INSTRUCTIONS TO PAPER SETTERS: MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

UNIT – I
Review of Physical & Data link layer, ISDN, Frame Relay, ATM

UNIT – II

UNIT – III
Transport Layer: UDP, TCP (Flow Control, Error Control, Connection Establishment)

UNIT – IV
Application layer: DNS, SNMP, RMON, Electronic Mail, WWW.
Network Security: Firewalls (Application and packet filtering), Cryptography, Virtual Print,

TEXT BOOKS:

REFERENCE BOOKS:
### UNIT – I
Parallel computer models: The state of computing, Multiprocessors and multicomputers, Multivector and SIMD computers, Architectural development tracks
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

*No. of Hrs.: 11*

### UNIT - II
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.
Processors and Memory Hierarchy: Advanced processor technology, Instruction-set Architectures, CISC Scalar Processors, RISCScalar Processors, Superscalar Processors, VLIW Architectures, Vector and Symbolic processors
Memory Technology: Hierarchical memory technology, Inclusion, Coherence and Locality, Memory capacity planning, Virtual Memory Technology

*No. of Hrs.: 11*

### UNIT - III
Backplane Bus System: Backplane bus specification, Addressing and timing protocols, Arbitration transaction and interrupt, Cache addressing models, Direct mapping and associative caches.
Pipelining: Linear pipeline processor, Nonlinear pipeline processor, Instruction pipeline design, Mechanisms for instruction pipelining, Dynamic instruction scheduling, Branch handling techniques, Arithmetic Pipeline Design, Computer arithmetic principles, Static arithmetic pipeline, Multifunctional arithmetic pipelines

*No. of Hrs. 11*

### UNIT - IV
Vector Processing Principles: Vector instruction types, Vector-access memory schemes.

*No. of Hrs.: 11*

### TEXT BOOKS:

### REFERENCES BOOKS:
INSTRUCTIONS TO PAPER SETTERS: MAXIMUM MARKS: 75

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

[No. of Hrs.: 10]

UNIT - II
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.

[No. of Hrs.: 12]

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

[No. of Hrs.: 12]

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

[No. of Hrs.: 10]

TEXT BOOKS:
2. A. Holub, “Compiler Design in C”, PHI, 2004

REFERENCES BOOKS:
UNIT – I

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.


[No. of Hrs.: 11]

UNIT – II

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).

[No. of Hrs.: 11]

UNIT – III

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.

[No. of Hrs.: 11]

UNIT – IV

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.

[No. of Hrs.: 11]

TEXT BOOKS:

REFERENCE BOOKS:
UNIT – I

UNIT – II
Operation of MOS transistor as a switch, Design and analysis of nMOS, pMOS and CMOS circuits, CMOS Logic, The Inverter, NAND gate, NOR Gate, Compound Gate. [No. of Hrs.: 11]

UNIT – III

UNIT – IV
Sequential MOS Logic Circuits, Dynamic Logic Circuits, Semiconductor Memories. [No. of Hrs.: 11]

TEXT BOOK:

REFERENCE BOOKS:
INSTRUCTIONS TO PAPER SETTERS: MAXIMUM MARKS: 75

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UNIT - I

Image Enhancement in the Spatial Domain: Some basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic and Logic operations, Basics of Spatial Filters, Smoothening and Sharpening Spatial Filters, Combining Spatial Enhancement Methods. [No. of Hrs.: 10]

UNIT - II
Image Enhancement in the Frequency Domain: Introduction to Fourier Transform and the frequency Domain, Smoothening and Sharpening Frequency Domain Filters, Homomorphic Filtering.


UNIT - III

Image Segmentation: Detection of Discontinuities, Edge linking and boundary detection, Thresholding, Region Oriented Segmentation, Motion based segmentation.[No. of Hrs.: 12]

UNIT - IV
Representation and Description: Representation, Boundary Descriptors, Regional Descriptors, Use of Principal Components for Description, Introduction to Morphology, Some basic Morphological Algorithms.

Object Recognition: Patterns and Pattern Classes, Decision-Theoretic Methods, Structural Methods. [No. of Hrs.: 10]

TEXT BOOKS:

REFERENCES:
UNIT – I
Requirements engineering: Requirements Elicitation, Requirement Elicitation techniques, Requirement Analysis, Requirement Analysis Models, Requirement Documentation, Requirement Management, IEEE Std. For SRS  [No. of Hrs.: 10]

UNIT - II
Size Estimation: Function Point Analysis, Mask II FPA, LOC estimation, Conversion between size measures  [No. of Hrs.: 12]

UNIT - III

UNIT - IV
Introduction to software life cycle, management activities in software project
Tools: Software Estimation Tools
Industry Resources; IFPUG, UQAM-SEMRL, COSMIC, IEEE, COCOMO  [No. of Hrs.: 10]

TEXT BOOKS:

REFERENCE BOOKS:
Students may select a project related to any of the subjects of the current semester.
<table>
<thead>
<tr>
<th>Code No.</th>
<th>Paper</th>
<th>L</th>
<th>P</th>
<th>C</th>
</tr>
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<tbody>
<tr>
<td>ETIT 451</td>
<td>Advanced Computer Network Lab.</td>
<td>0</td>
<td>2</td>
<td>1</td>
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Practical will be based on Advanced Computer Network.

<table>
<thead>
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<th>L</th>
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<th>C</th>
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<tr>
<td>ETCS 453</td>
<td>Practical Lab.</td>
<td>0</td>
<td>2</td>
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Practical will be based on Electives

<table>
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<th>Paper</th>
<th>L</th>
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<th>C</th>
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</thead>
<tbody>
<tr>
<td>ETCS 455</td>
<td>*Seminar</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

*NUES

A college committee will evaluate the performance of the students & marks will be awarded accordingly.
Students may choose a project based on any subject of Computer Science. The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format. The student will have to present the progress of the work through seminars and progress reports.

*NUES

Practical training conducted after sixth semester will be evaluated in the Seventh Semester based on Viva-Voce.
INSTRUCTIONS TO PAPER SETTERS:  MAXIMUM MARKS: 75

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2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

UNIT – I
Scope of AI: Games, theorem proving, natural language processing, vision and speech processing, robotics, expert systems, AI techniques-search knowledge, abstraction.
Problem Solving (Blind): State space search; production systems, search space control; depth-first, breadth-first search.
Heuristic Based Search: Heuristic search, Hill climbing, best-first search, branch and bound, Problem Reduction, Constraint Satisfaction End, Means-End Analysis. [No. of Hrs.: 12]

UNIT – II
Game Playing: Game Tree, Minimax Algorithm, Alpha Beta Cutoff, Modified Minimax Algorithm, Horizon Effect, Futility Cut-off.
Structured Knowledge Representation: Semantic Nets: Slots, exceptions and default frames, conceptual dependency, scripts. [No. of Hrs.: 12]

UNIT – III
Handling Uncertainty: Non-Monotonic Reasoning, Probabilistic reasoning, use of certainty factors, fuzzy logic.
Natural Language Processing: Introduction, Syntactic Processing, Semantic Processing, Pragmatic Processing. [No. of Hrs.: 10]

UNIT – IV
Expert Systems: Need and justification for expert systems, knowledge acquisition, Case Studies: MYCIN, RI. [No. of Hrs.: 10]

TEXT BOOKS:

REFERENCES BOOKS:
**INSTRUCTIONS TO PAPER SETTERS:**

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**UNIT – I**  
**Introduction:** What is software testing and why it is so hard?, Error, Fault, Failure, Incident, Test Cases, Testing Process, Limitations of Testing, No absolute proof of correctness, Overview of Graph Theory.  

[No. of Hrs.: 11]

**UNIT - II**  
**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.  

[No. of Hrs.: 11]

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

[No. of Hrs.: 11]

**UNIT - IV**  
**Object Oriented Testing:** Issues in Object Oriented Testing, Class Testing, GUI Testing, Object Oriented Integration and System Testing.  

[No. of Hrs.: 11]

**TEXT BOOKS:**

**REFERENCE BOOKS:**
INSTRUCTIONS TO PAPER SETTERS:  
MAXIMUM MARKS: 75

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UNIT – I
[No. of Hrs.: 11]

UNIT – II
[No. of Hrs.: 11]

UNIT – III
[No. of Hrs.: 11]

UNIT – IV
Application of Fuzzy Logic: Medicine, Economics etc.  
Genetic Algorithm: An Overview, GA in problem solving, Implementation of GA  
[No. of Hrs.: 11]

TEXT BOOKS:

REFERENCE BOOKS:
UNIT – I
Introduction to an embedded systems design & RTOS: Introduction to Embedded system, Processor in the System, Microcontroller, Memory Devices, Embedded System Project Management, ESD and Co-design issues in System development Process, Design cycle in the development phase for an embedded system, Use of target system or its emulator and In-circuit emulator, Use of software tools for development of an ES. Inter-process Communication and Synchronization of Processes, Tasks and Threads, Problem of Sharing Data by Multiple Tasks, Real Time Operating Systems: OS Services, I/O Subsystems, Interrupt Routines in RTOS Environment, RTOS Task Scheduling model, Interrupt Latency and Response times of the tasks. [No. of Hrs.: 11]

UNIT – II
Overview of Microcontroller: Microcontroller and Embedded Processors, Overview of 8051 Microcontroller family: Architecture, basic assembly language programming concepts, The program Counter and ROM Spaces in the 8051, Data types, 8051 Flag Bits ad PSW Register, 8051 Register Banks and Stack Instruction set, Loop and Jump Instructions, Call Instructions, Time delay generations and calculations, I/O port programming Addressing Modes, accessing memory using various addressing modes, Arithmetic instructions and programs, Logical instructions, BCD and ASCII application programs, Single-bit instruction programming, Reading input pins vs. port Latch, Programming of 8051 Timers, Counter Programming [No. of Hrs.: 11]

UNIT – III
Communication with 8051: Basics of Communication, Overview of RS-232, I²C Bus, UART, USB, 8051 connections to RS-232, 8051 serial communication programming, 8051 interrupts, Programming of timer interrupts, Programming of External hardware interrupts, Programming of the serial communication interrupts, Interrupt priority in the 8051 [No. of Hrs.: 11]

UNIT - IV
Interfacing with 8051: Interfacing an LCD to the 8051, 8051 interfacing to ADC, Sensors, Interfacing a Stepper Motor, 8051 interfacing to the keyboard, Interfacing a DAC to the 8051, 8255 Interfacing with 8031/51, 8051/31 interfacing to external memory [No. of Hrs.: 11]

TEXT BOOKS:

REFERENCES BOOKS:
INSTRUCTIONS TO PAPER SETTERS: MAXIMUM MARKS: 75

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UNIT – I
Introduction and Concepts: Networks and commercial transactions – Internet and other novelties; networks and electronic transactions today, Model for commercial transactions; Internet environment – internet advantage, worlds wide web and other internet sales venues; Online commerce solutions.
Security Technologies: Insecurity Internet; A brief introduction to Cryptography; Public key solution; Key distribution and certification; prominent cryptographic applications.
Electronic Payment Methods: Updating traditional transactions; secure online transaction models; Online commercial environments; digital currencies and payment systems; Offline secure processing; private data networks.

UNIT – II
Protocols for Public Transport of Private Information: Security protocols; secure protocols; Secure hypertext transfer protocols; Secure sockets layers; Integrating security protocols into the web; Non technical provide.
Electronic Payment Systems: Digital payment systems; First virtual internet payment system; cyber cash model.
On-line Commerce Environments: Servers and commercial environments; Netscape product line; Netscape commerce server; Microsoft internet explorer and servers; open market.
Digital Currencies: Optional process of Digicash, Ecash Trail; Using Ecash; Smart cards, Electronic Data Interchange; Its basics; EDI versus Internet and EDI over Internet.
Strategies, Techniques and Tools: Internet Strategies: Internet Techniques, Shopping techniques and online selling techniques; Internet tools.
Electronic Commerce Online Resources and Guide to the CD-ROM

UNIT – III
Management in global scenario, dynamic data management in complex global scenario.

UNIT – IV
ERP – Information System Perspective: Evolution of Application Software Technology Management, EDP, MIS, DBMS, DSS OLAP (Online Analysis and Processing), TP, OAS, KBS, MRP, BPR, SCM, REP, CRM, Information Communication Technology, E-Business, E-Commerce, EDI

TEXT BOOKS:

REFERENCE BOOKS:
INSTRUCTIONS TO PAPER SETTERS:  

MAXIMUM MARKS: 75

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UNIT – I
Block Ciphers – DES and variant, modes of use of DES. [No. of Hrs.: 11]

UNIT – II
Public Key systems – Knacksack systems – RSK – Diffle Hellman Exchange 0 Authentication and Digital signatures, Elliptic curve based systems.
System Identification and clustering
Cryptology of speech signals – narrow band and wide band systems – analogue & digital systems of speech encryption. [No. of Hrs.: 11]

UNIT – III
Network Security: Hash function – Authentication:
Protocols – Digital Signature standards.
Electronics Mail Security – PGP (Pretty Good Privacy) MIME, Data Compression technique.
Firewalls Design principle, established systems. [No. of Hrs.: 12]

UNIT – IV
Telecommunication Network architecture, TMN management layers, Management information Model, Management servicing and functions, Structure of management information and TMN information model. [No. of Hrs.: 10]

TEXT BOOKS:
UNIT – I
Introduction to Cellular Mobile Systems: A basic cellular system, performance criteria, uniqueness of mobile radio environment, operation of cellular systems, planning a cellular system, overview of generations of cellular systems.
Elements of Cellular Radio Systems Design and Interference: 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, Introduction to co-channel interference, co-channel measurement design of antenna system, antenna parameter and their effects.  

[No. of Hrs.: 11]

UNIT – II
Cell Coverage for Signal & Antenna Structures: 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, Characteristics of basic antenna structures, antenna at cell site, mobile antennas.
Frequency Management & Channel Assignment, Hand Off & Dropped Calls: Frequency Management, fixed channel assignment, non-fixed channel assignment, traffic & channel assignment, Why hand off, types of handoff and their characteristics, dropped call rates & their evaluation.  

[No. of Hrs.: 11]

UNIT – III
Modulation methods and coding for error detection and correction: Introduction to Digital modulation techniques, modulation methods in cellular wireless systems, OFDM, Block Coding, convolution coding and Turbo coding.
Multiple access techniques: FDMA, TDMA, CDMA: Time-division multiple access (TDMA), code division multiple access (CDMA), CDMA capacity, probability of bit error considerations, CDMA compared with TDMA.  

[No. of Hrs.: 11]

UNIT – IV
Second generation, digital, wireless systems: GSM, IS_136 (D-AMPS), IS-95, mobile management, voice signal processing and coding.  

[No. of Hrs.: 11]

TEXT BOOKS:
REFERENCE BOOKS:
Practical will be based on Artificial Intelligence.

Practical will be based on Software Testing.

Practical will be based on ELECTIVES:

The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format. The student will have to present the progress of the work through seminars and progress reports.