EB/EC/EE/EI/CE/CS/IT/ME/SE 501 ENGINEERING MATHEMATICS IV

Module 1

Probability distributions: random variables (discrete & continuous), probability density, mathematical expectation, mean and variance of a probability distribution, binomial distribution, Poisson approximation to the binomial distribution, uniform distribution , normal distribution. *Curve fitting*: method of least squares, correlation and regression, lines of regression.

Module 2

Sampling distributions: population and samples, the sampling distribution of the mean unknown),σ known), the sampling distribution of the mean (σ(the sampling distribution of the variance, point estimation, interval estimation, tests of hypotheses, null hypotheses and significance tests, hypothesis concerning one mean, type I and type II errors, hypotheses concerning two means. The estimation of variances : Hypotheses concerning one variance - Hypotheses concerning two variances.

Module 3

Finite difference Operators: ∇, Δ, E, δ, μ , $x^{(n)}$ .Newton's Forward and Backward differences interpolation polynomials, central differences, Stirlings central differences interpolation polynomial. Lagrange interpolation polynomial, divided differences, Newton's divided differences interpolation polynomial. *Numerical differentiation:* Formulae for derivatives in the case of equally spaced points. *Numerical integration:* Trapezoidal and Simpson's rules, compounded rules, errors of interpolation and integration formulae. Gauss quadrature formulae (No derivation for 2 point and 3 point formulae)

Module 4

Numerical solution of ordinary differential equations: Taylor series method, Euler's method, modified Euler's method, Runge-Kutta formulae 4th order formula. *Numerical solution of boundary value problems:* Methods of finite differences, finite differences methods for solving Laplace's equation in a rectangular region, finite differences methods for solving the wave equation and heat equation.

Text Books:

1. Irvrin Miller & Freind : Probability And Statistics For Engineers, Prentice Hall Of India
2. S.S.Sastry: Numerical Methods, PHI Publishers.

References:

1. P.Kandaswamy K.Thilagavathy, K.Gunavathy: Numerical Mehtods, S.Chand & Co.
2. A.Papoulis: Probability,Random Variables And Stochastic Processes,MGH Publishers

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

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CS/IT 502 SYSTEM PROGRAMMING

Module 1

Assemblers: Overview of the assembly process - Machine dependent assembler features-Machine independent assembler features-Design of two pass assembler-single pass assembler.

Module 2

Loaders and linkers -Loader functions-program relocatability- absolute and bootstrap loader-Overview of linkage editing-linking loader-Dynamic linking-Design of the linkage editor.

Module 3

Macroprocessors - macro definition and usage-Schematics for Macro expansion-Generation of unique labels- Conditional macro expansion- Recursive macro expansion-Design of a Macro pre-processor-Design of a Macro assembler.

Module 4

Operating Systems – Basic Operating Systems functions – Types of Operating Systems – User Interface – Run-time Environment. Operating Systems Design Options – Hierarchical Structures – Virtual Machines – Multiprocessor Operating Systems – Distributed Operating Systems – Object Oriented Operating Systems.

Text Books:

1. Leland L.Beck, "System Software - An Introduction to System Programming", Addison Wesely

References:

1. D.M.Dhamdhere, "System Programming and Operating Systems", 2nd Ed., Tata Mcgrawhill
2. John J. Donovan, "Systems Programming", McGraw Hill.

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CS/IT 503 SOFTWARE ENGINEERING

Module 1

Software Life Cycle - Water fall model – Prototyping – Spiral model – pros and cons of each model .

Requirements Analysis - SRS – DFD – ER Diagrams – Decision tables – Decision Trees – Formal specification techniques: Axiomatic and Algebraic specifications - Petrinets

Module 2

Software Design: Design Heuristics – Cohesion and Coupling

Design Methodologies - Structured analysis and design, Architectural Design, Interface design, Component Level design.

Software Reuse and Software Maintenance issues.

Module 3

Introduction to Software Quality Management - Software Testing - Objectives of testing – Functional and Structural testing –Generation of test data - Test Plan - Unit testing – Integration testing – System testing – Test reporting.

Overview of SQA Planning – Reviews and Audits – Software configuration management - Quality Standards - Study of ISO9000 & CMM

Module 4

Software Project Management - Brief study of various phases of Project Management – Planning – Organizing – Staffing – Directing and Controlling

Software Project Cost Estimation – COCOMO model – Software Project Scheduling

CASE tools: CASE definitions – CASE Classifications – Analysis and Design Workbenches, Testing Workbenches

Text Book:

1. Rajib Mall - Fundamentals of Software Engineering –, PHI.
2. Pankaj Jalote - Software Engineering –Narosa Publications

References:

1. Ali Behferooz and Frederick J. Hudson - Software Engineering Fundamentals -, Oxford University Press India.
2. Roger S. Pressman - Software Engineering – Mc GrawHill International Edition
3. Ian Somerville - Software Engineering – Pearson Education
4. Alka Jarvis & V. Crandall - In roads to Software quality –
5. Richard Thayer - Software Project Management –
6. Bass, Software Architecture Interactives - Pearson Education ,2003

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CS 504 COMPUTER GRAPHICS

Module 1

Graphic hardware. Graphic software Output primitives –points and lines. Line drawing algorithms - circle generating algorithms - polygon filling algorithms – Filling arcs – pattern filling Output attributes - Bundled attributes. Antialiasing. Graphical user interface - Logical classification of input devices.

Module 2

Two dimensional transformations. basic transformations - translation - rotation - scaling. Matrix representation and homogeneous coordinates - composite transformations. Transformation between coordinate systems - Affine transformations. Two dimensional viewing - viewing pipeline - Windows to viewport transformations - clipping operations - point clipping - line clipping - polygon clipping.

Module 3

Three dimensional object representations. polygon surfaces - curved surfaces. Spline representations - Hermite polynomials - Cubic splines - Bezier curves - B-splines. Octrees and BSP trees. Fractal geometry methods. Three dimensional transformations.. Three dimensional viewing. Projections.

Modula 4

Visible surface detection. Classification of visible surface detection algorithms. Back face detection - Depth buffer - A-buffer. Scan line algorithms- Depth sorting - Area subdivision methods octrees - BSP trees - octrees - Shading . Illumination models - light sources. Basic Illumination models. Polygon rendering - constant intensity - Goraud shading - Phong shading - Animation techniques.

Text Book:

1. Donald Hearn ,M Pauline Baker, *Computer Graphics C version,* 2/E Pearson Education ,2003 .

References:

1. James D.Foley et.al., Introduction to Computer Graphics, Addison Wesley Publishing Company, 1994
2. Alan Watt, Mark Watt, Introduction to Animation and Rendering,, Addison Wesley Publishing Company, 1994
3. Newmann W and Sproull R.F., Principles of Interactive Computer Graphics, McGraw-Hill,1980
4. Rogers D.F., Procedural Elements for Computer Graphics, McGraw-Hill, 1985

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Question 1 - 8 short answer questions of 5 marks each. 2 questions from each module
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CS/IT 505 DATABASE MANAGEMENT SYSTEMS

Module 1

Introduction: Characteristics of the Database approach – Data models, schemas and instances – DBMS architecture – Data independence – Database languages and interfaces – Database administrator – Data modeling using Entity - Relationship (ER), Entity sets, attributes and keys - Relationships, Relationship types, roles and structural constraints - Weak Entity types - Enhanced Entity-Relationship (EER) and object modeling. Sub classes, super classes and inheritance - Specialization and generalization.

Module 2

Record storage and file organizations: Placing file records on disks – Fixed length and variable length records - Spanned Vs Unspanned records – Allocating file records on disk– Files of unordered records(Heap files), Files of ordered records(Sorted files).- Hashing Techniques. Indexed structures for files – Types of single level ordered index, multi- level indexes.

Module 3

The Relational model: Relational model concepts – Relational model constraints - The Relational Algebra – Relational calculus – Tuple Relational calculus, Domain Relational calculus. - SQL. Database Design: Functional dependencies – Basic definitions – Trivial and non trivial dependencies –Closure of a set of dependencies – Closure of a set of attributes – Irreducible sets of dependencies – Nonloss decomposition and Functional dependencies. First, Second and Third normal forms – Boyce-codd normal form.

Module 4

Transaction Management- Concurrency Control-Lost Updates- Uncommited Data-Inconsistent Retrievals-The Scheduler-Concurrency Control with Locking Methods – Concurrency Control with Time Stamping- Concurrency Control with Optimistic Methods- Database Recovery Management.

Introduction to object oriented databases, Active databases. Data warehouses – Data mining

Text Books:

1. Elmasri and Navathe, *"Fundamentals of Database Systems*" , 3/e, Addison - Wesley, 2001.
2. Peter Rob Carlos Coronel, Database Systems , Design, Implementation &Management , 5/e,Thomson Course Technology
3. A Silberschatz, H. F. Korth, and S Sudarshan, *"Database System Concepts*", 3/e,Tata McGraw Hill,1997

References:

1. Thomas Connoly ,Carolyn Begg " Database Systems",3/e,Pearson Education.
2. C.J Date, " *An Introduction to Database Systems* ", Addison-Wesley
3. Margaret.H.Dunham *,"Data Mining. Introductory and advanced topics*", Pearson Education,2003.
4. Hector Garcia-Molina,Jeffret D. Ullman, Jenniffer Widom ,"*Database System implementation*", Prentice Hall International, Inc, 2000.

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CS/EB 506 MICROPROCESSOR BASED SYSTEM DESIGN

Module 1

Architecture of 16 bit microprocessors: Intel 8086 Architecture — Segment registers and memory segmentation – memory address space and data organization, addressing modes, instruction set, instruction template examples, instruction execution timing. Assembly Language programming, programming examples;

Modular programming-Assembler instruction format, assembler directives and operators, assembly process, linking and relocation, debugging, stacks, procedures, interrupt routines, macros

Module 2

8086 hardware design:minimum mode and maximum mode configurations, pin configuration of 8086, comparison with 8088; Bus structure, bus buffering, latching, system bus timing with diagram,

Peripherals and their interfacing:Dynamic RAM interfacing, interfacing I/O ports,, interfacing with programmable interrupt controller 8259,programmable DMA interface 8237, DMA transfer and operations

Multiprocessor Systems:Interconnection topologies-interfacing with 8087- architecture of 8087 and configuration- Design of a PC based multimicroprocessor system

Module 3

Architecture of 32 bit Microprocessors: Intel 80386 Architecture, Block Diagram, Addressing modes,Data Types 80386,Real address mode of 80386 protected mode of 80386, segmentation,paging and Virtual modes

Recent advances in microprocessor architectures-Pentium families-salient features of Pentium II Pentium III and Pentium IV- a few relevant concepts of computer architecure-pipelining,CISC and RISC Architecture-Introduction to dual-Core Architecture.

Module 4

Introduction to micro controllers - comparison with microprocessors Study of micro controller (MCS 51 family- 8051) - Architecture, instruction set, addressing modes and programming - Comparison of various families of 8bit micro controllers. Interfacing with sensors and actuators

Text books:

1. Ajoy Kumar Ray, Kishor M.Bhurchandi, Advanced Microprocessors and Peripherals,TMH, New Delhi,2000
2. Kenneth Ayala The 8086 Microprocessor :programming and interfacing the PC Thomson Learning
3. Mazidi, “The 8051 Microcontrollers & Embedded Systems”, Pearson Education.

References:

1. Kenneth Ayala“, The 8051 Microcontroller”, West Publishing Company.
2. Douglas V Hall,” Microprocessors & Interfacing-Programming and Hardware” TMH
3. Avtar Singh , “ The 8088 and 8086 Microprocessors_programming, Interfacing, Software, Hardware and Applications” PHI

4. Barry B. Brey, "The INTEL Microprocessors - 8086/8088, 80186/80188, 80286, 80386, 80486 Pentium and Pentium pro processor, Pentium II, Pentium III and Pentium IV - Architecture, Programming and interfacing", PHI , 6 Ed, 2003.
5. YU-Cheng Liu & Glenn A Gibson," Microprocessor System , Architecture Programming & Design"
6. Kenneth Hintz & Daniel Tabak "Microcontroller architecture implementation and programming" , Mc Graw Hill.
7. Intel Users manual for 8086, 80386 & 80486, Pentium & Pentium pro
8. "Microprocessor Systems", Learning Material Series, ISTE, NewDelhi,1997
9. John B. Peatman, "Design with microcontrollers" McGraw Hill, Singapore.

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CS/EB/EC/EI 507 MICROPROCESSOR LABORATORY

PART I – 3 Lab sessions

Part I A (Compulsory)
1. Study of a typical microprocessor trainer kit and its operation
2. Interfacing and programming of 8255.(eg: traffic light control, burglar alarm, stop watch)
3. Interfacing and programming of 8253/ 8254.
4. Interfacing and programming of 8279.

Part I B*
1. A/D and D/A converter interface
2. Stepper motor interface
3. Display interface
4. Programming of different types of EPROM 2716, 2732 etc

(* At least two topics from part B has to be covered.)

PART II – 7 Lab sessions

(Compulsory)

1. Introduction to IBM/PC and its DEBUG program commands
   - Examining and modifying the contents of the memory
   - Assembling 8086 instructions with the ASSEMBLER commands
   - Executing 8086 instructions and programmes with the Trace and GO Command.
   - Debugging a program
2. Assembly language program development using IBM/PC Macro assembler
   - Creating an Assembler source file
   - Assembling source program with MASM
   - The link program - creating a RUN module
   - Typical programming examples.
3. Interfacing Experiments with micro controllers

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 508 COMPUTER GRAPHICS LAB

1. Implementing Line ,Circle and Ellipse drawing algorithms
2. Implementing scan line polygon filling algorithm
3. Implementing seed filling algorithms –flood fill, Boundary fill (recursive and non recursive)
4. Implementing line clipping methods
5. Implementing polygon clipping methods
6. Generation of different 2D patterns and images.
7. 2D transformations using homogeneous coordinates
8. Generating Beizier and B-spline curves
9. Implementation of Hidden surface elimination techniques of 3D objects
10. Implementation of Shading methods for 3D objects
11. Implementation of animation methods.
12. Programming using Open GL
    (Can be done as a development of a small 2D/3D graphics package or Game using OpenGL)

References:

1. Donald Hearn ,M Pauline Baker, *Computer Graphics C version,* 2/E
2. Pearson Education ,2003
3. James D.Foley ct.al., *Introduction to Computer Graphics*, Addison Wesley Publishing
4. Company, 1994.
5. Mason Woo et.al, *OpenGL Programming Guide – The official guide to OpenGL*, 3rd
6. Edition, OpenGL Architecture Review board
7. Noman Lin, *Linux 3D Graphics Programming*, Worldwide Game Development
8. Library.
9. Ron Fosner, *OpenGL programming for Windows 95 and Windows NT*

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.