Department of Computer Science & Engineering
Triguna Sen School of Technology, Assam University, Silchar

IPP SYLLABUS

IPP 501: Research Methodology (Inter Schools Level)

As per Assam University guideline.

IPP 502: Inter Disciplinary Studies (Inter Departmental Level within School)

UNIT-I: COMPUTER FUNDAMENTALS

Introduction to Computer, Characteristics of Computers, Historical Evolution of Computers, Computer Generations, Classification of Computers, Application of Computers.
Block Diagram of Computer Organization: - (Input Device; Memory:- Primary Memory, Secondary Memory; CPU:- ALU, CU; Output Device)
Concepts of finite storage: Bits, Bytes, KiloBytes, MegaBytes, GigaBytes etc.
Computer System: - Hardware; Software:- Application Software, System Software.
Evolution of Programming Language:- Low-level Language:- Machine Language, Assembly Language; High-Level Language:- Procedural Language, Problem Oriented Language.
Program Language Translators: - Assembler, Compiler, Interpreter.
Data Representation: Number Systems: - Binary, Decimal, Octal, Hexadecimal and their conversations; Character Representation Codes:- BCD, ASCII, EBCDIC, ISCII, and Unicode.
Binary Representation of Integers:- Sign & Magnitude, 1's Complement, 2's Complement; Binary Representation of Real (Floating Point) Numbers.
Binary Arithmetic, Floating-Point Arithmetic, Signed and Unsigned Numbers.

UNIT-II: BASIC OF C/MATLAB PROGRAMMING

Concept of algorithms, Flow Charts, Data Flow diagrams etc.
Introduction to the Editing tools, Concept of variables, program statements and function calls from the library, data types, declarations and expressions, arithmetic operation, relational and logical operations, C assignment statements, extension of assignment of the operations. C primitive input output functions, C Statements. Branching, Looping, Arrays, Functions, Pointers.

UNIT-III: APPLICATION OF PROBABILITY AND STATISTICS

Frequency distributions, measures of central tendency (arithmetic mean, median, mode, geometric men and harmonic mean) and their properties, merits and demerits; Measures of Dispersion (range, quartile deviation, mean deviation and standard deviation), Skewness and Kurtosis; Probability and probability distribution (Normal,Binomial, Poisson); Correlation and Regression analysis;Testing of hypothesis.

UNIT-IV: IPR RELATED TO TECHNOLOGICAL INNOVATION

Introduction – Invention and Creativity – Intellectual Property (IP) – Importance – Protection of IPR – Basic types of property (i). Movable Property - Immovable Property and - Intellectual Property.
IP – Patents – Copyrights and related rights – Trade Marks and rights arising from Trademark registration – Definitions
International convention relating to Intellectual Property – Establishment of WIPO – Mission and Activities – History – General Agreement on Trade and Tariff (GATT) – TRIPS Agreement.
Indian Position Vs WTO and Strategies – Indian IPR legislations – commitments to WTO-Patent Ordinance and the Bill – Draft of a national Intellectual Property Policy – Present against unfair competition.

IPP 503: Departmental Level (Subject Specific)

UNIT-I: ALGORITHM

Time and Space analysis of Algorithms: Time Complexity, Space complexity, Order Notations; Finding time complexity of well-known algorithms like heap sort, search algorithm, etc.; Recursion: Design of recursive algorithms; Divide and Conquer, Dynamic Programming, Greedy Method, Minimum spanning tree (Prim's and Kruskal's algorithms); Properties of graphs and graph traversal algorithms: BFS and DFS; Notion of NP-completeness: P class, NP-hard class, NP-complete class.

UNIT-II: DATA STRUCTURES

Linear Data Structures; Link Representations: Linear linked lists, Circular linked lists, Doubly linked lists; Non-linear Data Structure: Trees, Binary Trees, Traversals and Threads, Binary Search Trees, Insertion and Deletion algorithms, Height-balanced and weight-balanced trees, B trees, B+ trees, AVL trees, Application of trees; Graphs Representations: Breadth-first and Depth-first Search; Sorting algorithms; Search Techniques, Hashing.

UNIT-III: COMMUNICATION AND NETWORKING

Coding and modulation; Signal transmission, Multiplexing, Error control, Flow control, MAC layer protocols, Addressing, Routing and Network Layer Protocols, Congestion control algorithms, Quality of service, Application layer protocols, IEEE 802.11.

UNIT-IV: IMAGE PROCESSING & VLSI DESIGN

Sampling and Quantization, Connectivity and Distance Measures, Fourier Transformation, Spatial Domain Enhancement, Frequency Domain Enhancement, Histogram Processing; Smoothing, Image Averaging and Image Sharpening, Mean Filter, Low-pass Filtering, High-pass Filtering, High-boost Filtering; Point detection, Line detection, Edge detection, Combined detection, Boundary detection, Thresholding, Region Oriented Segmentation, Compression techniques, Different types of Noises and denoising techniques.
Introduction to CMOS circuits: MOS Transistors, MOS transistor switches, CMOS Logic, The inverter, Combinational Logic, NOT Gate, NAND gate, NOR gate, Compound gates, Multiplexers; Stick representation; VLSI design cycle; Physical design cycle; Design styles: Custom design, Standard-cell design, Gate-array design; Partitioning, Floor-planning and Placement, Routing, Compaction.

IPP 504: Term Paper

As per Assam University guideline.