West Bengal University of Technology
BF-142, Salt Lake City, Kolkata-700064
Syllabus for BCA

Semester 1

Theory

Sl No	Course Code	Topic	L	T	P	Total	Credit
1	BCA101	Digital Electronics	3	1	-	4	4
2	BCA102	Business Systems and Applications	3	1	-	4	4
3	BCA103	Introduction to Programming	3	1	-	4	4
4	BM101	Mathematics	3	1	-	4	4
5	BCA104	PC Software	3	1	-	4	4
		Total of Theory				20	20

Practical

Sl No	Course Code	Topic	L	T	P	Total	Credit
6	BCA194	PC Software Lab	-	-	6	6	4
7	BCA193	Programming Lab (C/ Pascal)	-	-	6	6	4
		Total of Practical				12	8
		Total				32	28

Semester 2

Theory

Sl No	Course Code	Topic	L	T	P	Total	Credit
1	BCA201	Computer Architecture and Systems Software	3	1	-	4	4
2	BCA202	Information Systems Analysis & Design	3	1	-	4	4
3	BCA203	Computer Programming	3	1	-	4	4
4	BM201	Mathematics	3	1	-	4	4
5	HU201	English Language and Communication	3	1	-	4	4
		Total of Theory				20	20

Practical

Sl No	Course Code	Topic	L	T	P	Total	Credit
6	BCA293	Programming Lab (Visual Basic)	-	-	6	6	4
7	HU 291	Business Presentation and Language Lab	-	-	6	6	4
		Total of Practical				12	8
		Total				32	28

Semester 3

Theory

Sl No	Course Code	Topic	L	T	P	Total	Credit
1	BCA301	Operating Systems	3	1	-	4	4
2	BCA302	Data Structures with C	3	1	-	4	4
3	BCA303	Graphics & Internet	3	1	-	4	4
4	BM301	Mathematics for Computing	3	1	-	4	4
5	BBA301	Management & Accounting	3	1	-	4	4
		Total of Theory				20	20

Practical

Sl No	Course Code	Topic	L	T	P	Total	Credit
6	BCA393	Internet & Computer Graphics Lab	-	-	6	6	4
7	BCA392	Programming Lab (Data Structure with C)	-	-	6	6	4

		Total of Practical				12	8
		Total				32	28

Semester 4

Theory

Sl No	Course Code	Topic	L	T	P	Total	Credit
1	BCA401	Data Base Management System	3	1	-	4	4
2	BCA402	Object-Oriented Programming with C++	3	1	-	4	4
3	BCA403	Software Project Management and Quality Assurance	3	1	-	4	4
4	BM401	Statistics, Numerical Methods & Algorithms	3	1	-	4	4
5	HU401	Environment and Ecology	3	-	-	3	3
		Total of Theory				19	19

Practical

6	BCA491	Database Lab (Oracle)	-	-	6	6	4
7	BM491	Computing Lab	-	-	6	6	4
		Total of Practical				12	8
						31	27

Semester 5

Theory

Sl No	Course Code	Topic	L	T	P	Total	Credit
1	BCA501	Data Communication & Computer Networks	3	1	-	4	4
2	BCA502	Unix and Shell Programming	3	1	-	4	4
3	BCA503	Windows Programming	3	1	-	4	4
4	BCA E501/A/B/C	Elective 1	3	1	-	4	4
5	HU501	Values and Ethics of Profession	3	-	-	3	3
		Total of Theory				19	19

Practical

6	BCA591	Unix & Networking	-	-	4	4	3
7	BCA592	Minor Project	-	-	9	9	6
		Total of Practical				13	9

Sessionals

8	BCA 593	Industrial Training	-	-			3
		Total				32	31

6 to 8 weeks Industrial Training

Semester 6

Theory

Sl No	Course Code	Topic	L	T	P	Total	Credit
1	BCA E601/A/B/C	Elective 2	3	1	-	4	4
2	BCA E602/A/B/C	Elective 3	3	1	-	4	4

							8	8
		Total of Theory					8	8
Sessionals								
3	BCA693	Major project	-	-	21	21	16
4	BCA694	Seminar	-	-		3	2
5	BCA 695	Comprehensive Viva-Voce	-	-			4
		Total of Sessionals				24	22
		Total				32	30

Electives for semesters 5 and 6

Elective No.	Elective Code	Course Code	Topic
1.	BCA E501	BCA E501A	Advanced Unix and Shell Programming
		BCA E501B	Human Computer Interaction
		BCA E501C	Multimedia & E-Commerce
2.	BCA E601	BCA E601A	Advanced networking and Communication
		BCA E601B	Intelligent Systems
		BCA E601C	Image Processing
3.	BCA E602	BCA E602A	Software Engineering
		BCA E602B	Object Oriented Programming with Java
		BCA E602C	Advanced Database Management

Summary

Semester No	Contact hr/wk	Credit
1	32	28
2	32	28
3	32	28
4	31	27
5	32	31
6	32	30
Total		172

Semester duration: 15 weeks

Each lesson will consist of: 3 hours Lectures + 1 hour tutorial per week

Total lab: 12 hours per week

Detailed Syllabus

Digital Electronics

Code: BCA101
CONTACTS: 3L + 1 T
CREDITS: 4

Data and number representation- binary-complement representation BCD-ASCII, conversion of numbers form one system to the other, 2's complement representation, binary arithmetic

Logic gates, basic logic operations, truth tables, Boolean expression, simplification

Combination circuits, adders, Multiplexer, Sequential circuits, flip-flops, Registers, counter(Async &Sync)

Memory circuits, ROM, PROM, EPROM and dynamic RAM, Digital Components

Books:

1.Fundamentals of Digital Circuits, Anand Kumar,PHI

2Digital Electronics, Tokheim, TMH

3 Digital Electronics, S. Rangnekar, ISTE/EXCEL

4Digital Technology:Principles & Practice,Virendra Kumar,New Age International

5Digital Circuit & Design, Salivahan,VIKAS

6Electronic Circuits, Poornachandra,SCITECH

Business Systems and Applications

Code: **BCA102**
CONTACTS: 3L + 1 T
CREDITS: **4**

Use of computers for managerial applications, Technology issues and data processing in organisations, Introduction to Information Systems, shift in Information system thinking, latest trends in Information Technology

Computer Based Information Systems- office automation systems. Decision making and MIS, transaction processing systems.

Decision support system, Group Decision Support, Executive Information systems, DSS generator

Introduction to:

Artificial Intelligence Based Systems, End user computing, Distributed data processing.

Deciding on IS architecture, IT leadership & IS strategic planning.

Introduction to:

 IS strategy and effects of IT on competition.

Introduction to:

ERP, re-engineering work processes for IT applications, Business Process Redesign

Knowledge engineering and data warehouse.

Books:

1.Management Information System, O'Brien, TMH

2. Management Information System: A Concise Study,Kelkar,PHI

3.Decision support Systems, Janaki Raman, PHI

4 Business Information Systems, Munish Kumar, VIKAS

5.Business Application of Computers, M.M. Oka, EPH

Introduction To Programming

Code: **BCA 103**
CONTACTS: 3L + 1 T
CREDITS: **4**

Problem analysis, need for programmed languages, introduction to algorithms, algorithmic representations, Pseudocodes flow charts and decision tables, structured programming and modular programming .

Over view of c.

Constant, variables, data, types and size, variable declaration, operators and expressions, type conversion, conditional expression, special operators, precedence rules. Decision making, looping and control structures. Function, recursion, arrays, pointers, structures and unions, Managing input/output operations, formatted I/O, standard library/user-defined functions, file management in C.

Handling of character strings, Dynamic memory allocations, linked list, Pre-processor. Developing different C Programs.

Books:

1.Programming With C, Gottfried, TMH

2.The C Answer Book,Tondo,PHI

3.Programming & Problem Solving Through C Language, EXCEL BOOKS

4.Practical C Programming,Oualline,SPD/O'REILLY

5.A First Course in Pragramming with C, Jeyapoovan, VIKAS

6.C Programming made easy, Raja Ram, SCITECH

7.Projects Using C,Varalaxmi, SCITECH

Mathematics

Code: BM 101
CONTACTS: 3L + 1 T
CREDITS: 4

Algebra: Sets, Union, intersection, complement, mapping, notion of group, ring, field with simple examples; Polynomials, division algorithm, fundamental theorem of classical algebra (without proof), Descartes rule of sign and their application, relation between roots and coefficients, symmetric function of roots, transformation of polynomial equations, Cardan's solution of cubic equation.

Matrices, addition and multiplication of matrices, inverse matrix, solution of linear equations in three variables by Cramer's rule, solution of three line linear equations by matrix inversion method.

Differential calculus: Limits of function and continuity, fundamental properties of continuous functions (without proof), geometric meaning of derivative and differential, rules of differentiation, successive differentiation, Rolle's theorem, mean value theorem, Taylor's and Maclaurin's theorems with Cauchy's and Lagrange's forms of reminder, Taylor's series, function of several variables, partial derivatives, total differential, Euler's theorem on homogeneous functions of two variables.

Introduction to:

 Application to plane curves.

Integral calculus: Rules of integration of indefinite integrals, solution of definite integrals and their elementary properties, idea of improper integrals.

Dimensional geometry: Transformation of rectangular axes, invariants, general equation of second degree – reduction to standard forms and classification, plane polar equation of a straight line, circle and conic.

Books:

1.Engineering Mathematics, Vol:1 & Vol:2, Sastry,PHI

2.University Algebra through 600 Solved Problems, N. S. Gopalakrishnan, New Age International

3.Engineering Mathematics, Arumugam, SCITECH

PC Software

Code: BCA 104
CONTACTS: 3L + 1 T
CREDITS: 4

Introduction MS Windows(Windows '98 Second Edition)

Desktop, creation of folders and shortcuts, features of Windows explorer

Familiarisation and using MS packages – Word, Excel, PowerPoint, basic skills in using these tools.(Version MS-Office'2000)

Books:

1.Introduction to Computers with MS-Office, Leon, TMH

2.Personal Computer Software, EXCEL BOOKS

3.A First Course in Computers 2003, Saxena, VIKAS

4.Computer Concepts & Windows,Stoline,SPD/LABYRINTH

5.Windows'98 in easy steps,Harshad Kotecha, Wiley Dreamtech

6.Office 2000 in easy steps, Stephen Copestake, Wiley Dreamtech

7.Windows & MS-Office 2000, Krishnan, SCITECH

8.Trouble Shooting Microsoft Windows,PHI/MSP

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Syllabus for BCA

Computer Architecture and Systems Software

Code: BCA201
CONTACTS: 3L + 1T
CREDITS: 4

Microprocessors (8085 features), bus structure, Data representation, Register transfer and micro-operations, Central processing unit, Pipeline and vector processing.
Computer arithmetic, Input-output organisation, Memory organisation, CPU architecture, instruction format, addressing mode, stacks and handling of interrupts.
Basic computer organisation and design, programming the computer with assembly language (same basic applications), Micro-programmed control.

Books:
1.Computer Organization, Hamacher, TMH
2.0000 to 8085 : Introduction to Microprocessors for Engineers & Scientists,Ghosh &   Sridhar,PHI
3.Computer Organization & System Software, EXCEL BOOKS
4.System Architecture, Burd, VIKAS

Information Systems Analysis & Design

Code: BCA 202
CONTACTS: 3L + 1 T
CREDITS: 4

Overview of System analysis and design: Development life cycle (Waterfall, Spiral, incremental models), feasibility studies, Requirements determination, Logical design, Physical design, Program design, Risk and feasibility analysis, prototyping

Information requirement analysis: Process modelling with physical and logical data flow diagrams, Data modelling with entity relationship diagrams, Normalization upto 3NF

System design: Process descriptions, Input/output controls, object modelling, Database design, User Interface design, Documentation, Data Dictionary, Development methodologies: Top down, bottom up, structured chart, decision table, decision tree, CASE productivity tools.

Testing – Unit, integration, system, Acceptance, regression, Test Case generation

Case studies.

Books:

1.System Analysis & Design, Parthasarathi, EPH

2. Analysis & Design of Information Systems,Rajaraman,PHI

3.Analysis & Design of Information Systems, Senn , MH

4.Information Systems: Analysis and Design,Ram Bansal 'Vigyacharya',New Age International.

5.System Analysis, Design & MIS, EXCEL BOOKS

6.Analysis, Design & Implementation of Information System, Sharma, VIKAS

7.System Analysis & Design, V.K. Jain, Wiley Dreamtech

Computer Programming

Code: BCA 203
CONTACTS: 3L + 1 T
CREDITS: 4

Introduction to visual Basic, polymorphism, inheritance, class, object etc. Creating standard exe file. Forms, Tool Bar, different Tools (Text Box, label, combo box, list box, timer, Picture, image, command button).   Code window. Basic event based programming on controls. Including multiple forms within a project. Saving forms and projects. Using data control for database oriented application (Back end Ms-Access).
Arrays – Single dimensional, two dimensional, dynamic
Searching – Linear and binary, sorting-bubble sort, selection sort, insertion sort; Function and sub-routine-defining a function, referencing a function; defining a subroutine, referencing a subroutine; string processing-string function, concatenation, alphabetical sorting; Data files-sequential data file, random access files.

Books:

1.Programming with Visual Basic 6.0, Bradley, TMH
2.Programming & Problem Solving Through Visual Basic, EXCEL BOOKS
3.Beginning VB 6,Wright,SPD/WROX
4. Programming with Visual Basic 6.0, Azam, VIKAS
5.Visual Basic 6.0 programming,Eric A. Smith, Wiley Dreamtech
6.Visual Basic 6.0 in 60 days,Krishnan,Scitech

Mathematics

Code: BM201
CONTACTS: 3L + 1 T
CREDITS: 4

Differential equations: order, degree, solution and formation of a differential equation, standard techniques of solving a linear differential equation with constant coefficients, Cauchy's and Lagrange's linear differential equations with variable coefficients.

Linear algebra: Vector space, subspaces, bases and dimensions, co-ordinates, linear transformation, algebra of linear transformations, isomorphism, representation of transformation by matrices. Sequence and series: Bounded and unbounded sequences, convergence or divergence of a sequence, behaviour of monotone sequences, algebrea of convergent sequences, Cauchy's sequence, Cauchy's general principle of convergence, infinite series – its convergence and sum, series with positive terms and standard tests of convergence (without proof), alternating series, Leibnitz test, absolute convergence, rearrangement of absolutely convergent series, test of convergence of Abel and Dirichlet (without proof).

Books:
1. Engineering Mathematics,Vol:1 & 2, Sastry,PHI
2.Engineering Mathematics,Arumugam,Scitech
3.Higher Engineering Mathematics, Vol.2 , Rathore, EPH

English Language and Communication

Code: HU201
CONTACTS: 3L + 1 T
CREDITS: 4

This should cover general and technical writing, oral communications and listening skills: letter writing, technical report writing, and business communication.
Expression: Practical communication skill development, business presentation with multimedia, speaking skill, prepared speech, extempore speech
Reading skill: comprehension test

Writing skill: precise, technical/business letter, organisation of writing material, poster presentation, writing technical document, preparing software user manual, necessary part required to prepare a project documentation

Details in business communication – Introduction, Meaning of communication, Role of communication in Business, Basic elements of the communication process, level of communication, forms, models and media of communication,verbal and non-verbal communication – functions and types. Barriers of effective communication.

Books:
1.Business Correspondence & Report Writing, Sharma, TMH
2.English for Technical communication, Laxminarayanan, Scitech
3.Business Communication,Kaul,PHI

4.Effective Technical English,Laxminarayanan,scitech
5.Communication Skill, Ghanekar, EPH
6.Communication Skill, L.M. Shakh, EPH

Operating Systems

Code: BCA301
CONTACTS: 3L + 1 T
CREDITS: 4

Importance of OS, Basic concepts and terminology, types of OS, different views, journey of a command execution, design and implementation of OS

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Process: Concept and views, OS view of processes, OS services for process management, scheduling algorithms, performance evaluation; Inter process communication and synchronisation, mutual exclusion, semaphores, hardware support for mutual exclusion, queuing implementation of semaphores, classical problem of concurrent programming, critical region and conditional critical region, monitors, messages, deadlocks. Resource manager, Memory management, file management, processor management, device management

Security and protection, authentication, protection and access control, formal models of protection, worms and viruses.

Multiprocessor system, classification and types, OS functions and requirements, Introduction to parallel computing, multiprocessor interconnection synchronisation.

Distributes OS - rationales, algorithms for distributed processing..

Introduction to Unix OS/DOS (case study)

Books:
1. Operating Systems, Galvin, John Wiley
2.Operating Systems , Milankovic, TMH
3.An Introduction to Operating System, Bhatt,PHI
4.Modern Operating System, Tannenbaum,PHI
5.Guide to Operating Systems, Palmer, VIKAS
6.Operating Systems,Prasad,Scitech

Data Structures with C

Code: BCA 302
CONTACTS: 3L + 1 T
CREDITS: 4

Basic concepts of data representation: abstract and system defined types, primitive data structures

Linear data structures and their sequential representation: array, stack, queue, circular queue, dequeue and their operations and applications

Linear data structures and their linked representation: linear link lists, doubly linked lists, linked stack, linked queue and their operations and applications.

Non Linear Data Structures I: Binary trees, binary search trees, representations and operations, thread representations, sequential representations, graphs and their representation.

Searching Techniques- Linear, Binary, Interpolation

Sorting Techniques-Insertion Sort, Bubble, Selection, Quick

Non Linear Data Structures II : Hashing, Files
Programming with Data Structures in C

Books:

1.Data Structures in C, Ajay Agarwal, Cyber Tech
2.Data Structures Using C, Radhakrishnan & Shrinivasan, ISTE/EXCEL BOOKS
3. C and Data Structure,Radhaganesan,Scitech
4.Data Structure Using C & C++, Tannenbaum, PHI
5.Mastering Algorithms with C,Loudon,SPD/O'REILLY

Graphics & Internet

Code: BCA 303
CONTACTS: 3L + 1 T
CREDITS: 4

Computer graphics - Co-ordinate systems, Homogenous co-ordinate systems, line drawing algorithms, circle drawing algorithms, Two-dimension transformations (rotation, scaling, sharing etc).

Raster scanning, CRT (Interface Design)

Clipping Algorithm (Sudderland-cohen line clipping Algorithm), Projection (Two-dimensional), Bazier, B-spline curves, shadowing.

TCP/IP, addressing in Internet – IP and domains, Servers, type of Connectivity.

Email services and protocols (X400, SMTP, UUCD, PPP, POP), FTP.

Web publishing - HTTP, browsers (naming), Introduction to HTML, Java script, use of Java applets within HTML files, ASP (Cookies and database connectivity only).

Internet security, Introduction to e-commerce, electronic payment standards and methods.
Books:

1.Procedural & Mathematical Elements in Computer Graphics, Rogers, TMH

2.Computer Graphics, Hearn & Baker,PHI

3.Computer Graphics, EXCEL BOOKS

4.Introduction to Computer Graphics, A. Mukherjee, VIKAS

5.Fundamentals of Computer Graphics & Multimedia, Mukherjee,PHI

6.Beginning ASP 3.0, Baser,SPD/WROX

7.Dynamic HTML,Goodman,SPD/O'REILLY

8.HTML Black Book , Stephen Holzner, Wiley Dreamtech

9.ASP 3.0 programming Bible,Eric A. Smith, Wiley Dreamtech

10.Computer Graphics, Bhandari & Joshi, EPH

Mathematics for Computing

Code: BM301
CONTACTS: 3L + 1 T
CREDITS: 4

Propositional logic, Logical equivalence
 Permutation and combinations

Generating functions, Recurrence relations

Graph Theory Concepts Graphs, sub-graphs, cyclic graphs

Trees, spanning trees, binary trees, Algorithms- Prim's, Kruskal

Isomorphism, homomorphism
Finite automata – NFA, DFA, Conversion, Mealy M/C, Moore M/C ,
 Introduction to Languages & Grammars and their relation with Automata.

Books:
1.Discrete Mathematics, Mott, Kandel & Baker, PHI
2.Graph Theory, N. Deo,PHI
3. Discrete Mathematical Structure, C.L. Liu, TMH
4. Discrete Mathematical Structure, Somasundaram,PHI
5.Discrete Mathematical Structure,G.S.Rao,New Age International
6.Discrete Mathematics with Applications, Rosen, TMH
7.Discrete Mathematical Structure, Dubey, EXCEL BOOKS
8. Discrete Mathematics, Iyengar, VIKAS
9. Discrete Structures and Graph Theory, Rao, Scitech

10.Mathematical Foundations, Vijayarangan, Scitech
11.Discrete Structures and Graph Theory, Rathor,EPH.

Management & Accounting

Code: BBA 301
CONTACTS: 3L + 1 T
CREDITS: 4

Basics of management; Planning, scheduling, organising, staffing, directing, controlling
Managerial economics and financial management, productivity management
Financial accounting, financial statements and analysis
Conceptual framework of cost accounting
Cost-volume profit relationship, budgeting, cost accumulation system, variable and absorption costing system
Financial accounting computer packages
Financial Management-Finance functions in Business. Relation of finance with other functions.
Source of finance long term and short term. Financial institution – IDBI, ICICI, IFCI and Commercial Banks.
Conceptual framework of Cost-Accounting- Basic cost concept. Cost determination process, costing for materials, labour and overheads.
Profitability Analysis – budgeting – application of Capital budgeting techniques for decision making.

Books:
1.Management Accounting,M.E.Thukaram Rao,New Age International
2.Management Accounting, Khan & Jain, TMH
3.Cost Accounting-An Introduction, Nigam & Jain, PHI
4.Management Accounting, Pande, VIKAS
5.Accounting and Financial Management for MCA & MBA students,SCITECH
6. Management Accounting, A.P.Rao. EPH.
7. Cost & Management Accounting ,Inamdar.EPH.

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Data Base Management System

Code: BCA 401
CONTACTS: 3L + 1 T
CREDITS: 4

Introduction to DBMS, architecture, administration roles, data dictionary

Traditional models, three-level architecture, hierarchical model, network model and relational model, File organization , Security.

Relational model – definitions and properties, keys , integrity rules, relational algebra, joins, set operations, Tuple relational calculus

SQL constructs, embedded SQL , Query & Query Optimisation Techniques.

Database design, conceptual, logical and physical models, ER diagram and model,

Functional Dependency (Armstrong's Axioms), Normal forms(1NF, 2NF, 3NF, BCNF)

Indexing- Primary, Secondary, Multilevel

Books:

1.Data Base System Concepts, Korth, TMH

2.Fundamentals of DBMS,Vig & Walia, ISTE/EXCEL

3. Data Base Management System, A.K. Pujari, ISTE/EXCEL

4. Data Base Management System, Leon, VIKAS

5.Data Base Concepts, Kroenke,PHI

6.Oracle PL/SQL Programming, Feuerstein, SPD/O'REILLY

7. Data Base Management System, V.K. Jain, Wiley Dreamtech

8.SQL PL/SQL for Oracle 8 & 8i,P.S. Deshpande, Wiley Dreamtech

Object-Oriented Programming with C++

Code: BCA 402
CONTACTS: 3L + 1 T
CREDITS: 4

Basics of Object Oriented programming and software design

C++ object-oriented programming

*C++ & ANSI standard C, Predefined classes in C++

Building objects with classes, Introduction to Constructor, Destructor, Defining operations on objects, Using Inheritance in C++, Concepts of Overloading ,Virtual functions and Polymorphism

Using C libraries in C++ programs, Using commercial class libraries (Standard template library)

Advanced Topics in C++ (Templates, Exception Handling, file handling, Streams)

Books:

1.Object Oriented Programming and C++, Balaguruswamy, TMH

2.Programming in C++, Shah & Thakker, ISTE/EXCEL

3.C++ Programming Today,Johnston,PHI

4.Revolutionary Guide to Object Oriented Programming Using C++,Olshevsky,SPD/WROX

5.Object Oriented Programming and C++, R.Rajaram, New Age International

6. Object Oriented Programming with C++ & JAVA,Samanta,PHI

7. Object-Oriented Programming with C++, Subburaj, VIKAS

8. Object-Oriented Programming with C++, Emmerel , Wiley Dreamtech

9.Programming with C++,Radhaganesan,Scitech

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Software Project Management and Quality Assurance

Code: **BCA 403**
CONTACTS: 3L + 1 T

CREDITS: **4**

Project management concepts

People, process, project and product (4P)

Planning software. Projects – project schedule, PERT, Gantt Charts, S/W project plan document.

System development life cycle.

Project teams, project monitoring and controls- Formal Technical Review (FTR),Cost estimation, COCOMO model, S/W metrics-size oriented and functions oriented.

Using project management software tools, quality management, issue, standards and methods. ISO and CMM.

Risk management, Configuration management.

Books:

1.Software Project Management, Hughes, TMH

2.Software Project Management,Kelkar,PHI

2.Information System Project Mgmt., Schwable, VIKAS

4.Software Project Management from concept to deployment with CD, Kieron Conway, Wiley Dreamtech

Numerical Methods & Algorithms

Code: **BM401**
CONTACTS: 3L + 1 T

CREDITS: **4**

Approximation in numerical computation, Truncation and rounding errors.
Interpolation : Lagrange's interpolation, Newton forward and backward differences interpolation, Newton divided difference.
Numerical Integration: Trapezoidal rule, Simpson 1/3 rule, Weddle's rule.
Numerical solution of a system of linear equation
Gauss elimination method, Matrix inversion, LU factorisation method, Gauss-Jacobi method, Gauss Seidel method.
Algebraic Equation : Bisection method, Secant method, Regula–Falsi method, Newton Raphson method, Method of Iteration
Numerical solution of ordinary differential equation : Taylor's series method, Euler's method, Runga – kutta method, predictor – correction method.
Books :
1.Numerical Mathematical Analysis ,Sastry,PHI
2.Numerical Mathematical Analysis (By J.B.Scarborough)
3.Numerical Analysis & Algorithms, Pradeep Niyogi, TMH
4.Numerical Mathematical Analysis ,Mathews,PHI
5.C language and Numerical Methods (By C.Xacier)
6.Numerical Analysis (By S. Ali Mollah)
7.Introductory Numerical Analysis(By Dutta & Jana)
8.Numerical Methods (Problems and Solution) (By Jain , Iyengar & Jain),New Age International
9.Computer Oriented Numerical Methods, N. Dutta, VIKAS
10.Numerical Methods,Arumugam,Scitech
11.Numerical Methods in Computer Applications, P.U.Wayse.EPH.

Environment and Ecology

Code: **HU401**
CONTACTS: 3L

CREDITS: **3**
Introduction , components of the environment, environmental degradation
Ecology: Elements of Ecology ; Ecological balance and consequences of change, principles of environmental impact assessment
Air Pollution and Control: Atmospheric composition, energy balance, climate, weather, dispersion, sources and effects of pollutants, primary and secondary pollutants, green house effect, depletion of ozone layer, standards and control measures.

Water Pollution and Control: Hydrosphere, natural water, pollutants: their origin and effects, river / lake / ground water pollution, standards and control.

Land Pollution: Lithosphere, pollutants (municipal, industrial, commercial, agricultural, hazardous solid wastes); their origin and effects, collection and disposal of solid waste, recovery and conversion methods.

Noise Pollution: Sources, effects, standards and control.

Books:
1. Environmental Science, Cunningham, TMH
2. Environmental Pollution Control Engineering,C.S.Rao,New Age International
3. Environmental Science,Wright & Nebel, PHI
4. Environmental Pollution Analysis,S.M.Khopkar,New Age International
5. Environmental Mgmt, N.K. Oberoi, EXCEL
6. Environmental Mgmt, Mukherjee, VIKAS

7. Ecosystem Principles & Sustainable Agriculture,sithambaranathan,Scitech

Data Communication & Computer Networks

Code: BCA 501
CONTACTS: 3L + 1 T

CREDITS: 4

Introduction to computer network- Topology; Base Band & Broad Band Topology;

Guided & Unguided Media.

Overview of Data & Signal Bits. Baud & Bit Rate. Modulation (AM, PM, FM);

Multiplexing (TDM, FDM, STDM).

Digital To Analog – ASK, PSK, FSK, QPSK.

Transmission methods – Synchronous & Asynchronous, Flow Control, Error Control,

Error Detection methods.

Goals of Layered protocols- Introduction to OSI, TCP/IP

HDLC- frame format, station, states, configuration, access control.

LAN Topology – Ethernet (IEEE 802.3), Token Bus (IEEE 802.4), Token Ring (IEEE 802.5)

Switching Technologies – Circuit, Message, and Packet.

X.25, X.21, RS-232 C – frame format, channel, packet frames, facilities (In brief Only).

ISDN- D channel, B-Channel, International Standards, NT1, NT2, TA, TE Devices.

Bridging & Routing – Static.

Congestion Control – Leaky Bucket & Token Bucket Algorithms.

Introduction to data security (private key, public key)

Books:

1.Data Communication & Networking, Forouzan, TMH

2. Computer Networks,Tannenbaum,PHI

3.Computer Communication Networks,Shanmugam & Rajeev, ISTE/EXCEL

4.Data Communication,Prakash C. Gupta, PHI

5. Data & network Communication, Miller, VIKAS

6. Data Communication & Network, Dr. Prasad, Wiley Dreamtech

7. Computer network Theory,Prasad,Scitech

Unix and Shell Programming

Code: BCA 502
CONTACTS: 3L + 1 T

CREDITS: 4

The UNIX Operating System

File system, General-purpose utilities

The Bourne Shell, Simple filters

Advanced Filters – I, Advanced Filters - II

Line editing with ex, Vi editor

The Process, communication and scheduling

Programming with the Shell

Introduction to System administration.

Books:

1.UNIX-Concepts & Applications, Sumitava Das, TMH

2.Learning UNIX Operating System,Peek, SPD/O'REILLY

3.Understanding UNIX,Srirengan,PHI

4.Learning the Vi Editor,Lamb, SPD/O'REILLY

5.Essentials Systems Administration,Frisch, SPD/O'REILLY

Windows Programming

Code: BCA503
CONTACTS: 3L + 1 T

CREDITS: 4

Windows concepts and terminology, key elements, creating the look, using OO technology, communication via messages, windows resources and functions

Writing windows applications, taking control of windows, adding menus, dialog boxes, MFC programming concepts

Values and Ethics of Profession

Code: HU501
CONTACTS: 3L

CREDITS: 3

Science, Technology and Engineering as Knowledge and as Social and Professional Activities (2 lectures**)**

Effects of Technological Growth: Rapid Technological growth and depletion of resources. Reports of the Club of Rome. Limits of growth; sustainable development
(2 lectures)
Energy Crisis; Renewable Energy Resources   (2 lectures)
Environmental degradation and pollution. Eco-friendly Technologies. Environmental Regulations. Environmental Ethics
                              (4 lectures)
Appropriate Technology Movement of Schumacher: later developments (2 lectures)
Technology and developing nations. Problems of Technology transfer. Technology assessment, impact analysis
                              (4 lectures)
Human Operator in Engineering projects and industries. Problems of man machine interaction. Impact of assembly line and automation. Human centered Technology
(4 lectures)

Ethics of Profession
Engineering profession: Ethical issues in engineering practice. Conflicts between business demands and professional ideals. Social and ethical responsibilities of Technologists. Codes of professional ethics. Whistle blowing and beyond. Case studies.   (8 lectures)

Profession and Human Values
Value Crisis in contemporary society   (2 lectures)
Nature of values: Value Spectrum of a 'good' life   (2 lectures)
Psychological values: Integrated personality; mental health   (2 lectures)
Societal values: The modern search for a 'good' society, justice, democracy, secularism, rule of law; values in Indian Constitution
                          (4 lectures)
Aesthetic values: Perception and enjoyment of beauty, simplicity, clarity   (2 lectures)
Moral and ethical values: Nature of moral judgments; canons of ethics; ethics of virtue; ethics of duty; ethics of responsibility

Books:
    1.   Ethics in Mgmt & Indian Ethos,Ghosh, VIKAS
    2.   Business Ethics,G.Pherwani,EPH.
    3.   Ethics, Indian Ethos & Mgmt, Balachandran, Raja & Nair,SHROFF Publishers

West Bengal University of Technology
BF-142, Salt Lake City, Kolkata-700064
Syllabus for BCA

Electives for BCA

Advanced Unix and Shell Programming

Code: BCA E501A
CONTACTS: 3L + 1 T
CREDITS: 4

Organisation of Unix. User interface, Programmer interface. The environment of Unix process System calls. Process control, File related system calls. Process related system calls. Signals programming using system calls. Advanced I/O multiplexing. Memory mapped I/O. Inter-process communication: Pipes, shared memory, semaphores, messages. Advanced inter-process communications. Streams, Pipes, Open server.

Books:

1.Your UNIX, The Ultimate Guide, Sumitava Das, TMH

2.Design of Unix Operating System,Bach,PHI

3.UNIX Programming Environment,Kernigham & Pike,PHI

4.Learning UNIX Operating System,Peek, SPD/O'REILLY

5.Learning the Vi Editor,Lamb, SPD/O'REILLY

6.Essentials Systems Administration,Frisch, SPD/O'REILLY

Object Oriented Programming with Java

Code: BCA E602B
CONTACTS: 3L + 1 T
CREDITS: 4

Oops Concept and Introduction to JAVA

An overview of Java

Data Types - variables and arrays

Operators, Control statements

Classes and objects, Inheritance, String and string buffer, Packages, Interfaces, Exception handling, Multithreaded Programming, Applets, Event handling

Abstract Window Toolkit

Books:

1.JAVA 2- The Complete Reference, TMH

2.Beginning JAVA 2 SDK 1.4, Horton,SPD/WROX

3.Programming in JAVA, EXCEL

4.Object Oriented Programming With C++ & JAVA,Samanta,PHI

5.Object Oriented Application Development Using JAVA, Doke, VIKAS

6.Programming with Java 2,Xavier,Scitech

Advanced Networking and Communication

Code: BCA E601A
CONTACTS: 3L + 1 T
CREDITS: 4

Introduction to computer network- Topology; Base Band & Broad Band Topology;

Guided & Unguided Media.

Overview of Data & Signal Bits. Baud & Bit Rate. Modulation (AM, PM, FM);

Multiplexing (TDM, FDM, STDM).

Encoding (RZ, NRZ, BIPLOAR, MANCHESTER, DIFF. MANCHESTER).

Digital To Analog – ASK, PSK, FSK, QPSK.

Transmission methods – Synchronous & Asynchronous, Flow Control, Error Control,

Error Detection methods.

Goals of Layered protocols- Introduction to OSI, TCP/IP, IBM, SNA, ATM.

Bit oriented (BSC) & Character oriented Protocol (SDLC, LAPB, LAPD, LLC)

HDLC- frame format, station, states, configuration, access control.

LAN Topology – Ethernet (IEEE 802.3), Token Bus (IEEE 802.4), Token Ring (IEEE 802.5)

Introduction to WAN – DQDB (IEEE 802.6) & FDDI.

Switching Technologies – Circuit, Message, and Packet.

X.25, X.21, RS-232 C – frame format, channel, packet frames, facilities (In brief Only).

ISDN- D channel, B-Channel, International Standards, NT1, NT2, TA, TE Devices.

Introduction to leased lines, DSL, Digital Carriers.

Bridging & Routing – Static & Dynamic (In Brief).

IP, IP addressing, ICMP, ARP.RARP.

Congestion Control, TCP, UDP.

HTTP,FTP,Telnet,SMTP.

Introduction to data security (private key, public key, ISO standards).

Introduction to Mobile technology (Topology, FDM, TDM, CDMA), Satellite Communication (LEO, GEO, TDM).

Books:
1.Data Communication & Networking, Forouzan, TMH
2.Computer networks,Tannenbaum,PHI
3.Computer Communication Networks,Shanmugam & Rajeev, ISTE/EXCEL
4.Data & Computer Communication,Stallings,PHI
5.Data & Network Communication, Miller, VIKAS
6.Data Communication & Network, Dr. Prasad, Wiley Dreamtech
7.Computer Network Theory, Prasad, Scitech

Multimedia and E-commerce

Code: BCA E501C
CONTACTS: 3L + 1 T

CREDITS: 4
Multimedia system design and development
Computer Systems in Electronic Business
Business Process Re-Engineering
Electronic commerce Policy and Theory
Supply Chain Management
Customer Relationship Management
International trading network & communication protocols
Electronic payment standards

 E-Commerce strategy, Marketing and Business Processes

Books:

1.E-Commerce, P.T. Joseph, PHI

2.Multimedia Systems Design,Andleigh,PHI

3.E-Commerce Mgmt.- Text & Cases, Krishnamurthy, VIKAS

4.Multimedia & Web Create, Coorough, VIKAS

5.Streaming Multimedia Bible with CD,Steve, Wiley Dreamtech

6.E-Commerce,Oka,EPH.

7.Beginning E-Commerce,Reynolds,SPD/WROX

Intelligent Systems

Code: BCA E601B
CONTACTS: 3L + 1 T
CREDITS: 4

Scope of Artificial Intelligence, games, theorem proving, natural language processing, vision and speech processing, robotics, expert systems, AI techniques in search and knowledge abstraction

Problem solving; state space search, search space control, heuristic search, hill climbing, branch and bound

Knowledge representation; predicate logic, rule-based system, structured knowledge representation, semantic net

Handling uncertainty, Fuzzy sets, probabilistic reasoning

Learning, learning automation, learning by induction, Neural Networks, Genetic Algorithms

Emerging technologies and devices

Books:

1.Artificial Intelligence, Rich & Knight, TMH

2.Introduction to AI & Expert Systems,Patterson,PHI

3.Neural Networks, Fuzzy Logic & Genetic Algorithms,Rajsekharan,PHI

4.Expert Systems, Giaranto, VIKAS

Image Processing

Code: BCA E601C
CONTACTS: 3L + 1 T
CREDITS: 4

Image digital representation. Elements of visual perception. Sampling and quantisation. Image processing system elements. Fourier transforms. Extension to 2-D, DCT, Walsh, Hadamard transforms. Enhancement and segmentation. Point and region dependent techniques. Image encoding: Fidelity criteria. Transform compression. KL, Fourier, DCT, Spatial compression, Run length coding. Huffman and contour coding. Restoration: Models: Constrained & Unconstrained, Inverse filtering, Least squares filtering, Recursive filtering.

Books:

1.Digital Image Processing & Analysis, Chanda, PHI

2.Fundamentals of Digital Image Processing,Jain,PHI

3.Image Processing , Analysis & Machine Vision , Sonka, VIKAS

Software Engineering

Code: BCA E602A
CONTACTS: 3L + 1 T
CREDITS: 4

Introduction of Software Engineering

Software life cycles - different models

Structured system design

User Interface Design

Data Oriented Analysis and Design

Object Oriented Analysis & Design

Software quality assurance, Software testing techniques and strategies, test planning, reporting and bug fixing

Test automation, regression testing

 Software maintenance

Computer Aided Software Engineering (CASE) tool

Software Complexity & Reliability

Software Project Management

Books:
1.Software Engineering , Rogers G. Pressman, TMH
2. Software Engineering, Ghezzi,2nd Ed, PHI
3.Software Engineering,K.K.Aggarwal & Yogesh Singh,New Age International
4.Software Engineering , Leon, VIKAS
5. Software Engineering: Principles & Practice,Vanvliet,SPD/JOHN WILEY
6.Software Testing Fundamentals:Methods & Metrices, Marnie Hutchson, Wiley Dreamtech

Human-Computer Interaction

Code: BCA E501B
CONTACTS: 3L + 1 T

CREDITS: 4
Foundations of human-computer interaction (8 hours): Human-centered development and evaluation, Human performance models, accommodating human diversity, Principles of good design and good designers, engineering tradeoffs
Human-centered software evaluation (6 hours): Evaluation without users: walkthroughs, KLM, guidelines, and standards, Evaluation with users: usability testing, interviews, survey, experiment
Human-centered software development (10 hours): Approaches, characteristics, and overview of process, Functionality and usability: task analysis, interviews, surveys, Specifying interaction and presentation, Prototyping techniques and tools
Graphical user-interface design (10 hours): Choosing interaction styles and interaction techniques, HCI aspects of common widgets, HCI aspects of screen design: layout, color, fonts, labeling, Handling human failure, Beyond simple screen design: visualization, representation, metaphor, Multi-modal interaction: graphics, sound, and haptics, 3D interaction and virtual reality
Graphical user-interface programming (10 hours): UIMS, dialogue independence and levels of analysis, Widget classes, Event management and user interaction, Geometry management, GUI builders and UI programming environments, Cross-platform design
HCI aspects of multimedia systems (8 hours): Categorization and architectures of information: hierarchies, hypermedia, Information retrieval and human performance (Web search, Usability of database query languages, Graphics, Sound), HCI design of multimedia information systems, Speech recognition and natural language processing, Information appliances and mobile computing
HCI aspects of collaboration and communication (8 hours): Groupware to support specialised tasks: document preparation, multi-player games, Asynchronous group communication: e-mail, bulletin boards, Synchronous group communication: chat rooms, conferencing, Online communities: MUDs/MOOs, Software characters and intelligent agents

Advanced Database Management

Code: MCA E602C
CONTACTS: 3L + 1 T

CREDITS: 4
Database Design: Multivalued dependencies, theory of normalisation-4NF, 5NF, 6NF DKNF
ANSI SQL2: DDL, DML, constraints and assertions, views, database security.
Transaction processing, concurrency control, Recovery management. Transaction model properties, lock base protocols, Two-phase locking, Live – Lock, Time- Stamp Protocol.
Brief introduction to distributed database, temporal database and object-oriented database.
Embedded SQL & Applications.

Books:
1.Data Base System Concepts, Korth , MH
2.Data Base Management System, RamaKrishnan, MH
3.Data Base Management System, A.K. Pujari, ISTE/EXCEL
4.Data Base Management System, Leon, VIKAS
5.Data Base Management System,V.K. Jain,Wiley Dreamtech

Laboratory

PC Software Lab

Code: BCA194
CONTACTS: 3L + 1 T

CREDITS: 4

Basic skills lab

Introduction to MS Office, Windows Overview, Office features, Templates and Wizards, MS Word, Excel, PowerPoint, Outlook(Overview),

MS Access(Table, relation,queries,reports)

(Ms – Office Version 2000)

Programming Lab C/Pascal

Code: BCA193
CONTACTS: 3L + 1 T
CREDITS: 4

Programming using C, study of various features of the language, Structured and modular programming, various data structures in applications such as sorting, searching, string and list manipulation.

Programming Lab (Visual Basic)

Code: BCA293
CONTACTS: 3L + 1 T
CREDITS: 4

Computer programming with Visual Basic

Different constructs and applications, connecting with MS-ACCESS using data controls.

Business Presentation and Language Lab

Code: HU291
CONTACTS: 3L + 1 T
CREDITS: 4

Preparing business presentation with computers using PowerPoint, Developing structured project report with Word and Excel

Internet & Computer Graphics Lab

Code: BCA393
CONTACTS: 6P
CREDITS: 4

Developing web pages with HTML, Using ASP, Creating and experimenting with computer graphics. (with C-Language)

Programming Lab (Data Structure with C)

Code: BCA392
CONTACTS: 6P
CREDITS: 4

Solving problems related to Data structure implemented in C language.

Database Lab (Oracle)

Code: BCA491
CONTACTS: 6P
CREDITS: 4

Study of commercial DBMS package such as Oracle. Developing database application with Oracle Creation of a database, writing SQL queries and retrieving data, PL/SQL.

Computing Lab

Code: BCA 492
CONTACTS: 6P
CREDITS: 4

1. Solving various problems related to object oriented programme with C++

2. Implement Numerical problems Using C/MAT LAB

3. Assignments on Interpolation: Newton forward &backward, Lagrange

4. Assignments on Numerical Integration: Trapezoidal Rule, Simson's 1 /3 Rule, Weddle's
   Rule

5. Assignments on Numerical solution of a system of linear equation: Gauss elimination,
   Gasuss Jacobi, Matrix Inversion, Gauss Seidel

6. Assignments on Algebraic Equation: Bisection, Secant, Regula-falsi, Newton Raphson

7.   Assignments on Ordinary Differential Equation: Taylor Series, Euler's method, RungaKutta.

Unix & Networking

Code: BCA591
CONTACTS: 6P

CREDITS: 4
Using Unix, writing shell script, experimenting with Unix administration and programming. Network set-up and administration

Minor Project

Code: BCA 592
CONTACTS: 9 P
CREDITS: 6

Major Project

Code: BCA 692
CONTACTS: 21P
CREDITS: 16

Seminar

Code : BCA 693
Credits : 2

Comprehensive Viva-Voce

Code : BCA 695
Credits: 4