

**Nagpur Institute of Technology, Nagpur – 441501**  
**Syllabus- Rashtrasant Tukadoji Maharaj Nagpur University**

**04 YEAR B.E. DEGREE COURSE (COMPUTER SCIENCE & ENGINEERING)**

**SEMESTER: THIRD**

Sr. No.	Subject code	Subject	TEACHING SCHEME			
			L	T	P	Total hrs/week
1	33CS1	Applied Mathematics	4	1	0	5
2	33CS2	Programming Fundamentals In "C"	4	1	3	8
3	33CS3	Digital Circuits & Fundamentals Of Microprocessors	4	1	2	7
4	33CS4	Combinatorial Theories	4	1	0	5
5	33CS5	Principal Of Management	4	1	0	5
6	33CS6	Computer Workshop	0	0	2	2
<b>Total</b>			<b>20</b>	<b>05</b>	<b>07</b>	<b>32</b>
<b>CREDITS : 20+6=26</b>						

**SEMESTER: FOURTH**

Sr. No.	Subject code	Subject	TEACHING SCHEME			
			L	T	P	Total hrs/week
1	44CS1	Discrete Math and Graph Theory	4	1	0	5
2	44CS2	Data Structure and Program design in "C"	4	1	3	8
3	44CS3	Business Data Processing	4	1	2	7
4	44CS4	Theoretical Foundation of Computer Science	4	1	0	5
5	44CS5	Computer Architecture & Organization	4	1	0	5
6	44CS6	Internet Technologies	0	0	2	2
<b>Total</b>			<b>20</b>	<b>05</b>	<b>07</b>	<b>32</b>
<b>CREDITS : 20+6=26</b>						

**SEMESTER: FIFTH**

Sr. No.	Subject code	Subject	TEACHING SCHEME			
			L	T	P	Total hrs/week
1	55CS1	Data Communication	3	1	0	4
2	55CS2	Numerical Computing	3	1	2	6
3	55CS3	Object Oriented Methodologies	4	1	2	7
4	55CS4	Operating Systems	4	1	0	5
5	55CS5	Concepts In Programming Language	4	1	0	5
6	55CS6	Systems Programming	4	1	0	5
7	55CS7	Software Technology Lab - I	0	0	2	2
<b>Total</b>			<b>22</b>	<b>06</b>	<b>06</b>	<b>34</b>
<b>CREDITS : 22+6=28</b>						

[1] Suggested Topics beyond the prescribed syllabus

**Nagpur Institute of Technology, Nagpur – 441501**  
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**SEMESTER: SIXTH**

Sr. No.	Subject code	Subject	TEACHING SCHEME			
			L	T	P	Total hrs/week
1	66CS1	Design & Analysis of Algorithm	4	1	0	5
2	66CS2	Data Base Management System	4	1	2	7
3	66CS3	Computer Networks	4	1	2	7
4	66CS4	Microprocessors & Interfacing	4	1	2	7
5	66CS5	Software Engineering & Project Management	4	1	2	7
6	66CS6	Software Technology Lab - II	0	0	2	2
<b>Total</b>			<b>20</b>	<b>05</b>	<b>10</b>	<b>35</b>
<b>CREDITS : 20+7.5=27.5</b>						

**SEMESTER: SEVENTH**

Sr. No.	Subject code	Subject	TEACHING SCHEME			
			L	T	P	Total hrs/week
1	77CS1	TCP/IP & Internet	4	1	2	7
2	77CS2	Language Processors	4	1	2	7
3	77CS3	Elective - I	4	1	0	5
4	77CS4	Elective - II	4	1	0	5
5	77CS5	Project Seminar	—	—	3	3
<b>Total</b>			<b>16</b>	<b>04</b>	<b>07</b>	<b>27</b>
<b>CREDITS : 16+5.5=21.5</b>						

**ELECTIVE: I**

1. Digital Signal Processing
2. Computer Graphics
3. Real Time Operating System
4. Fundamentals of Multimedia

**ELECTIVE: II**

1. Advanced Computer Architecture
2. Artificial Intelligence
3. Enterprise Resource Planning
4. Operating System Design

**SEMESTER: EIGHTH**

Sr. No.	Subject code	Subject	TEACHING SCHEME			
			L	T	P	Total hrs/week
1	88CS1	Distributed & Object Oriented Database Management	4	1	2	7
2	88CS2	Computer System Security	4	1	2	7
3	88CS3	Elective - III	4	1	0	5
4	88CS4	Elective - IV	4	1	0	5
5	88CS5	Project	—	—	6	6
<b>Total</b>			<b>16</b>	<b>04</b>	<b>10</b>	<b>27</b>
<b>CREDITS : 16+7=23</b>						

**Elective – III**

1. Natural Language Processing
2. Mobile Computing
3. Soft Computing
4. Topics in Distributed System

**Elective – IV**

1. Data Warehousing and Mining
2. Grid Computing
3. Digital Image Processing
4. Embedded System

[1] Suggested Topics beyond the prescribed syllabus

**SYLLABUS OF IV SEMESTER B.E. COMPUTER SCIENCE (SEMESTER PATTERN)**

**44CS1: DISCRETE MATHEMATICS AND GRAPH THEORY**

**UNIT – I: Set theory**

Operation of Sets – relation and functions, partial order, equivalence relation peano axioms and inductions.

**UNIT – II: Mathematical Logics**

Propositions, predicate logic, formal mathematical system, algebra, Homomorphism, Automorphism.

**UNIT – III: Groups**

Elements of theory of some Algebras, semi group, monoid groups

**UNIT – IV: Rings**

Rings, fields, lattices, Boolean algebra.

**UNIT – V: Graph Theory**

Graphs, Hyper Graph, Transitive Closures, Spanning Tree

**UNIT – VI: Combinatorics**

Generating Functions, recurrences, counting theorem and applications.

**Text Books :**

- Discrete Mathematical Structures for computer science, Kolman / Rahman Pearson education
- Combinatorial Mathematics, C. L. Liu(McGraw Hill)

**Value Additions<sup>[1]</sup>:**

1. Vector space of a graph and vectors, basis vector, cut set vector, circuit vector, circuit and cut set subspaces,
2. Matrix representation of graph & Graph Coloring
3. Posets, Hasse Diagram and Lattices: Introduction, ordered set, Hasse diagram of partially, ordered set, isomorphic ordered set, well ordered set, properties of Lattices, bounded I and complemented lattices.

[1] Suggested Topics beyond the prescribed syllabus

# Nagpur Institute of Technology, Nagpur – 441501

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### 44CS2: DATA STRUCTURES AND PROGRAM DESIGN IN “C”

#### UNIT – I

General concepts and linear data structure : Abstract data structure as an organization of data with specified properties and operations, Time and space analysis of algorithms, Big oh and theta notations and omega notations, average, best and worst case analysis, Representation of Arrays : Single and multi dimensional – Address calculation using Column and row major ordering, Representation of Stacks and queues using arrays – Circular queues, priority queues, Dequeue, Application of stacks, Conversion from infix to postfix and prefix expressions, Evaluation of postfix expression using stacks, Multiple stacks.

#### UNIT – II

Linked list: Linked list, Simply Linked list, Implementation of Linked list using static & Dynamic memory allocation – dynamic memory allocation, operations on linked stacks and queues, polynomial representation and manipulations are using linked list, circular linked list, doubly linked list, Generalized list.

#### UNIT – III

Trees : General and binary trees, Representations and traversals, General trees as binary Trees, binary search tree, Applications, the concept of balancing and its advantages, B – trees, B + Trees, AVL Trees, Threaded Binary Trees.

#### UNIT – IV

Hashing: Hash functions, Collision resolution, Expected behavior, Applications

#### UNIT – V

Graphs and digraphs: Representations, Breadth and depth first searches, connectivity Algorithms, shortest path, Minimal spanning tree, the union find problem, Hamiltonian Path.

#### UNIT – IV

Sorting : Elementary sorts : selection, insertion, bubble sort, shell sort, radix sort, quick sort, merge sort, heap sort, bucket sorting, external sorting, worst case and average behavior, Lower bound for sorting using comparisons.

#### Text Books :

- Data Structures using C & C++ by Y. Langsam, Pearson Education
- Data Structures using C by Tenenbaum, Pearson Education
- Data Structures using C by S. K. Bandyopadhyay, Pearson Education
- S. Sahani, Data Structures in C
- D. Samantha, Classic Data Structures, PHI Publication
- Data Structures – Robert Kruse

#### Value Additions<sup>[1]</sup>:

**Recursion:** Recursive definition and processes, recursion in C, example of recursion, Tower of Hanoi Problem, simulating recursion, Backtracking, recursive algorithms, principles of recursion, tail recursion, removal of recursion.

**File Structures:** Physical Storage Media File Organization, Organization of records into Blocks, Sequential Files

[1] Suggested Topics beyond the prescribed syllabus

# Nagpur Institute of Technology, Nagpur – 441501

## Syllabus- Rashtrasant Tukadoji Maharaj Nagpur University

### 44CS3 : BUSINESS DATA PROCESSING

#### UNIT – I

Structural Organization of COBOL : Character set, words, sentences, Identification Division, Environment division, Data division, Data types – Alphabetic and Alphanumeric, Input - Output section, Working storage section,

PROCEDURE division features : ACCEPT, DISPLAY, MOVE, Arithmetic & COMPUTE verbs, levels, Error Handling, Sample programs, PERFORM & GOTO verbs, Sample programs using PERFORM, Miscellaneous COBOL statements.

#### UNIT – II

Conditional Statements & Handlings : Relation conditions, Nested conditions, Class Conditions, Condition-name conditions, Justified clause, Structured programming forms of program structures, Structural flowcharts, Subscripting, OCCURS clause, Multidimensional tables, Table handling with PERFORM verb.

#### UNIT – III

Business files : Structured flowcharts, Operations on files, Master files, Transaction files, Report files, Batch processing, online processing, case studies.

Sequential Access Files : Principles of magnetic storage & accessing, Blocking, Inter Record gap, Label records, COBOL language instruction for sequential files.

#### UNIT – IV

Direct Access Files : Characteristics of disk storage & timing index, Indexed sequential Files, COBOL instructions for indexed sequential files, relative file organization, Division –Remainder method, digital – analysis method, COBOL instruction for handling relative files.

#### UNIT – V

Sorting, Searching & merging : Linear search sort, Merge sort, Chained record sort, Linear search, Binary search, File sorting & Merging using sequential files.

Report Generation : Output layout design, Heading, Date & Detailed summaries. Control breaks, Language specifications for COBOL report writing.

#### UNIT – VI

Advanced Tool manipulators like STRING, UNSTRING, INSPECT & COPY verbs, COBOL subprogram and main program.

For Practical : 10- 12 experiments on COBOL based on above syllabus.

#### Text Books :

- COBOL Programming with business application – N. L. Sarda
- Information Systems through COBOL – Philippakis & Kazmier
- Structured COBOL Programming – Stern & Stern
- COBOL Programming by M. K. Roy, D. Ghosh Dastidar

#### Value Additions<sup>[1]</sup>:

1. Structured Programming
2. Data Movement
3. Reports and Control Breaks
4. Interactive Program Design

<sup>[1]</sup> Suggested Topics beyond the prescribed syllabus

Nagpur Institute of Technology, Nagpur – 441501  
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**44CS4: THEORETICAL FOUNDATIONS OF COMPUTER SCIENCE**

**UNIT – I**

Mathematical preliminaries – Sets, operation, relations, strings, transitive closure, countability and diagonalisation, induction and proof methods – pigeon – hole principle and simple applications – concept of language – grammars and production rules – Chomsky hierarchy.

**UNIT – II**

Finite State Machine, regular languages, deterministic finite automata, e – closure regular expression, finite automata, minimization of automata, Moore and Mealy machine and their equivalence.

**UNIT – III**

Pumping lemma for regular sets – closure properties of regular sets – decision properties for regular sets, equivalence between regular language and regular grammar. Context free languages, parse tree and ambiguity, reduction of CFGS, Chomsky and Griebach normal forms.

**UNIT – IV**

Push down automata (PDA), non determinism – acceptance by two methods and their equivalence, conversion of PDA to CFG CFLs and PDAs – closure and decision properties of CFLs.

**UNIT – V**

Turing machine – variants – recursively enumerable(r.e.) set – recursive sets TM as a computer function – decidability and solvability – Halting Problem – reductions Post correspondences Problems(PCP) and unsolvability of ambiguity problem of CFGs, Church's hypothesis.

**UNIT - VI**

Introduction to recursive function theory – primitive recursive and partial recursive functions, parsing: top down and bottom up approach, derivation and reduction

**Text Books:**

- Introduction to formal languages and automata – Peter Linz Norasa, 2000
- Theory Of Computer Science – Mishra and Chandrashekharan, PHI

**Reference Books:**

- Introduction Of Automata Theory, Languages and Computation – J. E. Hopcroft, J. D. Ullman, Pearson education.

**Value Additions<sup>[1]</sup>:**

Nondeterministic finite Automata (NFA),  
Construction of DFA from NFA and optimization,  
FA with output: Moore machine, Mealy machine and Equivalence

<sup>[1]</sup> Suggested Topics beyond the prescribed syllabus

# Nagpur Institute of Technology, Nagpur – 441501

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### 44CS5: COMPUTER ARCHITECTURE & ORGANIZATION

#### UNIT – I

BASIC STRUCTURE OF COMPUTER: Functional units, Basic operational concepts, Bus structure Addressing modes, subroutines: parameter passing, Instruction formats, expanding opcodes method.

BASIC PROCESSING UNIT : Bus architecture, Execution of a Complete Instruction, sequencing of control signals, Hardwired control, Microprogrammed Control, microinstruction format, Bit slice concepts.

#### UNIT – II

ARITHMETIC : Number representations and their operations, Designs of Fast Adders, Signed multiplication, Booth's algorithm, bit – pair recording, Integer division, Floating point number and operation, guard bits and rounding.

#### UNIT – III

THE MEMORY SYSTEM : Various technologies used in memory design, higher order memory design, multimodule memories and interleaving, Associative memory, Cache memory, Virtual memory.

#### UNIT – IV

INPUT / OUTPUT ORGANIZATION: I/O mapped I/O and memory mapped I/O Interrupts and interrupts handling mechanism, vectored interrupted, synchronous Vs. asynchronous data transfer, Direct memory access,

COMPUTER PERIPHERALS : I / O Devices such as magnetic tapes, magnetic disks, CD-ROM systems.

#### UNIT – V

RISC philosophy, pipelining, basic concepts in pipelining, delayed branch, branch prediction, data dependency, influence of pipelining on instruction set design, multiple execution units, performance considerations.

#### UNIT – VI

Basic concepts in parallel processing & classification of parallel architectures. Vector Processing, array processor.

#### BOOKS :

- V. C. Hamacher Z. G. Vranesic and S. G. Zaky, Computer Organization, Mc Graw Hill, 5<sup>th</sup> edition, 2002.
- Computer Architecture & Organization, 3<sup>rd</sup> edition – J. P. Hayes.
- A. S. Tanenbaum, "Structured Computer Organization", 4<sup>th</sup> edition, Pearson Education.

#### REFERENCE BOOKS :

- M. Mano, "Computer System and Architecture", Pearson Education.
- W. Stallings, "Computer Organization & Architecture", Pearson Education.

#### Value Additions<sup>[1]</sup>:

**Central Processing Unit:** Processor organization, general register organization, stack organization and addressing modes.

[1] Suggested Topics beyond the prescribed syllabus

# Nagpur Institute of Technology, Nagpur – 441501

## Syllabus- Rashtrasant Tukadoji Maharaj Nagpur University

Introduction to CISC & stack processors.

### 44CS6: INTERNET TECHNOLOGIES

Practical to be based on following topics :

- 1) HTML : Standard use for www documents on internet, GML, SGML, HTML tags, special characters, fonts, lists, images, tables, forms and frames.
- 2) DHTML : Introduction to CSS, Text in CSS, Boxes in CSS, CSS positioning, Tables in CSS, Generated contents and list in CSS.
- 3) XML : XML basics, understanding markup languages, structure and syntax, valid vs well formed XML, DTD(document type definition) classes, Scripting XML, XML processor, parent child relationship, XML as a data, data type in XML, XML namespaces, linking with XML simple link, the HTML way, XSL with style : style sheet basics, XSL basics, XSL style sheets.
- 4) FRONTPAGE
- 5) SECURITY
- 6) Scripting Language : Perl Scripts, Java Scripts
- 7) PHP

TEXT BOOKS:

- XML in action web technology by William J. Pardi(PHI) Pub.
- Web Technology by Ramesh Bangia,(Firewall Media)
- Programming the web using XML by Ellen Pearlman (Tata McGraw - Hill)

[1] Suggested Topics beyond the prescribed syllabus

**SYLLABUS OF VI SEMESTER B.E. COMPUTER SCIENCE (SEMESTER PATTERN)**

**66CS1: DESIGN AND ANALYSIS OF ALGORITHM**

**UNIT – 1**

Mathematical foundation, summation of arithmetic and geometric series  $n$ ,  $n^2$ , bounding summation using integration, recurrence relations, solution of recurrence relations using technique of characteristics equation and generating functions, complexity calculation of various standard functions, principles of designing algorithm.

**UNIT – 2**

Asymptotic notations of analysis of algorithm, analyzing control structures worst case and average case analysis, amortised analysis, application of amortised analysis, Sorting networks, comparison networks, biotonic sorting networks, advanced data structures like Fibonacci heap, disjoint set representation, red and black trees and their application.

**UNIT – 3**

Divide and conquer basic strategy, binary search, quick sort, merge sort, matrix operations, Greedy method – basic strategy, application to job sequencing with deadlines problems, minimum cost spanning trees, single source shortest path, etc.

**UNIT – 4**

Dynamic Programming basic strategy, multistage graphs, all pairs shortest path, single source shortest paths, optimal binary search trees, traveling salesman problem, Maximum flow networks.

**UNIT – 5**

Basic Traversal and Search Techniques, breadth first search and depth first search, Connected components, Backtracking basic strategy, 8- Queen's problem, graph colouring, Hamiltonian cycles etc, Approximation algorithm and concepts based on approximation algorithm.

**UNIT – 6**

NP – hard and NP – complete problems, basic concepts, non deterministic algorithm, NP – hard and NP – complete, decision and optimization problems, graph based problems on NP Principle, Computational Geometry, Approximation algorithm.

**Text Books :**

- Thomas H. Cormenetal "Introduction to Algorithm", Prentice Hall of India.
- Design & Analysis of Computer Algorithm by Aho, Pearson Education, Horowitz, Sahani, Rajsekharan
- "Computer Algorithm", Galgotia Publication Pvt. Ltd. Brassard, Bratley, "Fundamentals of Algorithms", Prendice Hall

**Reference Books :**

- Computer Algorithm : Introduction to Design & Analysis, 3<sup>rd</sup> edition, by Sara Baase & A. V. Gelder, Pearson Education.

**Value Additions<sup>[1]</sup>:**

**Advanced Data Structures:** Red-Black trees, B – trees, Binomial Heaps, Fibonacci Heaps.

<sup>[1]</sup> Suggested Topics beyond the prescribed syllabus

# Nagpur Institute of Technology, Nagpur – 441501

## Syllabus- Rashtrasant Tukadoji Maharaj Nagpur University

### 66CS2 : DATABASE MANAGEMENT SYSTEMS

#### UNIT - I

Database system concepts and Architecture – concept of relational database, Relational Data model, Relational algebra, SQL – the relational database standard, introduction to PL/SQL

#### UNIT – II

Database design theory – Functional dependencies and normalization, relational database Design algorithm, practical database design and demoralization, Relational constants, Programmatic ways foe implementing constraint, triggers.

#### UNIT – III

Physical database design – concepts of physical and logical hierarchy, storage structures like clusters, index organized table, partitions, various table storage parameter and block storage Parameters, concept of index, B – trees, hash index, function index, bitmap index.

#### UNIT – IV

Process and memory management in database : Various types of tasks in database, database buffer management, log buffer management code reuse, concepts of two tier and N – tier architecture, data dictionary and catalog, information database recovery technique. Aries Algorithm for recovery.

#### UNIT – V

Query Optimization and performance turning – Various technique for query optimization, Use of different storage structures in query optimization.

#### UNIT – VI

Transaction Processing – Transaction and system concepts, Desirable properties of transaction, Schedules and recoverability, serializability of schedules, concurrency control, lockbase protocols and time stamp based protocols read consistency.

#### BOOKS :

- Fundamental of database system – Elmasiri , Navathe & Gupta, Pearson Education.
- Database Systems by S. K. Singh, Pearson Education.
- Principles of Database Systems – Ullman, Golgotia Publications 1998

#### REFERENCE BOOKS :

- Database System Concepts by Henry Korth and others
- Database System by Connolly, 3<sup>rd</sup> edition, Pearson Education.

#### Value Additions<sup>[1]</sup>:

##### Entity Relationship Model:

ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationship of higher degree.

**Introduction** to Distributed Database, Concurrency Control Technique

[1] Suggested Topics beyond the prescribed syllabus

# Nagpur Institute of Technology, Nagpur – 441501

## Syllabus- Rashtrasant Tukadoji Maharaj Nagpur University

### 66CS3: COMPUTER NETWORKS

#### UNIT – I

Uses of Computer Networks, Network hardware : - LAN, WAN, MAN, Networks Software – protocol hierarchies, design issues for layers, connection oriented and connection less services, service primitives, services to protocol relationship, Reference models – OSI & TCP/IP. Performance: Bandwidth and Latency, Delay X bandwidth products, High Speed Networks, Application Performance Needs.

#### UNIT – II

Switching and MAC Layer, Packet Switching, Circuit Switching : Multiplexing : TDM FDM. Multiple Access: Random Access, Channelization, LAN: Token Ring, FDDI, Ethernet-Fast Ethernet, Gigabit Ethernet, Wireless LANs: IEEE 802.11.

#### UNIT – III

Data Link Layer: Error Detection and Correction, Flow control protocols, Error control protocols, HDLC, PPP.

#### UNIT – IV

Network Layer: Routing Algorithms – Shortest path Algorithms, Flooding, Flow based routing, Distance vector routing Link state routing, Hierarchical routing.

Congestion Control Algorithms: Leaky bucket algorithm, Token bucket algorithm. Congestion prevention Policies, Traffic shaping, Choke packets, Load Shedding, Jitter Control.

#### UNIT – V

Transport Layer: The transport. Service : Service Provided to upper layers, Transport Service primitives, Berkeley sockets, Elements of Transport protocols : Addressing, Connection establishment, Connection release, Flow control and buffering, Multiplexing, Crash recovery, Introduction to Internet Transport Protocols : Introduction to UDP, Remote procedure call, Introduction to TCP, Performance issues : Performance problems in Computer Network, Network performance measurement, System design for better performance, Fast TPDU processing, Protocols for Gigabit Networks.

#### UNIT – VI

Wide Area Networks: Packet switching principles, X.25, ATM and frame relay: ATM protocol Architecture, Cells, Cell format, Segmentation and reassembly in ATM, ATM adaptation Layer 3/4 ATM adaptation Layer 5; Introduction to Frame relay and frame protocol architecture.

#### TEXT BOOK :

- Computer Networks : 4th ed by Andrew. S. Tanenbaum, Pearson Education.
- Data Communications and Networks : 4th ed by Behrouz. A. Forouzan. Tata McGraw Hill Publication.
- Computer Networks : A systems approach by Larry L. Peterson and Bruce S. Davie, 3rd Edition, Morgan Kaufmann Publishers.
- Data & Computer Communications : William Stallings, Sixth Edition, Pearson Education Asia.

#### REFERENCE BOOK :

- Communication Networks : By Alberto Leon – Garcia & Indra Widjaja, 2nd Edition, McGraw Hill.

#### Value Additions<sup>[1]</sup>:

<sup>[1]</sup> Suggested Topics beyond the prescribed syllabus

# Nagpur Institute of Technology, Nagpur – 441501

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

### 66CS4 : MICROPROCESSOR & INTERFACING

#### UNIT – I :

8085 based Microprocessor organization; 8085 Instruction set, Assembly language programming.

#### UNIT – II :

Memory & I/O organization, Address decoding, Interrupts of 8085, Basic timing diagram of 8085.

#### UNIT – III :

8085 Interfacing with 8255, Simply keyboard matrix interfacing with 8085, Interfacing of 7, segment LED with 8085, Introduction to DMA using HOLD/HLDA Signals.

#### UNIT – IV :

8279 keyboard/display controller, Interfacing fo Stepper motor with 8085.

#### UNIT – V :

9051 architecture, code/data memory interfacing, I/o interfacing, Address decoding logic, Interrupts.

#### UNIT – VI :

Serial data communication, UART operation, 8051 Instruction set, assembly language programming.

#### TEXT BOOKS :

- Microprocessor Architecture, Programming and Applications with 8085/8080 A by R.S. Gaonkar, Wiley Eastern Ltd.
- The 8051 Microcontroller & Embedded System. By Mazidi & Mazidi, Pearson Education.
- The 8051 Microcontroller, Architecture, programming & applications, second edition by K. J. Ayala, Penram International.
- Microcontrollers : Architecture, Programming, Interfacing & System design by Rajkamal, Pearson Education.
- The 8 bit microprocessor & Microcontroller by V. J. Vibhute.

#### Value Additions<sup>[1]</sup>:

80X86 PROCESSORS: 8086 Architecture, Pin Configuration, Addressing modes, Basic Instructions, 8086 interrupts.

Introduction to Assembly levels programming.

Introduction to 80186, 80286, 80386, 80486 and Pentium processors.

<sup>[1]</sup> Suggested Topics beyond the prescribed syllabus

# Nagpur Institute of Technology, Nagpur – 441501

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### 66CS5 : SOFTWARE ENGINEERING AND PROJECT MANAGEMENT

#### UNIT – I :

Software Engineering an Introduction : Introduction to Software Engineering, Software Myths, Software Engineering. A Layered Technology, Software Process Framework, Software Process Models, The Waterfall Model, Incremental Process Models, Evolutionary Process Models, Specialized Process Models, The Unified Process Model, Agile Process Models.

#### UNIT – II :

Software Engineering Practice: An overview, Communication Practices, Planning Practices, Modeling Practices, Construction Practice & Deployment, System Engineering Hierarchy, Business Process Engineering, Product Engineering, System Modeling, Requirements Engineering.

#### UNIT – III :

Software Engineering Analysis & Design An overview, Requirements Analysis, Analysis Modeling Approaches, Data Modeling, Object – Oriented Analysis, Scenario – Based Modeling, Flow – Oriented Modeling, Class – based Modeling, Behavioral Model.

Design Engineering Concepts, Design Model, Pattern – based Software Design.

#### UNIT – IV :

Testing Strategies and Tactics: An overview, Unit Testing, Validation Testing, System Testing, Debugging.

Software Testing Fundamentals, Black – Box Testing, White – Box Testing.

#### UNIT – V :

Product Metrics : An overview, Software Quality, A Framework of Product Metrics, Metrics for Analysis & Design Models, Metrics for Source Code, Metrics for Testing & Maintenance.

#### UNIT – VI:

Software Project Management : An overview, Software Measurements, Metrics for Software Quality, Software Project Estimation Techniques, Project Scheduling, Risk Management, Quality management, Change Management, Software Reengineering.

#### TEXT BOOK:

- Software Engineering – A Practitioner’s Approach (Sixth Edition) – Roger Pressman (TMH)

#### REFERENCE:

- Software Engineering (Seventh Edition) – Ian Sommerville, Pearson Education.
- Software Engineering Theory and Practice by Pfleeger, Pearson Education.
- Software Engineering – Schaurn’s Series (TMH)  
Object – Oriented Analysis and Design using UML in Relational Rose 2003 Enterprise edition (case studies).

#### Value Additions<sup>[1]</sup>:

Estimation of Various Parameters such as Cost, Efforts, Schedule/Duration, Constructive Cost Models (COCOMO), Resource Allocation Models, Software Risk Analysis and Management.

[1] Suggested Topics beyond the prescribed syllabus

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**Syllabus- Rashtrasant Tukadoji Maharaj Nagpur University**

Introduction to Reverse engineering, Web Engineering.

[1] Suggested Topics beyond the prescribed syllabus