

LACHOO MEMORIAL COLLEGE OF SCIENCE & TECHNOLOGY (AUTONOMOUS)
SYLLABUS FOR BCA FROM SESSION 2014-2015

| SNo | COURSE CODE | SUBJECT | PERIODS | | | CIA | ESE | Subject Total |
|-------------------|-------------|--------------------------|---------|---|---|-----|-----|---------------|
| | | | L | T | P | | | |
| 1. | BCA311 | Java Programming | 3 | | | 20 | 80 | 100 |
| 2. | BCA312 | Computer Networks | 3 | | | 20 | 80 | 100 |
| 3. | BCA313 | Database System | 3 | | | 20 | 80 | 100 |
| 4. | BCA314 | e-commerce and Cyber Law | 3 | | | 20 | 80 | 100 |
| 5. | BCA315 | Communicative English | 3 | | | 20 | 80 | 100 |
| PRACTICALS | | | | | | | | |
| 6. | BCA321 | JAVA Lab | | | 6 | 20 | 80 | 100 |
| 7. | BCA322 | Database System Lab | | | 6 | 20 | 80 | 100 |
| 8. | BCA323 | Communicative English | | | 6 | 20 | 80 | 100 |

BCA YEAR II SEMESTER IV

| S No | COURSE CODE | SUBJECT | PERIODS | | | CIA | ESE | Subject Total |
|-------------------|-------------|---|---------|---|---|-----|-----|---------------|
| | | | L | T | P | | | |
| 1. | BCA411 | VB .net | 3 | | | 20 | 80 | 100 |
| 2. | BCA412 | Computer Oriented Numerical And Statistical Methods | 3 | | | 20 | 80 | 100 |
| 3. | BCA413 | Operating System | 3 | | | 20 | 80 | 100 |
| 4. | BCA414 | Computer Graphics | 3 | | | 20 | 80 | 100 |
| 5. | BCA415 | Computer Architecture | 3 | | | 20 | 80 | 100 |
| PRACTICALS | | | | | | | | |
| 6. | BCA421 | VB .net | | | 6 | 20 | 80 | 100 |
| 7. | BCA422 | Computer Graphics lab | | | 6 | 20 | 80 | 100 |
| 8. | BCA423 | Computer Architecture Lab | | | 6 | 20 | 80 | 100 |

SEMESTER III

BCA II Year Semester III

| BCA311 | JAVA PROGRAMMING |
|---------------|--|
| UNIT I | Object Oriented Concepts in Java, Comparison of Java and C++, Java features like security, portability, byte code, java virtual machine, object oriented, robust, multithreading, architectural neutral, distributed and dynamic. Java Source File Structure, Compilation, Execution, Difference between application and applet. |
| UNIT II | Class Fundamentals, Object & Object reference, Creating and Operating Objects, Use of Tokens, Identifiers, Keywords, Literals, Comments, Primitive Datatypes, Operators-precedence and associativity, Type conversion, Command line argument, accepting input from keyboard, decision making – if, if..Else, switch; loops – for, while, do...while; special statements–return, break, continue. |
| UNIT III | Object Life time & Garbage Collection, Constructors, Access Modifiers, Abstract Class, Interfaces, Implementing Interfaces, Defining Methods, Argument Passing Mechanism, Method Overloading, Recursion, Static Members, Finalize() Method, Use of this keyword, Array – single and two dimension array. |
| UNIT IV | Inheritance – Advantages of Inheritance in OOP, types of Inheritance, constructors in inheritance, use of super keyword, polymorphism; Interfaces - defining an interface, implementing and applying interfaces, using variables in interfaces, extending interfaces; Method overriding – use, need, advantage. |
| UNIT V | Package - Organizing Classes and Interfaces in Packages, Package as Access Protection, defining Package, CLASSPATH Setting for Packages and Naming Convention for packages. Applets, Applet security restrictions, the class hierarchy for applets, Life cycle of applet, HTML Tags for applet. |

Suggested readings

- Programming with JAVA by E Balaguruswamy (Tata McGraw-Hill Publication)
- Herbert Schildt: JAVA 2 - The Complete Reference, TMH, Delhi
- Herbert Schildt: JAVA 2 - The Complete Reference, TMH, Delhi

| BCA312 | COMPUTER NETWORKS |
|---------------|--|
| UNIT I | Principles of Data Communication: Evolution of computer networks, General features and tasks of a communication system, need for modulation. Fundamentals of signals, carrier waves, general principles of amplitude modulation, frequency modulation and phase modulation, elements of LAN, WAN, MAN . Introduction to serial communication. |
| UNIT II | Networking Architecture: ISO-OSI, IBM SNA architecture –their functions of each layer and implementation. Concepts of circuit switching, packet switching and message switching. Fundamentals of datagrams. Flow and Error Control – Stop and Wait, Sliding Window, Automatic Repeat Request |
| UNIT III | Data communication concepts: Connecting devices, hub, switch, bridge, routers and gateways, Signal encoding and decoding techniques - Amplitude Modulation, Frequency Modulation, Phase Modulation, signal bandwidth requirements, signal formats used in LAN, network protocols: LAN cabling standards, IEEE LAN standards, Introduction to Ethernet (IEEE 802.3) |
| UNIT IV | Error detection and correction codes: Parity bit, Checksum, Hamming codes, CRC, single error detection and correction. Introduction to Network security Model, concepts of key, ceaser cipher, transposition cipher, DES. |
| UNIT V | Transmission media- twisted pair, coaxial cable, optical-fibre. LAN topologies: STAR, BUS and RING network, LAN access techniques: ALOHA, CSMA, token ring and token bus. Issues related with network reliability and fault redundant network systems. |

Suggested readings

- Stalling, Data & Computer Communication.

- Tanenbaum, Computer Network, Pearson.Ed., Pearson.
- Kurose, Computer Networking, Pearson.
- Peterson, Davie; Computer Networks, Elsevier.
- Youlu Zheng, Shakil Akhtar, Networks for Computer Scientists and Engineers, Oxford Press.

| BCA313 | DATABASE SYSTEM |
|---------------|--|
| UNIT I | Introduction to Database: Need for DBMS, advantages of DBMS, views of data, instances and schema data independence, database administrator, database manager, database languages, overall structure of DBMS. |
| UNIT II | Entity Relationship Model: Entities, attributes, relationship, constraints, keys, E-R diagram. Concept of strong and weak entity sets, generalization, specialization and aggregation. |
| UNIT III | Relational Model : Structure of Relational Databases, Relational Databases, Modification of the Databases, Tuple Relational Calculus, Domain Relational Calculus. |
| UNIT IV | SQL – Basic structure – Clauses, data types, creating tables. Modification of the database – deletion, insertion, updates. Retrieving data from tables, ordering, set operations – union, intersect, except, concept of NULL values, nested subqueries – set membership, set comparison, exist and not exist operator, unique, not unique construct. |
| UNIT V | Joins, equi-joins, non-equi-joins, self joins, outer joins. Aggregate functions – group by and having clause. Math functions, string functions, group by clause. Indexes, views, granting and revoking permissions. |

Suggested readings

- Database Concepts, Korth, Silbertz, Sudarshan, McGraw Hill
- Fundamentals of Database Systems, Elmasri, Navathe, Addison Wesley
- An Introduction To Database System, Date C J, Addison Wesley
- An introduction to Database Systems, Bipin C. Desai, Galgotia Publication
- Database Management System, Ramakrishnan, Gehrke, McGraw Hill

| BCA314 | E - COMMERCE AND CYBER LAW |
|---------------|--|
| UNIT I | Introduction, Definition, Objectives, Advantages and disadvantages, E-Commerce Models: Business to consumer, Business to Business, Consumer to Consumer, other models – Brokerage Model, Aggregator Model, Info-mediary Model, Community Model and value chain Model. |
| UNIT II | Electronic Payment Systems: Special features required in payment systems, Types of E payment systems, E-Cash, E-cheque, credit card, Smart Card, Electronic Purses. E-Marketing , E-Customer Relationship Management, E-Supply Chain Management. |
| UNIT III | The Online Landscape: Technological, Social and Legal Issues, Harmonization of Laws and the Issue of Jurisdiction Over the Internet , The Internet in the Context of International Commerce, Electronic Signature Legislation-a historical perspective, An Overview of Specific Aspects. |
| UNIT IV | Employee Privacy Rights, Employer Protection, Internet Banking in India: Analyzing Legal Issues, Negligent Misstatements. The legal framework, Confidential Information, Protection of Confidential Information ,Nature of confidential information , Confidence implied in a contract, Confidence implied by circumstances, Identification of confidential information, Essential requirements of breach of confidence, Exceptions to breach of confidence, Remedies for breach of confidence . |
| UNIT V | Concept of Cyber Crime and the IT Act 2000, Hacking, Teenage Web Vandals, Cyber Fraud and Cyber Cheating, Virus on the Internet, Defamation, Harassment and E-mail Abuse, Cyber Pornography, Other IT Act Offences, Monetary Penalties, Adjudication and Appeals under IT Act 2000, Strategies to Tackle Cyber Crime and Trends, Criminal Justice in India and Implications on Cyber Crime, Protection of Cyber Consumers in India – Consumer Protection Act, Consumer Complaint, Defects in Goods and Services, Consumer Forums, Jurisdiction |

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| | and Implications on Cyber Consumers in India. |
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Suggested readings

- Bajaj and Nag, "E-Commerce the cutting edge of Business", TMH
- Ravi Kalakota, Andrew Winston, "Frontiers of Electronic Commerce", Addison Wesley.
- P. Loshin ,John Vacca, "Electronic commerce", Firewall Media, New Delhi
- Rodney D. Ryder, " Guide to Cyber Laws", Second Edition, Wadhwa and Company, 2007
- Vakul Sharma, "Handbook of Cyber laws" Macmillan India Ltd, 2003
- Justice Yatindra Singh, " Cyber Laws", Universal Law Publishing, New Delhi, 2003
- Joha Rao, " Law of Cyber Crimes and Information Technology Law", Wadhwa and Company, 2007

| BCA315 | COMMUNICATIVE ENGLISH |
|---------------|--|
| UNIT I | Unseen Passage for analysis (Question answers, vocabulary, one word, sentence formation, synonyms and Antonyms) |
| UNIT II | (a) Subject verb concord (rules Regarding the concord will be Discussed and Exercises will be given) (b) Reported Speech (Declarative sentences , Imperatives, Interrogatives – wh- questions yes / no questions, exclamation sentences) (c) Non Finite verbs (Gerunds, infinitives and participles) |
| UNIT III | (a) Idioms (b) Common Errors [Involving the use of Articles, Prepositions and Tenses] (c) one word substitution. |
| UNIT IV | Writing skills : Formal Letters Various types of Business letters related to Job Application and Resume Writing Report writing, Project Report |
| UNIT V | Essay writing and short composition |

BCA Syllabus
BCA II Year Semester IV

| BCA411 | VB.NET |
|---------------|---|
| UNIT I | DOT NET Framework, Overview and Base Class Library, MSIL, Common Language Run Time (CLR), Events, .NET Assemblies, Shared Assemblies, Advantages of Assemblies over Predecessors, Dynamic Link Library (DLL), Namespaces, Visual Studio IDE. |
| UNIT II | Variables, Data types, Operators, Control Structures: if-then-else, Select Case, for-next, for Each....Next, Do loop, While...End While, Type Conversions, Functions, Subroutines, Classes and Objects, Access modifiers, Error Handling and Debugging |
| UNIT III | Array: One dimensional, two dimensional, variable size arrays, System. Array class, Array list class, Building Windows Application: button, checkbox, checkedlistbox, colordialog, combobox, datetimetypepicker, label, listbox, listview, picturebox, progressbar. |
| UNIT IV | Controls: Radiobutton, textbox, masked text box, rich text box, numeric up-down, treeview, tooltip, timer, Tab control, panel, group box, menu strip, status strip, tool strip, openfiledialog, savefiledialog, folderbrowserdialog. |
| UNIT V | Basic Idea of ADO.NET, OleDbConnection, OleDbCommand, OleDbDataReader, OleDbDataAdapter, Dataset, Datatable, Datarow, DataColumn. Using Data controls: Datagridview, binding source, binding navigator. |

Suggested readings

- VB.NET Programming (Black Book) , Steven Holzne
- VB.NET Programming Bible, Bill Evjen, Jason Beras

| BCA412 | COMPUTER ORIENTED NUMERICAL & STATISTICAL METHODS |
|---------------|---|
| UNIT I | Significant digits, floating point representation of numerals, arithmetic operations with normalized floating point number–addition, subtraction, multiplication and division, errors in numerical computation. Pitfalls in computing. |
| UNIT II | Initial approximation of roots, Descate's rule of sign, Iterative Methods - Bisection, Regula-Falsi, Newton Raphson, method of successive approximations, Concepts of roots synthetic division , value and values of derivative of a polynomial by synthetic division. |
| UNIT III | Solution of ordinary differential equations - Taylor's method, Euler's method, Runge Kutta second and fourth order method, Picard's method, modified Euler's method. Numerical Integration - Introduction, Trapezoidal rule, Simpson's 1/3 and 3/8 rule. |
| UNIT IV | Solution of simultaneous linear equation: Gauss elimination method, Pivoting, ill conditioned equations, Refinement of solution, Gauss Seidal iterative method. Curve fitting - Method of least squares, fitting of straight lines, polynomials, exponential curves. |
| UNIT V | The basic concepts: Variables and Attributes, Statistics, Population and sample, complete enumeration vs sample surveys, probability and purposive sampling, simple random sampling Frequency distributions: Frequency distributions, histograms, Frequency polygons, frequency curves, cumulative frequency, distributions, ogives, Measure of Central Tendency, Median, mode, arithmetic mean |

Suggested readings

- Computer Oriented Numerical & Statistical Techniques ,R. Singh,I. Singh, Khanna Publication
- Computer Oriented Numerical Methods, V Rajaraman, Prentice Hall India
- Calculus of Finite Differential & Numerical Analysis, Gupta & Malik, Krishna Prakashan Media (P) Ltd, Meerut
- Computer Oriented Numerical Methods, R S Salaria, Khanna Publication
- Computer Oriented Numerical Methods, P Thangaraj, PHI Publication

| BCA413 | OPERATING SYSTEM |
|---------------|---|
| UNIT I | Introduction: Definition of Operating System, types of operating systems: Early Systems, Batch Systems, multi programming, Multiuser, Multitasking, time-sharing, spooling, parallel, distributed and real-time systems, Operating system concepts, Operating system services, System calls. |
| UNIT II | Process Management: Process concept, Process States, Representation of process(PCB),Process scheduling, Threads, CPU scheduling : Scheduling Criteria, Scheduling algorithms, Algorithm evaluation. |
| UNIT III | Memory management: contiguous, non contiguous, swapping, single and multiple partitions, fragmentation, compaction, paging, segmentation, combination of paging and segmentation. Virtual memory management, demand paging, page replacement and virtual memory concepts, Page replacement and allocation algorithms, Thrashing. |
| UNIT IV | The deadlock problem, characterization (Hold and wait, Circular Wait, No Preemption, No sharing of resources), prevention, avoidance: (RAG And Wait for Graph), detection and recovery form deadlock: (banking algorithm and detection algorithm), concept of Fork and Join methods. |
| UNIT V | Process concurrency, Concept of concurrency, cooperating process, precedence graph, Critical section problem, Mutual exclusion , semaphores, classical process (Reader Writer problem, Consumer producer problem, dining philosopher problem), inter process communication ,Different methods of communication between cooperating process. |

Suggested readings

- Stallings Williams , "Operating Systems "
- Silberschatz A , Galvin P, Gagne G "Operating System concepts 8e"
- Milan MilenKovic "Operating system concept and design "

| BCA414 | COMPUTER GRAPHICS |
|---------------|---|
| UNIT I | Introduction: fundamentals of Computer Graphics, point, dot, pixel, Resolution, Elements of graphics workstation. Video Display Devices-Raster Scan Systems Random Scan systems. Input devices. Graphics Software Coordinate Representations, Fundamental Problems in Geometry ,Concepts of video memory and frame buffer. |
| UNIT II | Algorithms: Line drawing algorithms- DDA Algorithm, Bresenham's Line Algorithm, Circle: Midpoint Circle Algorithm. Polygons, convex and convex polygons. Inside-Outside tests, Polygon fill algorithms: Boundary fill Algorithm, Flood fill Algorithm. Character generation. Attributes of lines, curves, characters. etc. |
| UNIT III | Graphics Primitives: Primitive Operations, The display file interpreter-Normalized Device Coordinates, Display- File structure. Display – file algorithm. Display control and Polygon representation. Attributes of output primitives: Line attributes - Line type. Line width. Pen and Brush options. Line Color. Color and gray scale levels. Color-tables. Gray scale. Area- Fill Attributes- Fill styles. Pattern fill. Soft fill. Character Attributes. Text attributes. |
| UNIT IV | Geometric Transformations: Matrices. Translation, Scaling Transformations. Sine and Cos Rotation. Homogeneous Co-ordinates . Composite Transformation. Rotation and scaling about an arbitrary point. Inverse Transformations, Transformations Routines. |
| UNIT V | 2-D Viewing- The viewing pipeline. Viewing co-ordinate, Reference Frame. Window to viewports co-ordinate transformation, 2-D Viewing functions. Clipping operations point clipping, Cohen- Sutherland Line Clipping algorithm, Sutherland Hodgmann polygon clipping algorithm |

Suggested readings:

- Madasu Hanmandlu ,PBP publications.
- Herrington ,Tata McGraw-Hill Education private Limited,New Delhi.
- Gautam Roy,Khanna publications.
- Donald D Hearn, M. Pauline Baker, Pearson Education

| BCA415 | COMPUTER ARCHITECTURE |
|---------------|---|
| UNIT I | Micro operations: Bus transfer, Memory transfer, Arithmetic and logic micro-operations, Control functions, Instruction codes: Computer instructions, Timing and control, Instruction cycles, I/O and interrupt. |
| UNIT II | I/O Architecture: I/O devices and their controllers, Hex keyboard, LED Display, VDU, Floppy disk drive, Transfer of information between I/O devices, CPU and memory, Elementary concept of I/O mapped and memory mapped I/O, Direct memory Access. |
| UNIT III | CPU Organization: Data bus and address bus, ALU, Instruction formats, Addressing modes- Direct, indirect, Immediate, Indexed and relative. Addressing formats one, two and three addresses. |
| UNIT IV | Microprocessor: Organization of 8085 microprocessor, Instruction set of 8085, Mnemonics and operation codes of data transfer group, Arithmetic group, Logical group, Branches group and stack, I/O and Machine control group, Assembly language, Assembler, Simple programs in assembly language. |
| UNIT V | Introduction to microprocessor interfacing: PPI, PIT, PIC. Serial and parallel interfacing. Introduction to microcontroller systems. Basics of intel 8051 microcontroller and programming concepts. |

Suggested readings

- Computer Organization and Architecture - William Stallings (Pearson Education Asia)
 - Computer Organization and Architecture -John P. Hayes (McGraw -Hill)RTU MCA Syllabus 2007-08 3/26
 - Computer Organization -V. Carl. Hamacher (McGraw-Hill)
- Computer Organization & Design, Patterson & Hennessy, ELSEVIER