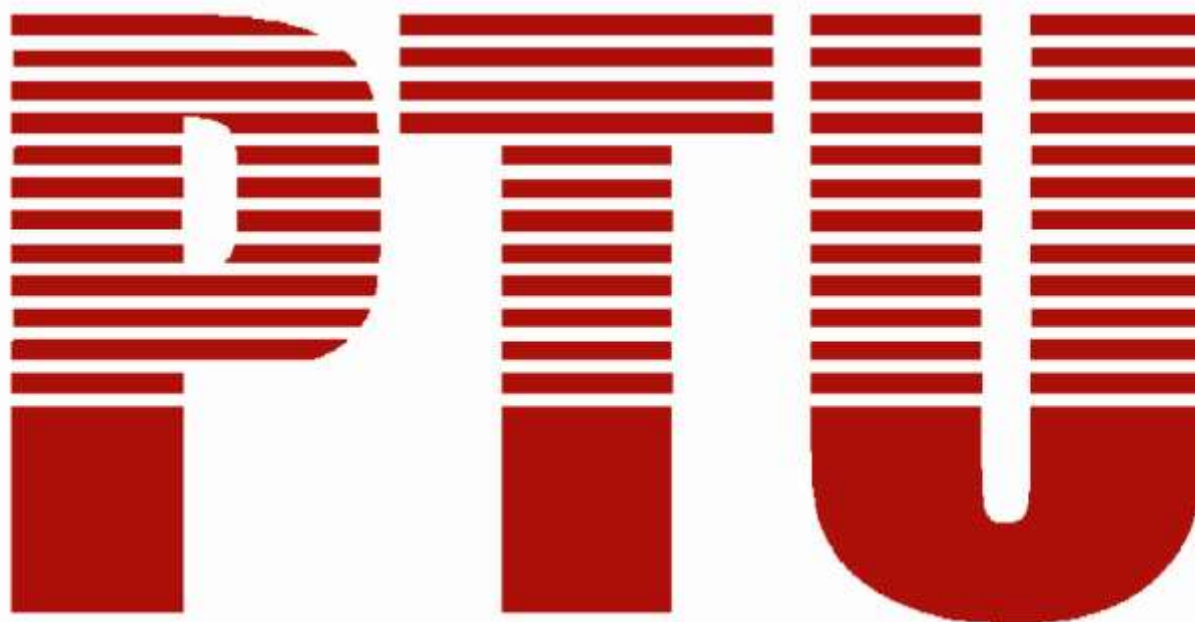


**Scheme & Syllabus of
Bachelor of Computer Applications
(BCA)
Batch 2011**



By
Department of Academics

Punjab Technical University

Scheme and Syllabus
Bachelor of Computer Applications, Batch-2011
17th June 2011

SEMESTER-I		L	T	P	INT	EXT	TOTAL	Credits
BSBC101	Communication-I	3	1	-	40	60	100	4
HVPE101	Human Values and Professional Ethics	3		-	40	60	100	3
BSBC102	Programming in C	4	1	-	40	60	100	5
BSBC103	Mathematics- I	4	2	-	40	60	100	6
BSBC104	Information Technology	3	1	-	40	60	100	4
BSBC105	Software Lab-I (Programming in C)	-	-	4	60	40	100	2
BSBC106	Software Lab-II (Information Technology)	-	-	4	60	40	100	2
	Total	17	5	8	320	380	700	26
SEMESTER-II		L	T	P	INT	EXT	TOTAL	TOTAL
EVSC 101	Environmental Science	2	-	-	40	60	100	2
BSBC 201	Communication-II	3	1	-	40	60	100	4
BSBC 202	Mathematics-II	4	2	-	40	60	100	6
BSBC 203	OOPS Using C ++	4	1	-	40	60	100	5
BSBC 204	Computer System Architecture	3	1	-	40	60	100	4
BSBC 205	Workshop on Web Development	-	-	4	60	40	100	2
BSBC 206	Software Lab-III (OOPS Using C++)	-	-	4	60	40	100	2
	Total	16	5	10	320	380	700	25
SEMESTER-III		L	T	P	INT	EXT	TOTAL	TOTAL
BSBC301	System Analysis & Design	3	1	-	40	60	100	4
BSBC302	Data Structures	3	1	-	40	60	100	4
BSBC303	Digital Circuits & Logic Design	3	1	-	40	60	100	4
BSBC304	Workshop on Visual Basic	1	1	4	40	60	100	4
BSBC305	Basic Accounting	3	1	-	40	60	100	4
BSBC306	Software Lab-IV (Data Structures)	-	-	4	60	40	100	2
BSBC307	Hardware Lab-I (Digital Circuits & Logic Design)	-	-	4	60	40	100	2
	Total	13	5	12	320	380	700	24
SEMESTER-IV		L	T	P	INT	EXT	TOTAL	TOTAL
BSBC401	Software Engineering	4	1	-	40	60	100	5
BSBC402	Microprocessors & Microcontrollers	4	1	-	40	60	100	5
BSBC403	Operating Systems	4	1	-	40	60	100	5
BSBC404	Database Management Systems	4	1	-	40	60	100	5
BSBC405	Hardware Lab-II (Microprocessors & Microcontrollers)	-	-	4	60	40	100	2
BSBC406	Software Lab-V (Database Management Systems)	-	-	4	60	40	100	2
	Total	16	4	8	280	320	600	24

Scheme and Syllabus
Bachelor of Computer Applications, Batch-2011
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SEMESTER-V		L	T	P	INT	EXT	TOTAL	TOTAL
BSBC501	Data Warehousing & Mining	3	1	-	40	60	100	4
BSBC502	Programming in Java	4	1	-	40	60	100	5
BSBC503	Management Information System	3	1	-	40	60	100	4
BSBC504	Workshop on Advanced Web Development	2	0	4	60	40	100	4
BSBC505	Software Lab-VI(Programming in Java)	-	-	4	60	40	100	2
BSBC506	Project Work -I	1	-	6	60	40	100	4
	Total	13	3	14	300	300	600	23
SEMESTER-VI		L	T	P	INT	EXT	TOTAL	TOTAL
BSBC601	Principles of Management	3	1	-	40	60	100	4
BSBC602	Computer Graphics	4	1	-	40	60	100	5
BSBC603	Computer Networks	4	1	-	40	60	100	5
BSBC604	System Administration	1	-	4	60	40	100	3
BSBC605	Software Lab-VII (Computer Graphics)	1	-	4	60	40	100	3
BSBC606	Project Work-II	2	-	6	120	80	200	5
	Total	15	3	14	360	340	700	25

First Semester

BSBC101 COMMUNICATION – I

Objective and Expected outcome:

The objective of this course is to make students understand that both oral & written communications are equally important. The students should be comfortable with both verbal & written communication.

SECTION-A

English Language: Sentence, Parts of speech, Tenses, Active passive voice, Direct Indirect speech, Creative writing& vocabulary, Comprehension passage, Reading of biographies of at least 10 IT business personalities (can be a home assignment or classroom reading). (9)

SECTION-B

Business communication-Types, Medias, Objectives, Modals, Process, Importance Understanding Barriers to communication & ways to handle and improve barriers. (9)

SECTION-C

Presentation skills-Its Purpose in business world, How to find material for presentation, How to sequence the speech with proper introduction and conclusion, How to Prepare PPT& Complete set of required body language while delivering presentation.

Reading & writing skills- Importance of reading and writing, improving writing skills through understanding and practicing Notice, E-mail, Tenders, Advertisement, formal letter. (9)

SECTION-D

Listening skills-Its importance as individual and as a leader or as a worker, Its types, barriers to listening & remedies to improve listening barriers.

Non verbal Communication- understanding what is called non verbal communication, its importance as an individual, as a student, as a worker and as a leader, its types. (9)

Suggested Readings/ Books:

1. **Effective Business Communication**, M.V. RODRIGUEZ
2. **Business Communication**, Meenakshi Raman, Parkash Singh, Paperback Edition, Oxford University Press.

HVPE 101 Human Values & Professional Ethics

Objective/s and Expected outcome:

To help the students to discriminate between valuable and superficial in the life. To help develop the critical ability to distinguish between essence and form, or between what is of value and what is superficial, in life – this ability is to be developed not for a narrow area or field of study, but for everyday situations in life, covering the widest possible canvas. To help students develop sensitivity and awareness; leading to commitment and courage to act on their own belief. It is not sufficient to develop the discrimination ability, it is important to act on such discrimination in a given situation. Knowingly or unknowingly, our education system has focused on the skill aspects (learning and doing) – it concentrates on providing to its students the skills to do things. In other words, it concentrates on providing “How to do” things. The aspects of understanding “What to do” or “Why something should be done” is assumed. No significant cogent material on understanding is included as a part of the curriculum. A result of this is the production of graduates who tend to join into a blind race for wealth, position and jobs. Often it leads to misuse of the skills; and confusion and wealth that breeds chaos in family, problems in society, and imbalance in nature. This course is an effort to fulfill our responsibility to provide our students this significant input about understanding. This course encourages students to discover what they consider valuable. Accordingly, they should be able to discriminate between valuable and the superficial in real situations in their life. It has been experimented at IIITH, IITK and UPTU on a large scale with significant results.

SECTION- A

1. Course Introduction – Need, Basic Guidelines, Content and Process for Value Education

- Understanding the need, basic guidelines, content and process for Value Education.
- Self Exploration–what is it?- its content and process; ‘Natural Acceptance’ and Experiential Validation- as the mechanism for self exploration.
- Continuous Happiness and Prosperity- A look at basic Human Aspirations

- Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority
- Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
- Method to fulfill the above human aspirations: understanding and living in **harmony** at various levels **(8)**

2. Understanding Harmony in the Human Being – Harmony in Myself!

- Understanding human being as a co-existence of the sentient 'I' and the material 'Body'
- Understanding the needs of Self ('I') and 'Body' – *Sukh* and *Suvidha*
- Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)
- Understanding the characteristics and activities of 'I' and harmony in 'I'
- Understanding the harmony of I with the Body: *Sanyam* and *Swasthya*; correct appraisal of Physical needs, meaning of Prosperity in detail
- Programs to ensure *Sanyam* and *Swasthya* **(7)**

3. Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

- Understanding harmony in the Family- the basic unit of human interaction
- Understanding values in human-human relationship; meaning of *Nyaya* and program for its fulfillment to ensure *Ubhay-tripti*; Trust (*Vishwas*) and Respect (*Samman*) as the foundational values of relationship
- Understanding the meaning of *Vishwas*; Difference between intention and competence
- Understanding the meaning of *Samman*, Difference between respect and differentiation; the other salient values in relationship
- Understanding the harmony in the society (society being an extension of family): *Samadhan*, *Samridhi*, *Abhay*, *Sah-astitva* as comprehensive Human Goals

- Visualizing a universal harmonious order in society- Undivided Society (*Akhand Samaj*), Universal Order (*Sarvabhaum Vyawastha*)- from family to world family! (8)

PART B

4. Understanding Harmony in the Nature and Existence – Whole existence as Co-existence

- Understanding the harmony in the Nature
- Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature
- Understanding Existence as Co-existence (*Sah-astitva*) of mutually interacting units in all-pervasive space
- Holistic perception of harmony at all levels of existence (5)

5. Implications of the above Holistic Understanding of Harmony on Professional Ethics

- Natural acceptance of human values
- Definitiveness of Ethical Human Conduct
- Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
- Competence in professional ethics:
 - Ability to utilize the professional competence for augmenting universal human order
 - Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems
 - Ability to identify and develop appropriate technologies and management patterns for above production systems.
- Case studies of typical holistic technologies, management models and production systems
- Strategy for transition from the present state to Universal Human Order:
 - At the level of individual: as socially and ecologically responsible engineers, technologists and managers

- At the level of society: as mutually enriching institutions and organizations

(8)

Suggested Readings / Books:

1. R R Gaur, R Sangal, G P Bagaria, 2009, *A Foundation Course in Value Education*.
2. Ivan Illich, 1974, *Energy & Equity*, The Trinity Press, Worcester, and HarperCollins, USA
3. E.F. Schumacher, 1973, *Small is Beautiful: a study of economics as if people mattered*, Blond & Briggs, Britain.
4. A Nagraj, 1998, *Jeevan Vidya ek Parichay*, Divya Path Sansthan, Amarkantak.
5. Sussan George, 1976, *How the Other Half Dies*, Penguin Press. Reprinted 1986, 1991
6. PL Dhar, RR Gaur, 1990, *Science and Humanism*, Commonwealth Purblishers.
7. A.N. Tripathy, 2003, *Human Values*, New Age International Publishers
8. Subhas Palekar, 2000, *How to practice Natural Farming*, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
9. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, *Limits to Growth – Club of Rome’s report*, Universe Books.
10. E G Seebauer & Robert L. Berry, 2000, *Fundamentals of Ethics for Scientists & Engineers*, Oxford University Press
11. M Govindrajran, S Natrajan & V.S. Senthil Kumar, *Engineering Ethics (including Human Values)*, Eastern Economy Edition, Prentice Hall of India Ltd
12. B P Banerjee, 2005, *Foundations of Ethics and Management*, Excel Books.
13. B L Bajpai, 2004, *Indian Ethos and Modern Management*, New Royal Book Co., Lucknow. Reprinted 2008.

BSBC102 PROGRAMMING IN C

Objective and Expected Outcome:

The objective of this course is to help the students in finding solutions to various real life problems and converting the solutions into computer program using C language (structured programming). Students will learn to write algorithm for solutions to various real-life problems. Converting the algorithms into computer programs using C language.

SECTION-A

Algorithm and Programming Development: Steps in development of a program, Flow charts, Algorithm Development, Program Debugging, Compilation and Execution.

Fundamentals of 'C': I/O statements, Assignment Statements, Constants, Variables, Operators and Expressions, Standards and Formatted statements, Keywords, Data Types and Identifiers. (12)

SECTION-B

Control Structures: Introduction, Decision making with if – statement, if-else and Nested if, while and do-while, for loop. Jump statements: break, continue, goto, switch Statement

Functions: Introduction to Functions, Function Declaration, Function Categories, Standard Functions, Parameters and Parameter Passing, Call – by value/reference, Recursion, Global and Local Variables, Storage classes. (12)

SECTION-C

Arrays: Introduction to Arrays, Array Declaration, Single and Multidimensional Array, Memory Representation, Matrices, Strings, String handling functions.

Structure and Union: Declaration of structure, Accessing structure members, Structure Initialization, Arrays of structure, nested structures, Unions (12)

SECTION-D

Pointers: Introduction to Pointers, Address operator and pointers, Declaring and Initializing pointers, Assignment through pointers, Pointers and Arrays

Files: Introduction, Creating a data file, opening and closing a data file, processing a data file.

Preprocessor Directives: Introduction and Use, Macros, Conditional Preprocessors,
Header Files (12)

Suggested Readings/ Books:

1. **Let us C**, Yashvant P Kanetkar, Seventh Edition, BPB Publications, New Delhi.
2. **Programming in ANSI C**, E. Balagurusami, Fourth Edition, Tata McGraw Hill
3. **Programming in C**, Byron S. Gottfried, Second Edition, McGraw Hills.
4. **The C Programming Language**, Kernighan & Richie, Second Edition, PHI Publication
5. **Object Oriented Programming**, Lafore R, Third Edition, Galgotia Publications
6. **Problem Solving and Programming in C**, R. S. Salaria, Second Edition

BSBC103 MATHEMATICS – I

Objectives and Expected Outcome:

The syllabus of this course is specially designed for the beginners in computer science with the first exposure to mathematical topics essential to their study of computer science or digital logic. Topics like recursion and recurrence relations will help them in learning the important concepts of C language. The topic Graph Theory has applications in various fields of computer science like switching theory, logical designs, artificial language and computer graphics etc. These topics will help the students to understand various important concepts of the other subjects of the course. Further it will also provide ground for higher studies in these topics.

SECTION-A

SET THEORY AND RELATIONS

Sets- Elements of a set, methods of describing a set, types of sets, Operations on sets-- union, intersection and difference of sets, Venn diagrams, statement problems, Associative Laws, Distributive laws, DeMorgan's laws, duality, partitioning of a set.

Relation -Basic definition of relation and types of relations, graphs of relations, properties of relations, (domain, range, inverse and composite relations), Matrix representation of a relation. (12)

SECTION-B

ALGEBRA OF LOGIC, MATHEMATICAL INDUCTION

Propositions and Logic operations, truth tables, arguments and validity of arguments, propositions generated by a set, equivalence and implication laws of logic, mathematical system and propositions over a universe, Quantifiers, Principle of Mathematical Induction. (12)

SECTION-C

GRAPH THEORY

Various types of graphs- Simple and multi graphs, directed and undirected graphs, Eulerian and Hamiltonian graphs, Graph connectivity, graph traversals, graph optimizations, graph coloring, Trees, spanning trees. (12)

SECTION-D

RECURSION AND RECURRENCE RELATIONS, BINOMIAL THEOREM

Recursion, many faces of recursion, recurrence relations, some common recurrence relations, Binomial theorem-Binomial theorem of positive index, general term, middle terms, particular terms, and terms from end. (12)

Suggested Readings/ Books:

1. **Discrete Mathematical Structure with application to Computer Science**, Tremblay J.P. and Manohar R, McGraw Hill , 30th Reprint (2007)
2. **Text Book of Mathematics** (for XI Class), R D Sharma, Dinesh Publications
3. **Applied Discrete Structure of Computer Science**, Doerr A & Kenneth L., Paperback Edition, Galgotia Publications Pvt.Ltd. New Delhi
4. **Graphics Networks and Algorithms**, Swami M.N.S & Thisiraman E., Second Edition, John Wiley & Sons

BSBC104 INFORMATION TECHNOLOGY

Objectives and Expected Outcome:

This course will enable the student to gain an understanding of the core concepts and technologies which constitute Information Technology. The intention is for the student to be able to articulate and demonstrate a basic understanding of the fundamental concepts of Information Technology

SECTION- A

Computer Fundamentals: Block structure of a computer, characteristics of computers, problem solving with computers, generations of computers, and classification of computers on the basis of capacity, purpose, and generation.

Number System: Bit, byte, binary, decimal, hexadecimal, and octal systems, conversion from one system to the other, representation of characters, integers and fractions.

Binary Arithmetic: Addition, subtraction and multiplication. (9)

SECTION-B

Memory Types: Magnetic core, RAM, ROM, Secondary, Cache, Bubble Memory.

Input and Output Units: Keyboard, Mouse, Monitor (CRT and LCD): Light pen, joystick, Mouse, Touch screen; OCR, OMR, MICR

Overview of storage devices: Floppy disk, hard disk, compact disk, tape.

Printers: Impact, non-impact, working mechanism of Drum printer, Dot Matrix printer, Inkjet printer and Laser printer.

Computer languages: Machine language, assembly language, higher level language, 4GL. Introduction to Compiler, Interpreter, Assembler, Assembling, System Software, Application Software. (9)

SECTION- C

Operating system: Batch, multi-programming, time sharing, network operating system, on-line and real time operating system, Distributed operating system, multi-processor, Multi-tasking.

Graphical OS: Fundamentals of windows, types of windows, anatomy of windows, windows explorer, customizing windows, control panel, taskbar setting, Network

Neighborhood.

Personal Productivity Software:

Word processing: Editing features, formatting features, saving, printing, table handling, page settings, spell-checking, macros, mail-merge, equation editors.

Spreadsheet : Workbook, worksheets, data types, operators, cell formats, freeze panes, editing features, formatting features, creating formulas, using formulas, cell references, replication, sorting, filtering, functions, Charts & Graphs.

Presentation Graphics Software: Templates, views, formatting slide, slides with graphs, animation, using special features, presenting slide shows. (9)

SECTION -D

Computer Network and Communication: Network types, network topologies, network communication devices, physical communication media.

Internet and its Applications: E-mail, TELNET, FTP, World Wide Web, Internet chatting; Intranet, Extranet, Gopher, Mosaic, WAIS.

Security management tools: PC tools, Norton Utilities, Virus, worms, threats, virus detection, prevention and cure utilities, Firewalls, Proxy servers. (9)

Suggested Readings/ Books:

1. “**Computers Today**”, D. H. Sanders, Fourth Edition, McGraw Hill, 1988.
2. “**Fundamentals of Computers**”, V. Rajaraman, Second Edition, Prentice Hall of India, New Delhi, 1996.
3. “**Information Technology**”, Satish Jain, Paperback Edition, BPB 1999.
4. “**Information Technology Inside and Outside**”, David Cyganski, John A. Orr, Paperback Edition, Pearson Education 2002.
5. “**Computer Fundamentals**”, B. Ram, Third Edition, Wiley, 1997.
6. “**Fundamentals of Information Technology**”, Chetan Srivastva, Third edition, Kalayani Publishers
7. **Computers**, Larry long & Nancy long, Twelfth edition, Prentice Hall

BSBC105 SOFTWARE LAB-I (Programming in C)

Objective and Expected Outcome:

The objective of this course is to help the students in finding solutions to various real life problems and converting the solutions into computer program using C language (structured programming). Students will learn to write programs for solving various real-life problems.

1. **Keywords and Identifiers:** introduction, purpose
2. **Variables and constants:** data types, Initialization, declaration, scope, memory limits
3. **Input-output statements:** formatted and non-formatted statements
4. **Operators:** Arithmetic, logical, conditional, assignment, bitwise, increment/decrement operators
5. **Decision Making:** switch, if-else, nested if, else-if ladder, break, continue, goto
6. **Loops:** while, do-while, for
7. **Functions:** definition, declaration, variable scope, parameterized functions, return statement, call by value, call by reference, recursive functions
8. **Pre-processor Directives:** Pre-processor directives like INCLUDE, IFDEF, DEFINE, etc
9. **Header Files:** STDIO.H, MATH.H, STRING.H, PROCESS.H etc
10. **Arrays:** Array declarations, Single and multi-dimensional, memory limits, strings and string functions
11. **Pointers:** Pointer declarations, pointer to function, pointer to array/string,
12. **Files:** Creation and editing of various types of files, closing a file(using functions and without functions)

BSBC106 SOFTWARE LAB-II (Information Technology)

1. Familiarizing with PC and WINDOWS commands,
2. File creation,
3. Editing
4. Directory creation.
5. Mastery of DOS internal & external commands.
6. Learning to use MS Office: MS WORD, MS EXCEL & MS PowerPoint.

Second Semester

EVSC 101 ENVIRONMENTAL SCIENCE

Objective/s and Expected outcome:

Upon successful completion of the course, students should be able to:

1. Measure environmental variables and interpret results
2. Evaluate local, regional and global environmental topics related to resource use and management
3. Propose solutions to environmental problems related to resource use and management
4. Interpret the results of scientific studies of environmental problems
5. Describe threats to global biodiversity, their implications and potential solutions

SECTION-A

Introduction: Definition and scope and importance of multidisciplinary nature of environment. Need for public awareness. (2)

Natural Resources: Natural Resources and associated problems, use and over exploitation, case studies of forest resources and water resources. (4)

Ecosystems: Concept of Ecosystem, Structure, interrelationship, producers, consumers and decomposers, ecological pyramids-biodiversity and importance. Hot spots of biodiversity (4)

Environmental Pollution: Definition, Causes, effects and control measures of air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards. Solid waste Management: Causes, effects and control measure of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Disaster Management : Floods, earthquake, cyclone and landslides. (5)

SECTION-B

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. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of pollution) Act. Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation Public awareness

(5)

Human Population and the Environment, Population growth, variation among nations. Population explosion – Family Welfare Programme. Environment and human health, Human Rights, Value Education, HIV/AIDS. Women and child Welfare. Role of Information Technology in Environment and human health. Case studies

(4)

Suggested Readings/ Books:

1. Agarwal, K. C. 2001 **Environment Biology**, Nidi Publ. Ltd. Bikaner.
2. Jadhav, H & Bhosale, V.M. 1995. **Environment Protection and Laws**. Himalaya Pub House, Delhi 284p.
3. Rao M. N. & Datta A.K. 1987. **Waste Water Treatment**. Oxford & IBH Publ. Co. Pvt. Ltd. 345 p.
4. **Principle of Environment Science** by Cunningham, W.P.
5. **Essentials of Environment Science** by Joseph.
6. **Environment Pollution Control Engineering** by Rao, C.S.
7. **Perspectives in Environmental Studies** by Kaushik, A.
8. **Elements of Environment Science & Engineering** by Meenakshi.
9. **Elements of Environment Engineering** by Duggal.

BSBC 201COMMUNICATION –II

Objective & Expected Outcome: The objective of this course is to make students understand the value of business communication, written & presentation skills in professional life. The students should be well equipped with business & written communication with effective presentation skills.

SECTION-A

Introduction to Business Communication (09)

Meaning and Definition; process and classification of communication; elements & characteristics of communication; barriers to effective communication in business organization; Formal and Informal communication; grapevine, importance of effective communication in business house; Principles of effective communication

SECTION-B

Writing Skills (09)

Inter-office memorandums; faxes; E-mails; writing effective sales letters - to agents; suppliers; customers; report writing; project writing.

SECTION-C

Curriculum Vitae (CV) (09)

Drafting a CV; writing job application and other applications; do's and don'ts while appearing for an Interview; types of interview.

SECTION-D

Presentation Skills (09)

Introduction; need of good presentation skills in professional life; preparing a good presentations; group discussion; extempore speaking.

Suggested Readings / Books:

1. **Effective Business Communication** - M.V. RODRIGUEZ
2. **Business Communication** -Meenakshi Raman, Parkash Singh, Paperback Edition, Oxford University Press

BSBC202 MATHEMATICS –II

Objectives & Expected Outcome: This syllabus is specially designed to help the students of computer science to understand the mathematical concepts like matrices, differential calculus and integral calculus which have applications in various subjects of computer science. Also Statistics has been added to help them understand the topics like central tendency, deviations, and moments etc which are very useful in day to day life. After learning these topics, students will be able to apply these concepts in designing the software applications for some specific devices.

SECTION-A

MATRIX ALGEBRA (12)

Matrix algebra- Matrices, types of matrices, operations on matrices, determinants (without properties), minors, cofactors, adjoint and inverse of a matrix, Elementary transformations in a matrix Rank of a matrix, solution of simultaneous equations using Cramer's rule and matrix inversion method.

SECTION-B

STATISTICS & APPLICATIONS OF LOGARITHMS (12)

Statistics- Introduction to statistics, measures of central tendency - mean, median and mode, measures of dispersion, mean deviation, standard deviation and coefficient of variation.

Applications of Logarithms- Problems related to compound interest, depreciation and Annuities.

SECTION-C

DIFFERENTIAL CALCULUS (12)

Introduction to differentiation, derivative of a function of one variable, power functions, sum and product of two functions, function of a function, differentiation by method of substitution, maxima and minima.

SECTION-D

INTEGRAL CALCULUS (12)

Indefinite Integral, Integration by substitution, Integration by parts, Integration by partial fractions, Definite Integral. Numerical Integration: Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule.

Suggested Readings/ Books:

1. **Numerical Methods to Engineering.**, B.S.Grewal, Seventh Edition, Khanna Publishers
2. **Business Mathematics**, D.C.Sancheti, Eleventh Edition, Sultan Chand & Sons
3. **Computer Oriented Numerical Methods**, Rajaraman, Third Edition, PHI Publications

BSBC203 OOPS USING C++

Objective & Expected Outcome: The objective of this course to learn programming from real world examples and understanding object oriented approach for finding solutions to various problems with the help of C++ language. Students will learn to create computer based solutions to various real-world problems using C++ and will learn various concepts of object oriented approach towards problem solving.

SECTION-A

Introduction: Object oriented programming approach, characteristics of object orientated languages, Bridging C & C++ (Overview of C Concepts).

Structures and Unions: Declaration of structures, Accessing structure members, Structure Initialization, Arrays of structure, nested structures, structure with pointers, functions & structures, Unions, Structure/Union Versus Class in C++.

Class Declaration: Data Members, Member Functions, Private and Public Members, Data Hiding and Encapsulation, Array within a class. (12)

SECTION-B

Class Function Definition: Member Function definition inside the class and outside the class, Friend Function, Inline Function, Static Members & Functions, Scope Resolution Operator, Private and Public Member Functions, Nesting of Member Functions.

Creating Objects, Accessing class data members, Accessing member functions, Arrays of Objects, Objects as function arguments: Pass by value, Pass by reference, Pointers to Objects.

Constructors and Destructors: Declaration and Definition, Default Constructors, Parameterized Constructors, Constructor Overloading, Copy Constructors. Destructors: Definition and use. (12)

SECTION-C

Inheritance - Extending Classes Concept of inheritance, Base class, Derived class, Defining derived classes, Visibility modes : Private, public, protected; Single inheritance : Privately derived, Publicly derived; Making a protected member inheritable, Access Control to private and protected members by member functions of a derived class, Multilevel inheritance, Nesting of classes.

Function Overloading & Operator Overloading: Binary & Unary. (12)

SECTION-D

Polymorphism: Definition, early Binding, Polymorphism with pointers, Virtual Functions, late binding, pure virtual functions.

Input/output files: Streams, buffers & iostreams, header files, redirection, file input and output. (12)

Suggested Readings / Books:

1. **Object Oriented Programming with C++**, E. Balagurusami, Fourth Edition, Tata Mc-Graw Hill
2. **Object Oriented Programming in Turbo C++**, Robert Lafore, Fourth Edition Galgotia Publications.
3. **The C++ Programming Language**, Bjarna Stroustrup, Third Edition, Addison-Wesley Publishing Company.
4. **Object Oriented Programming Using C++**, Salaria, R. S, Fourth Edition, Khanna Book Publishing

BSBC204 COMPUTER SYSTEM ARCHITECTURE

Objectives and Expected Outcome: To make students aware about the basic building blocks of computer system and how the different components are interfaced together. Students will know about the basic functioning of various parts of computer system from hardware point of view and interfacing of various peripheral devices used with the system.

SECTION-A

Introduction to Computer Organization: Introduction to Computer and CPU (Computer Organization, Computer Design and Computer Architecture), Stored Program Concept- Von Neumann Architecture. Introduction to Flynn's Classification- SISD, SIMD, MIMD

Register Transfer and Micro operations- Introduction to Registers, Register Transfer Language, Data movement among Registers and Memory.

Micro operations: Introduction to micro operations, Types of micro operations--Logic Operations, Shift operations, Arithmetic and Shift operations.

Common Bus System : Introduction to Common Bus System, Types of Buses(Data Bus, Control Bus, Address Bus), 16 bit Common Bus System--Data Movement among registers using Bus. (09)

SECTION-B

Basic Computer Instructions- Introduction to Instruction, Types of Instructions (Memory Reference, I/O Reference and Register Reference), Instruction Cycle, Instruction Formats (Direct and Indirect Address Instructions, Zero Address, One Address, Two Address and Three Address Instructions)

Interrupt: Introduction to Interrupt and Interrupt Cycle.

Design of Control Unit: Introduction to Control Unit, Types of Control Unit (Hardwired & Micro programmed Control Unit).

Addressing Modes-Introduction & different types of Addressing Modes. (09)

SECTION-C

I/O Organization: I/O Interface Unit, types of ports (I/O port, Network Port, USB port, Serial and Parallel Port), Concept of I/O bus, Isolated I/O versus Memory Mapped I/O.

I/O Data Transfer Techniques: Programmed I/O, Interrupt Initiated I/O, DMA Controller and IOP.

Synchronous and Asynchronous Data Transfer: Concept of strobe and handshaking, source and destination initiated data transfer. (09)

SECTION-D

Stack Organization: Memory Stack and Register Stack

Memory organization: Memory Hierarchy, Main Memory (RAM and ROM chips, Logical and Physical Addresses, Memory Address Map, Memory Connection to CPU), Associative Memory

Cache Memory: Cache Memory (Initialization of Cache Memory, Writing data into Cache, Locality of Reference, Hit Ratio), Replacement Algorithms (LRU and FIFO).

Cache Memory Mapping Techniques: Direct Mapping, Associative Mapping and Set-Associative Mapping. Harvard Architecture, Mobile Devices Architecture (Android, Symbian and Windows Lite), Layered Approach Architecture. (09)

Suggested Readings / Books:

1. **Computer System Architecture**, M.M. Mano, Third Edition, PHI
2. **Computer Organization and Architecture**, J.P. Hayes, Third Edition, TMH
3. **Computer Organization and Architecture**, Stallings, Eighth Edition, PHI

BSBC 205 WORKSHOP ON WEB DEVELOPMENT

Objectives and Expected Outcome/s: This course will enable the student to build and publish web sites using Dreamweaver, a popular visual web site production and management program, using HTML, DHTML, CSS and JavaScript. This course will enable the student to build and publish web sites using Dreamweaver, a popular visual web site production and management program. The intention is for the student to be able to:

1. Identify the entities responsible for implementing mark-up language standards.
2. Code and troubleshoot HTML and XHTML web pages, incorporating CSS and scripts.
3. Incorporate multimedia (images, animation, sound, and movies) into web pages.
4. Demonstrate effective use of Dreamweaver to build and publish professional web sites that employ best practices, adhere to current web standards, and pass validation.

- **Introduction to Web Development:**

Website, Webpage, Static Website, Dynamic Website.

- **Introduction to HTML/DHTML:**

HTML Basics, HTML Elements (Tags), Structure of HTML Program, Attributes, Headings, Paragraphs, Formatting, Links, Images, Tables, Lists, Forms, Frames, Where to put Tables, Lists, Images, Forms, CSS in DHTML, Implementation of WebPages using CSS.

- **Introduction to JavaScript:**

How & Where to put the JavaScript Code, JavaScript Statements, Comments, Variables, Operators, Control Statements, Loops, Popup Boxes, Functions.

- **Introduction to Dreamweaver:**

Understanding Workspace Layout, Managing Websites, Creating a Website, Using Dreamweaver Templates, Adding New WebPages, Text and Page Format, Inserting Tables, Lists, Images, Adding Links.

- **Purchasing a Domain Name & Web Space:**

Domain Name & Web Space, Getting a Domain Name & Web Space (Purchase or Free), Uploading the Website to Remote Server.

Suggested Readings / Books:

1. **HTML & CSS: The Complete Reference**, Thomas Powell, Fifth Edition
2. **Sams Teach Yourself HTML and CSS in 24 Hours** Julie C. Meloni & Michael Morrison, Eighth Edition
3. **HTML A Beginner's Guide** Wendy L. Willard, Fourth Edition
4. **HTML, XHTML and CSS All-In-One For Dummies** Andy Harris, Second Edition
5. **JavaScript, A Beginner's Guide** John Pollock, Third Edition
6. **Professional JavaScript for Web Developers (Wrox Programmer)** Nicholas C. Zakas, Second Edition
7. **Dreamweaver CS5 For Dummies** Janine C. Warner, Paperback Edition
8. **Adobe Dreamweaver CS5 Bible** Joseph Lowery, Paperback Edition
9. **The Essential Guide to Dreamweaver CS4** David Powers

Websites:

1. www.w3schools.com
2. www.html.net
3. www.thesitewizard.com
4. www.learndreamweavertutorials.com

BSBC 206 SOFTWARE LAB-III (OOPS using C++)

Instructions for candidates: All the following concepts need to be practised with at least 10 programs per topic and sub-topic along with their algorithms. Practical file needs to be maintained.

SECTION – A

Structures: Definition, declaration, scope, functions

Union: Definition, declaration, scope, functions

Class: Definition, declaration, members, scope of members.

SECTION – B

Class Function: definition (Inside class, outside class), in-line functions, static function, friend functions, scope of functions (public, private), and nesting of member functions

Class Data members: creating objects, accessing member functions, array of objects, objects as arguments (Pass by value, pass by reference)

Constructor and destructor: creating default constructor, parameterized constructor, copy constructor, destructor

SECTION – C

Inheritance: base class, derived class, visibility mode (public, private, protected), single inheritance, multi-level inheritance, multiple inheritance, nesting of classes, access control to functions(with different scope),

Function overloading and overriding, operator overloading,

SECTION – D

Early binding, late binding, virtual functions, pure virtual functions

Input/output files: streams, buffers and io-streams, various input-output functions, processing files using class functions

Third Semester

BSBC301 SYSTEM ANALYSIS & DESIGN

Objective/s & Expected Outcome: To teach the analysis and practicality of various systems on which software system can be developed. After completing this course students will be able to design and develop systems.

SECTION-A

System Development Life Cycle: System Definition, characteristics, elements & types of system, Phases of SDLC, Information gathering tools, Structured Analysis tools, Role of System Analyst.

SECTION-B

System Design: Process and stages of systems design, Input / Output and file design, Documentation (User Manual, Design Documentation, Training Manual), Case Study techniques in system design.

SECTION-C

System testing: Unit Testing, System Testing, Integration Testing, Alpha & Beta Testing, Acceptance Testing, Regression Testing.

SECTION-D

System Implementation: System implementation Process, Implementation methods, System maintenance, Post implementation maintenance.

Suggested Readings/ Books:

- **System Analysis and Design** Awad Elias N. *Second Edition*, Galgotia Publications
- **Analysis and Design of Information System** Sen James A. *Second Edition*, Tata McGraw Hill.

BSBC302 DATA STRUCTURES

Objective/s Expected Outcome: Objective is to make the students understand how data is managed internally within any computer with the understanding of basic knowledge of C and C++. The students will gain the knowledge of basics of internal data structure.

SECTION-A

Introduction to Data Structures: Basic concept of data, Problem analysis, algorithm complexity, Big O notation and time space trade off, Types of data structures: arrays records, pointers, stack, queue, trees, linked list packet, blocks, tracks, sector(in storage devices).

Searching and Sorting: Use of various data structures for searching and sorting, linear and binary search, bubble sort, insertion sort, selection sort.

SECTION-B

Stacks & Queues: Basics of stacks and queues, Recursion, Polish notation, circular Queues, priority Queues.

SECTION-C

Linked Lists: Single linked list, Circular linked list, Doubly linked list and Dynamic storage management, generalized list, Garbage Collection.

SECTION-D

Trees: Definition & Concepts, Basic trees, Binary tree representations, Binary tree traversals and application of trees.

Suggested Readings/ Books:

- **Data Structures**, Lipschutz Seymour, Second Edition, TMH
- **Algorithm + Data Structures = Programs**, Niclaus Wirth, Prentice Hall
- **Data Structures**, Tanenbaum, Paperback Edition
- **An Introduction to Data Structures Applications**, Trembley & Soreson, Second Edition

BSBC303 DIGITAL CIRCUITS & LOGIC DESIGN

Objective/s & Expected Outcome: To give knowledge about the various electronics components and digital circuits to the students and designing of various building blocks of computer system. After studying this subject students will be able to design small projects and can easily understand the internal working of digital electronic circuits.

SECTION-A

Number System: Decimal Number System, Binary Number System, Octal Number System, Hexadecimal Number System, Conversion from One Number System to another, Arithmetic Operation without Changing the Base, 1's Complement and 2's Complement. **Logic Gates:** AND, OR, NOT, NAND, NOR, XOR, XNOR, NAND & NOR as Universal Gates, Logic Gates Applications.

SECTION-B

Boolean Algebra: Introduction, Theorems, Simplification of Boolean Expression using Boolean Algebra, SOP & POS Forms, Realization of Boolean Expression using Gates, K-Maps, Simplification of Boolean Expression using K-Maps. **Combinational Logic Circuits:** Half Adder & Half Subtractor, Full Adder & Full Subtractor, Parallel Binary Adder, Binary Adder/Subtractor.

SECTION-C

Combinational Logic Circuits: Multiplexers & Demultiplexers, Implementation of Boolean equations using Multiplexer and Demultiplexer, Encoders & Decoders. **Sequential Logic Circuits:** Latch, Flip Flops- R-S Flip-Flop, J-K Flip-Flop, Master-Slave J-K Flip-Flop, Race Condition, Removing Race Condition, D Flip-Flop, T Flip-Flop, Applications of Flip-Flops.

SECTION-D

Counters: Clock Pulse Generator using 555 Timer as Monostable and Multivibrator, Design of Asynchronous Counters, Design of Synchronous Counters, Up-Down Counters, MOD-N Counters.

Suggested Readings / Books:

- **Digital Computer Electronics**, Malvino, Second Edition, Mc-Graw Hill
- **Modern Digital Electronics**, R. P. Jain, Fourth Edition, TMH
- **Digital Logic & Computer Design**, D. Morris Mano, Second Edition, PHI
- **Digital and Electronic Circuits**, T. C. Bartee, McGraw Hill
- **Digital Fundamentals**, Floyd, Ninth Edition, PHI
- **Digital Integrated Electronics**, Taub & Schilling, Eighth Edition, Mc-Graw Hill

BSBC304 WORKSHOP ON VISUAL BASIC

Objective/s & Expected Outcome: The objective of this syllabus is to help the students in finding solutions to various real life problems and converting the solutions into computer program using Visual Basic (Event Driven programming). Students will be able to create software with 2 tier or 3 tier architecture. Students will learn about event driven programming and database access.

SECTION-A

Introduction to Visual Basic : The Visual Basic Program Development Process; The Visual Basic Environment; Opening a Visual Basic Project; Saving a Visual Basic Project; Running a Visual Basic Project. **Visual Basic Fundamentals:** Constants; Variables; Data Types and Data Declarations; Operators and Expressions; String Expressions; Library functions , Branching and Looping Statements, Relational Operators and Logical Expressions; Branching with the if-Then Block; Branching with if-Then -Else Blocks; Selection: Select-case; Looping with for-Next; Looping With Do-Loop; Looping with While-Wend **Visual Basic Control Fundamentals:** Visual Basic Control Tools; Control tool Categories; Working with controls; Naming Forms and Controls; Assigning Property Values to Forms and Controls; Executing Commands(Event Procedures and Command Buttons). Display Output Data (Labels and Text Boxes); Entering Input data(Text Boxes); selecting Multiple Features(Check Boxes); selecting Exclusive Alternatives(Option Button and Frames). Assigning Properties Collectively (The With Block); Generating Error Messages (The MsgBox Function); Creating Times Events; Scrollbars

SECTION-B

Menus and Dialog Boxes : Building Drop-down Menus; accessing a Menu from the Keyboard; Menu Enhancements; Submenus; Pop-up Menus; Dialog Boxes; Input Box. **Executing and Debugging a New Project :** Syntax Errors; Logical Errors; Setting break Points; Defining Watch Values; Stepping Through a Program; User- Induced Errors; Error Handlers. **Procedures:** Modules and Procedures; Sub Procedure; Event Procedures; Function. **Arrays:** Array Characteristics; Array declarations; Processing Array Elements; Passing Arrays to Procedures; Dynamic Arrays; Array-Related Functions; Control Arrays

SECTION-C

Using Class Modules: Object Oriented Principles; Creating Class Modules; Using Class Modules Adding Properties and Events and Methods. **Using COM Components :** Introduction to ActiveX Components and Component Object Model; Benefits of COM; Clients and Servers; Types of ActiveX Components Available in Visual Basic; Creating user defines ActiveX Components; Managing Components; The Visual Component Manager; Registering and Un Registering Components. **ActiveX Controls :** Creating an ActiveX Control; Benefits of ActiveX Control; Adding Properties; Methods and Events to the Control; Managing and Distribution of the Control; Built-in Active X Controls. **ActiveX EXE and ActiveX DLL:** Introduction to ActiveX DLL and EXE; Creating ActiveX EXE Component; Creating ActiveX DLL Component

SECTION-D

Data Access using ADO : Data Access Technology with VB ; The ActiveX Data Object Model; Advantages of ADO and OLEDB; Connecting to a Data Source; Retrieving from a Data Source; Sorting and Searching Data; Updating Data; Creating Dynamic Record Sets; Using Cursors; Cursor Types; Locking; Accessing ADO Data Control. Data Environment and Data Report: Introduction; Data Environment Designers; Working with Data Reports; Cut different types of Data Reports.

Suggested Readings / Books:

- Visual Basic 6 from the Ground Up, Gary Cornell, Paperback Edition, TMH
- Essentials of Visual Basic 6.0 Programming, David I. Schneider, First Edition, Prentice Hall
- Visual Basic 6: The Complete Reference, Noel Jerke, First Edition, TMH

BSBC305 BASIC ACCOUNTING

Objective/s & Expected Outcome: This course provides an orientation in the field of accounting and basic accounting fundamentals. After completion of this course, candidate would be able to record and post transactions in the basic accounting equation and maintain subsidiary ledgers.

SECTION-A

Basic Accounting Concepts: Background of Accounting, Introduction, importance and scope, Accounts – Types and classification; basic terms– Capital, Income, Expenditure, Expenses, Assets, Liabilities and application to Problems., Accounting Equation, Double Entry System.
Generally accepted accounting principles.

SECTION-B

Journal and Ledger- Journal and recording of entries in journal with narration; Ledger –Posting from Journal to respective ledger accounts. Basic concepts of purchase book, sales book and cashbook. **Trial Balance:** Need and objectives; Application of Trial Balance; different types of errors escaped, trial Balance preparation.

SECTION-C

Final Accounts: Final Accounts without adjustments. **Bank Reconciliation Statement:** Bank transactions, Preparation of simple bank reconciliation statement.

SECTION-D

Sources of raising of capital in corporate undertaking: working Capital and Long term Capital.
Application of computers in accounting.

Suggested Readings/ Books:

- Managerial Accounting, Jawahar Lal, First Edition
- Financial Accounting, Dr. R.K. Mittal & M.R. Bansal
- Basic Accounting, Rajni Sofat & Preeti Hiro, Second Edition
- Accounting for management, Bhattacharya & Deaden, Paperback Edition, Vikas 1986
- Financial Accounting (Part I and Part II), R.L Gupta & V.K Gupta
- Fundamental Accountancy, S.N. Maheshwari
- Accounting Principal, Antony & Reece, Sixth Edition.

BSBC306 SOFTWARE LAB-IV (Data Structures)

Note: Program should be fully documented with sample I/O. Data Flow charts should be developed wherever necessary.

Write an Algorithm and Program using functions for:

1. Program using Recursion.
2. Traversing the elements of an Array
3. Inserting an element in an Array
4. Deleting an element from an Array
5. Merging of two Arrays
6. Linear Search
7. Binary Search
8. Insertion Sort
9. Bubble Sort
10. Selection Sort
11. Implementing PUSH & POP operations of a Stack
12. Array Implementation of a Queue and Circular Queue
13. Converting infix notation into post fix notation
14. Insertion in single and double Linked List
15. Deletion from single and double Linked List

BSBC307 HARDWARE LAB-I (Digital Circuits & Logic Design)

Basic Electronics: Introduction to Diode, Diode as Logic Element, Schottky diode, Transistor, Transistor Characteristics, Transistor as a Switch & Logical Element, Introduction to TTL and MOS Technology, Transformer.

Practicals:

1. To study the function of basic logic gates and verify the truth table of AND, OR, NOT, X OR, NAND, NOR.
2. To study applications of AND, OR, NAND, X-OR gates for gating digital signals.
3. To develop the different Arithmetic Circuits:
 - a. Half-Adder and Subtractor.
 - b. Full-Adder and Subtractor.
4. To study the BCD to binary and binary to BCD Code converter.
5. Study of Decoder Circuits:
 - a. BCD-to-Decimal Decoder
 - b. BCD-to-7-Segment Decoder
6. Study of Encoder Circuits:
 - a. BCD-to-Decimal Encoder
 - b. Octal-to-Binary Encoder
7. To study the flip flop circuit using Gates:
 - a. R-S Flip Flop
 - b. J-K Flip Flop
 - c. Master Slave J-K Flip Flop
 - d. D-Flip Flop
8. To study R-S, J-K and D Flip Flop Using IC's.
9. Study of Ring Counter.
10. Study of Asynchronous and Synchronous Counters.