

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 known), 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. Irvin Miller & Freund : 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 one module

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

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 Wesley

References:

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

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 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.

Module 2

Software Design: Design Heuristics – Cohesion and Coupling

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

Software Maintenance, Software Reuse

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. Software Quality Management - 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

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 504 COMPUTER GRAPHICS AND ANIMATION

MODULE I

Computer – Aided Design, Presentation graphics, Computer art, Entertainment , Education & Training, Visualization, image- Processing, Graphical User Interfaces, Over view of graphic systems. Points and Lines, Line drawing algorithms, Circle Generating algorithms, Ellipse generating algorithms, Parallel curve algorithms, Attributes of output primitives.

MODULE II

Basic transformations, Matrix representations and homogeneous co-ordinates, Composite transformations, other transformations, Raster methods for transformations. The viewing Pipe-Line , Viewing Co-ordinate reference frame, Window-to-viewport co-ordinate transformation, 2-D viewing functions, Clipping operations.

MODULE III

3-D Display methods, 3-D Graphics packages. Polygon surfaces, Curved lines and surfaces, spline representations, Bezier curves and surfaces, B-spline curves and surfaces, Beta splines, Relational splines, Conversion between spline representations, Displaying spline curves, Sweep representations, Constructive Solid-Geometry Methods, Octrees, BSP trees, Fractal Geometry methods.

MODULE IV

Transformation, Rotation scaling, Other transformations , composite Transformations, 3-D Transformation functions, Modeling and co-ordinate transformations, 3-D Viewing concepts. Classification of visible surface detection algorithms, Back-face detection, Depth-Buffer method, A-Buffer method, Scan-Line method, Depth-Sorting method, BSP-Tree method, Area subdivision method, Octree methods, Ray-Casting methods, Curved surfaces, Wireframe methods, Visibility- Detetction functions, Illumination models and surface rendering methods, colour applications, Computer Animation.

TEXT BOOK

Donald Hearn & M.Paulin Baker, Computer Graphics- Eastern Economy Edn, 1995

REFERENCES :

1. William .M.Newmann & Robert.F.Sproull- Principles of Interactive Computer Graphics, McGraw Hill Inc. 1981
2. Roy .A. Plastock & Gordon Kelly- Computer graphics, Schaum's Series in Computers , Int Edn.
3. Steven Harrington- Computer Graphics – A Programming Approach McGraw Hill ,Int Edn.4.
4. Anirban Mukhopadhyay, "Introduction to Computer Graphics", Vikas Thomson Learning Publishing, N Delhi
5. Peter Ratner, "Human Modeling & Animation", Wiley Dream Tech India P Ltd, N Delhi

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 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- Uncommitted 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.
- 2) A Silberschatz, H. F. Korth, and S Sudarshan, “*Database System Concepts*”, McGraw Hill
- 3) Peter Rob, Carlos Coronel, *Database Systems*, Thomson Learning.

References:

- 1) Patrick O’Neil, Morgan Kaufman, Database –Principles, Programming & Performance,
- 2) Thomas Connolly ,Carolyn Begg “ Database Systems”,3/e,Pearson Education.
- 2) C.J Date, “ *An Introduction to Database Systems* “, Addison-Wesley
- 4) Margaret.H.Dunham ,”*Data Mining. Introductory and advanced topics*”, Pearson Education,2003.
- 5) Hector Garcia-Molina,Jeffret D. Ullman, Jenniffer Widom ,”*Database System implementation*”, Prentice Hall International, Inc, 2000.

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 506 KNOWLEDGE ENGINEERING

Module I

History and Applications of AI, Knowledge Representation, Propositional Calculus, Predicate Calculus, Rule Based Knowledge Representation, Unification, Forward and backward Chaining, Resolution, Symbolic reasoning under uncertainty, Non-monotonic reasoning, Baye's Theorem, Knowledge representation issues.

Module II

Search: Heuristic Search, Admissibility, Monotonicity, Informedness, Heuristic Classification, Intelligent Agents, State space search, Depth-first search, Breadth first search, Pattern directed search, Production systems, Learning, Natural language processing, Applications of search techniques in Game Playing and Planning.

Module III

LISP, S-expressions, List manipulation functions, Program Control in LISP, Iteration Constructs, Input, Output and local variables, Matching of patterns, LISP as a problem solving tool.

Module IV

Artificial Neural Networks: Artificial Neurons, Supervised Learning, Feed forward Neural Networks, Back propagation Neural Network, Hopfield Network, Back propagation training Algorithms.

Text Book:

1. N. P. Padhy, Artificial Intelligence and Intelligent Systems, Oxford Univ Press.
2. Nils J. Nilson, Artificial Intelligence – A New Synthesis, Elsevier

Reference:

3. Stuart Russell and Peter Norvig: Artificial Intelligence, A Modern Approach, Pearson Education
4. E. Rich and K Knight, Artificial Intelligence, Tata Mc Graw hill.
5. Dan W Peterson, Introduction of Artificial Intelligence and Expert Systems, PHI
6. M Tim Jones, "A I Applications Programming", Wiley Dreamtech India P Ltd.
6. John. F .Sowa, Knowledge Representation-Logical, Philosophical & Computational Foundation, Vikas Thomson Learning Publishing, N Delhi

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 507 MINI PROJECT – RDBMS BASED

Any of the following projects or similar one using relational database systems like DB2, UNIFY, INGRESS, ORACLE, SYBASE, INFORMIX, Visual Foxpro etc

1. Hospital Automation
2. Bank Transaction Management
3. Hotel Management
4. Scheduling in Power Plant
5. Promotion Management for a Firm
6. Manufacturing System Database
7. Placement Center Database Management
8. Gas Agency Management
9. Office Automation
10. Railway Reservations
11. Computerizing Course Reservation
12. Hostel Management
13. Managing of Research Laboratory Activities
14. Business Transaction in an Industry
15. Inventory Management
16. Cricket Board Database
17. Carrier Planning
18. Employee Database
19. Production Management
20. Natural Resources Database
21. Salary Payment Database
22. Airless Reservations
23. Finance Database Management
24. Transport Management System
25. Library Management System
26. College Admission
27. Question Paper Bank

Each batch comprising of 3 to 5 students shall design. Each student shall submit a project report at the end of the semester. The project report should contain the design and engineering documentation including the Bill of Materials and test results. Product has to be demonstrated for its full design specifications. Innovative design concepts, reliability considerations and aesthetics / ergonomic aspects taken care of in the project shall be given due weight.

Guidelines for evaluation:

i) Attendance and Regularity	10
ii) Work knowledge and Involvement	30
iii) End-Semester presentation & Oral examination	20
iv) Level of completion and demonstration of functionality/specifications	25
v) Project Report	15

Total 100 marks

Note: External projects and R&D projects need not be encouraged at this level. Points (i) & (ii) to be evaluated by the project guide & co-ordinator and the rest by the final evaluation team comprising of 3 teachers including the project guide.

IT 508 SYSTEMS PROGRAMMING LAB

1. MASM Lab:
 - Basic programming in 8086 programs
2. Generate Assemblers:
 - One pass assembler
 - Two pass assembler
3. Compiler:
 - Generation of lexical Analyzer
 - Generation of parser
 - Generation of Intermediate Code Generator
 - Symbol Table

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.