UTTARAKHAND TECHNICAL UNIVERSITY
DEHRADUN

SYLLABUS AND ORDINANCES

Wef-2010-11
SYLLABUS

FOR

B.Sc. (IT) Programme
Ordinance
for
B.Sc (IT) Programme 2007 & onwards
Uttarakhand Technical University, Dheradun

1. Admission

Admission to the B.Sc.(IT) I\textsuperscript{st} semester will be made as per rules prescribed by the Academic Council of the University \textbf{or} as per guidelines prescribed by the State Govt. from time to time.

2. Eligibility

Intermediate.

3. Attendance

3.1 Every candidate is required to attend all the lectures, tutorials, practical and other prescribed curricular and co-curricular activities. It can be condoned up to 25\% on medical grounds or for other genuine reasons.

3.2 A further relaxation of attendance up to 15\% can be given by Principal/Dean/ Director of the Institute for the students, who have been absent with prior permission, for reasons acceptable to Head of the Institution/ College/ University.

3.3 No candidate will be allowed to appear in the end semester examinations if he/she does not satisfy the overall average attendance requirements as per clause 3.1 and clause 3.2.

4. Duration

4.1 Total duration of the B.Sc.(IT) Course shall be three years, each year comprising two semesters.

4.2 Each semester shall normally have teaching for the 90 working days.

4.3 A student failing 2 times in I and / or II semester (of first year) and ineligible for the carry over system (clause 8) shall not be permitted to continue studies further.

4.4 Maximum time allowed for completing the B.Sc.(IT) course will be 5 (five) years. Those who are unlikely to satisfy the condition shall not be allowed to continue the studies any further.

5. Curriculum
5.1 The 3 (Three) years curriculum will be divided into six semesters. Each semester include lectures, tutorials, practical and seminars as defined in the scheme of instructions and examinations.

5.2 It will also include co-curricular and extra curricular activities as prescribed from time to time by the Institute/college/university.

6. **Examination**

6.1 Student’s performance will be evaluated through continuous assessment in the form of Class Tests, Assignments, Quizzes, Viva voce/Practical etc. There shall also be an examination at the end of each semester in theory subjects, practical and project.

6.2 The distribution of marks for the class tests, quiz test, assignments, end semester theory, practical, project, seminar and other examination shall be as per the prescribed scheme of examination.

6.3 The maximum marks for the theory subjects shall consist of marks allotted for end semester examination and sessional work.

6.4 The maximum marks for the practical shall consist of marks allotted for practical examination and sessional work.

6.5 Pass/fail in a subject shall be declared on the basis of total marks obtained in theory/practical examination and the sessional award for theory/practical subjects.

6.6 The minimum pass marks in the theory subjects (including sessional marks) shall be 40%.

6.6.1 Theory 30%, theory + sessional = 40%, i.e; 21+19 =40.

6.7 The minimum pass marks in the practical subjects (including sessional marks) shall be 50%.

6.8 The marks of the previous semester(s) shall not be added in declaring the result of any semester examination.

6.9 To pass a semester candidate must secure 50% of aggregate marks in that semester.

6.10 No merit position shall be awarded to a candidate who has qualified for promotion to higher classes with back papers.

6.11 The student failing in the project only but satisfying all other requirements including obtaining 50% or more marks in aggregate will be allowed to submit a new / modified project at any time after three months of the declaration of result without repeating the whole session.

7. **Promotion Rules**

7.1 A candidate satisfying all the conditions under clause 6 shall be promoted to the next semester.

7.2 A candidate not satisfying the above conditions but failing in not more than 2 subjects (Theory and/or practical) of a semester examination shall be governed by the clause No. 8.

7.3 All other candidates will be required to repeat the semester either as regular candidate, after re-admission or opting for ex-studentship. This facility is however subject to the time limits stipulated in clause No. 4.
8. **Promotion under carry-over system**

8.1 A candidate who fails in the category of clause No. 7.2 shall become eligible for provisional promotion to next semester and the carry-over system as per the following table.

<table>
<thead>
<tr>
<th>For promotion to &amp; exam</th>
<th>Max. permitted no. of carry over subjects of semester</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
</tr>
<tr>
<td>II</td>
<td>2</td>
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<tr>
<td>III</td>
<td>2</td>
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<tr>
<td>IV</td>
<td>2</td>
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<tr>
<td>V</td>
<td>-</td>
</tr>
<tr>
<td>VI</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Admission to &amp; Semester Exams. not Permitted</th>
<th>Carry over subjects not cleared of semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>V</td>
<td>I &amp; II</td>
</tr>
</tbody>
</table>

8.2 No separate carry-over Examination will be held for any subject except for B.Sc.(IT) Final year. Any candidate eligible for the carry-over system shall have to appear in the carry over subjects in the subsequent University Examination for the same semester.

9. **Ex-studentship**

Sessional marks in the subject of an ex-student shall remain the same as those secured by him/her earlier.

10. **Result**

Results at the end of final year will be declared with the following weightages:

- I year 100%
- II year 100%
- III year 100%

11. **Award of Division**
11.1 If candidate passes all examinations in single attempt and secures 75% or more in aggregate marks he/she shall be placed in the First Division with Honours.

11.2 If candidate passes all examinations and secures aggregate marks of 60% or more but less than 75% OR greater than or equal to 75% after back in any examination, he/she shall be placed in First Division.

11.3 If candidate passes all examinations and secures aggregate marks of 50% or more but less than 60%, he/she shall be placed in Second Division.

12. Seminar and Project

12.1 Candidate must secure 50% marks to pass in seminar and project.

13. Grace Marks

A candidate shall be entitled to grace marks of a maximum of 5 in any one subject in a semester to enable him to pass, provided he is failing in only one subject and has secured the necessary minimum aggregate. 5 marks are allowed in any combination upto two theory subjects. The grace marks shall not be added to the marks of the subject or to the aggregate. The grace marks will not be awarded to enable a candidate to pass in a practical or project.

14. Scrutiny shall be allowed as per the rules of the University. Revaluation is not permitted.
Uttrakhand Technical university, Dheradun

B.Sc. (Information Technology)

Programme Structure

**SEMESTER - I**

BS101: Fundamental of Computers and Information Technology
BS102: Programming in ‘C’
BS103: Mathematical Foundation
BS104: Financial Accounting
BSP11: Programming in ‘C’
BSP12: PC Packages (Introduction to DOS & MS Office)

**SEMESTER - II**

BS201: Data Structures
BS202: Object Oriented Programming using ‘C++’
BS203: System Analysis and Design
BS204: Probability & Statistical Techniques
BSP21: Data Structures
BSP22: Object Oriented Programming using ‘C++’

**SEMESTER - III**

BS301: Computer Based Numerical Techniques
BS302: DBMS
BS303 : Digital Electronics  
BS304 : Web technology  
BSP31 : Computer Based Numerical Techniques  
BSP32 : Web technology

**SEMESTER - IV**

BS401 : Operating system  
BS402 : Advance RDBMS  
BS403 : Management Information System  
BS404 : Multimedia Technology and Application  
BSP41 : Operating system  
BSP42 : Advance RDBMS

**SEMESTER – V**

BS501 : Programming in JAVA  
BS502 : Data Communication & Networks  
BS503 : Network Security  
BS504 : Software Engineering  
BSP51 : Programming in JAVA  
BSP52 : Data Communication & Networks

**SEMESTER VI**

BS601 : E-Governance  
BS602 : Advance programming in JAVA  
BSP61 : Advance programming in JAVA  
BSSM : Seminar  
BSPR : Project
**FIRST SEMESTER:**

<table>
<thead>
<tr>
<th>S. No</th>
<th>Course No.</th>
<th>Subject</th>
<th>Evaluation – Scheme</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Period</td>
<td>Sessional</td>
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<td></td>
<td>L</td>
<td>T</td>
</tr>
<tr>
<td>Theory</td>
<td></td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>1.</td>
<td>BS101</td>
<td>Fundamental of Computers and Information Technology</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>BS102</td>
<td>Programming in ‘C’</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>BS103</td>
<td>Mathematical Foundation</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>BS104</td>
<td>Financial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>Practical</td>
<td></td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>1.</td>
<td>BSP11</td>
<td>Programming in ‘C’</td>
<td>-</td>
</tr>
<tr>
<td>2.</td>
<td>BSP12</td>
<td>PC Packages(Introduction to Operating system &amp; MS Office)</td>
<td>-</td>
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<td></td>
<td>Total</td>
<td>12</td>
<td>4</td>
</tr>
</tbody>
</table>

Total Period = 24
Total Marks = 700

**SECOND SEMESTER:**

<table>
<thead>
<tr>
<th>S. No</th>
<th>Course No.</th>
<th>Subject</th>
<th>Evaluation – Scheme</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Period</td>
<td>Sessional</td>
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<tr>
<td>Theory</td>
<td></td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>1.</td>
<td>BS201</td>
<td>Data Structures</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>BS202</td>
<td>Object Oriented Prog. using ‘C++’</td>
<td>3</td>
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<tr>
<td>3.</td>
<td>BS203</td>
<td>System Analysis &amp; Design</td>
<td>3</td>
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<tr>
<td>4.</td>
<td>BS204</td>
<td>Probability &amp; Statistical Techniques</td>
<td>3</td>
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<tr>
<td>Practical</td>
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<td>-</td>
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<tr>
<td></td>
<td></td>
<td>Object Oriented Programming using ‘C++’</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12</td>
<td>4</td>
</tr>
</tbody>
</table>

| TA | : Teacher Assessment |
| CT | : Class Test |
| ESE | : End Semester Examination |
| SUB TOT. | : Subject Total |
| TOT. | : Total |

Total Period = 24  
Total Marks = 700
BS101 : Fundamental of Computers and Information Technology

Computer system concept, computer system characteristics, capabilities and limitations, types of computers – analog, digital, hybrid, general, special purpose, micro, mini, mainframe, super. generations of computers, personal computer (PC) - IBM PC, characteristics, PC/PCXT/PCAT - configurations, Pentium and newer PC specifications and main characteristics. Types of PC- desktop, laptop, notebook, palmtop, workstations etc, their characteristics, add on cards on PC : sound card, video card, network card etc. Basic components of a Computer System - Control Unit, ALU, Input / Output functions and Characteristics, Memory – RAM, ROM, EPROM, PROM and other types of memory.


Virus, Types of Viruses, Virus detection and prevention Viruses on Network. Introduction to Multimedia.

References:

1. INTRODUCTION TO COMPUTERS AND INFORMATION TECHNOLOGY BY ANURAG SEETHA, RAM PRASAD & SONS, BHOPAL.
2. COMPUTERS TODAY BY S.K.BASANDRA, GALGOTIA PUBLICATIONS.
3. FUNDAMENTALS OF INFORMATION TECHNOLOGY BY ALEXIS LEON & MATHEWS LEON, VIKAS PUBLISHING HOUSE, NEW DELHI.
BS102 : Programming in ‘C’

Programming in C: History, Introduction to C Programming Languages, Structure of C programs, compilation and execution of C programs. Debugging Techniques, Data Types and Sizes, Declaration of variables,Modifiers, Identifiers and keywords, Symbolic constants, Storage classes (automatic, external, register and static), Enumerations, command line parameters, Macros, The C Preprocessor

Operators: Unary operators, Arithmetic & logical operators, Bit wise operators, Assignment operators and expressions, Conditional expressions, precedence and order of evaluation. Control Statements: if-else, switch, break, continue, the comma operator, go to statement.

Loops: for, while, do-while.

Functions: built-in and user-defined, function declaration, definition and function call, parameter passing: call by value, call by reference, recursive functions, multifile programs.

Arrays: Linear arrays, multidimensional arrays, Passing arrays to functions, Arrays and strings.

Structure and Union: Definition and differences, self-referential structure. And address of (&) operator, pointer to pointer, Dynamic Memory Allocation, calloc and malloc functions, array of pointers, function of pointers, structures and pointers.

References:

1. V. Rajaraman, "Fundamentals of Computers", PHI
2. Pater Norton's "Introduction to Computer", TMH
3. Hahn, "The Internet complete reference", TMH
4. Peter Norton's, "DOS Guide", Prentice Hall of India
BS103 : Mathematical Foundation

Relation: Type and compositions of relations, Pictorial representation of relations, Equivalence relations, Partial ordering relation.

Function: Types, Composition of function, Recursively defined function.

Mathematical Induction: Piano's axioms, Mathematical Induction, Discrete Numeric Functions and Generating functions, Simple Recurrence relation with constant coefficients, Linear recurrence relation without constant coefficients, Asymptotic Behaviour of functions

Algebric Structures: Properties, Semi group, monoid, Group, Abelian group, properties of group, Subgroup, Cyclic group, Cosets, Permutation groups, Homomorphism, Isomorphism and Automorphism of groups.

Prepositional Logic: Preposition, First order logic, Basic logical operations, Tautologies, Contradictions, Algebra of Proposition, Logical implication, Logical equivalence, Normal forms, Inference Theory, Predicates and quantifiers, Posets, Hasse Diagram.


Classification & Presentation of Data including diagrammatic presentation. Measures of central tendency – Mean, Mode, Median, Geometric & Harmonic. Measures of dispersion - Range, Quartile Deviation, Average & Standard deviation.


References:

1. Liptschutz, Seymour, "Discrete Mathematics", TMH.
2. Trembley, J.P. & R. Manohar, "Discrete mathematical Structure with Application to Computer Science", TMH.
BS104 : Financial Accounting


Capital Budgeting: Meaning, importance, difficulties, Introduction to evaluation techniques - Traditional techniques (ARR Payback method). Discounting cash flow techniques (Present value, NPV, IRR) Ratio Analysis: Meaning, advantages, limitations of ratio analysis, Types of ratios and their usefulness.


References:

BS201 : Data Structures


Queues: Array and linked representation and implementation of queues, Operations on Queue; Create, Add, Delete, Full and Empty, Circular queue, Dequeue, and Priority Queue. Link List: Representation and implementation of Singly linked lists, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to from Linked Lists, Insertion and deletion Algorithms, Doubly linked list, Linked List of Array, Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction.

Trees: Basic terminology, Binary Tree, Binary tree representation algebraic Expressions, Complete Binary Tree, Extended Binary Tree, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees. Traversing Threaded Binary tree, Huffman algorithm. Searching and Hashing: Sequential search, comparison and analysis, Hash Table, Hash Function, Collection Resolution Strategies, Hash Table Implementation.

Sorting: Insertion Sort, Bubble sorting, Quick Sort, Two way Merge Sort, Trees: Binary Search (BST), Insertion and Deletion in BST.

References:

1. Horowitz and Sahani, "Fundamentals of data Structures" Galgotia
2. R. Kruse etal, "Data Structures and Program Design in C" Person Education
3. A.M. Tenenbaum etal, "Data Structures and Program Design in C" Person Education
4. Lipschutz, "Data Structure", TMH
7. Adm Frozek, "Data Structures and Algorithms in C++" Thomson Asia
8. Pal G. Sorenson, "An Introduction to Data Structures with Application", TMH
BS202 : Object Oriented Programming using ‘C++’


Class, Constructors, Friend Class : Introduction, Comparing class with Structure, Class Scope, Accessing Members of a class, Constructor, Destructor, Const objects, Const member functions, Friend class, Friend function, This pointer, Data abstraction and Information hiding, container classes and Iterators

Overloading & Inheritance: Operator Overloading, Fundamentals, Restrictions, Overloading stream, Insertion and stream extraction operators, Overloading unary & binary operators, Converting between types, Overloading ++ and --. Inheritance, Introduction, Protected members, Casting base _class pointers to derived _class pointers Overloading Base class members in a Derived class, Public, Protocols and Private inheritance, Direct base classes and Indirect Base Classes, Using Constructors and Destructors in Derived classes, Implicit Derived class object to base class object conversion.

Virtual Functions: Introduction, Type fields and switch statements, Virtual functions, Abstract base classes and concrete classes, Polymorphism, Dynamic binding, Virtual destructors.


Files : File Operations –File pointers – error Handling during file Operations

References:

3. Herbert Scheldt, “Complete Reference”.
4. E. Balagurusamy “Object Oriented Programming with C++”.
BS203 : System Analysis and Design


Information Gathering: Kind of Information needed. Information about the firms, Information gathering tools, the art of Interviewing, Arranging the Interview, Guides to Successful Interview, Types of Interviews and Questionnaires, The Structured and Unstructured Alternatives.


References:

1. Elias M.Awad, "Systems Analysis & Design" Galgotia Publication
2. Hoffer, "Modern Systems Analysis & Design" Addision Wesley
BS204 : Probability & Statistical Techniques

Data representation, Histogram, frequency distribution, Ogive, Arithmetic mean and Geometric Mean, Harmonic Mean, Medium quadrates.

Probability Theory: Sample space & events, the axioms of probability, some elementary theorem, conditional probability, Baye’s Theorem, mathematical expectation.

Probability distribution: random variables, binomial distribution, hyper geometric distribution, chebyshev distribution, Poisson distribution, geometric distribution, Erlang distribution.

Probability Densities: continuous random variables, normal distribution, uniform distribution.

Example of Least square, fitting of curves. Correlation and regression.

Theory of Sampling: Sampling, sampling of attributes, Mean of standard deviation of sample, Sampling distribution, Distribution of the means.

Chi square test as a goodness of fit, Chi square test as test of independence.

References:
2. Hogg:”Introduction Mathematical Statistics”, Pearson Education
3. Lipschutz, “Introduction to Probability & Statistics” PHI
BS301 : Computer Based Numerical Techniques


References:

1. Rajaraman V., :Computer Oriented Numerical Methods", PHI
2. Gerald and Wheatley, "Applied Numerical Analyses", AW
BS302 : DBMS

Introduction: An overview of database management system, Database System Vs File System, Database system concepts and architecture, data models schema and instances, data independence and data base language and interfaces, Data definitions language, DMI, Overall Database structure. Data modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationships of higher degree.

Relational Data Model and Language: Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus.

Introduction to SQL: Characteristics of SQL, Advantages of SQL, SQL data types and literals, Types of SQL commands, SQL operators and their procedure, Tables, views and indexes Queries and sub queries, Aggregate functions, Insert, update and delete operations, Joints, Unions, Intersection, Minus, Cursors in SQL. PL/SQL, Triggers and clusters.

Database Design & Normalization: Functional dependencies, normal forms, first, second third normal forms, BCNF, inclusion dependencies, loss less join decompositions, normalization using FD, MVD, and JDs, alternative approaches to database design


References:

1. Date C.J. "An Introduction to Database System". Addision Wesley
4. Paul Beynon Davis, "Database Systems" Palgrave Macmillan
BS303 : Digital Electronics


Memory Organization: Memory hierarchy, Main memory (RAM/ROM) chips), Auxiliary memory, Associative memory, Cache memory, Virtual memory, Memory Management Hardware, hit/miss ratio, magnetic disk and its performance, magnetic Tape etc.


References:

1. Willam Stalling, "Computer Organization & Architecture" Pearson Education Asia
2. Mano Morris, "Computer System Architecture" PHI
4. B. Ram, "Computer Fundamental Architecture & Organization" New Age
5. Tannenbaum, "Structured Computer Organization" PHI.
BS304 : Web technology


Communication Issues, the client, Multi-departmental & Large scale Websites, Quality Assurance and testing, Technological advances and Impact on Web Teams.


Common Gateway Interface (CGI), PERL, RMI, COM/DCOM, VBScript, Active Server Pages (ASP).

References:

1. Burdman, "Collaborative Web Development", Addison Wesley
2. Sharma & Sharma, "Developing E-Commerce Sites" Addison Wesley
3. Iva Bayross, "Web Technologies Part-II" BPB Publications
5. DON Box, "Essential COM" Addison Wesley
BS401 : Operating system

Introduction: Definition, Design Goals, Evolution; Concept of User, job and Resources; Batch processing, Multi-programming, Time sharing; Structure and Functions of Operating System.


References:
3. Tanenbaum, Modern operating Systems, PHI.
5. Vijay Mukhi, The C Odyssey, BPB.
7. P. B. Hansen, Operating System Principles, PHI.
BS402 : Advance RDBMS


Monitoring Database performance. Database Machine overview.
Designing RDBMS for organization. Object modeling. Perspectives of Data Modelling. Evolving the logical model. Transformation from Logical to Physical model.

Concurrency Control Techniques: Concurrency control, locking Techniques for concurrency control. CODD’s 12 rules for a fully relational DBMS.

Data Integrity. Redundancy. Primary and Foreign keys.

Object database management. Database design and choosing the database server. SQL and Mysql. Database access and ODBC.

Middleware: Kinds of middleware. Sockets-talking to database, virtual database engine defined, web based middleware, Microsoft JET engine,

Database security and Recovery. Data Mining and Warehouse.

References:

1. Adv. DBMS by V.K. Jain, Cyber Tech Publication, 5A/13 Ansari Road, Daryagang, N.Delhi.-110002
2. Date C.J. "An Introduction to Database System". Addition Wesley
5. Paul Beynon Davis, "Database Systems" Palgrave Macmillan
BS403 : Management Information System
Fundamentals of Information Systems, Systems approach to problem solving, Developing information system solutions, Levels of MIS (Top, Middle, Lower).

Corporate Databases & Database Management, Data Organization, Data models, Data Security & Information quality.


References:
1. Brein James O. – Management Information Systems
2. Murdick & Ross – Information Systems for Modern Management
BS404 : Multimedia Technology and Application


Production and Planning of Multimedia building blocks, Text, sound (MIDI), Digital Audio, Audio File Formats, MIDI under Windows environment, Audio & Video Capture.

Macromedia products, Basic drawing techniques, Advance animation techniques, Creating Multi layer combining interactivity and multiple scenes, Creating transparency effects using text in Flash, Flash animation.


References:

1. Andreas Halzinger, "Multimedia Basics" Vol-I to VOL-III Firewall Media
BS501 : Programming in JAVA

Java Programming: Introduction, Operator, Data types, Variables, Methods and Classes, Multi threaded programming, I/O Java applet.


Software Development Using Java: Java Bean, Java Swing, Java Servlets, Migrating from C++ to Java, Application of JAVA, Dynamic Billboard Applet.

Image Menu: An image based menu, Lavatron Applets, Scrabblets JDBC, Brief functioning of Upper Layer E-mail and their applications.

References:

1. Naughton, Schidt, "The Complete Reference JAVA2", TMH
2. Balagurusamy E, "Programming in JAVA, TMH
3. Dustin R. Calway, "Inside Serviets" Addison Wesley
4. Mark Wutica, "Java Enterprise Edition" QUE
5. Steven Hoizner, "Java2 Black book" Dreamtech
BS502 : Data Communication & Networks

Introductory Concepts: Goals and Applications of Networks, Network structure and architecture, the OSI reference model, services, networks topology, Physical Layer transmission, switching methods, Integrated services digital networks, terminal handling.

Medium Access sub Layer: Channel allocations, LAN protocols, ALOHA Protocols-Pure Aloha, slotted ALOHA, Carrier Sense Multiple Access Protocols, CSMA with Collision Detection, Collision free Protocols, IEEE standards, FDDI, Data Linked Layer elementary data link protocols, sliding windows protocols, error handling, High Level Data Link Control.


References:

3. Comer, "Internetworking with TCP/IP" PHI
4. Comer, "Computer networks & Inter" PHI
5. Forouzan, "Data Communication and Networking" PHI
BS503 : Network Security


References:

2. Johannes A. Buchmann, "Introduction to Cryptography" Springer-Verlag
3. Atul Kahate, "Cryptography and Network Security" TMH
BS504 : Software Engineering


Coding: Top-Down and Bottom-Up programming, structured programming, information hiding, programming style and internal documentation.

Testing principles, Levels of testing, functional testing, structural testing, test plane, test case specification, reliability assessment, software testing strategies, Verification and validation, Unit testing, Integration Testing, Alpha & Beta testing, system testing and debugging.

Software Project Management: The Management spectrum (The people, the product, the process, the project) Cost estimation, project scheduling, staffing, software configuration management, Structured Vs. Unstructured maintenance, quality assurance, project monitoring, risk management.


References:

3. Schaum's Series, "Software Engineering" TMH
4. Ghezzi Carlo and Others "Fundamentals of Software Engineering" PHI
6. Sommerville, Ian, "Software Engineering" AWL
BS601 : E-Governance


Electronic Payments: Overview, The SET protocol, payment Gateway, certificate, digital Tokens, Smart card, credit card, magnetic strip card, E-Checks, Credit/Debit card based EPS, online Banking EDI Application in business, E-Commerce Law, Forms of Agreement, Govt. policies and Agenda.

References:

2. Bajaj and Nag. "E-Commerce the cutting edge of Business". TMH.
BS602 : Advance programming in JAVA

Core Java: Introduction Operator, Data Types, Variable, Arrays, Control statements, Methods & classes, Inheritance, Package and Interface, Exception Handling, Multithread programming, I/O, Java Applet, String handling, Networking, Event handling, Introduction to AWT, AWT controls, Layout manager, Menus, Images, Graphics.


Introduction to RMI (Remote Method Invocation): A simple client server application using RMI.


References:

1. Margarel Leving Young,"The complete Reference Internet" TMH
2. Naughton, Schidt, "The Complete Reference JAVA2", TMH
3. Balagurusamy E, "Programming in JAVA, TMH
4. Dustin R. Calway, "Inside Serviets" Addison Wesley
5. Mark Wutica, "Java Enterprise Edition" QUE