

S.Y.B.Tech. (Information Technology) Sem –III (2020-21)
Revised Syllabus

Computer Architecture and Organization (BTCOC304)

- Unit1** [05Hrs]
Introduction: Concept of computer organization and architecture, Fundamental unit, Computer functional interconnection,
[Topics for self study mode: CPU structure and function]
- Unit2** [05Hrs]
Instruction Sets: Characteristics, Types of operands, Types of operations, Assembly language, Addressing modes, Instruction format, Types of instruction, Instruction execution,
[Topics for self study mode: Machine state and processor status, Structure of program, Introduction to RISC and CISC architecture]
- Unit3** [05Hrs]
Computer Arithmetic: The arithmetic and logic Unit, Integer representation, Integer arithmetic, Floating point representation, Floating point arithmetic,
[Topics for self study mode: Introduction of arithmetic co-processor]
- Unit4** [05Hrs]
Memory Organization: Internal Memory: Semiconductor main memory, Error correction, Advanced DRAM organization, Virtual memory systems and cache memory systems, Magnetic tape,
[Topics for self study mode: External Memory: Organization and characteristics of magnetic disk, Optical memory, RAID, Memory controllers]
- Unit5** [05Hrs]
Control Unit: Control unit operation: Micro-operations, Control of the processor, Hardwired implementation, Micro-programmed Control Unit, Basic concepts,
[Topics for self study mode: Micro-instruction sequencing, Microinstruction execution, Applications of micro-programming]
- Unit6** [05Hrs]
Input/ Output Organization: External devices, I/O module, Programmed I/O, Interrupt driven I/ O, Direct memory access, I/O channels and processors, External interface. Instruction pipe-lining: Concepts.
[Topics for self study mode: Parallel processing: Multiple processor organization, Symmetric multiprocessor, Cache coherence and the MESI protocol]

Engineering Mathematics-III (BTBSC301)

Unit 1: Laplace Transform

Definition – conditions for existence ; Transforms of elementary functions; Properties of Laplace transforms - Linearity property, first shifting property, second shifting property, transforms of functions multiplied by t^n , scale change property, transforms of functions divided by t , transforms of integral of functions, transforms of derivatives ; Evaluation of integrals by using Laplace transform Transforms of some special functions-, Heaviside-unit step function, Dirac deltafunction. **[06Hours]**

[Topics for self study mode: periodic function]

Unit 2: Inverse Laplace Transform

Introductory remarks ; Inverse transforms of some elementary functions ; General methods of finding inverse transforms ; Partial fraction method and Convolution Theorem for finding inverse Laplace transforms **[06 Hours]**

[Topics for self study mode: Applications to find the solutions of linear differential equations and simultaneous linear differential equations with constant coefficients]

Unit 3: Fourier Transform

Definitions – integral transforms ; Fourier integral theorem (without proof) ; Fourier sine and cosineintegrals; **[05 Hours]**

[Topics for self study mode: Complex form of Fourier integrals ; Fourier sine and cosine transforms, Properties of Fourier transforms, Parseval's identity for Fourier Transform]

Unit 4: Partial Differential Equations and Their Applications

Formation of Partial differential equations by eliminating arbitrary constants and functions; Equations solvable by direct integration; Linear equations of first order (Lagrange's linear equations)

[Topics for self study mode: Method of separation of variables – applications to find solutions of one dimensional heat flow equation and two dimensional heat flow equation] **[05Hours]**

Unit 5: Functions of Complex Variables (Differential calculus)

Limit and continuity of $f(z)$; Derivative of $f(z)$; Analytic functions; Cauchy-Riemann equations in Cartesian and polar forms; Harmonic functions in Cartesian form; Mapping: Translation, magnification and rotation, inversion and reflection , Conformal mapping.

[Topics for self study mode: bilinear transformation] **[06Hours]**

Unit 6: Functions of Complex Variables(Integralcalculus) [05 Hours]

Cauchy's integral theorem; Cauchy's integral formula; Residues

[Topics for self study mode; Cauchy's residue theorem (All theorems without proofs)]

Text Books

1. Higher Engineering Mathematics by B. S. Grewal, Khanna Publishers, New Delhi.
2. Advanced Engineering Mathematics by Erwin Kreyszig, John Wiley & Sons, New York.
3. A Course in Engineering Mathematics (Vol III) by Dr. B. B. Singh, Synergy Knowledge ware, Mumbai.
4. A Text Book of Applied Mathematics (Vol I & II) by P. N. Wartikar and J. N. Wartikar, Pune Vidyarthi Griha Prakashan, Pune.
5. Higher Engineering Mathematics by H. K. Das and Er. Rajnish Verma, S. Chand & CO. Pvt. Ltd., New Delhi.

Reference Books

1. Higher Engineering Mathematics by B. V. Ramana, Tata McGraw-Hill Publications, New Delhi.
2. A Text Book of Engineering Mathematics by Peter O' Neil, Thomson Asia Pte Ltd., Singapore.
3. Advanced Engineering Mathematics by C. R. Wylie & L. C. Barrett, Tata Mcgraw-Hill Publishing Company Ltd., New Delhi.
4. Integral Transforms and Their Engineering Applications by Dr. B. B. Singh, Synergy . Knowledge ware, Mumbai.
5. Integral Transforms by I. N. Sneddon, Tata McGraw-Hill, New York.

Switching Theory and Logic Design (BTITC302)

UNIT I: Number Systems and Codes: [06 Hours]

Number systems: Binary, Octal, Hexadecimal number systems, Binary arithmetic, Codes: Binary code, Excess-3 code, Gray code.

[Topics for self-study mode: Error detection and correction codes]

UNIT II: Boolean algebra and Logic Functions: [06 Hours]

Boolean algebra: Postulates and theorems, Logic functions, Minimization of Boolean functions using algebra, Karnaugh map and Quine – McClusky methods.

[Topics for self study mode: Realization using logic gates]

UNIT III: Classification of logic families: [06 Hours]

Classification of logic families, Characteristics of digital ICs- Speed of operation, power dissipation, figure of merit, fan in, fan out, current and voltage parameters, noise immunity, operating temperatures and power supply requirements, TTL logic, Operation of TTL NAND gate, active pull up, wired AND, open collector output, unconnected inputs.

[Topics for self study mode: Tri-State logic, CMOS logic, CMOS inverter, NAND, NOR gates, unconnected inputs, wired logic, open drain output, Interfacing CMOS and TTL]

UNIT IV: Combinational Functions: [06 Hours]

Realizing logical expressions using different logic gates, Design of combinational circuits using combinational IC's, Realization of adders and subtractors, , Design of multiplexers, Demultiplexers.

[Topics for self study mode: Design of code converters, Comparators and decoders]

UNIT V: Introduction to Sequential Circuits: [06 Hours]

Moore and mealy machines, Introduction to flip-flops like SR, JK, D and T with truth tables, Logic diagrams and timing relationships, Conversion of flip-flops, Excitation table

[Topics for self study mode: State tables, Realization of state stables]

UNIT VI: Programmable Logic Devices: [04 Hours]

Semiconductor memories, RAM, ROM, EPROM, EEPROM, NVRAM, SRAM, DRAM, PLA, PAL

[Topics for self study mode: Memory System design]

Text Books:

1. M. M. Mano, "Digital Logic and Computer Design", Prentice Hall of India Publication, 4th Edition, 2006.
2. R.P. Jain, "Modern Digital Electronics", Tata McGraw Hill Publication, 4th Edition, 2010.

Reference Books:

1. D. P. Leach, A. P. Malvino, G. Saha, "Digital Principles and Applications", Tata McGraw Hill Publication, 8th Edition, 1993.
2. Comer, "Digital Logic & State Machine Design", Oxford Universities Press, 3rd Edition, 2014.