Course Structure & Scheme

for

Master of Technology [Information Technology]
Weekend Programme


Offered by

School of Information Technology

Guru Gobind Singh Indraprastha University
Kashmere Gate, Delhi [INDIA] –110 006
M.Tech. [Information Technology]  
Weekend Programme

Audit Courses

FIRST SEMESTER

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Paper</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITW – 601</td>
<td>Programming &amp; Data Structure</td>
</tr>
<tr>
<td>ITW – 603</td>
<td>Computer Architecture</td>
</tr>
<tr>
<td>ITW – 605</td>
<td>Digital Electronics &amp; Microprocessor</td>
</tr>
<tr>
<td>ITW – 607</td>
<td>Data Communication</td>
</tr>
</tbody>
</table>

NOTE:

Students of Credit Course are exempted from all the above courses.
# M.Tech. [Information Technology] Weekend Programme

**Audit Courses**

**SECOND SEMESTER**

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Paper</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITW – 602</td>
<td>Algorithm Analysis &amp; Design</td>
</tr>
<tr>
<td>ITW – 604</td>
<td>Database Management System</td>
</tr>
<tr>
<td>ITW – 606</td>
<td>Software Engineering</td>
</tr>
<tr>
<td>ITW – 608</td>
<td>Operating System</td>
</tr>
</tbody>
</table>

**NOTE:**

Students of Credit Course are exempted from all the above courses.
M.Tech. [Information Technology]  
Weekend Programme

Credit Courses

FIRST SEMESTER

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Paper</th>
<th>Credits</th>
<th>Contact Hrs./Semester</th>
<th>Self Study Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITW – 701</td>
<td>Object Oriented Technology</td>
<td>3</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>ITW – 703</td>
<td>VLSI Design</td>
<td>3</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>ITW – 705</td>
<td>Advanced DBMS</td>
<td>3</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>ITW – 707</td>
<td>Advanced Computer Networks</td>
<td>3</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td><strong>Practicals</strong></td>
<td><strong>Lab – I</strong></td>
<td>3</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>ITW – 753</td>
<td>Lab – II</td>
<td>3</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td>18</td>
</tr>
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# M.Tech. [Information Technology] Weekend Programme

## Credit Courses

### SECOND SEMESTER

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Paper</th>
<th>Credits</th>
<th>Contact Hrs./Semester</th>
<th>Self Study Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITW – 702</td>
<td>Operating System</td>
<td>3</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>ITW – 704</td>
<td>Cellular &amp; Mobile Communication</td>
<td>3</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td><strong>Elective I (choose any two)</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>ITW – 706</td>
<td>Computer Graphics</td>
<td>3</td>
<td>40</td>
<td>15</td>
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<tr>
<td>ITW – 708</td>
<td>VLSI Design</td>
<td>3</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>ITW – 710</td>
<td>Real Time Systems &amp; Software</td>
<td>3</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>ITW – 712</td>
<td>Data Warehousing &amp; Data Mining</td>
<td>3</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>ITW – 714</td>
<td>AI &amp; Expert System</td>
<td>3</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>ITW – 716</td>
<td>Digital Signal Processing</td>
<td>3</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>ITW – 718</td>
<td>Theory of Computation</td>
<td>3</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>ITW – 720</td>
<td>Internet &amp; Web Technology</td>
<td>3</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>ITW – 722</td>
<td>Software Engineering</td>
<td>3</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>ITW – 724</td>
<td>Object Oriented Software Engineering</td>
<td>3</td>
<td>40</td>
<td>15</td>
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### Practicals

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Paper</th>
<th>Credits</th>
<th>Contact Hrs.</th>
<th>Self Study Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITW – 752</td>
<td>Lab – III</td>
<td>3</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>ITW – 754</td>
<td>Lab – IV</td>
<td>3</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>ITW – 756</td>
<td>Project work - I*</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td>20</td>
</tr>
</tbody>
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*Non University Exam System*
### M.Tech. [Information Technology]
#### Weekend Programme

#### Credit Courses

**THIRD SEMESTER**

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Paper</th>
<th>Credits</th>
<th>Contact Hrs./ Semester</th>
<th>Self Study Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITW – 801</td>
<td>Software Verification, Validation &amp; Testing</td>
<td>3</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>ITW – 803</td>
<td>Network Security</td>
<td>3</td>
<td>40</td>
<td>15</td>
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</table>

**Elective II (choose any one)**

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Paper</th>
<th>Credits</th>
<th>Contact Hrs./ Semester</th>
<th>Self Study Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITW – 805</td>
<td>Neural Network</td>
<td>3</td>
<td>40</td>
<td>15</td>
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<tr>
<td>ITW – 807</td>
<td>Embedded Systems Design</td>
<td>3</td>
<td>40</td>
<td>15</td>
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<tr>
<td>ITW – 809</td>
<td>Digital Image Processing</td>
<td>3</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>ITW – 811</td>
<td>Designing with ASICSs</td>
<td>3</td>
<td>40</td>
<td>15</td>
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<tr>
<td>ITW – 813</td>
<td>Compiler Design</td>
<td>3</td>
<td>40</td>
<td>15</td>
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<tr>
<td>ITW – 815</td>
<td>Soft Computing</td>
<td>3</td>
<td>40</td>
<td>15</td>
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<tr>
<td>ITW – 817</td>
<td>Software Project Management</td>
<td>3</td>
<td>40</td>
<td>15</td>
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<tr>
<td>ITW – 819</td>
<td>Digital VLSI Design</td>
<td>3</td>
<td>40</td>
<td>15</td>
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<tr>
<td>ITW – 821</td>
<td>Telecommunication Networks</td>
<td>3</td>
<td>40</td>
<td>15</td>
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</table>

**Elective III (choose any one)**

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Paper</th>
<th>Credits</th>
<th>Contact Hrs./ Semester</th>
<th>Self Study Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITW – 823</td>
<td>Multimedia Technology</td>
<td>3</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>ITW – 825</td>
<td>Natural Language Processing</td>
<td>3</td>
<td>40</td>
<td>15</td>
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<tr>
<td>ITW – 827</td>
<td>Enterprise Resource Planning</td>
<td>3</td>
<td>40</td>
<td>15</td>
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<tr>
<td>ITW – 829</td>
<td>Cognitive Psychology</td>
<td>3</td>
<td>40</td>
<td>15</td>
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<tr>
<td>ITW – 831</td>
<td>Software Quality Assurance &amp; Certification</td>
<td>3</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>ITW – 833</td>
<td>Network Programming</td>
<td>3</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>ITW – 835</td>
<td>Advanced VLSI Design</td>
<td>3</td>
<td>40</td>
<td>15</td>
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<tr>
<td>ITW – 837</td>
<td>Advanced Digital Circuit Design</td>
<td>3</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>ITW – 839</td>
<td>Mobile Computing</td>
<td>3</td>
<td>40</td>
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</tr>
</tbody>
</table>

**Practicals**

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Paper</th>
<th>Credits</th>
<th>Contact Hrs./ Semester</th>
<th>Self Study Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITW – 851</td>
<td>Lab – V</td>
<td>3</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>ITW – 853</td>
<td>Lab – VI</td>
<td>3</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>ITW – 855</td>
<td>Project Work – II*</td>
<td>2</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
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<td><strong>20</strong></td>
</tr>
</tbody>
</table>

*Non University Exam System*
# M.Tech. [Information Technology] Weekend Programme

## Credit Courses

### FOURTH SEMESTER

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Paper</th>
<th>Credits</th>
<th>Contact Hrs./Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITW – 802</td>
<td>Dissertation</td>
<td>20</td>
<td>-</td>
</tr>
<tr>
<td>ITW – 804</td>
<td>Seminar &amp; Progress Reports*</td>
<td>03</td>
<td>-</td>
</tr>
<tr>
<td>ITW – 806</td>
<td>Comprehensive Viva*</td>
<td>01</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>24</strong></td>
<td>-</td>
</tr>
</tbody>
</table>

*Non University Exam System

**Note:**

1. The total number of credits of the programme M.Tech. [Information Technology] = 82
2. Each student shall be required to appear for examinations in all courses. However, for the award of the degree a student shall be required to earn the minimum of 75 credits.
3. These students are exempted from Eight courses due to their engineering background in computer science or cleared the qualifying exams of six computer science courses.
ITW-601 Programming and Data Structures

C program structures, Variables, Data Types, Declarations, Operators (Arithmetic, Relational, Logical), increment and decrement operators, Assignment operators and expressions, Arithmetic expressions, statements, symbolic constants, conditional expressions, Bitwise operators, precedence and order of evaluations, input-output functions.

Statements and Blocks, branching statements (if, switch), Loops (while, for, do-while, repeat-until), Break and continue, go to and labels.

Functions, external variables, scope rules, header files, static variables, initialization, parameter passing (call-by-value, call-by-reference), recursion, C preprocessor.

Pointers and addresses, pointers and function arguments, pointer and arrays, address arithmetic, character pointers and functions, pointer arrays, multidimensional arrays, initialization of pointer arrays, pointers and multidimensional arrays, command line arguments, memory management.

Structures: Defining and processing, passing to a function, Unions.

Files: Standard input and output, formatted output, formatted input, file access, miscellaneous functions.

Data Structures:
Arrays : representation and basic operations.

Linked list : Singly, Doubly, Circular and Doubly circular, definition, representation and their basic operations.

Stacks and queues : insertion, deletion.

Trees : insertion, deletion, traversal (inorder, preorder and postorder), binary trees, AVL trees, B-trees, B+-trees.

Text:

References
5. Rajaraman, V., “Computer programming in C”, PHI.
Introduction: Overview of Digital Fundamentals

Register Transfer and Microoperation: Register Transfer Language, Register Transfer, Bus and Memory Transfer, Arithmetic Microoperations, Logic Microoperations, Shift Microoperations.

Basic Computer Organization and Design: Instruction Codes, Computer Registers, Computer Instructions, Timing & Control, Instruction Cycle, Memory Reference Instructions, Input-Output and Interrupts, Design of Basic Computer, Design of Accumulator Logic.

Microprogrammed Control Unit: Control Memory, Address Sequencing.

Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes.


Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware.

Text:
1. Mano, M “Computer System and Architecture”, PHI.

Reference:
**ITW-605 Digital Electronics and Microprocessor**

**Number System**: Binary and other Number system, Base Conversion, Binary Arithmetic, Codes and Code conversion

**Boolean Algebra**: Boolean Function, Canonical and Standard forms, Digital Logic Gates, Gate Level Minimization: The map method, Four Variable map.

**Combinational Logic**: Combinational circuits, Analysis Procedure, Design Procedure, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers

**Synchronous Sequential Logic**: Sequential Circuits, Latches, Flip-Flops, Registers, Shift Registers, Ripple Counters, Synchronous Counters


**Text**:

1. Jain R. P., Modern Digital Electronics; TMH
2. Mano M. Morris, Digital Design; PHI
3. Douglas V. Hall; Microprocessor and Interfacing Programming and Hardware, TMH

**References**:

1. Malvino A. P., Digital Computer Electronics, TMH
ITW – 607  Data Communications

Data communications fundamentals: Communication model, computer communications architecture, OSI model, standards, signals, analog and digital transmission, transmission media, line configuration, topologies, data communications codes, error detection and correction methods.

Data Modem & Modulation: Data encoding methods, analog to digital, digital to analog etc., data modulation methods: ASK, FSK, PSK, QAM, M-ary systems. Data modems: modulation interface, operation on 2 wire, 4 wire and dial up lines.

Data communications methods: Data communication interface, line control unit, UART, USRT, Serial interface, terminal types.

Data link control & multiplexing: Flow control, error detection & control, IBM Bisync protocol, SDLC, HDLC, HDLC line procedures, time division multiplexing (TDM), FDM, line encoding, carriers.

Data communication networking: Switched networks, circuit switching, packet switching, broadcast networks, LAN, WAN topologies, ATM & Fram relay, cell relay.

Text Books:
2. W. Tomasi – Advanced Electronic Communication Systems

Reference Books:
3. PC Gupta – Data Communications, PHI, 2001
ITW-651  Lab – I

The practicals will be based on the following papers:

a) Programming and data structures.
b) Data Communication

ITW-653  Lab – II

The practicals will be based on the following papers:

a) Computer Architecture.
b) Digital Electronics & Microprocessor
ITW-602 Algorithm Analysis and Design

Preliminaries:
Growth of functions, Summations, Recurrences: The substitution method, the iteration method, the master method, Divide and Conquer paradigm, Dynamic programming, Greedy Algorithms.

Sorting and Order Statistics:
Merge Sort, Heap sort, and Quick sort, sorting in linear time, Medians and Order statistics.

Searching and Data Structures for Disjoint Sets:
Hash Tables, Binary Search Trees, Red-Black trees, order statistic tree, disjoint-set Operations, Linked list representation of disjoint sets, Disjoint set forests.

Graph Algorithms:
Representation of Graphs, Breadth First Search, Depth First Search, Topological Sort, Strongly Connected Components, Algorithm for Kruskal’s and Prim’s for Finding Minimum cost Spanning Trees, Dijkstra’s and Bellman Fort Algorithm for finding Single source shortest paths. All pair shortest paths and matrix multiplication, Floyd-Warshall algorithm for all pair shortest paths.

String matching:

NP-Complete Problem
Polynomial-time verification, NP-Completeness and Reducibility, NP-Completeness Proof, NP-Complete problems.

Text:

References:
7. John C.Martin, “Introduction to Languages and Theory of Computation”, TMH
ITW-604 Database Management Systems

Basic concepts: database & database users, characteristics of the database, database systems, concepts and architecture, date models, schemas & instances, DBMS architecture & data independence, database languages & interfaces, data modelling using the entity-relationship approach. Overview of hierarchical, Network & Relational Data Base Management Systems.

Relational model, languages & systems: relational data model & relational algebra: relational model concepts, relational model constraints, relational algebra, SQL - a relational database language: date definition in SQL, view and queries in SQL, specifying constraints and indexes in sql, a relational database management systems, DB2.

DB2 Architecture, Logical Data Structures Physical Data Structure, Instances, Table Spaces, Types of Tablespaces, Internal Memory Structure, Background Processes, Data Types, Roles & Privileges, Stored Procedures, User Defined Functions, Cursors, Error Handling, Triggers.

Relational data base design: function dependencies & normalization for relational databases: functional dependencies, normal forms based on primary keys, (1NF, 2NF, 3NF & BCNF), lossless join and dependency preserving decomposition.

Concurrency control & recovery techniques: concurrency control techniques, locking techniques, time stamp ordering, granularity of data items, recovery techniques: recovery concepts, database backup and recovery from catastrophic failures.

Concepts of object oriented database management systems, Distributed Data Base Management Systems.

Text:

References:
5. DB2 Manuals
Introduction:
Software Crisis, Software Processes, Software life cycle models: Waterfall, Prototype, Evolutionary
and Spiral models, Overview of Quality Standards like ISO 9001, SEI-CMM

Software Metrics:
Size Metrics like LOC, Token Count, Function Count, Design Metrics, Data Structure Metrics,
Information Flow Metrics.

Software Project Planning:
Cost estimation, static, Single and multivariate models, COCOMO model, Putnam Resource
Allocation Model, Risk management.

Software Requirement Analysis and Specifications:
Problem Analysis, Data Flow Diagrams, Data Dictionaries, Entity-Relationship diagrams, Software
Requirement and Specifications, Behavioural and non-behavioural requirements, Software
Prototyping.

Software Design:
Cohesion & Coupling, Classification of Cohesiveness & Coupling, Function Oriented Design,
Object Oriented Design, User Interface Design.

Software Reliability:
Failure and Faults, Reliability Models: Basic Model, Logarithmic Poisson Model, Calender time
Component, Reliability Allocation.

Software Testing:
Software process, Functional testing: Boundary value analysis, Equivalence class testing, Decision
table testing, Cause effect graphing, Structural testing: Path testing, Data flow and mutation testing,
unit testing, integration and system testing, Debugging, Testing Tools & Standards.

Software Maintenance:
Management of Maintenance, Maintenance Process, Maintenance Models, Reverse Engineering,
Software Re-engineering, Configuration Management, Documentation.

Text:

Reference:
ITW-608  Operating Systems

Overview:
Importance of Operating Systems; Basic Concepts and Terminology; An Operating System Resource Manager: Memory Management Functions, Processor Management Functions, Device Management Functions, Information Management Functions.

Process Management:
Processes: Concept, Job Scheduler, Process Scheduling, operation on process, Threads, Overview of Interprocess communication
CPU Scheduling: Scheduling criteria, Scheduling Algorithms, Algorithm Evaluation
Process Synchronization: Synchronization Hardware, Semaphores, Classical Problem of Synchronization, Monitors and Atomic Transaction
Deadlocks: System model, Deadlock Characterization, Deadlocks Prevention, Deadlocks Avoidance, Deadlocks Detection, Recovery from Deadlock

Storage Management:
Memory Management: Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation and Segmentation with Paging
Virtual Memory: Demand Paging, Page Replacement, Page Replacement Algorithms, Allocation of Frames, Thrashing, and Demand Segmentation

Information Management:

I/O Systems:
I/O Hardware, Application of I/O interface, Overview of Kernel I/O Subsystem, Disk Structure, Disk Scheduling, Disk Management, Swap-Space Management, Disk Reliability

Text:

References:
2. Peterson, “Operating System”.
ITW-652    Lab – III

The practicals will be based on the following papers:

   a) Algorithm analysis and Design
   b) Database Management System

ITW-654    Lab – IV

The practicals will be based on the following papers:

   a) Software Engineering
   b) Operating System
ITW- 701 Object Oriented Technology

General concepts of object oriented software, encapsulation, inheritance, polymorphism.

Review of C, difference between C and C++, cin, cout, new, delete operators.

Encapsulation, information hiding, abstract data types, object & classes, attributes, methods. C++ class declaration, state identity and behavior of an object, constructors and destructors, instantiation of objects, default parameter value, object types, C++ garbage collection, dynamic memory allocation, metaclass/abstract classes.

Inheritance, Class hierarchy, derivation – public, private & protected; aggregation, composition vs classification hierarchies, polymorphism, categorization of polymorphic techniques, method polymorphism, polymorphism by parameter, operator overloading, parametric polymorphism, generic function – template function, function name overloading, overriding inheritance methods, run time polymorphism.

Standard C++ classes, using multiple inheritance, persistant objects, streams and files, namespaces, exception handling, generic classes, standard template library: Library organization and containers, standard containers, algorithm and Function objects, iterators and allocators, strings, streams, manipulators, user defined manipulators, vectors, valarray, slice, generalized numeric algorithm.

Text:
2. A.R.Venugopal, Rajkumar, T. Ravishanker “Mastering C++”, TMH

References:
ITW-703 VLSI Design

Introduction to VLSI
Overview of Design automation approach to digital design, Introduction to HDLs, Introduction to Levels of abstractions and concept of Register Transfer Level, Introduction to the concept of Simulation and Synthesis.

VHDL

VLSI
Devices and layouts: Transistor structures and characteristics, wires and vias, parasitics, design rules, layout design and tools. Logic gates and combination logic networks, interconnect delay and cross talk, Power Optimization, Switch Logic Networks. Sequential machines, Latches and Flip-flops, Sequential Systems and Clocking Disciplines and sequential system design.

Floorplanning: Floorplanning Methods, Off-Chip Connections, clock distribution and power distribution


Architecture of FPGA and CPLD such as Xilinx 9500 series CPLD or 4000 or Spartan II series FPGA.

Text book:
1. Modern VLSI Design: system on silicon by Wayne Wolf; Addison Wesley Longman Publisher.
2. VHDL primer by J. Bhasker; Addison Wesley Longman Pub.

References:
1. Basic VLSI Design by Douglas A. Pucknell & Kamran Eshranghian; PHI
2. Digital Integrated Circuits: A Design Perspective by Jan M. Rabaey; PHI
3. VHDL by Douglas Perry
ITW–705 Advanced DBMS

Review of traditional DBMS’s, relational algebra and relational calculus, design principles, normalization, transaction and concurrency control, recovery management.

**Design Process**
Design process, design evaluation, modelling process, E-R model, semantic data model, object oriented model, models and mapping normalization and denormalization. Data warehousing, OLAP and data mining.

**Architecture**
Architecture of DB2, SQL server and Oracle.
DB2 sever tuning, SQL server tuning, Oracle server tuning, OS tuning (Microsoft OS’s)

**OODBMS**
Introduction, object oriented model – data relationship, relationship integrity, ER diagramming for objected oriented relationships (Coad/ Yourdon, Shlaer/ Mellar, OMT Booch and UML), OODBMS standard, case study on Oracle.

**Distributed Database Management Systems**
Components, levels of data & process distribution, transparency features, data fragmentation, data replication.

**Client Server Systems**
Principles, components, ODBC, ADO, JDBC and JSQL overview

Text:
1. C J Date – Introduction to Database Systems, AWL
2. J L Warrington – Object Oriented Database Design, Morgan Kaufman

Reference:
1. DB2, Oracle & SQL Server Documentation
Advanced Computer Networks


Application layer: Security, DNS, SNMP, RMON, Electronic Mail, WWW.


Text:

Reference:
**ITW-751 Lab – I**

The practicals will be based on the following papers:

a) Object Oriented Technology  
b) Advanced DBMS

**ITW-753 Lab – II**

The practicals will be based on the following papers:

a) VLSI Design  
b) Advanced Computer Network
Overview:
Importance of Operating Systems; Basic Concepts and Terminology; An Operating System Resource Manager: Memory Management Functions, Processor Management Functions, Device Management Functions, Information Management Functions;

Process Management:
Processes: Concept, Job Scheduler, Process Scheduling, operation on process, Threads, Overview of Interprocess communication
CPU Scheduling: Scheduling criteria, Scheduling Algorithms, Algorithm Evaluation
Process Synchronization: Synchronization Hardware, Semaphores, Classical Problem of Synchronization, Monitors and Atomic Transaction
Deadlocks: System model, Deadlock Characterization, Deadlocks Prevention, Deadlocks Avoidance, Deadlocks Detection, Recovery from Deadlock

Storage Management:
Memory Management: Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation and Segmentation with Paging
Virtual Memory: Demand Paging, Page Replacement, Page Replacement Algorithms, Allocation of Frames, Thrashing, and Demand Segmentation

Information Management:

I/O Systems:
I/O Hardware, Application of I/O interface, Overview of Kernel I/O Subsystem, Disk Structure, Disk Scheduling, Disk Management, Swap-Space Management, Disk Reliability

Text:

References:
2. Peterson, “Operating System”.
Introduction to Cellular Mobile Systems
A basic cellular system, performance criteria, uniqueness of mobile radio environment, operation of cellular systems, planning a cellular system, analog & digital cellular systems.

Elements of Cellular Radio Systems Design
General description of the problem, concept of frequency reuse channels, co-channel interference reduction factor, desired C/I from a normal case in an omni directional antenna system, cell splitting, consideration of the components of cellular systems.

Interference
Introduction to co-channel interference, real time co-channel interference, co-channel measurement design of antenna system, antenna parameter and their effects, diversity receiver in co-channel interference – different types.

Cell Coverage for Signal & Traffic
General introduction, obtaining the mobile point to point mode, propagation over water or flat open area, foliage loss, propagation near in distance, long distance propagation, point to point prediction model- characteristics, cell site, antenna heights and signal coverage cells, mobile to mobile propagation.

Cell Site Antennas and Mobile Antennas
Characteristics, antenna at cell site, mobile antennas

Frequency Management and Channel Assignment
Frequency management, fixed channel assignment, non-fixed channel assignment, traffic & channel assignment.

Hand Off, Dropped Calls
Why hand off, types of handoff and their characteristics, dropped call rates & their evaluation.

Operational Techniques
Parameters, coverage hole filler, leaky feeders, cell splitting and small cells, narrow beam concept.

Text Books:
2. Wireless and Digital Communications; Dr. Kamilo Feher (PHI)

Reference Book
2. Mobile Communication Engineering – Theory & Applications; TMH
Basic raster graphics algorithms for drawing 2 D Primitives liner, circles, ellipses, arcs, clipping, clipping circles, ellipses & polygon.

Polygon Meshes in 3D, curves, cubic & surfaces, Solid modeling. Geometric Transformation: 2D, 3D transformations, window to viewport transformations, acromatic and color models.

Graphics Hardware: Hardcopy & display techniques, Input devices, image scanners


Procedural models, fractals, grammar-based models, multi-particle system, volume rendering.

Text:

References:
ITW- 708 VLSI Design

Introduction to CMOS circuits: MOS Transistors, MOS transistor switches, CMOS Logic, The inverter, Combinational Logic, NAND gate, NOT Gate, Compound Gates, Multiplexers, Memory-Latches and Registers.

Circuits and System Representation: Behavioural Representation, structural representation, and physical representation

CMOS Processing Technology: Silicon Semiconductor Technology- An Overview, wafer processing, oxidation, epitaxy deposition, Ion-implantation and diffusion, The Silicon Gate Process-Basic CMOS Technology, basic n-well CMOS process, p-well CMOS process, Twin tub process, Silicon on insulator, CMOS process enhancement-Interconnect, circuit elements, 3-D CMOS.

Layout Design Rule: Layer Representations, CMOS n-well Rules, Design Rule of background scribe line, Layer Assignment, SOI Rule

Latch up: Physical origin of Latch up, Latch up triggering, Latch prevention, Internal Latch up prevention techniques, I/O Latch up Prevention

Switching Characteristics: analytic delay models, empirical delay model, gate delay.

Power Dissipation: Static dissipation, Dynamic dissipation, short-circuit dissipation, total power dissipation.

CMOS design Methods: Design Strategies, Structural design strategies, Hierarchy, Regularity, Locality.

Programmable Logic, Programmable Logic structure, Programmable interconnect, and Reprogramable Gate Array: Xilinx Programmable Gate Array, Algortomix, concurrent logic, Gate array design, Full custom mask design


Design Verification: Simulation, Timing verifier, Netlist Comparisons


2. Modern VLSI Design: system on silicon by Wayne Wolf; Addison Wesley Longman Publisher
3. Basic VLSI Design by Douglas A. Pucknell & Kamran Eshranghian; PHI
4. Digital Integrated Circuits: A Design Perspective by Jan M. Rabaey; PHI

Process and State-based Systems model, Periodic and Sporadic Process, Cyclic Executives, CE definitions and Properties, Foreground-Background Organizations, Standard OS and Concurrency – Architectures, Systems Objects and Object-Oriented Structures, Abstract Data Types, General Object Classes


Declarative Specifications: Regular Expressions and Extensions, Traditional Logics-Propositional Logic, Predicates, Temporal logic, Real time Logic

Deterministic Scheduling : Assumptions and Candidate Algorithms, Basic RM and EDF Results, Process Interactions-Prority Inversion and Inheritance


Timer Application, Properties of Real and ideal clocks, Clock Servers – Lamport’s Logical clocks, Monotonic Clock service, A software Clock server, Clock Synchronization- Centralized Synchronization, Distributed Synchronization

Programming Languages: Real Time Language Features, Ada-Core Language, Annex Mechanism for Real Time Programming, Ada and Software Fault Tolerance, Java and Real-time Extensions, CSP and Occam

Operating Systems: Real Time Functions and Services, OS Architectures-Real Time UNIX and POSIX, Issues in Task management- Processes and Threads, Scheduling, Synchronization and communication

**Text Book:** Real – Time Systems and software by Alan C. Shaw ; John Wiley & Sons Inc
Data Warehousing and Data Mining

Data Warehousing: Definition, Scope, Practical Implications, Structures and functions.

Data Mining: Process, Technologies & Rules, platform tools & tool characteristics, operational vs. information systems.

Types of Data Warehouses: Host based, single stage, LAN based, Multistage, stationary distributed & virtual data-warehouses.

Data warehouses architecture: Metadata, operational data & operational data bases. Data warehouse architecture model, 2-tier, 3-tier & 4-tier data warehouses.

OLAP & DSS support in data warehouses.

Data Mining: Knowledge discovery through statistical techniques, Knowledge discovery through neural networks, Fuzzy tech. & genetic algorithms.

Text:

Reference:
2. “Advances in knowledge discovery & Data Mining”, Fayyad, Usama M. et. al., MIT Press.
3. “Data Mining”, A. K. Pujari; Longman Publisher
ITW – 714    AI & Expert System

Scope of AI
Games, theorem proving, natural language processing, vision and speech processing, robotics, expert systems, AI techniques- search knowledge, abstraction.

Problem solving
State space search; Production systems, search space control: depth-first, breadth-first search, heuristic search - Hill climbing, best-first search, branch and bound. Problem Reduction, Constraint Satisfaction End, Means-End Analysis

Knowledge Representation

Handling uncertainty
Non-Monotonic Reasoning, Probabilistic reasoning, use of certainty factors, fuzzy logic.

Learning
Concept of learning, learning automation, genetic algorithm, learning by inductions, neural nets.

Expert Systems
Need and justification for expert systems, knowledge acquisition, Case studies: MYCIN, RI.

Text:

Reference:
ITW – 716  Digital Signal Processing


Signals and signal Processing: characterization & classification of signals, typical Signal Processing operations, example of typical Signals, typical Signals Processing applications.


Transform-Domain Representation of Signals: the Discrete-Time Fourier Transform, Discrete Fourier Transform, DFT properties, computation of the DFT of real sequences, Linear Convolution using the DFT. Z-transforms, Inverse z-transform, properties of z-transform, transform domain representations of random signals.

Transform-Domain Representation of LTI Systems: the frequency response, the transfer function, types of transfer function, minimum-phase and maximum-Phase transfer functions, complementary transfer functions, Discrete-Time processing of random signals.


Digital Filter Structure: Block Diagram representation, Signal Flow Graph Representation, Equivalent Structures, bone FIR Digital Filter Structures, IIR Filter Structures, State-space structure, all pass filters, tunable IIR Digital filters. cascaded Lattice realization of IIR and FIR filters, Parallel all pass realization of IIR transfer function, Digital Sine-Cosine generator.


Applications of DSP.

Text / Reference:
ITW – 718 Theory of Computation

Mathematical notation and terminology, sets, sequences, graphs, proof.

Regular languages, finite automates, DFA’s, NFA’s, regular expression, pumping lemma, non-regular languages, content free grammars, chomsky normal form, push down automata, pushdown down automata equivalence with content free grammer, pumping lemina for content free languages, turing machines, computable languages, multi-tape TM non-deterministic TM, equivalence of TM models, Church’s hypothesis, Turing machine as enumerator, decidable languages, the halting problem, Rice’s therorem, mapping reducibility, turing reducibility complexity theory, time complexity (big Q, small Q) analysing complexities, relationships among computing models), the class P problem, the class NP, P V NP, NP completeners, cook-Levine theorem.

Text / Reference:

1. J. Hopcroft and J. Ullman, “Introduction to Automata theory languages and computation”, AWL, 2002
Overview of Internet & Web: Basics of Internet, Networking & Web concepts. Network topologies, types & layers. Internet & Web protocols like TCP/IP, ARP, RARP, PPP, Telnet, ftp etc. Subnets & Hosts, WWW, Domain Names, Websites, Browsers, Search Engines, Counters, Internet Chat etc. Hardware & Software requirements for Internet & Web based applications. Overview of various Internet & Web technologies.

Web Design: Key issues in web site design, Structure of a Web Page. Introduction to HTML, Head & Body Sections, Content layout and presentation, Various HTML Tags, Table Handling, Frames.

Techniques & Tools: Graphics & Animation techniques. Usage of various web based tools like Microsoft Front page, Macromedia Dream Weaver, Adobe photoshop, Ulead Gif Animator, Macromedia Flash etc.


Active Server Pages: Creating interactive applications using active server pages: Client & server side script in VBScript, Variables & Constants, creating modules, creating objects from classes, using ASP’s Object Model, Arrays, Collections, Control Structures, using request & response objects. Integration with database. Overview & usage of various other internet & web based technologies like JSP, PHP, Java Applets, Java Script, E-Commerce, etc.

Concept of Web Engineering.

Text
1. Internet and Web Technologies by Raj Kamal, TMH
2. Web publishing by Monica D’Souza, TMH
3. Active Server Pages by Heith Morneau, Vikas Publishing House

References
1. Web Design by David Crowder and Rhonda Crowder, IDG Books India
2. Database Driven Web Sites by Mike Morrison, Vikas Publishing House
4. ASP 3 Programming, Eric A. Smith, IDG Books India.
ITW - 722  Software Engineering

Introduction:
Software Crisis, Software Processes, Software life cycle models: Waterfall, Prototype, Evolutionary and Spiral models, Overview of Quality Standards like ISO 9001, SEI-CMM

Software Metrics:
Size Metrics like LOC, Token Count, Function Count, Design Metrics, Data Structure Metrics, Information Flow Metrics.

Software Project Planning:

Software Requirement Analysis and Specifications:

Software Design:
Cohesion & Coupling, Classification of Cohesiveness & Coupling, Function Oriented Design, Object Oriented Design, User Interface Design.

Software Reliability:
Failure and Faults, Reliability Models: Basic Model, Logarithmic Poisson Model, Calendar time Component, Reliability Allocation.

Software Testing:
Software process, Functional testing: Boundary value analysis, Equivalence class testing, Decision table testing, Cause effect graphing, Structural testing: Path testing, Data flow and mutation testing, unit testing, integration and system testing, Debugging, Testing Tools & Standards.

Software Maintenance:

Text:

Reference:
ITW – 724  Object Oriented Software Engineering

Introduction:
The system life cycle, concept of object orientation, object oriented system development.

Architecture:
Model architecture, requirement model, analysis model.

Construction:
The design model, Block design

Database:
Relational DBMS, Object DBMS

Components:
Use of components, Component management

Testing:
Unit testing, integration listing, system testing, case studies

Text / References:
ITW-752  Lab – III

The practicals will be based on the following papers:

a. Cellular & Mobile Communication

ITW-754  Lab – IV

The practicals will be based on the following papers:

a. Elective I
b. Elective II

ITW – 756  *Project Work – I

Minor Project

* NUES

Functional Testing: Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing, Cause Effect Graphing Technique.

Structural Testing: Path testing, DD-Paths, Cyclomatic Complexity, Graph Metrics, Data Flow Testing, Mutation testing.

Reducing the number of test cases:
Prioritization guidelines, Priority category, Scheme, Risk Analysis, Regression Testing, Slice based testing


Text:

Reference:
Basic concepts:

Information system reviewed, LAN, MAN, WAN, Information flow, Security mechanism in OS., Targets: Hardware, Software, Data communication procedures

Threats to Security:

Physical security, Biometric systems, monitoring controls, Data security, systems, security, Computer System security, communication security.

Encryption Techniques:

Conventional techniques, Modern techniques, DES, DES chaining, Triple DES, RSA algorithm, Key management.

Message Authentication and Hash Algorithm:

Authentication requirements and functions secure Hash Algorithm, NDS message digest algorithm, digital signatures, Directory authentication service

Firewalls and Cyber laws:

Firewalls, Design Principles, Trusted systems, IT act and cyber laws, Virtual private network

Future Threats to Network:

Recent attacks on networks, Case study

Text:


References:

2. Jeff Crume “Inside Internet Security” Addison Wesley
**ITW – 805  Neural Networks**

**Introduction to an embedded systems and its design:**
Introduction to ES & its applications, Design parameters of an ES and its significance (with respect to all parameter). Present trends in ES, Embedded system design life cycle, Product specifications and hardware, software partitioning, Co-design

**RTOS & its overview:**
Spell of OS 2 Difference between OS 2 RTOS, Role of RTOS in ES 2 its process models (Process transition diagram), Course structure, Overview Window, CE, Unix, Mino Kernel, UCOs & RT Linux, Interrupt rotatining in RTOS & Inblow response cycle, Different IPC machines in RTOS, Scheduling construm in RTOS (hand 2 soft), Memory sowing and its protechan, Encapsulation of Semephores and Queues, Timon in RTOS (Watch dog timer)

**Processor Selection:**
Role of processor selection in ES (Mp V/s Uc), Mino control – 8051, 16232 bit mino controller 2 its processor, More about micro controller applications with respect to embedded system design, DSP’s in ES, New trends in processing and DSP’s.

**Cost Compiler and cross assembly for embedded systems**
Why we need cross compiler / Assemble, Embedded software development take chain and software development tool chain, Compiler linker, locators, cross assembles, GCC compiler.

**Basic Concepts of Device Driving:**
Device drives introduction & how device driver are different from the normal ports, Sevical communication enterface device drivers.

**System Synthesis and Debugging Techniques:**
Introduction to system synthesis & Hardware and Software, Biomultation & methods to improve to speed of simulations, Emulators (ICE) and its type, How emolutors an difference for simulations, Introduction JTAG and OCP (on chich and debugging)

**Communication Protocols with reference to ES:**
Introduction to protocol, why we need in ES, Overview TCP (IP), UDD< wings protocols, IrDA, Blue Box, IEEE 8811
Other design issues and current trends on its application of ES
Memory optimization, Poorer optimization, Co-simulation of its system on chip and SOS (System on Slices), Revision of Cost

**Text / References:**
2. John Catsoulis, “Designing Embedded Hardware”, O’reilly
5. Michael Barr, “Programming Embedded Systems”, O’reilly
Embedded Systems Overview, Processor Technology, General-purpose processors-software, Single-purpose processor-Hardware, Application-specific Processors

Custom Single-purpose Processor (Hardware): combinational Logic, Sequential Logic, Optimizing Custom Single Purpose Processors—Optimizing the Original Program, FSMD, Datapath, FSM

General Purpose Processors (Software): Introduction, Basic Architecture—Datapath, control unit, Memory; operation—Instruction Execution, Pipelining, Superscalar and VLIW Architectures; Development Environment—Design flow and Tools; Application Specific Instruction set Processors (ASIPs)—Microcontrollers, Digital Signal Processors (DSP)


Memory: Introduction, Memory Write Ability and Storage Performance, ROM, Mask-Programmed ROM, OTP ROM, EPROM, EEPROM, Flash memory, RAM, SRM, DRAM, PSRAM, NVRAM, Comsung memory, Advanced RAM.

Interfacing: Introduction, Communication basics, Microprocessor interfacing— I/O Addressing, Port and Bus-based I/O, Interrupts, DMA, Arbitration—Priority Arbiter, Daisy-chain arbitration, Network-oriented Arbitration methods; Multilevel Bus Architecture, Advanced communication Principles—parallel communication, serial communication, wireless communication, Layering, error detection and correction, Parallel Protocol—PCI bus, ARM bus; wireless protocol—IrDA, Bluetooth, IEEE 802.11


References: 1. An Embedded System Primer by David E. Simon; Addison-Wesley Pub
3. Embedded System Computer Architecture by Graham Wilson, Butterworth-Heinemann,
4. Microcontroller Programming, PHI
ITW – 809 Digital Image Processing

Introduction And Digital Image Fundamentals
Digital Image Representation, Fundamental Steps in Image Processing, Elements of Digital image processing systems, Sampling and quantization, some basic relationships like neighbours, connectivity, Distance measure between pixels, Imaging Geometry.

Image Transforms
Discrete Fourier Transform, Some properties of the two-dimensional fourier transform, Fast fourier transform, Inverse FFT.

Image Enhancement
Spatial domain methods, Frequency domain methods, Enhancement by point processing, Spatial filtering, Lowpass filtering, Highpass filtering, Homomorphic filtering, Colour Image Processing.

Image Restoration

Image Compression

Image Segmentation
Detection of Discontinuities, Edge linking and boundary detection, Thresholding, Region Oriented Segmentation, Motion based segmentation.

Representation and Description
Representation schemes like chain coding, Polygonal Approximation, Signatures, Boundary Segments, Skeleton of region, Boundary description, Regional descriptors, Morphology.

Recognition and Interpretation
Elements of Image Analysis, Pattern and Pattern Classes, Decision-Theoretic Methods, Structural Methods, Interpretatiion.

Text:

Reference:
1. Rosefield Kak, “Digital Picture Processing”,

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ITW – 811 DESIGNING WITH ASICS

Types of ASICs – Design flow – Economics of ASICs – ASIC cell libraries – CMOS logic cell data path logic cells – I/O cells – cell compilers.

ASIC Library design: Transistors as resistors – parasitic capacitance – logical effort programmable ASIC design software: Design system – logic synthesis – half gate ASIC.

Low level design entry: Schematic entry – low level design languages – PLA tools – EDIF – An overview of VHDL and verilog.

Logic synthesis in verilog and VHDL simulation.

ASIC Construction – Floor planning & placement – Routing.

References:
ITW – 813  Compiler Design

Classification of grammars, Context free grammars, Deterministic finite state automata (DFA)
Non-DFA.

Scanners, Top down parsing, LL grammars, Bottom up parsing, Polish expression Operator
Precedence grammar, IR grammars, Comparison of parsing methods, Error handling.

Symbol table handling techniques, Organization for non-block and block structured languages.

Run time storage administration, Static and dynamic allocation, Intermediate forms of source
program, Polish N-tuple and syntax trees, Semantic analysis and code generation.

Code optimization, Folding, redundant sub-expression evaluation, Optimization within iterative
loops.

Text / References:


Application of Fuzzy Logic: Medicine, Economics etc.

Genetic Algorithm: An Overview, GA in problem solving, Implementation of GA

Text:

Reference:
Introduction to Software Project Management: The Nature of Software Production, Key Objectives of Effective Management, Quality, Productivity, Risk Reduction, The Role of the Software Project Manager

Planning the Project: Business Planning, Determining Objectives, Forecasting demand for the Product, Proposal Writing, Requirements analysis, Legal issues (patent, copyright, liability, warranty).


Evaluating the Project.

Text:

Reference:
UNIT I

UNIT II
Design flow & Multilevel logic minimization: Design specification and minimization, design entry, low level design entry – design verification, Design realization and prototyping – review of logic design – minimization of combinational functions – the Quine Mcclusky algorithm – representation of Boolean functions – multilevel logic minimization methods – technology mapping Relating literal count to number of CLBs.

UNIT III

UNIT IV

UNIT V

References:
Evolution of Tele-Communication Networks, Basic Switching System, Simple Tele-phone Communication, Brief Introduction to Electromagnetic Exchanges, Electronic Switching – Space Division Switching Stored Programme Control – Centralized SPC, Distributed SPC, Software Architecture, Application Software – Enhanced Services, Multi Stage Switching Networks.

Speech Digitization, Quantization Noise, Companding, Differential Coding, Delta Modulation, Vocoders, Pulse Transmission on Transmission line concepts, Line Coding, NRZ and RZ Codes, Manchester Coding, AMI Coding, Walsh Codes, TDM,

Time Division Switching – Time Division space switching, Time Division Time Switching, Time multiplexed space switching, Time multiplexed Time Switching, Combination Switching.


Access Technology; WLL, (Wire less loop), ADSL (Asymmetrical Digital Subscriber Loop) AVCC( Advanced Intelligent Network), BMFB

Wired, Wireless, broadcast, point to point, Satellite medium-SCPC, VSAT broadcast medium etc, link budget analysis, Link behavior, Peburst, error, Optimum packet size, error control, Elementary coding ideas, ATM transport mechanism, ISDN
ITW – 823  Multimedia Technology

Introduction:
Concept of Multimedia, Multimedia Applications, Hardware Software requirements, Multimedia products & its evaluation.

Components of multimedia: Text, Graphics, Audio, Video.

Design & Authoring Tools, Categories of Authority Tools, Types of products.

Animation:

Introduction, Basic Terminology techniques, Motion Graphics 2D & 3D animation.

Introduction to MAYA(Animating Tool):

Fundamentals, Modeling: NURBS, Polygon, Organic, animation, paths & boxes, deformers.

Working with MEL: Basics & Programming

Rendering & Special Effects: Shading & Texturing Surfaces, Lighting, Special effects.

Text/References:
ITW – 825  Natural Language Processing


References:


Introduction:

ERP: An Overview, Enterprise-An Overview, Benefits of ERP, ERP and Related Technologies, Business Process Reengineering (BPR), Data Warehousing, Data Mining, On-line Analytical Processing (OLAP), Supply Chain Management

ERP Implementation:

To be or not to be, ERP Implementation Lifecycle, Implementation Methodology, Not all Packages are Created Equal!, ERP Implementation-The Hidden Costs, Organizing the Implementation, Vendors, Consultants and Users, Contracts with Vendors, Consultants and Employees, Project Management and Monitoring, After ERP Implementation…

The Business Modules:

Business Modules in an ERP Package, Finance, Manufacturing (Production), Human Resources, Plant Maintenance, Materials Management, Quality Management, Sales and Distribution

The ERP Market:

ERP Market Place, SAP AG, PeopleSoft, Baan Company, JD Edwards World Solutions Company, Oracle Corporation, QAD, System Software Associates, Inc. (SSA)

ERP-Present and Future:

Turbo Charge the ERP System, Enterprise Integration Applications (EIA), ERP and E-Commerce, ERP and Internet, Future Directions in ERP, Appendices"

Text/References:

ITW – 829  Cognitive Psychology

A Brief history of the cognitive approach, cognitive science, Neuro science, Artificial intelligence, The Parallel processing approach.

Perceptual Process: Perception, pattern recognition, theories of pattern recognition, Bottom-up vs Top-down Processing, Template matching, feature analysis, prototype matching, pattern recognition: The role of the perceives.


Memory Modules: Memory, process, storage, Short term memory, long term memory, organization in memory, simulation modules of learning and memory, mnemonics, syntactic and semantic issues, Concept formation, problem solving.

Contribution of cognitive psychology to advances in Artificial Intelligence, computer based learning/teaching systems, knowledge acquisition and knowledge based systems, expert systems.

References:
2. R. C. Shank, P. Childers, “Cognitive computer on language, Learning and AI”, 1984
ITW – 831 Software Quality Assurance & Certification


Tailoring the Software Quality Assurance Program: Reviews, Walkthrough, Inspection, and Configuration Audits.

Evaluation: Software Requirements, Preliminary design, Detailed design, Coding and Unit Test, Integration and Testing, System Testing, types of Evaluations.


Trend Analysis: Error Quality, Error Frequency, Program Unit Complexity, Compilation Frequency.

Corrective Action as to Cause: Identifying the Requirement for Corrective Action, Determining the Action to be Taken, Implementing the Correcting the corrective Action, Periodic Review of Actions Taken.


Text:

Reference:
ITW – 833  Network Programming

Introduction
TCP/IP Architecture, TCP/IP addressing, services, FTP, SMTP, TFTP, SNMP, Network file system, domain name system, transport layer protocols, user datagram protocol, transmission control protocol.

Interprocess communications
File and record locking, pipes, FIFO’s, stream and messages, message queues, samphorers.

Sockets
Sockets system cells, reserved parts, stream pipes, socket option, asynchronous I/O, Sockets and signals

Transport Lay Interface
Elementary TLI functions, stream and stream pipes, asynchronous I/O I/O multiplexing

Remote Procedure cells
Remote login, remote command execution, external data representation.

Text/Reference:

Integrated Circuit and Modeling: MOS and BJT transistor modelling for MOS transistor & BJT - SPICE modelling parameters – CMOS and bipolar processing – CMOS and Analog layout consideration

CMOS current mirror – CS, CG and CD amplifier – cascade gain stage, bipolar current mirror, bipolar gain stage, frequency response – SPICE simulator Examples

Noise Analysis: Time and frequency domain analysis noise models and analysis – OP AMP Two Stage CMOS OP AMP, OP Amp compensation, Fielded cascade and differential Op AMP- SPICE simulation Examples – CMOS and BiCMOS comparators.

MOS and CMOS sample and hold circuit, Bipolar and BiCMOS sample and hold switched capacitor circuits-data converters, various types of D/A and A/D converters over sampling with without noise shapping – digital decimation filter, multibit oversampling converters, continuous time filter and phases locked loop.s

**Text book**: 1. CMOS Circuit Design, layout and simulation by Baker Li and Boyee; Prentice Hall

   2. CMOS Analog Circuit Design by Phillips A. Allen and D. R. Holberg; Oxford Univ.
UNIT I
Digital design fundamentals: Concept of a logic state – state machine – finite state machine – models for sequential machines – Moore and Mealy machines and memory cells.

UNIT II

UNIT III
Alternative design methodologies: Conventional approach – using state decoder – direct and indirect addressed multiplexers – direct and indirect addressed FPLA/FROM – Design using shift registers and counters for memory and programmable FSM architecture.

UNIT IV

UNIT V
Asynchronous sequential circuits: Lumped path delay (LPD) model – problems associated with asynchronous sequential circuits – design of asynchronous circuits – implementation using PLA.

References:
Introduction to Personal Communications Services (PCS): PCS Architecture, Mobility management, Networks signalling.

Global System for Mobile Communication (GSM) system overview: GSM Architecture, Mobility management, Network signalling.


Mobile Data Communication: WLANs (Wireless LANs) IEEE 802.11 standard, Mobile IP.

Wireless Application Protocol (WAP): The Mobile Internet standard, WAP Gateway and Protocols, wireless mark up Languages (WML).

Third Generation (3G) Mobile Services: Introduction to International Mobile Telecommunications 2000 (IMT 2000) vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G.

Wireless Local Loop (WLL): Introduction to WLL Architecture, wireless Local Loop Technologies.

Global Mobile Satellite Systems; case studies of the IRIDIUM and GLOBALSTAR systems.

Wireless Enterprise Networks: Introduction to Virtual Networks, Blue tooth technology, Blue tooth Protocols.

Text Books:

Reference Books:
ITW-851 Lab – V

The practicals will be based on the following papers:

   a)  Software Verification, Validation & Testing
   b)  Network Security

ITW- 853 Lab – VI

The practicals will be based on the following papers:

   a)  Elective I
   b)  Elective II

ITW – 855 *Project Work – II

   Minor Project

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A second week of full match replays is completed this weekend! Join us on the Volleyball World and Beach Volleyball World YouTube channels and on Facebook for daily streams. Click here to see last week's broadcast programme. Only click the Match Centre links if you want to see the match scores. This week's broadcasts.