# UTTARAKHAND TECHNICAL UNIVERSITY

## Program: B. Tech-CSE

**Year:** Session: 2011 – 2012

### Scheme and Evaluation Pattern

<table>
<thead>
<tr>
<th>S.No</th>
<th>Course No.</th>
<th>Subject</th>
<th>Periods</th>
<th>Evaluation</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Semester: 5th

| Theory  | 1. TCS – 501 | Computer Graphics | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 |
|         | 2. TCS – 502 | Computer Network  | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 |
|         | 3. TCS – 503 | Design & Analysis of Algorithms | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 |
|         | 4. TCS – 504 | Principles of Programming Languages | 2 | 1 | 0 | 15 | 10 | 25 | 50 | 75  |
|         | 5. TCS – 505 | Advance Java Programming | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 |
|         | 6. TCS – 506 | Modeling & Simulation  | 2 | 1 | 0 | 15 | 10 | 25 | 50 | 75  |

#### Practical/Design

| 1. PCS -551 | Computer Graphics Lab. | 0 | 0 | 2 | 0 | 0 | 25 | 25 | 50 |
| 2. PCS-552 | Computer Network Lab. | 0 | 0 | 2 | 0 | 0 | 25 | 25 | 50 |
| 3. PCS-553 | Algorithms Lab. | 0 | 0 | 2 | 0 | 0 | 25 | 25 | 50 |
| 4. PCS-555 | Adv. Java Lab. | 0 | 0 | 2 | 0 | 0 | 25 | 25 | 50 |
| 5. Discipline | 0 | 0 | 2 | 0 | 0 | 25 | 0 | 50 |

#### Semester: 6th

| Theory  | 1. TCS – 601 | Operating System | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 |
|         | 2. TCS – 602 | Compiler Design  | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 |
|         | 3. TCS – 603 | Artificial Intelligence | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 |
|         | 4. TCS – 604 | Graph Theory    | 2 | 1 | 0 | 15 | 10 | 25 | 50 | 75  |
|         | 5. TCS – 605 | Visual Programming & DotNet Technologies | 3 | 1 | 0 | 30 | 20 | 50 | 100 | 150 |
|         | 6. THU – 608 | Principles of Management | 2 | 1 | 0 | 15 | 10 | 25 | 50 | 75  |

#### Practical/Design

| 1. PCS-651 | Operating System Lab. | 0 | 0 | 2 | 0 | 0 | 25 | 25 | 50 |
| 2. PCS-652 | Compiler Design Lab. | 0 | 0 | 2 | 0 | 0 | 25 | 25 | 50 |
| 3. PCS-653 | Artificial Intelligence Lab. | 0 | 0 | 2 | 0 | 0 | 25 | 25 | 50 |
| 4. PCS-655 | Visual Programming Lab. | 0 | 0 | 2 | 0 | 0 | 25 | 25 | 50 |
| 5. Discipline | 0 | 0 | 2 | 0 | 0 | 25 | 0 | 50 |
# Uttar Pradesh Technical University

## Program: B. Tech-CSE

### Year: Session: 2012 - 2013

## Scheme and Evaluation Pattern

<table>
<thead>
<tr>
<th>S.No</th>
<th>Course No.</th>
<th>Subject</th>
<th>Periods</th>
<th>Evaluation</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CT</td>
<td>TA</td>
<td>Total</td>
</tr>
</tbody>
</table>

### 7th Semester

**Theory**

1. TCS-701 System Administration  
   3 1 0 30 20 50 100 150

2. TCS-702 Advance Computer Architecture  
   3 1 0 30 20 50 100 150

3. TCS-703 Data Warehousing & Mining  
   3 1 0 30 20 50 100 150

4. TCS-07X ELECTIVE-I  
   3 1 0 30 20 50 100 150

5. TOE-XX Open Elective  
   3 1 0 30 20 50 100 150

**Practical/Design**

1. PCS-757 Project  
   0 0 4 0 0 50 50 100

2. PCS-758 Industrial Interaction/ Seminar (Term Paper)  
   0 0 2 0 0 25 25 50

3. PCS-751 System Administration Lab  
   0 0 2 0 0 25 25 50

4. Discipline  
   0 0 0 0 0 50 0 50

### 8th Semester

**Theory**

1. TCS-801 Distributed Computing  
   3 1 0 30 20 50 100 150

2. TCS-802 Web Technology  
   3 1 0 30 20 50 100 150

3. TCS-02X ELECTIVE-II  
   3 1 0 30 20 50 100 150

4. TCS-03X ELECTIVE-III  
   3 1 0 30 20 50 100 150

**Practical/Project**

1. PCS-857 Project  
   0 0 6 0 0 100 200 300

2. PCS-852 Web Technology Lab.  
   0 0 2 0 0 50 0 50

3. Discipline  
   0 0 0 0 0 50 0 50

---

UK Tech University  
B. Tech. CSE 3rd Year
### ELECTIVE-I

- **TCS-071**  Digital Image Processing
- **TCS-072**  Soft Computing TCS-
- **073**  Wireless Networks TCS-
- **074**  Information Security

### ELECTIVE-II

- **TCS-081**  Parallel Computing
- **TCS-082**  Database Administration
- **TCS-083**  Advance Computer Network
- **TCS-084**  Fault Tolerant Computing

### ELECTIVE-III

- **TCS-086**  Computer Vision
- **TCS-087**  Advanced DBMS
- **TCS-088**  Intrusion Detection Systems
- **TCS-089**  Cryptography & Network Security
COMPUTER GRAPHICS (TCS-501)

Unit-I

Line generation: Points lines, Planes, Pixels and Frame buffers, vector and character
generation. Graphics Primitives: Display devices, Primitive devices, Display File Structure,
Display control text.

Unit-II

Polygon: Polygon Representation, Entering polygons, Filling polygons. Segments: Segments
table, creating deleting and renaming segments, visibility, image transformations.

Unit-III

Transformations: Matrices transformation, transformation routines, displays procedure.
Windowing and Clipping: Viewing transformation and clipping, generalize clipping, multiple
windowing.

Unit-IV

Three Dimension: 3-D geometry primitives, transformations, projection clipping.
Hidden Line and Surface: Back face removal algorithms, hidden line methods

Unit-V

Graphics Programming: The Sierpinski Gasket, Programming Two-Dimensional
Applications, The OpenGL API, Primitives and Attributes, Color, Viewing, Control
Functions, Polygons and Recursion, The Three-Dimensional Gasket, Plotting Implicit
Functions

Input and Interaction: Interaction, Input Devices, Clients and Servers, Display Lists,
Programming Event-Driven Input, Menus, Picking, Building Interactive Models, Animating
Interactive Programs, Design of Interactive Programs, Logic Operations.

References :

   Ltd. (2009)
2. Donald D. Hearn, M. Pauline Baker; Computer Graphics with OpenGL; 3/E;
   Pearson Education
COMPUTER NETWORKS (TCS-502)

Unit - I


Unit-II

Medium Access sub layer: Medium Access sub layer – Channel Allocations, LAN protocols - ALOHA protocols - Overview of IEEE standards - FDDI. Data Link Layer - Elementary Data Link Protocols, Sliding Window protocols, Error Handling.

Unit - III


Unit - IV


Unit-V

Application Layer: Application Layer: File Transfer, Access and Management, Electronic mail, Virtual Terminals, Other application, Example Networks - Internet and Public Networks.

References:

1. Forouzen, "Data Communication and Networking", TMH


DESIGN & ANALYSIS OF ALGORITHMS (TCS-503)

Unit -I


Unit -II


Unit -III


Unit -IV


Unit -V

Selected Topics: Randomized Algorithms, String Matching, NP Completeness, Approximation Algorithms.

References:

1. Coreman, Rivest, Lisserson, “Algorithm”, PHI.


PRINCIPLES OF PROGRAMMING LANGUAGES (TCS-504)

Unit -I

Introduction: Characteristics of programming Languages, Factors influencing the evolution of programming language, developments in programming methodologies, desirable features and design issues. Programming language processors: Structure and operations of translators, software simulated computer, syntax, semantics, structure, virtual computers, binding and binding time.

Unit -II

Elementary and Structured Data Types, Structured data type and objects, Sub Program and programmer defined data types: Evolution of data types, abstractions, encapsulations, information hiding, sub programmes, abstract data types. Sequence Control; Implicit and Explicit sequence control, sequence control with within expression and statements, recursive sub programmes, exception handling, co-routines, Scheduled sub programmes, concurrent execution.

Unit -III

Data control referencing environments, static and dynamic scope, local data local data referencing environment, shared data: Explicit common environment dynamic scope parameter passing mechanism. Storage Management: Major run time requirements, storage management phases, static storage management, stack based, heap based storage management.

Unit -IV

Syntax and translation: General syntactic criteria, syntactic element of a language, stages in translation, formal syntax and semantics.

Introduction to Functional Programming, Lambda calculus, Data flow language and Object Oriented language, Comparison in various general and special purpose programming languages e.g. Fortran, C, Pascal, Lisp, etc.

References:

1. Terrance W Pratt, "Programming Languages: Design and Implementation" PHI
2. Sebesta, "Concept of Programming Language", Addison Wesley
Advance Java Programming (TCS-505)

UNIT-1


Java Script: Data types, variables, operators, conditional statements, array object, date object, string object, Dynamic Positioning and front end validation, Event Handling

UNIT-2

JSP: Introduction to JSP, JSP processing, JSP Application Design, Tomcat Server, Implicit JSP objects, Conditional Processing, Declaring variables and methods, Error Handling and Debugging, Sharing data between JSP pages- Sharing Session and Application Data.


UNIT-4

Java Servlet: Brief origin and advantages over CGI, J2EE Servlet 2.x Specification, Writing small Servlet Programs, Deployment Descriptor, Inter Servlet Collaboration, Session: Definition, State on web, Different ways to track sessions.

UNIT-5

J2SE: Concepts and Prerequisites: Data Types, Arrays, Dynamic Arrays, Type Casting, Classes and Objects, Inheritance, Interfaces, Exception Handling, Multi-Threading.

J2EE Architecture: J2EE as a framework, Client Server Traditional model, Comparison amongst 2-tier, 3-tier and N-tier architectures, Thin and Thick Clients

TEXT BOOKS:


REFERENCES:

UNIT-I
Introduction: Systems, models, discrete event simulation and continuous simulation.
Discrete Event Simulation: Time-advance mechanisms, event modeling of discrete dynamic systems, single-server single queue model, event graphs, Monte Carlo simulation.

UNIT-II
GPSS: Model structure, entities and transactions, blocks in GPSS, process oriented programming, user defined functions, SNA, logic switches, save locations, user chains, tabulation of result, programming examples.

Random Number Generation: Congruence generators, long period generators, uniformity and independence testing

UNIT-III
Random Variate Generation: Location, scale and shape parameters, discrete and continuous probability distributions; Inverse transform method, composition and acceptance-rejection methods

UNIT-IV
Queuing Models: Little’s theorem, analytical results for M/M/1, M/M/1/N, M/M/c, M/G/1 and other queuing models.

Books:
COMPUTER GRAPHICS LAB (PCS-551)

1. Implementation of line generation using slope’s method, DDA and Bresenham’s algorithms.
2. Implementation of circle generation using Mid-point method and Bresenham’s algorithm.
3. Implementation of ellipse generation using Mid-point method.
4. Implementation of polygon filling using Flood-fill, Boundary-fill and Scan-line algorithms.
5. Implementation of 2D transformation: Translation, Scaling, Rotation, Mirror Reflection and Shearing (write a menu driven program).
7. Implementation of Polygon Clipping using Sutherland-Hodgman algorithm.
8. Implementation of 3D geometric transformations: Translation, Scalind and rotation.
10. Implementation of Curve generation using B-spline and Bezier curves.
11. Implementation of any one of Back face removal algorithms such as Depth-Buffer algorithm, Painter’s algorithm, Warnock’s algorithm, Scanline algorithm).

COMPUTER NETWORKS LAB (PCS-552)

1. Implementation of the Data Link Layer framing method such as character stuffing and bit stuffing.
2. Implementation of CRC algorithm.
3. Implementation of a Hamming (7,4) code to limit the noise. We have to code the 4 bit data into 7 bit data by adding 3 parity bits.
5. Write a socket program to implement a listener and a talker.
6. Simulation of a network of 3 nodes and measure the performance on the same network.
7. Write a program to encrypt 64-bit text using DES algorithm.
ALGORITHMS LABORATORY (PCS-553)

Programming assignments on each algorithmic strategy:

1. Divide and conquer method (quick sort, merge sort, Strassen’s matrix multiplication),
2. Greedy method (knapsack problem, job sequencing, optimal merge patterns, minimal spanning trees).
3. Dynamic programming (multistage graphs, OBST, 0/1 knapsack, traveling sales person problem).
5. Sorting: Insertion sort, Heap sort, Bubble sort
6. Searching: Sequential and Binary Search
7. Selection: Minimum/ Maximum, Kth smallest element

ADVANCE JAVA LAB (PCS-555)

At least following must be completed

1. Development of dynamic website of an online Departmental Store. The website should be user friendly and should have the following pages:
   - Home page
   - Registration and user login
   - User profile page
   - Items catalog
   - Shopping cart
   - Payment by credit card
   - Order confirmation

2. Add validations to the above site for registration, user login, user profile and payment by credit card using Java Script.

1. Creation of a JavaBean which gives the converted value of Temperature (in degree celcius) into equivalent Fahrenheit
2. Creation of a simple Bean with a label – which is a “count” of number of clicks. Then create a BeanInfo class such that only the “count” is visible in the Property Window.
3. Creation of two Beans a) Keypad b) Display pad. After that integrate the two beans to make it work as a calculator.
4. Do the assignment 2 using JSP by converting the static web pages of assignment 2 into dynamic web pages. Create database with User Information and Item information. The Item catalog should be dynamically loaded from the database.
5. Implementation of currency converter program using JSP Struts Framework.
OPERATING SYSTEMS (TCS-601)

Unit - I

Unit - II
Cpu Scheduling: Scheduling Concept, Performance Criteria, Scheduling Algorithm Evolution, Multiprocessor Scheduling.

Unit - III

Unit - IV

UNIT V
Windows XP: System architecture, system management mechanisms, process, thread, memory and file management, I/O subsystem, Interprocess communication, Security.

Suggested Books and References:
5. Tannenbaum, "Operating System Design and Implementation", PHI.
COMPILER DESIGN (TCS-602)

Unit-I

Introduction to Compiler, Phases and passes, Bootstrapping, Finite state machines and regular expressions and their applications to lexical analysis, Implementation of lexical analyzers, lexical-analyzer generator, LEXcompiler,

Formal grammars and their application to syntax analysis, BNF notation, ambiguity, YACC. The syntactic specification of programming languages : Context free grammars, derivation and parse trees, capabilities of CFG.

Unit-II

Basic Parsing Techniques: Parsers, Shift reduce parsing, operator precedence

parsing, top down parsing, predictive parsers Automatic Construction of efficient Parsers : LR parsers, the canonical Collection of LR(0) items, constructing SLR parsing tables, constructing Canonical LR parsing tables, Constructing LALR parsing tables, using ambiguous grammars, an automatic parser generator, implementation of LR parsing tables, constructing LALR sets of items.

Unit-III

Syntax-directed Translation: Syntax-directed Translation schemes,

Implementation of Syntax- directed Translators, Intermediate code, postfix notation, Parse trees & syntax trees, three address code, quadruple & triples, translation of assignment statements, Boolean expressions, statements that alter the flow of control, postfix translation, translation with a top down parser.

More about translation: Array references in arithmetic expressions, procedures call, declarations, case statements.

Unit-IV


Unit-V

Introduction to code optimization: Loop optimization, the DAG representation of basic blocks, value numbers and algebraic laws, Global Data-Flow analysis.

Implementation of a subset of C using YACC.

References:

3. Chattopadhyay Santanu; Compiler Design; Phi Learning (2009)
ARTIFICIAL INTELLIGENCE (TCS-603)

UNIT I

UNIT II
**Knowledge Representation:** Approaches and issues in knowledge representation, Knowledge Based Agent, Propositional Logic, Predicate logic – Unification – Resolution, Weak slot – filler structure, Strong slot - filler structure.

UNIT III
**Reasoning under uncertainty:** Logics of non-monotonic reasoning, Implementation, Basic probability notation, Bayes rule, Certainty factors and rule based systems, Bayesian networks, Dempster - Shafer Theory, Fuzzy Logic.

UNIT IV
**Planning and Learning:** Planning with state space search, conditional planning, continuous planning. Multi-Agent planning. Forms of learning - inductive learning - Reinforcement Learning - learning decision trees - Neural Net learning and Genetic learning

UNIT V
**Advanced Topics: Game Playing:** Minimax search procedure - Adding alpha-beta cutoffs.
**Expert System:** Representation - Expert System shells - Knowledge Acquisition.
**Swarm Intelligent Systems** – Ant Colony System, Development, Application and Working of Ant Colony System.

TEXT BOOKS

REFERENCES
Graph theoretic algorithms must be provided wherever required to solve the problems.

Unit - I
Graphs, Sub graphs, some basic properties, various example of graphs & their sub graphs, walks, trails, path & circuits, connected graphs, disconnected graphs and component, various operation on graphs, Euler graphs, Hamiltonian paths and circuits, the traveling salesman problem, directed graphs, some types of directed graphs, directed paths and connectedness, Hamiltonian and Euler digraphs.

Unit - II
Trees and fundamental circuits, distance diameters, radius and pendent vertices, rooted and binary trees, on counting trees, spanning trees, fundamental circuits, finding all spanning trees of a graph and a weighted graph, trees with directed edges, fundamental circuits in digraph, algorithms of Prim, Kruskal and Dijkstra.

Unit - III
Cuts sets and cut vertices, some properties, all cut sets in a graph, fundamental circuits and cut sets, connectivity and separability, network flows, planer graphs, Euler’s formula and its corollaries, Kuratowski’s theorem and its application to planarity detection of graphs, combinatorial and geometric dual, some more criterion of planarity, thickness and crossings.

Unit - IV
Incidence matrix of graph, sub matrices of A(G), circuit matrix, cut set matrix, fundamental circuit matrix and rank of B, path matrix and relationships among $A_p$, $B_p$ & $C_f$, adjacency matrices, adjacency matrix of a digraph, matrices A, B and C of digraphs, rank-nullity theorem, coloring and covering and partitioning of a graph, chromatic number, chromatic partitioning, chromatic polynomials, matching, covering, enumeration, types of enumeration, counting of labeled and unlabeled trees.

References:
1. Deo, N: Graph theory, PHI
2. Bondy and Murthy: Graph theory and application. Addison Wesley.
Visual Programming & DotNet Technologies (TCS-605)

UNIT 1 The Philosophy of .NET
Understanding the previous states affair, The .NET Solution, The building Block of the .NET platform (CLR,CTS,CLS), the role of the .NET base class libraries, C# characteristics, additional .NET Aware programming Languages, An overview of .NET binaries (assemblies), The role of the common intermediate language, The role of .NET type metadata, The role of the assembly manifest, Compiling CIL to platform specific instruction, Understanding the common type system, Intrinsic CTS data types, Understanding the common languages specification, Understanding the common languages runtime, A tour of the .NET namespace, increasing your namespace nomenclature, Deploying the .NET runtime.

UNIT 2 Building C# Applications
The role of the command line compiler (CSC.exe), Building application using csc.exe, Working with csc.exe response file, generating bug reports, C# compiler option, The command line debugger, using the visual studio .Net IDE, Other key aspects of the VS.Net IDE, Documenting source code via XML, C# preprocessor directives, An interesting Aside: The System. Environment class.

C# Language Fundamentals : An Anatomy of a basic class, Creating objects: Constructor basic, the composition of an application, Default Assignment and variable scope, member initialization syntax, Basic input and output with the console class, Understanding value types and reference types, The master node: System. Objects, The system Data type (And C# aliases), Converting between value type and reference type: Boxing and Unboxing, Defining program constraints, Iterations constructs, control flow constructs, The complete set operator, Defining Custom class methods, Understanding static methods, Method parameter modifiers, Array manipulation, String manipulation, Enumerations, Defining structures, Defining custom namespaces.

UNIT 3 Object Oriented Programming with C#
Formal definition of the class, Definition the “Default public interface” of a type, Recapping the pillars of OOP, The first pillar: Encapsulation services, Pseudo Encapsulation: Creating read only field, The second pillar: Inheritance supports keeping family secrets: The “Protected” keyword, The Nested type definitions, The third pillar: Polymorphic support casting between types, Generating class definitions using Visual Studio.

Net. Exceptions and Objects Life Time Ode to errors, Bugs and exceptions, The role of .NET exceptions handling, The system. Exception base class throwing a generic exception catching exception, CLR system level exception (System. system exception),Custom application level exception (System. application exception), Handling multiple exception, The finally block The last chance exception, dynamically identify application and system level exception, Debugging system exception using VS.Net, Understanding Object life time, The CIT of new, The basic of garbage collection, Finalizing a type, Finalization process, building and Ad hoc destruction method, garbage collection optimization, The system .GC type.

UNIT 4 Interfaces and Collections
Defining interfaces using C#, Invoking interface member at the object level, Exercising the shape hierarchy, Understanding explicit interface implementation, Interfaces as Polymorphic agents, Building interface hierarchies, Implementing interface using VS.Net, Understanding the IConvertible interface, Building a custom enumerator, Building cloneable objects, Building comparable objects, Exploring the system the collection namespace, Building a custom container (Retrofitting the cars type).

UNIT 5

Text Book:
1. Andrew Troelsen; Pro C# 2008 And The .Net 3. 5 Platform, 4Th Ed; Dreamtech Press
3. Joel Murach; Murach's C# 2008; Shroff/murachs (2008)
PRINCIPLES OF MANAGEMENT (THU-608)

UNIT 1
INTRODUCTION TO MANAGEMENT: Theories of management: Traditional behavioral, contingency and systems approach. Organization as a system.

UNIT 2
MANAGEMENT INFORMATION: Interaction with external environment. Managerial decision making and MIS.

UNIT 3
PLANNING APPROACH TO ORGANIZATIONAL ANALYSIS: design of organization structure; job design and enrichment; job evaluation and merit rating.

UNIT 4

TEXT BOOK:
OPERATING SYSTEMS LAB (PCS-651)

1. Simulation of the CPU scheduling algorithms a) Round Robin b) SJF c) FCFS d) Priority
2. Simulation of MUTEX and SEMAPHORES.
4. Implementation of Process Synchronization (Reader-Writer, Sleeping Barber and Dining Philosopher’s Problem)
5. Simulation of page Replacement Algorithms a) FIFO b) LRU c) LFU
6. Simulation of paging techniques of memory management.
7. Simulation of file allocation Strategies a) Sequential b) Indexed c) Linked
8. Simulation of file organization techniques a) Single Level Directory b) Two Level c) Hierarchical d) DAG

COMPILER DESIGN LAB (PCS-652)

1. Simulation of a Finite state Automata to recognize the tokens of various control statements.
2. Simulation of a Finite state machine to distinguish among Integers, Real Numbers & Numbers with Exponents.
3. Program in LEX tool to recognize the tokens and to return the token found for a C like Language
4. Parsing of arithmetic and algebraic expressions and equations.
5. Use of YACC tool to parse the statements of C like Language.
1. Write a LISP Program to solve the water-jug problem using heuristic function.
2. Create a compound object using Turbo Prolog.
3. Write a Prolog Program to show the advantage and disadvantage of green and red cuts.
4. Write a prolog program to use of BEST-FIRST SEARCH applied to the eight puzzle problem.
6. Write a Lisp Program to implement the STEEPEST-ASCENT HILL CLIMB ING.
7. Write a Prolog Program to implement COUNTTE PROPAGATION NETWORK.

Visual Programming Lab. (PCS-655)

At least following should be covered

Starting with simple exercise given in the text book regarding C# language constructs (flow control structures, data types, file I/O and local libraries) the lab must graduate to a full project using GUI forms for data entry (with validation) processing, querying and reporting on .Net platform with database connectivity.
## UTTARAKHAND TECHNICAL UNIVERSITY

### Program: B. Tech-CSE

**Year:** Session: 2012 – 2013

### Scheme and Evaluation Pattern

#### Semester: 7th

<table>
<thead>
<tr>
<th>S.No</th>
<th>Course No.</th>
<th>Subject</th>
<th>Periods</th>
<th>Evaluation</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>TCS - 701</td>
<td>System Administration</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2.</td>
<td>TCS -702</td>
<td>Advance Computer Architecture</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>3.</td>
<td>TCS -703</td>
<td>Data Warehousing &amp; Mining</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4.</td>
<td>TCS-07X</td>
<td>ELECTIVE-I</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5.</td>
<td>TOE-XX</td>
<td>Open Elective</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

#### Practical/Design

<table>
<thead>
<tr>
<th>S.No</th>
<th>Course No.</th>
<th>Subject</th>
<th>Periods</th>
<th>Evaluation</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>PCS -757</td>
<td>Project</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>PCS-758</td>
<td>Industrial Interaction/ Seminar (Term Paper)</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>PCS-751</td>
<td>System Administration Lab</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td>Discipline</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

#### Semester: 8th

<table>
<thead>
<tr>
<th>S.No</th>
<th>Course No.</th>
<th>Subject</th>
<th>Periods</th>
<th>Evaluation</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>TCS -801</td>
<td>Distributed Computing</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2.</td>
<td>TCS-802</td>
<td>Web Technology</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>3.</td>
<td>TCS-08X</td>
<td>ELECTIVE-II</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4.</td>
<td>TCS-08X</td>
<td>ELECTIVE-III</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

#### Practical/Project

<table>
<thead>
<tr>
<th>S.No</th>
<th>Course No.</th>
<th>Subject</th>
<th>Periods</th>
<th>Evaluation</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>PCS-857</td>
<td>Project</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>2.</td>
<td>PCS-852</td>
<td>Web Technology Lab.</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td>Discipline</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
### ELECTIVE-I

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCS-071</td>
<td>Digital Image Processing</td>
</tr>
<tr>
<td>TCS-072</td>
<td>Fault Tolerant Computing</td>
</tr>
<tr>
<td>TCS-073</td>
<td>Wireless Networks</td>
</tr>
<tr>
<td>TCS-074</td>
<td>Soft Computing</td>
</tr>
</tbody>
</table>

### ELECTIVE-II

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCS-081</td>
<td>Parallel Computing</td>
</tr>
<tr>
<td>TCS-082</td>
<td>Database Administration</td>
</tr>
<tr>
<td>TCS-083</td>
<td>Adv. Computer Network</td>
</tr>
<tr>
<td>TCS-084</td>
<td>Information Security</td>
</tr>
</tbody>
</table>

### ELECTIVE-III

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCS-086</td>
<td>Computer Vision</td>
</tr>
<tr>
<td>TCS-087</td>
<td>Advanced DBMS</td>
</tr>
<tr>
<td>TCS-088</td>
<td>Intrusion Detection Systems</td>
</tr>
<tr>
<td>TCS-089</td>
<td>Cryptography &amp; Network Security</td>
</tr>
</tbody>
</table>
SYSTEM ADMINISTRATION (TCS-701/TIT-701)

Unit-I


Managing User Accounts: Principles, password file, Password security, Shadow file, Groups and the group file, Shells, restricted shells, user management commands, homes and permissions, default files, profiles, locking accounts, setting passwords, Switching user, Switching group, Removing users.

Unit - II

Managing Unix File Systems: Partitions, Swap space, Device files, Raw and Block files, Formatting disks, Making file systems, Superblock, I-nodes, File system checker, Mounting file systems, Logical Volumes, Network File systems, Boot disks

Configuring the TCP/IP Networking: Kernel Configuration; Mounting the /proc File system, Installing the Binaries, Setting the Hostname, Assigning IP Addresses, Creating Subnets, Writing hosts and networks Files, Interface Configuration for IP, ifconfig, netstat command, Checking the ARP Tables; Name service and resolver configuration.

Unit- III

TCP/IP Firewall: Methods of Attack, What Is a Firewall? What Is IP Filtering? Setting Up Linux for Firewalling Testing a Firewall Configuration; A Sample Firewall Configuration: IPAccounting, Configuring the Kernel for IP Accounting, Configuring IP Accounting, Using IPAccounting Results

IP Masquerade and Network Address Translation: Side Effects and Fringe Benefits, Configuring the Kernel for IP Masquerade, Configuring IP Masquerade.

Unit-IV


System Backup & Recovery: Log files for system and applications; Backup schedules and methods (manual and automated).

Unit- V

Active Directory, LDAP

Text Books:

2. Michel Ticher – “PC System Programming”, Abacus
4. Maxwell – “Unix system administration” – TMH
5. Limoncelli –“The Practice of System & Network Administration”-Pearson
6. Wells, LINUX Installation & Administration, Vikas

Reference Books:

E. Nemeth, G. Snyder, S. Seebass, T. R. Hein – “ Unix system administration handbook” – Pearson Education
ADVANCE COMPUTER ARCHITECTURE (TCS - 702)

Unit 1
Parallel computer models: The state of computing, Classification of parallel computers, Multiprocessors and multicomputers, Multivector and SIMD computers.

Program and network properties: Conditions of parallelism, Data and resource Dependences, Hardware and software parallelism, Program partitioning and scheduling, Grain Size and latency, Program flow mechanisms, Control flow versus data flow, Data flow Architecture, Demand driven mechanisms, Comparisons of flow mechanisms

Unit 2
System Interconnect Architectures: Network properties and routing, Static interconnection Networks, Dynamic interconnection Networks, Multiprocessor system Interconnects, Hierarchical bus systems, Crossbar switch and multiport memory, Multistage and combining network.

Advanced processors: Advanced processor technology, Instruction-set Architectures, CISC Scalar Processors, RISC Scalar Processors, Superscalar Processors, VLIW Architectures, Vector and Symbolic processors

Unit 3
Pipelining: Linear pipeline processor, nonlinear pipeline processor, Instruction pipeline Design, Mechanisms for instruction pipelining, Dynamic instruction scheduling, Branch Handling techniques, branch prediction, Arithmetic Pipeline Design

Memory Hierarchy Design: Cache basics & cache performance, reducing miss rate and miss penalty, multilevel cache hierarchies, main memory organizations, design of memory hierarchies. Memory consistency models: SC, PC,WO/WC, RC;

Unit 4
Multiprocessor architectures: Symmetric shared memory architectures, distributed shared memory architectures, cache coherence protocols (MSI, MESI, MOESI), scalable cache coherence, overview of directory based approaches, design challenges of directory protocols, memory based directory protocols, cache based directory protocols, synchronization. Introduction of OpenMP and MPI, threads, mutex etc.

Unit 5
Introduction to multi-core architectures, multiprocessor Chip architecture case studies: Intel core 2 duo, Core i3, Core i5

Text Books:
3. www.intel.com

Reference Books:
3. J. Quin, “Parallel Computing”, TMH
UNIT I

Data Preprocessing, Language, Architectures, Concept Description: Preprocessing, Cleaning, Integration, Transformation, Reduction, Discretization, Concept Hierarchy Generation, Data Mining Primitives, Query Language, Graphical User Interfaces, Architectures, Concept Description, Data Generalization, Characterizations, Class Comparisons, Descriptive Statistical Measures.

UNIT II


UNIT III

Classification and Prediction: Classification and Prediction, Issues, Decision Tree Induction, Bayesian Classification, Association Rule Based, Other Classification Methods, Prediction, Classifier Accuracy.

UNIT IV


UNIT V

Data Warehousing: Introduction, Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Implementation - Data Warehousing to Data Mining -Data warehousing components-building a data warehouse – mapping the data warehouse to an architecture – data extraction - cleanup- transformation tools- metadata – OLAP - Patterns and models – Data visualization principles.

TEXT BOOKS

1. J. Han and M. Kamber, “Data Mining: Concepts and Techniques”, Harcourt India /Morgan Kauffman, 2001. (UNITs 1 to IV)

REFERENCES

UNIT-I Introduction and Fundamentals


UNIT-II
Image Enhancement in Frequency Domain
Fourier Transform and the Frequency Domain, Basis of Filtering in Frequency Domain, Filters – Low-pass, High-pass; Correspondence Between Filtering in Spatial and Frequency Domain; Smoothing Frequency Domain Filters – Gaussian Lowpass Filters; Sharpening Frequency Domain Filters – Gaussian Highpass Filters; Homomorphic Filtering.

Image Restoration: A Model of Restoration Process, Noise Models, Restoration in the presence of Noise only-Spatial Filtering – Mean Filters: Arithmetic Mean filter, Geometric Mean Filter, Order Statistic Filters – Median Filter, Max and Min filters; Periodic Noise Reduction by Frequency Domain Filtering – Bandpass Filters; Minimum Mean-square Error Restoration.

UNIT-III
Color Image Processing
Color Fundamentals, Color Models, Converting Colors to different models, Color Transformation, Smoothing and Sharpening, Color Segmentation.


UNIT-IV
Registration
Introduction, Geometric Transformation – Plane to Plane transformation, Mapping, Stereo Imaging – Algorithms to Establish Correspondence, Algorithms to Recover Depth


UNIT-V
Feature Extraction: Representation, Topological Attributes, Geometric Attributes
Description: Boundary-based Description, Region-based Description, Relationship.

Object Recognition: Deterministic Methods, Clustering, Statistical Classification, Syntactic Recognition, Tree Search, Graph Matching

Books:
3. R.J. Schalkoff; Digital Image Processing and Computer Vision, John Wiley and Sons, NY
SOFT COMPUTING (TCS-072/TIT-074)

Unit –I

Unit-II
Introduction to artificial neural network
Neural Networks: Learning rules, Learning Paradigms-Supervised, Unsupervised and reinforcement Learning, ANN training Algorithms-perceptions, Training rules, Delta, Back Propagation Algorithm, Multilayer Perceptron Model, Competitive learning networks, Kohonen self organizing networks, Hebbian learning; Hopfield Networks,

Unit-III

Unit- IV
Genetic algorithms(Gas), Evolution strategies(Ess), Evolutionary programming(EP), Genetic Programming(GP), Selecting, crossover, mutation, schema analysis, analysis of selection algorithms; convergence; Markov & other stochastic models.

Unit - V
Other Soft computing approaches Simulated Annealing, Tabu Search, Ant colony based optimization.

Text:
1. “Neuro-Fuzzy and Soft computing”, Jang, Sun, Mizutani, Pearson
2. “Neural networks: a comprehensive foundation”, Haykin,
3. “Genetic Algorithms”, Goldberg,

Reference:
2. Hertz J. Krogh, R.G. Palmer, “Introduction to the Theory of Neural Computation”, Addison- Wesley, California,
WIRELESS NETWORKS (TCS-073/TIT-073)

Unit – 1 Introduction
Liberalization of communications Industry, Digitalization of content, changes in spectrum management, cellular reuse, drive towards broadband, IEEE 802.11 networks

Unit – 2 Wireless Network Systems
Cellular networks
The GSM circuit switched network, GSM channel structure, Authentication and location updating, physical channels, TMN
GPRS
Introduction to GPRS, contexts, PDP context, Mobility management context, MS-SGSN physical layer, MS-SGSN protocols, GPRS operations

Unit – 3 Principles of access network planning
Circuit voice networks
Introduction to CVN, coverage, capacity, planning for circuit multimedia services

Planning for packet multimedia services
Planning approaches, buffer-pipe model, characterization of applications, practical modeling methodologies, multiuser packet transport configurations

Unit – 4 Planning and design
RAN, GSM RAN, UMTS RAN, Cellular OFDM RAN, Mesh network

Unit – 5 Network operation and optimization
Enhanced telecom operations model (eTOM), wireless network life cycle – strategy, infrastructure and product, operations, enterprise management, GSM network performance optimization – principles and key performance indicators, coverage optimization, GPRS RAN optimization, UMTS network performance optimization

Text Books:
2. Fundamental of Wireless Networking, Ron Price, TMH
3. 3G Wireless Networks, Clint Smity, TMH
4. Essentials of UMTS, Christopher Cox, Cambridge University Press
UNIT I
**Introduction:** Security problem in computing, Secure system characteristics, What to secure – How to secure - at what cost?


UNIT II

UNIT III

UNIT IV

UNIT V

**TEXT BOOK**

**REFERENCES**


SYSTEM ADMINISTRATION LAB (PCS-751/PIT-751)

1. Installation of operating system (Window 7 and LINUX)
2. Installation of office productivity software (MS Office/ Open Office)
3. User Management
4. Security Management
5. Startup & Shutdown scripts
6. Network planning – subnet creation
7. Firewall configuration
8. Basic properties of Windows Registry
9. Study of Important Windows Services
10. Study of Important LINUX Services

PROJECT (PCS-757)

The project is intended to develop and test complete understanding of various ICT Technologies for practical real life applications. Proper project work is necessary for overall development of the student. Its need cannot be over emphasized for improving employability of the students.

Students must work for at least 50 hours to develop the project. Project topic must be decided within first two weeks of the start of the semester.

INDUSTRIAL INTERACTION/ SEMINAR (TERM PAPER) (PCS-758)

It will involve documentation of technical activities of some prominent industry/company in IT field by a group of students (not more than 4). Students must deliver a seminar on current technology in covered in the syllabus which must be submitted as hard copy document in the form of a term paper.
DISTRIBUTED COMPUTING (TCS-801/TIT-087)

Unit–I
**Characterization of Distributed Systems**: Introduction, Examples of distributed Systems, Resource sharing and the Web Challenges.

**System Models**: Architectural models, Fundamental Models

**Theoretical Foundation for Distributed System**: Limitation of Distributed system, absence of global clock, shared memory, Logical clocks, Lamport’s & vectors logical clocks, Causal ordering of messages, global state, termination detection.

Unit–II
**Distributed Mutual Exclusion**: Classification of distributed mutual exclusion, requirement of mutual exclusion theorem, Token based and non token based algorithms, performance metric for distributed mutual exclusion algorithms.

**Distributed Deadlock Detection**: system model, resource Vs communication deadlocks deadlock prevention, avoidance, detection & resolution, centralized dead lock detection, distributed dead lock detection, path pushing algorithms, edge chasing algorithms.

**Agreement Protocols**: Introduction, System models, classification of Agreement Problem, Byzantine agreement problem, Consensus problem, Interactive consistency Problem, Solution to Byzantine Agreement problem.

Unit–III
**Distributed Objects and Remote Invocation**: Communication between distributed objects, Remote procedure call, Events and notifications, Java RMI case study.


Unit–IV
**Transactions and Concurrency Control**: Flat and nested distributed transactions, Locks, Optimistic Concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

**Distributed Transactions**: Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery. Replication: System model and group communication, Fault - tolerant services, highly available services, Atomic Commit protocols.

Unit –V
**Introduction to Grid Computing**: Basics of grid Computing, Benefits of grid computing, Grid terms and concepts, Grid user roles, Standards for grid environments, Grid security requirements.


**Books:**
INTRODUCTION TO WEB TECHNOLOGY (TCS-802/TIT-603)

UNIT I:
Internet Principles and Components: History of the Internet and World Wide Web-HTML; protocols – HTTP, SMTP, POP3, MIME, IMAP. Domain Name Server, Web Browsers and Web Servers

UNIT II: HTML, DHTML and XML

UNIT III: Web Services
Introduction to Web Services, UDDI, SOAP, WSDL, Web Service Architecture, Developing and deploying web services. Ajax – Improving web page performance using Ajax, Programming in Ajax. CORBA,

UNIT IV: Web 2.0
Interactive and social web: Blogs, wikis, and social networking sites – The technology behind these applications- AJAX, RSS and syndication, Ruby on Rails, Open APIs,

UNIT V:
Web 3.0: Semantic Web, Widgets, drag & drop mashups (iGoogle) - The technology behind these applications- RDF
Web based Information Systems, Search engines, Recommender Systems, Web Mining

Books:
3. Joel Sklar , “Principal of web Design” Vikash and Thomas Learning
UNIT-1

UNIT-2
Basic Communication Operation: One-to-all broadcast; All-to-all broadcast; Reduction and prefix sums; One-to-all personalized communication; All-to-all personalized communication;

UNIT-3
Performance and Scalability of Parallel Systems: Performance matrices for Parallel systems? Run time, Speed up, Efficiency and Cost; The effect of granularity on performance

UNIT-4
Sorting: Sorting networks; Bubble sort and its variants; Quick sort and other sorting algorithms

UNIT-5
Dynamic Programming: Overview of dynamic programming, Serial monadic DP Formulations: The shortest path Problem, the 0/1 Knapsack Problem, Serial Polyadic DP Formulation: all pair shortest paths algorithms.

References:
2. George Coulouris, Jean Dollimore and Tim Kindberg; Distributed Systems Concepts and Design, Addison-Wesley, Massachussetts
5. J Jaja; An Introduction to Parallel Algorithms, Addison Wesley, Massachussetts
DATABASE ADMINISTRATION (TCS-082/TIT-083)

Any of MySQL, Oracle, DB2 or Microsoft SQL Server may be used. Replace Oracle word with the selected RDBMS.

UNIT 1 DBA Fundamental I

Oracle Architectural Components, Getting Started With Oracle Server, Managing an Oracle Instance, Creating a Database, Data Dictionary Contents and Usage, Maintaining the Control File, Redo Log Files, Managing Tablespaces and Data Files, Storage Structures and Relationships, Managing Undo Data, Tables, Indexes, Maintaining Data Integrity, Managing Password, Managing Security, Resources, users, Privileges & Roles, Loading Data Into a Database & Globalization Support

UNIT 2 DBA Fundamental II


UNIT 3 Performance Tuning

Overview Of Oracle 9i Performance Tuning, Diagnostic and Tuning Tools, Sizing the Shared Pool & the Buffer Cache, Sizing The Other SGA Structures, Database Configuration and I/O Issues, Optimizing Sort Operations, Diagnosing Contention For Latches, Tuning Rollback Segments, Monitoring and Detecting Lock Contention, Tuning The Oracle Shared Server, Application Tuning, Using Oracle Blocks Efficiently, SQL Statement Tuning, Tuning the OS and Using Resource Manager

UNIT 4 Managing Oracle

Oracle10g: Overview, Preparing the Operating System & Install Oracle9i Software, Create a Custom Oracle Database, Install and Configure Enterprise Manager, Customize the Oracle Database Linux Measurement Tools, Oracle Measurement Tools, Tuning Oracle

UNIT 5 Database Troubleshooting

One Time Troubleshooting, Adhoc Troubleshooting, Escalations, Connectivity, Business Continuity, High Availability and Scalability, Data Sharing and Information Integration

BOOKS:

For Oracle:
1. Oracle Database Administrator’s Guide
2. Oracle DBA Handbook
3. Oracle DBA on Unix and Linux *by Michael Wessler*
UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V

TEXT BOOK

REFERENCE
UNIT-I

UNIT-II

UNIT-III
Fault Tolerant in Real time Systems - Architecture of Fault - tolerant computers general purpose commercial systems - High availability systems - Critical computations Fault Tolerant multiprocessor - Communication Architectures, Shared memory

UNIT-IV
Interconnections, loop architectures, Tree Networks, Graph Network and in Binary cube interconnection.

UNIT-V

TEXT BOOKS
UNIT-I

**Introduction:** Purpose, State of the art

**Image Formation:** Projection, Sensing, Color

UNIT-II

**Image Processing:** Filtering (low-pass and median), derivatives, and Edges

UNIT-III

**Geometric Calibration:** Interior and Exterior Calibration, Rectification

**Stereo:** Epipolar Geometry, Correspondence, Triangulation, Depth Estimation

UNIT-V

**Motion:** Detection and Tracking of Point Features, Optical Flow

**Object Tracking:** Kalman Filter, Condensation, Tracking Humans

**Books & References:**

4. [http://www.cs.duke.edu/courses/fall07/cps296.1](http://www.cs.duke.edu/courses/fall07/cps296.1)
UNIT-1
Distributed DBMS Concepts and design: Introduction, functions and architecture of a DDBMS, distributed relational database design, Transparencies in a DDBMS, Twelve rules for a DDBMS. Advanced concepts: Distributed transaction management, distributed concurrency control, distributed deadlock management, distributed database recovery, X/open distributed Transaction processing model, Replication servers, Distributed query optimization, Mobile databases.

UNIT-2
Object-Oriented DBMS Introduction, advanced database applications, weakness of RDBMS, storing objects in a relational database, next-generation database systems. Concepts and design: OODBMS perspectives, persistence, issues in OODBMS, advantages and disadvantages of OODBMS, Object-oriented database design.

UNIT-3
Standards and systems: object management group, object database standard ODMG 3.0 1999, Object store. Object relational DBMS: Introduction, third generation database manifestos, SQL8, Object oriented extensions in Oracle, Comparison of ORDBMS and OODBMS.

UNIT-4
Web technology and DBMS Web as a database Application Platform: Requirements for web-DBMS integration, web-DBMS architecture, advantages and disadvantages of web-DBMS approach, approaches to integrating the web and DBMS, Oracle Internet Application Server (IAS).

UNIT-5
Data Warehousing Concepts, OLAP and Data mining Evolution of data warehousing, data warehousing concepts, benefits and problems of data warehousing, comparison of OLTP systems and data warehousing, On-Line Processing, Introduction to data mining.

Books:
UNIT-I
Intruder types, intrusion methods, processes and detection, message integrity and authentication, honey pots. General IDS model,

UNIT-II
Data mining based IDS, Denning model, data mining framework for constructing features and models for intrusion detection systems. Unsupervised anomaly detection, CV5 clustering, SVM,

UNIT-III
probabilistic and statistical modeling, general IDS model and taxonomy, evaluation of IDS, cost sensitive IDS. NBAD, specification based and rate based DDOS, scans/probes, predicting attacks

UNIT-IV
Network based anomaly detection, stealthy surveillance detection; Defending against DOS attacks in scout: signature-based solutions, snort rules.

Host-based anomaly detection, taxonomy of security flaws in software, self-modeling system calls for intrusion detection with dynamic window size.

UNIT-V
Secure intrusion detection systems, network security, secure intrusion detection environment, secure policy manager, secure IDS sensor, alarm management, intrusion detection system signatures, sensor configuration, signature and intrusion detection configuration, IP blocking configuration, intrusion detection system architecture.

Books
Unit-I
Introduction to security attacks, services and mechanism, introduction to cryptography.
Conventional Encryption: Conventional encryption model, classical encryption techniques
substitution ciphers and transposition ciphers, cryptanalysis, stereography, stream and block
ciphers.
Modern Block Ciphers: Block ciphers principals, Shannon’s theory of confusion and
diffusion, fiestal structure, data encryption standard(DES), strength of DES, differential and
linear crypt analysis of DES, block cipher modes of operations, triple DES, IDEA encryption
and decryption, strength of IDEA, confidentiality using conventional encryption, traffic
confidentiality, key distribution, random number generation.

Unit-II
Introduction to graph, ring and field, prime and relative prime numbers, modular arithmetic,
Fermat’s and Euler’s theorem, primality testing, Euclid’s Algorithm, Chinese Remainder
theorem, discrete logarithms. Principals of public key crypto systems, RSA algorithm,
security of RSA, key management, Diffie-Hellman key exchange algorithm, introductory
idea of Elliptic curve cryptography, Elganel encryption.

Unit-III
Message Authentication and Hash Function: Authentication requirements, authentication
functions, message authentication code, hash functions, birthday attacks, security of hash
functions and MACS, MD5 message digest algorithm, Secure hash algorithm(SHA).
Digital Signatures: Digital Signatures, authentication protocols, digital signature standards
(DSS), proof of digital signature algorithm.

Unit-IV
Authentication Applications: Kerberos and X.509, directory authentication service, electronic
mail security-pretty good privacy (PGP), S/MIME.

Unit-V
IP Security: Architecture, Authentication header, Encapsulating security payloads, combining
security associations, key management.
Web Security: Secure socket layer and transport layer security, secure electronic transaction
(SET).
System Security: Intruders, Viruses and related threads, firewall design principals, trusted
systems.

Books:
   Prentice Hall, New Jersey.
2. Johannes A. Buchmann, “Introduction to Cryptography”, Springer-Verlag
PROJECT (PCS-857)

The project is intended to develop and test complete understanding of various ICT Technologies for practical real life applications. Proper project work is necessary for over all development of the student. Its need cannot be over emphasized for improving employability of the students.

Students must work for at least 100 hours to develop the project. Project topic must be decided within first two weeks of the start of the semester.

WEB TECHNOLOGY LAB (PCS-852)

At least following must be completed

3. Installation and configuration of Apache server

4. Development of static website of an online Departmental Store. The website should be user friendly and should have the following pages:
   - Home page
   - Registration and user login
   - User profile page
   - Items catalog
   - Shopping cart
   - Payment by credit card
   - Order confirmation

5. Add validations to the above site for registration, user login, user profile and payment by credit card using Java Script.


7. Creation of a XML document of 20 students of UKTech. Add their roll numbers, marks obtained in 5 subjects, total and percentage and save this XML document at the server. Write a program that takes students’ roll number as an input and returns the students’ marks, total and percentage by taking the students’ information from the XML document.

8. Design a website using existing web services (Google map, weather forecast, market information etc.) using AJAX.
### LIST OF OPEN ELECTIVES-VII SEMESTER
Effective from the session – 2009-10

[List of Open Elective of 7th Semester for B. Tech. Civil/Electrical/Electrical and Electronics/ Mechanical & Allied Courses/ Electronics and Communications & Allied Courses/ Instrumentation and Control & Allied Courses/Computer Science and Engineering & Allied Courses/ Information Technology & Allied Courses/ Biotechnology]

<table>
<thead>
<tr>
<th>S.No.</th>
<th>P.Code</th>
<th>Subject</th>
<th>Dept.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>TOE 01</td>
<td>Non-conventional Energy Resources</td>
<td>Electrical</td>
</tr>
<tr>
<td>2.</td>
<td>TOE 02</td>
<td>Reliability Engineering</td>
<td>Electrical</td>
</tr>
<tr>
<td>3.</td>
<td>TOE 03</td>
<td>Environment &amp; Ecology</td>
<td>Civil</td>
</tr>
<tr>
<td>4.</td>
<td>TOE 04</td>
<td>Geographic Inf. System (GIS) Technology &amp; its Applications</td>
<td>Civil</td>
</tr>
<tr>
<td>5.</td>
<td>TOE 05</td>
<td>Entrepreneurship Development Programme</td>
<td>Humanities</td>
</tr>
<tr>
<td>6.</td>
<td>TOE 06</td>
<td>Ancient Indian Culture</td>
<td>Humanities</td>
</tr>
<tr>
<td>7.</td>
<td>TOE 07</td>
<td>Human Values</td>
<td>Humanities</td>
</tr>
<tr>
<td>8.</td>
<td>TOE 08</td>
<td>Quality System &amp; Management</td>
<td>Mechanical</td>
</tr>
<tr>
<td>9.</td>
<td>TOE 09</td>
<td>Condition Monitoring &amp; Diagnostics</td>
<td>Mechanical</td>
</tr>
<tr>
<td>10.</td>
<td>TOE 10</td>
<td>Value Engineering</td>
<td>Mechanical</td>
</tr>
<tr>
<td>11.</td>
<td>TOE 11</td>
<td>Nanotechnology</td>
<td>Mechanical</td>
</tr>
<tr>
<td>12.</td>
<td>TOE 12</td>
<td>Solar Energy</td>
<td>Mechanical</td>
</tr>
<tr>
<td>13.</td>
<td>TOE 13</td>
<td>Human Resource Management</td>
<td>Mechanical</td>
</tr>
<tr>
<td>14.</td>
<td>TOE 14</td>
<td>Advance Material Science</td>
<td>Mechanical</td>
</tr>
<tr>
<td>15.</td>
<td>TOE 15</td>
<td>Industrial Instrumentation &amp; Control</td>
<td>Instrumentation &amp; Control</td>
</tr>
<tr>
<td>16.</td>
<td>TOE 16</td>
<td>Biomedical Engineering</td>
<td>Instrumentation &amp; Control</td>
</tr>
<tr>
<td>17.</td>
<td>TOE 17</td>
<td>Fundamentals of Coding Theory</td>
<td>Electronics &amp; Communication</td>
</tr>
<tr>
<td>18.</td>
<td>TOE 18</td>
<td>Consumer Electronics</td>
<td>Electronics &amp; Communication</td>
</tr>
<tr>
<td>19.</td>
<td>TOE 19</td>
<td>Artificial Neural Networks &amp; Fuzzy Logic</td>
<td>Electrical</td>
</tr>
<tr>
<td>20.</td>
<td>TOE 20</td>
<td>Human Computer Interaction</td>
<td>Computer Science</td>
</tr>
<tr>
<td>21.</td>
<td>TOE 21</td>
<td>I T in Business</td>
<td>Information Technology</td>
</tr>
<tr>
<td>22.</td>
<td>TOE 22</td>
<td>Artificial Intelligence in Manufacturing</td>
<td>Manufacturing Technology</td>
</tr>
<tr>
<td>23.</td>
<td>TOE 23</td>
<td>Health, Hospital and Equipment Management</td>
<td>Biomedical Engineering</td>
</tr>
<tr>
<td>24.</td>
<td>TOE 24</td>
<td>Introduction to Medical Physics</td>
<td>Biomedical Engineering</td>
</tr>
<tr>
<td>25.</td>
<td>TOE 25</td>
<td>Modern Control System</td>
<td>Electrical</td>
</tr>
<tr>
<td>26.</td>
<td>TOE 26</td>
<td>Mechatronics</td>
<td>Electrical</td>
</tr>
<tr>
<td>27.</td>
<td>TOE 27</td>
<td>SCADA &amp; Energy Management System</td>
<td>Electrical</td>
</tr>
</tbody>
</table>

**Note:** The students will choose any one subject of the course of other than their Engineering Branch.
TOE-01 NON-CONVENTIONAL ENERGY RESOURCES

Unit I:
Introduction: Various non-conventional energy resources- Introduction, availability, classification, relative merits and demerits.

Unit II:

Unit III:
Geothermal Energy: Resources of geothermal energy, thermodynamics of geo-thermal energy conversion-electrical conversion, non-electrical conversion, environmental considerations.

Unit IV:
Thermo-electrical and thermionic Conversions: Principle of working, performance and limitations.
Wind Energy: Wind power and its sources, site selection, criterion, momentum theory, classification of rotors, concentrations and augments, wind characteristics. performance and limitations of energy conversion systems.

Unit V:
Bio-mass: Availability of bio-mass and its conversion theory.

Books Recommended:
1. Andra Gabdel, "A Handbook for Engineers and Economists".
2. A. Mani, "Handbook of Solar radiation Data for India".
4. F.R. the MITTRE, "Wind Machines" by Energy Resources and Environmental Series.
5. Frank Kreith, "Solar Energy Hand Book".
7. N.G. Calvert, " Wind Power Principles".
8. W. Palz., P. Chartier and D.O. Hall, "Energy from Biomass".
TOE – 02 RELIABILITY ENGINEERING

Unit I:
Introduction: Definition of reliability, types of failures, definition and factors influencing, system effectiveness, various parameters of system effectiveness.

Unit II:
Reliability Mathematics: Definition of probability, laws of probability, conditional probability, Bay's theorem; various distributions; data collection, recovery of data, data analysis procedures, empirical reliability calculations.

Unit III: Reliability Types of system- series, parallel, series parallel, stand by and complex; development of logic diagram, methods of reliability evaluation; cut set and tie set methods, matrix methods event trees and fault trees methods, reliability evaluation using probability distributions, Markov method, frequency and duration method.

Unit IV:
Reliability Improvements: Methods of reliability improvement, component redundancy, system redundancy, types of redundancies series, parallel, series - parallel, stand by and hybrid, effect of maintenance.

Unit V:
Reliability Testing: Life testing, requirements, methods, test planning, data reporting system, data reduction and analysis, reliability test standards.

Books Recommended:
TOE-03 ENVIRONMENT AND ECOLOGY

Unit I:

Unit II:
Water Quality: Measure of water quality, water quality standards, water treatment; waste water transport and treatment, sludge treatment and disposal.
Air Quality: Sources and effects of air pollution, major air pollutants, air quality control, treatment of emissions, dispersion of air pollutants.

Unit III:
Solid waste: Collection of refuse, removal and transport, disposal of refuse.
Noise Pollution: Effect of noise on human health and its control.

Unit IV:
Ecology: Ecology and Ecosystems, concept of ecological imbalances, physical and climate factors, biotic components, energy and material flows in ecosystems, human influence on ecosystems.

Unit V:
Conservation of Natural Resources: Water resources, mineral resources, agricultural and forestry resources, agriculture soil and need of nutrients, fertilizers and pesticides. Brief introduction about environmental legislation and environmental audit.

Books Recommended:
TOE-04 GEOGRAPHIC INFORMATION SYSTEMS (GIS) TECHNOLOGY AND ITS APPLICATIONS:

Unit I
Definition of GIS, Cartography and GIS, GIS database: spatial and attribute date; Spatial models: Semantics, spatial information, temporal information, conceptual models of spatial information, representation of geographic information: point, line and area futures, topology,

Unit II
Raster and vector data, raster to vector data conversion, map projection, analytical transformation, rubber sheet transformation, manual digitizing and semi-automatic line following digitizer; Remote sensing data as an input to GIS data;

Unit III
Attribute database: scale and source of inaccuracy; GIS functionality; data storage and data retrieval through query, generalization, classification, containment search within a spatial region;

Unit IV
Overlay: arithmetical, logical and conditional overlay, buffers, inter visibility, aggregation; Network analysis;

Unit V
Applications of GIS in planning and management of utility lines and in the filed of environmental engineering, geotechnical engineering, transportation engineering and water resources engineering.

Books Recommended:
TOE-05 ENTREPRENEURSHIP DEVELOPMENT PROGRAMME

Unit I:
Entrepreneur: Definition. Growth of small scale industries in developing countries and their positions vis-a-vis large industries; role of small scale industries in the national economy; characteristics and types of small scale industries; demand based and resources based ancillaries and sub-control type. Government policy for small scale industry; stages in starting a small scale industry.

Unit II:
Project identification: Assessment of viability, formulation, Evaluation, financing, field-study and collection of information, preparation of project report, demand analysis, material balance and output methods, benefit cost analysis, discounted cash flow, internal rate of return and net present value methods.

Unit III:
Accountancy: Preparation of balance sheets and assessment of economic viability, decision making, expected costs, planning and production control. Quality control. marketing, industrial relations. Sales and purchases, advertisement, wages and incentive, inventory control, preparation of financial reports, accounts and stores studies.

Unit IV:
Project Planning and control: The financial functions, cost of capital approach in project planning and control. Economic evaluation, risk analysis, capital expenditures, policies and practices in public enterprises. Profit planning and programming, planning cash flow, capital expenditure and operations, control of financial flows, control and communication.

Unit V:
Laws concerning entrepreneur: Partnership laws, business ownership, sales and income taxes and workman compensation act. Role of various national and state agencies which render assistance to small scale industries.

Books Recommended:
TOE-06 ANCIENT INDIAN CULTURE

Unit I: Main features of Indian Culture
(a) The orientalist view (b) The nationalist view
(c) The Marxist view (d) Analysis and formulations

Principal Components – historical and archeo-ethnic perspective
(a) Indian Civilization (b) Vedic culture
(c) Tribal and folk culture (d) Foreign elements

Unit II: Impact of integrating, disintegrating and proliferating forces of History.
(a) Eras of political unification (b) Foreign invasions
(c) Regional conflicts (d) Religious movements
(e) Trade and Dissemination

Unit III: Ideas and Institution
a. Political b. Social
c. Economic d. Religious

Unit IV: Achievements in Arts, Science and Technology
(a) Literature (b) Art and Architecture
(c) Music and Dance (d) Astronomy and Mathematics
(e) Medicine

Unit V: Values and disvalues
a. Humanism and spiritualism b. Ahinsa
c. Altmism d Caste
e. Unsociability f. Religious suicide and superstition
g. Degradation of women and prostitution.

Books Recommended:
3. Coomarswami, dance of Siva
4. Thapar Ramila, Ancient Indian Social History
6. Kossambi, Introduction to Indian History.
8. Altekar, A.S., Position of Women in Hindu Civilization
9. Prakash, Om, conceptualization and History.
10. Bartam, A.I., Wonder that was India.
TOE 07 HUMAN VALUES

Unit I: Introduction
1. Nature of value crisis in the contemporary Indian society and the larger human community.
2. Meaning and nature of values; holistic view of life and its value.

Material and Societal value
1. Role of material values in promoting human well being.
2. Role of Science and technology: problems of material development.
3. Socio-political ideologies for promoting material wellbeing
4. Conceptualizing ‘good’ society and ‘social goods’
5. Justice as a societal value.
6. Democracy and rule of law.
8. Gandhian concepts of good society; gram swaraj, sarvodaya, antyodaya

Unit II : Psychological and Aesthetic Values
1. Humanistic psychology; meaning of ‘personhood’
2. Maslow’s hierarchy of human need; characteristics of ‘self-actualizing’ persons.
3. Mental health
4. Psycho-spiritual Indian concepts.
5. Areas and nature of aesthetic experiences.

Unit III : Ethical and Spiritual Values
1. Bases for moral judgments : customary morality, religious morality, reflective morality.
2. Some principles of ethics; ethical canons and their significance in modern life.
3. Virtue ethics; personal virtues for the modern times.
4. Ethics of duty and ethics of responsibility.
5. Factors to be considered in making ethical judgments: motives, means and consequences.
6. Spirituality and spiritual values : spiritual wisdom of the Upanishads; Buddha’s view.
7. Science, materialism and spirituality.
8. Spirituality in the modern times.

Unit IV : Human Values
1. Different meaning of human values: foundational human values – freedom, creativity, love and wisdom.
2. Nature of Human freedom; individual freedom, intellectual freedom, freedom of will, spiritual freedom.
3. Creativity: its meaning and nature; different kinds of creativity.
5. Creative personality, creative environment.
6. Love as a foundational human value; different kinds of love.
7. Human wisdom; characteristics of a wise person.

Unit V : Work Ethics and Professional Ethics
1. Different attitudes to work.
2. Demands of work-ethics, ethics at work place.
3. ‘Good’ organization and its values.
4. What is a profession?
5. Professional ethos and code of professional ethics.
7. Problems in practicing the code.
8. Case studies.

Books Recommended:
1. Human Values By : Prof. A.N. Tripathi New Age International.
2. 7 Habits of Highly By : Dr. Stephen R. Covey Effective People Harper Publications.
TOE-08 QUALITY SYSTEM & MANAGEMENT

Introduction
Definition, need of quality systems, role of quality standards, stages of quality assurance systems. Quality charts, control charts for variables and attributes, acceptance sampling.

Quality Systems
Overall responsibility for progress of quality systems. quality manuals, procedures and role of auditing, auditing for conformance versus quality for effectiveness, auditing a tool for quality improvement. ISO 9000 quality systems, British Standards BS5750/ISO 9000 origin of standards, requirements, issues associated with implementation.

Registration
Registration and accreditation in quality system-certification, approval, registration of leading accessors.

Recommended Books:
1. Mohamed Isiri, " Total Quality Management for Engineers".

TOE – 09 CONDITION MONITORING & DIAGNOSTICS

Unit I
Productivity, Quality circle in Maintenance, Reliability, Reliability assurance, Maintainability vs. Reliability. Failure analysis, Equipment downtime analysis, breakdown analysis.

Unit II
Maintenance type, Breakdown maintenance, Corrective maintenance, Opportunity maintenance, Routine maintenance, Preventive and predictive maintenance, Condition based maintenance systems, Design-out maintenance.

Unit III

Unit IV

Unit V
TOE – 10 VALUE ENGINEERING

Unit I: An Overview
Definition, value engineering recommendations, programmes, advantages. Approach of function Evaluation of function, determining function, classifying function, evaluation of costs, evaluation of worth, determining worth, evaluation of value.

Unit II: VE Job Plan
Introduction, orientation, information phase, speculation phase, analysis phase. Selection of Evaluation of
VE Projects
Projects selection, Methods selection, value standards, application of VE methodology.

Unit III: Versatility of VE
VE operation in maintenance and repair activities, value engineering in non hardware projects.
Initiating A VE Programme
Introduction, training plan, career development for VE specialties.

Unit IV: Fast Diagramming
Cost models, life cycle costs

Unit V: VE level of Effort
VE team, Co-coordinator, designer, different services, definitions, construction management contracts, value engineering case studies.

Recommended Books:
TOE-11 NANOTECHNOLOGY

Unit I: Introduction to Physics of Solid State
Structure: Size dependence of properties; crystal structures, face centered cubic nano particles; Tetrahedral bounded semiconductor structures; lattice vibrations.
Energy bounds: Insulators, semiconductor and conductors; Reciprocal space; Energy bounds and gaps of semiconductors; effective masses; Fermi Surfaces.
Localized Particles: Acceptors and deep taps; mobility; Eacitons.

Unit II: Methods of Measuring Properties
Structure: Atomic Structures; Crystallography; Particle size determination, surface structure.
Microscopy: Transmission electron Microscopy; field ion microscopy Scanning Microscopy.
Spectroscopy: Infrared and Raman Spectroscopy; Photoemission and X-ray Spectroscopy; Magnetic resonance, optical and vibrational Spectroscopy, Luminescence.

Unit III: Properties of Individual Nano particles
Metal Nano clusters: Magic Numbers; Theoretical Modelling of nano particles, Geometric Structure; Electronic Structure; Reactivity; Fluctuations Magnetic Clusters; Bulle to Nano structure.
Semi conducting Nanoparticles: Optical Properties; Photofragmentation; Columbic Explosion.
Rare Gas & Molecular Clusters: Inert Gas Clusters; Superfluid Clusters molecular clusters.
Method of Synthesis: RF Plasma; Chemical methods; thermolysis; pulsed laser methods.

Unit IV: Carbon Nanoparticles
Carbon Clusters: Small carbon clusters; Discovery of 60 c ; Strictures of 60 c , Alkali doped 60 c; superconductivity in 60 c ; Large and smaller fullerenes; other buckyballs.
Carbon Nano tubes: Fabrication; structure, Electrical Properties; Vibrational properties, Mechanical Properties. Field emission & Shielding; Computers; Fuel cells, chemicals sensors; catalysis, Mechanical reinforcement.
Balle Nanostructure materials:
Solid Disordered Nanostructure, Nano structured Crystals, Nano structured Ferromagnetism Basics of Ferromagnetism; Effect of structuring of Magnetic properties, Dynamics of Nanomagnets; Nanopore containment of magnetic particles, Nanocarbon Ferromagnets, Giant & colossal magnetoresistance; Ferrofluids.

Unit V: Quantum Wells, Wires and Dots
Preparation of Quantum Nanostructure; Size and Dimensionality effect, Fermi gas; Potential wells; Partial confinement; Excitons; Single electron Tunneling, Infrared detectors; Quantum dot laser Superconductivity. Nano-machines & Nano-device. Microelectromechanical systems (MEMS) Nanoelectromechanical systems (NEMS), Fabrication, Nanodevices and Nanomachines. Molecular & Supermolecular switches Applications areas of Nanotechnology in Engineering.

Recommended Books
1. Introduction to Nanotechnology – C.P.Poole Jr F.J. Owens
2. Introduction to S.S. Physics - (7th Edn.) Wiley 1996.
**TOE 12 SOLAR ENERGY**

**Unit I:**
Introduction, Energy alternative, Devices for thermal collection and storage, Thermal applications.

**Unit II:**
Liquid flat- Plate Collectors: General performance analysis, Transmissivity, absorptivity, product and overall loss coefficient and heat transfer correlations, Collector efficiency factor, Numerical, Analysis of collectors similar to the conventional collector. Testing procedures, Alternatives to the conventional collector, Numerical.

**Unit III:**
Solar Air Heaters: Performance analysis of a conventional air heater, Other types of air heaters.
Concentrating Collectors: Flat plate collectors with plane reflectors, Cylindrical parabolic collector, Compound parabolic dish collector, Central receiver collector, Numerical.

**Unit IV:**

**Unit V:**

**Recommended Books**
TOE-13 HUMAN RESOURCE MANAGEMENT

Unit I
Scope and Importance of Human Resource management, Historical background of Evolution of HRM and HRD in 20th century, Outlining the contemporary role for HRM in organization. Goals of HRM. (Why behavioural approach?)

Unit II
Manpower as a resource in job related behaviour and individual motivation in a work setting. Various theories of human motivation, Maslow’s hierarchy of needs. Needs for achievement, power and affiliation, other theories, group motivation and conflicts.

Unit III
Manpower planning and recruitment, Testing procedures and their limitations. Reservations in jobs, pre-induction training.

Unit IV
Wage and salary administration-pay roll and compensation. Job analysis and job specification, other pay plans, employment contracts, special compensation plans for example personnel, effect of Financial rewards on individual’s performance. Goal setting and performance evaluation, promotion policy, employee satisfaction, turnover.

Unit V
Assessment of training needs, forces promoting investment in HRD, Human resource development through individual and group efforts. Training analyses and training methods guidelines for individual development, job enlargement and job enrichment, job rotation, special assignment, Sponsored courses cost benefit exercise. Importance of unions, industrial petitions and conflict analysis and resolution. Relevant labour laws.

TOE-14 ADVANCED MATERIAL SCIENCE

Unit I: Introduction


Unit II: Fatigue & Creep: Fatigue loading, Mechanisms of fatigue, fatigue curve, Fatigue tests. Design criteria in fatigue, Corrosion fatigue.

Unit III: Corrosion and its prevention
Mechanism of corrosion, Chemical Corrosion, Electro chemical corrosion, Anodic and Cathodic protection, Forms of metallic coatings. Anodizing, Phosphasting.

Unit IV: Selection of materials for hazardous/ saline environment
Selection of materials of saline/ hazardous environment - Boilers, Steam and Gas turbine and Diesel engine components, Pumping, Machinery, Piping, Engine seating, Propellers and Rudders, Composition strength value and other requirements for materials used. Material standards.

Unit V: Electrical and Electronics materials
Science and engineering of electrical and electronics materials such as semiconductor, super conductor, its devices and applications.
TOE-15 INDUSTRIAL INSTRUMENTATION

Unit I
Basic Measurement principles & Source of Errors, Units of pressure and vacuum, different type of manometer, diaphragm gauges, bellows and force balance type sensors, bourdon gauge, and piezoelectric, capacitive and inductive pressure pickups. Vacuum pressure measurements: McLeod gauge, pirani gauge, thermocouple gauge, Knudsen gauge ionization calibration procedures,

Unit II

Unit III

Unit IV

Unit V

Text Books:
2. S.K Singh / Industrial instrumentation and control/TMH 2nd edition
3. Eckman/Industrial Instrumentation / Wiley Eastern Ltd.

Reference Books:
TOE-16 BIOMEDICAL ENGINEERING

Unit I: Introduction:
Specifications of bio-medical instrumentation system, Man- Instrumentation system Components, Problems encountered in measuring a living system. Basics of Anatomy and Physiology of the body.


Unit II: Cardiovascular Measurements:
Patient Care & Monitoring: Elements of intensive care monitoring, displays, diagnosis, Calibration & Reparability of patient monitoring equipment.

Unit III: Respiratory system Measurements:
Nervous System Measurements: Physiology of nervous system, Neuronal communication, Neuronal firing measurements.

Unit IV: Ophthalmology Instruments:
Electroretinogram, Electro-oculogram, Ophthalmoscope, Tonometer for eye pressure measurement.
Diagnostic techniques: Ultrasonic diagnosis, Eco-cardiography, Ecoencephalography, Ophthalmic scans, X-ray &Radio-isotope diagnosis and therapy, CAT-Scan, Emission computerized tomography, MRI.

Unit V: Bio-telemetry:
The components of a Bio-telemetry system, Implantable units, Telemetry for ECG measurements during exercise, for Emergency patient monitoring.
Prosthetic Devices and Therapies: Hearing Aids, Myoelectric Arm, Dia-thermy, Laser applications in medicine.

Text Books:
1. Khandpur R.S.- Biomedical Instrumentation- TMH

Reference Books::
3. Cromwell- Biomedical Instrumentation and Measurements- PHI
5. Ananthi, S. –A Text Book of Medical Instruments-2005-New Age International
6. Carr &Brown –Introduction to Biomedical Equipment Technology – Pearson
7. Pandey & Kumar-Biomedical Electronics and Instrumentation. - Kataria
TOE-17 FUNDAMENTALS OF CODING THEORY

Unit I: Purpose of encoding, separable binary codes, Shannon-fano encoding, noiseless coding. Shannon binary encoding, Huffman encoding, discrete coding in presence of noise.

Unit II: Error detecting and error correcting codes, Hamming single error correcting code, Elias's iteration technique for coding.

Unit III: Block codes, encoders and decoders for block codes, syndrome and syndrome decoding.

Unit IV: Cyclic codes. Encoders and decoders for cyclic code, Golay code, BCH code, Reed solomon code.

Unit V: Convolution coding, code generation, decoding of convolution code, sequential decoding, state and trellis diagram.

Text Book:

TOE-18 CONSUMER ELECTRONICS

Unit I
Audio Systems: Microphones, Loudspeakers, Speaker baffle and enclosure, Acoustics, Mono, Stereo, Quad, Amplifying Systems, Equalizers and Mixers, Electronic Music Synthesizers, Commercial Sound, Theater Sound System

Unit II
Video Systems and Displays: Monochrome TV, Colour TV standards and systems, TFT, Plasma, HDTV, Digital TV, Video Telephone and Video Conferencing

Unit III
Domestic Appliances: Washing machines, Microwave ovens, Air-conditioners and Refrigerators, In car computers Office Systems: FAX, Xerox, Telephone Switching System, Mobile Radio System

Unit IV
Recording and Reproduction Systems: Disc recording and reproduction, Magnetic recording and reproduction, Video tape recording and reproduction, Video disc recording and play back, Distortion and Noise reduction in Audio and Video System

Unit V
Power Supplies and other systems: SMPS, UPS and Preventive Maintenance, Set Top Boxes, Remote controls, Bar codes, ATM

Text Books:
1. S P Bali, Consumer Electronics; Pearson ed 2005
TOE-19 ARTIFICIAL NEURAL NETWORKS & FUZZY LOGIC

Unit I: Fundamental Concepts
Introduction, neuron signal function, mathematical preliminaries, Feedforward & feedback architecture.

Unit II: Geometry of Binary threshold neurons and their networks
Pattern recognition, convex sets and convex hulls, space of Boolean functions, binary neurons for pattern classification, non linear separable problems, capacity of TLN, XOR solution. Perceptions and LMS, Learning objective of TLN, pattern space & weight space, perception learning algorithm, perception convergence theorem, pocket algorithm, a - LMS learning, MSE error surface, steepest descent search, μ -LMS and application.

Unit III: Back propagation algorithm
Multilayered architecture, back propagation learning algorithm, practical considerations, structure growing algorithms, applications of FFNN. Statistical Pattern Recognition Bayes' theorem, classical decisions with bayes' theorem, probabilistic interpretation of neuron function, interpreting neuron signals as probabilities, multilayered networks & posterior probabilities, error functions for classification problems.

Unit IV: Self Organizing Feature MAP
Introduction, Maximal eigenvector filtering, principal component analysis, generalized learning laws, competitive learning, vector quantization, maxican hat networks, SOFM, applications of SOFM. Other Networks Generalized RBF networks. Stochastic Machines: simulated annealing, Boltzmann machine, ART.

Unit V: Fuzzy Logic
Introduction, classical & Fuzzy sets, classical & fuzzy relations, membership function, geometry & operations of fuzzy sets, fuzzy rules, rule composition & defuzzification, fuzzy engineering applications, Neural network & fuzzy logic. Fuzzy Neural Control

Text Books
2. Satish Kumar, "Neural Networks," Tata McGraw-HILL.

Reference Books
TOE- 20 HUMAN COMPUTER INTERACTION

Unit I
User centered design of system & interfaces, anatomy and rational of WIMP (Window, Icon, Menus & Pointing Devices) interfaces.

Unit II
Dialogue design, Presentation design, user documentation, evaluation / usability testing of user interface.

Unit III

Unit IV
User centered design, human factors in user-centered design, development & evaluation, Interactive design rapid prototyping.

Unit V
Designing for usability –effectiveness, learnability, flexibility, attitude and usability goals, criteria for acceptability.

Books Recommended:

TOE – 21 IT IN BUSINESS

Unit I
Business Drivers IT’s Competitive Potential Strategic Alignment Strategic Management and Competitive Strategy

Unit II
Rethinking Business through IT Developing a Competitive Strategy Interorganization Information Systems
Business-To-Business Systems Electronic Commerce and Market Systems

Unit III
Forming a Corporate IT Strategy Developing an Information Architecture

Unit IV
Incorporating Business Innovation into the Corporate IT Strategy The Changing Role of IT In International business The Changing Global IT Practices

Unit V
The Impact and value of Information Technology in Competitive Strategy Changing the Focus of Strategy Trends: Beyond 2000

Books Recommended:
TOE –22 ARTIFICIAL INTELLIGENCE IN MANUFACTURING

Unit I: Artificial Intelligence
Definition - Components - Scope - Application Areas; Knowledge - Based Systems (Expert Systems)  
- Definition - Justification -Structure – Characterization

Unit II: Knowledge Sources
Expert - Knowledge Acquisition – Knowledge Representation - Knowledge Base - Interference Strategies - Forward and Backward Chaining

Unit III: Expert System Languages
ES Building Tools or Shells; Typical examples of Shells. Expert System software for manufacturing applications in CAD, CAPP, MRP , Adaptive control,

Unit IV: Robotics
Robotics, Process control, Fault diagnosis, Failure Analysis; Process Selection, GT etc. Linking expert systems to other software such as DBMS, MIS, MDB.

Unit V: Process control and Office automation

Books Recommended:
2. T. Barnold; Artificial Intelligent
3. Dan. W. Patterson; Introduction to Artificial Manufacturing Export system

TOE 23 HEALTH, HOSPITAL AND EQUIPMENT MANAGEMENT

Unit I: HEALTH SYSTEM
Health organization of the country, the state, the cities and the region, Health Financing System, Organization of Technical Section.

Unit II: HOSPITAL ORGANIZATION AND MANAGEMENT
Management of Hospital organization, Nursing section Medical Sector, Central Services, Technical Department, 
Definition and Practice of Management by Objective, Transaction Analysis Human relation in Hospital, 
Importance to Team Work, Legal aspect in Hospital Management.

Unit III: REGULATORY REQUIREMENT AND HEALTH CARE CODES
FDA Regulation, joint commission of Accreditation for Hospitals, National Fire Protection Association Standard, IRPC.

Unit IV: EQUIPMENT MAINTENANCE MANAGEMENT
Organizing Maintenance Operations, Paper Work Control, Maintenance Job, Planning Maintenance Work, 
Measurement and Standards, Preventive Maintenance, Maintenance Budgeting and Forecasting, Maintenance Training, Contract Mainframe.

Unit V: TRAINED TECHNICAL PERSONNEL
Function of Clinical Engineer, Role to be performed in Hospital, Man power Market, Professional Registration, 
Structure in hospital.

Books Recommended:
5. Jacob Kline, Handbook of Bio Medical Engineering, Academic Press, San Diego
TOE 24 INTRODUCTION TO MEDICAL PHYSICS

Unit I: ATOMIC PHYSICS

Unit II: INTERACTION WITH LIVING CELLS
Target theory, single hit and multi target theory, cellular effects of radiation, DNA damage, depression of Macro molecular synthesis, Chromosomal damage.

Unit III: SOMATIC EFFECT OF RADIATION
Radio sensitivity protocol of different tissues in human, LD 50/30 effect of radiation on skin, blood forming organs, lenses of eye, embryo and Endocrinal glands.

Unit IV: GENETIC EFFECT OF RADIATION
Threshold of linear dose effect, relationship, factors affecting frequency of radiation induced mutation, Gene controlled hereditary disease, biological effect of microwave and RF wave. Variation in dielectric constant and specific conductivity of tissues. Penetration and propagation of signals effects in various vital organs, Protection standards.

Unit V: PHOTO MEDICINE
Synthesis of Vitamin D in early and late cataneous effects, Phototherapy, Photo hemotherapy, exposure level, hazards and maximum permissible exposure.

LASER PHYSICS — Characteristics of Laser radiation, Laser speckle, biological effects, laser safety

Books Recommended:
TOE – 25 MODERN CONTROL SYSTEM

Unit I: Introduction to control systems
Introduction to control systems, properties of signals and systems. Convolution integral, Ordinary differential equation, Transfer function, Pole zero concepts, effect of pole location on performance specification.

Unit II: State Space analysis
State equations for dynamic systems, State equations using phase, physical and canonical variables, realization of transfer matrices, Solution of state equation, concepts of controllability, observability, Controllability and Observability tests.

Unit III: Discrete time control systems
Sampling theorem, Sampled-data systems, the sample and hold element, pulse transfer function, The Ztransform, stability analysis.

Unit IV: Stability
Liapunov’s method, generation of Liapunov’s function, Popov’s criteria, design of state observers and controllers, adaptive control systems, model reference.

Unit V: Optimal Control
Introduction, formation of optimal control problems, calculus of variation, minimization of functions, constrained optimization, dynamic programming, performance index, optimality principles, Hamilton – Jacobian equation, linear quadratic problem, Ricatti II equation and its solution, solution of two point boundary value problem

Text Books:
1. K. Ogata, "Modern Control Engineering", Prentice Hall of India.

Reference Books:
TOE 26 MECHATRONICS

Unit I: Mechatronics and its scope
Sensors and transducers- Displacement, position & proximity, velocity, force, pressure and level. Signal conditioning amplification, filtering & data acquisition.

Unit II: Pneumatic and Hydraulic actuation systems

Unit III: Elements of Microprocessors & Microcontrollers
Elements of Microprocessors & Microcontrollers Programmable logic controllers & Communication interface.

Unit IV: Case Studies of Mechatronic Systems
Industrial Robot and its control Automobile Engine Control Electromechanical disc-control.

Unit V: Veil suspension Control

Books Recommended:
TOE 27 SCADA & ENERGY MANAGEMENT SYSTEM

Unit I: SCADA
Purpose and necessity, general structure, data acquisition, transmission & monitoring. general power system hierarchical Structure. Overview of the methods of data acquisition systems, commonly acquired data, transducers, RTUs, data concentrators, various communication channels- cables, telephone lines, power line carrier, microwaves, fiber optical channels and satellites.

Unit II: Supervisory and Control Functions
Data acquisitions, status indications, majored values, energy values, monitoring alarm and event application processing. Control Function: ON/ OFF control of lines, transformers, capacitors and applications in process in industry - valve, opening, closing etc. Regulatory functions: Set points and feed back loops, time tagged data, disturbance data collection and analysis. Calculation and report preparation.

Unit III: MAN- Machine Communication
Operator consoles and VDUs, displays, operator dialogues, alarm and event loggers, mimic diagrams, report and printing facilities.

Unit IV: Data basis
SCADA, EMS and network data basis. SCADA system structure - local system, communication system and central system. Configuration- NON-redundant- single processor, redundant dual processor. multicontrol centers, system configuration. Performance considerations: real time operation system requirements, modularization of software programming languages.

Unit V: Energy Management Center
Functions performed at a centralized management center, production control and load management economic dispatch, distributed centers and power pool management.

Books Recommended:
2. George L Kusic "Computer Aided Power System Analysis", Prentice Hall of India,