## EB/EC/EE/EI/CE/CS/IT/ME/SE 401 ENGINEERING MATHEMATICS III

**Module 1**

*Complex Analytic functions and conformal mapping:* curves and regions in the complex plane, complex functions, limit, derivative, analytic function, Cauchy - Riemann equations, Elementary complex functions such as powers, exponential function, logarithmic, trigonometric and hyperbolic functions. *Conformal mapping*: Linear fractional transformations, mapping by elementary functions like $Z^2$, $e^z$, sin z, cos z, sin hz, and Cos hz, Z+1/Z.

**Module 2**

***Complex integration:*** Line integral, Cauchy's integral theorem, Cauchy's integral formula, Taylor's series, Laurent's series, residue theorem, evaluation of real integrals using integration around unit circle, around the semi circle, integrating contours having poles, on the real axis.

**Module 3**

*Partial differential equations:*Formation of partial differential equations. Solutions of equations of the form F(p, q) = 0, F(x,p,q)=0, F(y,p,q)=0, F(z,p,q)=0, F1(x,p) = F2 (y,q), Lagrange's form Pp+Qq = R. Linear homogeneous partial differential equations with constant co-effients.

**Module 4**

*Vibrating string* : one dimensional wave equation, D'Alembert's solution, solution by the method of separation of variables. *One dimensional heat equation*, solution of the equation by the method of separation of variables, *Solutions of Laplace's equation* over a rectangular region and a circular region by the method of separation of variables.

**Text Books:**


1. R.K.Jain, S.R.K.Iyengar: Advanced Engineering Mathematics, Narosa Publishers.1991
2. C.R.Wilie & L.C.Barrett: Advanced Engineering Mathematics, MGH Co.


**References:**


1. Ervin Kreyszig, Wiley Eastern , Advanced Engineering Mathematics
2. Complex Variables & Applications: Churchill R.V, Mgh Publishers.
3. M.C.Potter, J.L.Goldberg , Advanced Engineering Mathematics, Oxford University Press


***Type of questions for University Examination***
***Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module***
***Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks***

# IT 402 MICROPROCESSOR ARCHITECTURE AND SYSTEM DESIGN

**Module I**

Introduction to microprocessors: Intel 8085architecture – CPU Registers- ALU, Decoders, Bus system- Tristate Logic – Opcode and operands – Instruction word size – Instruction cycle – Timing diagram. Instruction set: Addressing modes –Status flags – Intel 8085- Instruction set

**Module II**

Memory and I/O- Interfacing memory sections – Timing Analysis –DMA structure - I/O Interfacing – Intel 8085 I/O structure – programming examples. Interrupt structures: Need for interrupt structures – Handling of specific source of interrupts – Software interrupts – Hardware interrupts – Programmable interrupts controllers – 8259-PIC – Asynchronous and synchronous interrupt driven data transfer – Multiple interrupts.

**Module III**

Peripheral devices: I/O ports – Programmable peripheral interface- Intel 8255 – Programmable DMA controller – 8257-8279 keyboard/display controller – ADC/DAC Interface – stepper motor control

**Module IV**

Advanced Microprocessor: Introduction to Pentium & Pentium pro architectures : RISC concepts –Bus operation –super scalar architecture pipelining –Branch Prediction – Instruction and data caches –FPU – comparison of Pentium and Pentium pro architecture Introduction to Pentium II and Pentium III and Pentium IV processor – Introduction to Intel and AMD 64 Bit architecture RISC architecture :definition of RICS – properties of RISC system – Practices in RISC system- Register windowing – Advantages and Short coming –comparison with CISC architecture

**Text Book**

1. R.S.Gaonkar : Microprocessor architecture programming & Application
2. Douglas V Hall, “Microprocessors & Interfacing” 2nd edition, Tata Mc GrawHill

**References:**


1. Ghosh and Sridhar: 0000 to 8085 Microprocessors for Engineers and Scientists
2. Barry B.: The Intel Microprocessor 8085 to Pentium 4 Architecture and programming and Interface
3. James .l Antonacos , An Introduction to Intel Family of Microprocessor ,3/e Pearson Education 2002
4. Mohammed Rafiquzzaman : Microprocessor & Microcomputer System Design, Wiley Publication


***Type of questions for University Examination***
***Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module***
***Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks***

# IT 403 OPERATIONS RESEARCH

**Module I**

Linear Algebra : Review of the properties of matrices and matrix operations, partitioning of matrices, vectors and Euclidean spaces , unit vectors , sum vectors, linear dependence, bases, spanning set , rank, product form of inverse, simultaneous equations , basic solutions, point sets, lines and hyper planes, convex sets, extreme points, fundamental theorem of linear programming.

**Module II**

Linear Programming : Statement of LP problem, slack and surplus variables, basic feasible solutions, reduction of feasible solutions to basic feasible solutions, artificial variables, optimality conditions, unbounded solutions, Charne's M method, two phase method, degeneracy, duality. Rectangular zero sum games : Von Neumans' theorem, saddle points, pure and mixed strategies , formulation of primal and dual LP problem for mixed strategies, dominance graphical solution.

**Module III**

Transportation, Assignment & Game problems : the transportation problem, the coefficient matrix and its properties , basic set of column vectors , linear combination of basic vectors, the tableau format, stepping stone algorithm, U-N method , inequality constraints, degeneracy in transportation problem , Koening's method

**Module IV**

Queueing theory : Basic structure of queueing models, exponential and poisson distribution, the birth and death process , queueing models based on poissons input and exponential services time, the basic model with constant arrival rate and service rate, finite queue, limited source Q models involving non exponential distributions, single service model with poission arrival and any services time distribution , poission arrival with constant service time , poisson arrival with constant service time , poission arrival and Erlang service time priority disciplines.

**References**


1) Hamdy.A Taha : Operation Research, 8th Edition, Pearson Education
2) Hadely G. : Linear Programming( Addision Weselys)
3) Hiller & Lieberman : Operation Research (Holden – Day – Inc)
4) Sasieni, Yaspen & Friedman : Operation Research
5) Gue & Thomas : Operation Research
6) S.Kalavath : Operation Research-Vikas Thomson Learning Publishing, NewDelhi
7) N.G.Nair : Resource Management-Vikas Thomson Learning Publishing,NewDelhi
8) C.R.Kothari : Introduction to Operational Research- Vikas Thomson Learning Publishing, NewDelhi


***Type of questions for University Examination***

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***Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks***

# CS/IT 404 AUTOMATA LANGUAGES AND COMPUTATION

**Module 1**

Finite state systems NFA DFA, Equivalence of NFA and DFA, Equivalence of NFA and NFA with epsilon moves, regular expression, Equivalence of regular expression and finite automata, Finite automata with output associated with state, Finite automata with output associated with transition, Equivalence of finite automata with output ,applications of Finite automata, Pumping Lemma , closure properties of Regular sets, Decision algorithms , My Hill Nerode theorem ,minimization of DFA

**Module 2**

Context Free grammars derivations parse Trees, ambiguity Simplification CNF,GNF,PDA DPDA, equivalence of PDA and CFL, pumping lemma for CFL, Closure Properties, decision algorithms, CYK algorithm

**Module 3**

Turing machine, Techniques for construction of TM , storage in finite control, multiple tracks ,shifting over ,checking of symbols ,subroutines, NDTM , undecidability, universal TM

**Module 4**

Recursive and recursively enumerable languages, Properties, halting problem of TM Chomsky Hierarchy ,equivalence of regular grammar and FA , equivalence of unrestricted grammar and TM , equivalence of LBA and CSL relation between languages

**Text Books:**


1. J E Hopcroft and J D Ullman Introduction to Automata Theory and Languages and Computation, Addison Wesley
2. Michael Sipser, Introduction to the Theory of Computation, Thomson Learning


**References:**


1. Misra and Chandrasekharan, Theory of Computation, Prentice Hall
2. H R Lewis Papadimitrou, Elements of Theory of Computation PHI
3. John Martin, Introduction to Language and Theory of Computation, TMH
4. Peter Linz, An Introduction to Formal Languages and Automata Narosa Publucation


***Type of questions for University Examination***
***Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module***
***Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks***

# CS/IT 405 DATA STRUCTURES& ALGORITHMS

**Module 1**

Introduction to Data structures - Arrays & sparse matrices – representation, Searching - linear, binary, Fibonacci – Sorting – selection, bubble, insertion, quick, merge, heap, Introduction to external sorting, Hash tables – Hashing functions

**Module 2**

Linked lists – singly, doubly and circular lists, Application of linked lists – Polynomial manipulation, Stacks – Implementation of stacks using arrays and lists – Typical problems – Conversion of infix to postfix – Evaluation of postfix expression . Queues & Deques – implementation., priority queues

**Module 3**

Trees, Definition and mathematical properties. Representation – sequential, lists - Binary trees – Binary tree traversals – pre-order, in-order & post-order, Expression trees . Threaded binary trees . Binary Search trees . AVL trees

**Module 4**

Graphs – Graph representation using adjacency matrices and lists – Graph traversals – DFS, BFS - shortest path – Dijkstra's algorithm, Minimum spanning tree – Kruskal Algorithm, prins algorithm – Binary search, B trees and B+ trees.

**Text Book:**


1. Michael Waite and Robert Lafore, "Data Structures and Algorithms in Java" , Techmedia, NewDelhi, 1998.
2. Sartaj Sahni, 'Data Structures, Algorithms, and Applications in Java", McGraw-Hill
3. Adam drozdek," Data Structures and Algorithms in Java" ,Thomson Publications, 2nd Edition


**References:**


1. Aaron M.Tanenbaum, Moshe J.Augenstein, "Data Structures using C", Prentice Hall InternationalInc., Englewood Cliffs, NJ, 1986
2. Ellis Horowitz and Sartaj Sahni, " An introduction to Data Structures", Computer Science Press,Rockville, MA, 1984
3. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Benjamin/CummingsPublishing Company Inc., Redwood City, CA, 1991
4. Jean Paul Tremblay and Paul G Sorenson, "An introduction to Data Structures with Applications",McGraw-Hill, Singapore, 1984


***Type of questions for University Examination***

***Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module***

***Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks***

## CS/IT 406 DATA COMMUNICATION

**Module 1**

Data transmission: Communication model-Data Transmission: Concepts and Terminology- Analog and Digital Data Transmission- Transmission Impairments-Guided transmission media- Wireless Transmission- Line-of-sight Transmission. Channel Capacity-Band width and Shannon's capacity equation

**Module 2**

Signal Encoding Techniques: *Digital Data,Digital Signals*:-Unipolar. Polar: NRZ-RZ-Biphase-Manchester-Differential Manchester. Bipolar: AMI-B8ZS-HDB3.

*Digital Data, Analog Signals*:-Aspects of Digital to Analog Conversion: Bit rate and Baud rate-Constellation pattern. ASK-FSK-PSK-QPSK-QAM-Bandwidth of ASK,FSK,PSK and QAM. Modems-Types of modem-Modem standards

*Analog Data, Digital Signals*:- Sampling principles-Quantization-Nyquist Theorem. PAM-PCM-Delta Modulation

*Analog Data, Analog Signals*:-AM-FM-PM-Bandwidth of AM,FM and PM.

*Data Compression*:- Frequency dependent coding-Huffman coding-LZW Coding

**Module 3**

Digital Data Communication Techniques: Asynchronous and Synchronous Transmission-Types of Errors-single bit and burst errors-Error Detection: Redundancy- LRC-VRC-CRC-Capabilities and performance of CRC-Error Correction: single bit error correction – Hamming code- Burst error correction-convolution code.

Data Link Control: Line discipline-Flow control-Error control: ARQ-stop and wait ARQ-Continuous ARQ-Line utilization of different ARQs-Link management-HDLC

**Module 4**

Multiplexing: Frequency-Division Multiplexing-Synchronous Time-Division Multiplexing-Statistical Time-Division Multiplexing-Asymmetric Digital Subscriber Line-xDSL Spread Spectrum: The Concept of Spread Spectrum-Frequency Hopping Spread Spectrum-Direct Sequence Spread Spectrum-Code-Division Multiple Access

**Text Books:**

William Stallings, *Data and Computer Communication*, 8/e ,Pearson education,2006.

**References:**


Behrouz A. Forouzan, *Data Communication and Networking* 4/e, TMG,2006.

Fred Halsal, *Data Communication Computer Network and Open Systems, 4/e*, Person education ,2005.

William A. Shay, *Understanding Data Communication & Networks*, 2/e, Thomson Learning,2003

Jmaes Irvin & David Harle, *Data communication and Networks: an Engineering approach*, Wiley,2006.


***Type of questions for University Examination***

***Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module***

***Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks***

**IT 407 PC HARDWARE AND MICROPROCESSOR LAB**

## Part A - PC HARDWARE

Study of SMPS, TTL and composite type monitor circuits, Emulator, Logic state analyser, Serial port, Parallel port, Mother board, CGA card, Floppy disk controller, Hard disk controller, Printer Interface, Keyboard Interface

Diagnostic Software, Diagnostic card, Designing and programming add on cards

Floppy Disk drive: Alignment, Programming, Formatting

Hard Disk drive: Partitioning, Familiarisation of disk maintenance, Software Tools.

Trouble shooting and maintenance: Preventive and maintenance, Common maintenance problems

Familiarisation: Device drivers, Microcontrollers, Transputers

## Part B - MICROPROCESSOR

1. Study of typical microprocessor trainer kit
2. Simple Programming examples using 8085 instruction set to understand the use of various instructions and addressing modes – Monitor routines – at least 20 examples
3. Programming examples to initialise 8251 and to understand it's I/O operations
4. Programming examples to initialise 8255 and to understand it's I/O operations
5. Programming examples to initialise 8279 and to understand it's I/O operations
6. A/D and D/A counter Interface
5. Interface and programming of 8255(e.g. Traffic light control, burglar alarm, stop water)

**Note: 50% Marks is earmarked for continuous evaluation and 50% marks for end semester examination to be assessed by two examiners. A candidate shall secure a minimum of 50% marks separately for the two components to be eligible for a pass in that subject.**

## CS/IT 408 DATA STRUCTURES LABORATORY

1. Simple programming exercises in Java
2 Study of algorithms and implementation in Java programming language for the following:
    - Searching and Sorting
    - Linked Lists- Singly and doubly
    - Stacks – various applications
    - Queues
    - Trees
    - Graphs

**Note: 50% Marks is earmarked for continuous evaluation and 50% marks for end semester examination to be assessed by two examiners. A candidate shall secure a minimum of 50% marks separately for the two components to be eligible for a pass in that subject.**