000, 2002 and 2005, Pharmaceutical Products and Process and Patent , Protection, Software Patents, Business Method, Protection of Plant Varieties and Farmers' Rights Act, 2001, Patenting of Micro-organism.

UNIT – III **Procedure of Obtaining of Patents:** Concepts of a Patent Application,, Specification: Provisional, Complete, Disclosure Aspects, Claims: Principal, Dependant, Omnibus, Examination of Application, Opposition of Application, Sealing of Patents.

Working of Patents: Compulsory License: Commercialization of Inventions: License- Terms of License Agreement, Assignments of Patents, Revocation of Patents.

UNIT - IV **Infringement:** What is Infringement?, How is Infringement determined? Who is an Infringer?, Direct, Contributory and Induced, Defences of Infringement: 5.2.1 Research Exemption, Invalidity, Misuse, Failure to mark, Laches and Estoppel and first sale doctrine.

Text Books/ Reference Books:

1. W.R. Cornish, Intellectual Property, Sweet & Maxwell, London (2000)
2. P. Narayana, Patent Law, Wadhwa Publication
3. Merges, Patent Law and Policy: Cases and Materials, 1996
4. Brian C. Reid, A Practical Guide to Patent Law, 2nd Edition, 1993
5. Brinkhof (Edited), Patent Cases, Wolters Kluwer.
6. Prof. Willem Hoyng & Frank Eijsvogels, Global Patent Litigation, Strategy and Practice, Wolters Kluwer.
7. Gregory Stobbs, Software Patents Worldwide, Wolters Kluwer.
8. Feroz Ali Khader, The Law of Patents- With a special focus on Pharmaceuticals in India, Lexis Nexis Butterworths Wadhwa, Nagpur.
9. Sookman, Computer Law, 1996
10. N.S. Gopalakrishnan & T.G. Agitha, Principles of Intellectual Property (2009). Eastern Book Company, Lucknow.

Note: Latest and additional good books may be suggested and added from time to time.