

# SEMESTER V

## MA1251 – NUMERICAL METHODS

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3	1	0	4

### UNIT I SOLUTION OF EQUATIONS AND EIGEN VALUE PROBLEMS 9

Linear Interpolation Methods (Method of False Position) – Newton’s Method – Statement of Fixed Point Theorem – Fixed Point Iteration:  $X = G(X)$  Method – Solution of Linear System by Gaussian Elimination and Gauss Jordan Methods – Iterative Methods: Gauss Jacobi and Gauss – Seidel Methods – Inverse of a Matrix by Gauss Jordan Method – Eigen value of a Matrix by Power Method.

### UNIT II INTERPOLATION AND APPROXIMATION 9

Lagrangian Polynomials – Divided Differences – Interpolating with a Cubic Spline – Newton’s Forward and Backward Difference Formulas.

### UNIT III NUMERICAL DIFFERENTIATION AND INTEGRATION 9

Derivatives from Difference Tables – Divided Differences and Finite Differences – Numerical Integration by Trapezoidal and Simpson’s 1/3 and 3/8 Rules – Romberg’s Method – Two and Three Point Gaussian Quadrature Formulas – Double Integrals using Trapezoidal and Simpson’s Rules.

### UNIT IV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS 9

Single Step Methods – Taylor Series Method – Euler and Modified Euler Methods – Fourth Order Runge Kutta Method for Solving First and Second Order Equations – Multistep Methods – Milne’s and Adam’s Predictor and Corrector Methods.

### UNIT V BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS 9

Finite Difference Solution of Second Order Ordinary Differential Equation – Finite Difference Solution of One Dimensional Heat Equation by Explicit and Implicit Methods – One Dimensional Wave Equation and Two Dimensional Laplace and Poisson Equations.

**L: 45 T: 15 Total: 60**

### TEXT BOOKS

1. C. F. Gerald and P. O. Wheatley, “Applied Numerical Analysis”, 6th Edition, Pearson Education, 2002.
2. E. Balagurusamy, “Numerical Methods”, Tata McGraw - Hill Pub. Co. Ltd., 1999.

### REFERENCES

1. P. Kandasamy, K. Thilagavathy and K. Gunavathy, “Numerical Methods”, S. Chand Co. Ltd., 2003.
2. R. L. Burden and T. D. Faires, “Numerical Analysis”, 7th Edition, Thomson Asia Pvt. Ltd., 2002.

## EC1305 – SIGNALS AND SYSTEMS

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

### **UNIT I CLASSIFICATION OF SIGNALS AND SYSTEMS 9**

Continuous Time Signals (CT Signals) – Discrete Time Signals (DT Signals) – Step – Ramp – Pulse – Impulse – Exponential – Classification of CT and DT Signals – Periodic and aperiodic – Random Signals – CT systems and DT systems – Classification of systems – Linear time invariant systems.

### **UNIT II ANALYSIS OF CT SIGNALS 9**

Fourier series analysis – Spectrum of CT signals – Fourier transform and laplace transform in signal analysis.

### **UNIT III LTI – CT SYSTEMS 9**

Differential equation – Block diagram representation – Impulse response – Convolution integral – Frequency response – Fourier methods and laplace transforms in analysis – State equations and matrix.

### **UNIT IV ANALYSIS OF DT SIGNALS 9**

Spectrum of DT signals – Discrete Time Fourier Transform (DTFT) – Discrete Fourier Transform (DFT) – Properties of z transform in signal analysis.

### **UNIT V LTI – DT SYSTEMS 9**

Difference equations – Block diagram representation – Impulse response – convolution SUM – Frequency response – FFT and z - Transform analysis – State variable equation and matrix.

**Total: 45**

### **TEXT BOOK**

1. Alan V. Oppenheim, Alan S. Willsky and S.Hamid Nawab, “Signals & Systems”, Pearson / Prentice Hall of India, 2003.

### **REFERENCES**

1. K.Lindner, “Signals and Systems”, Tata McGraw-Hill, 1999.
2. Simon Haykin and Barry Van Veen, “Signals and Systems”, John Wiley & Sons, 1999.

**UNIT I      FUNDAMENTALS OF EMBEDDED SYSTEMS      9**

Definition and classification – Overview of processors and hardware units in an embedded system – Software embedded into the system – Exemplary embedded systems – Embedded Systems on a Chip (SOC) and the use of VLSI designed circuits.

**UNIT II      DEVICES AND BUSES FOR DEVICES NETWORK      9**

I/O devices – Device I/O types and examples – Synchronous ISO – Synchronous and asynchronous communications from serial devices – Examples of internal serial communication devices – UART and HDLC – Parallel port devices – Sophisticated interfacing features in devices/ports – Timer and counting devices – 12C, USB, CAN and advanced I/O serial high speed buses – ISA, PCI, PCI-X, CPCI and advanced buses.

**UNIT III      PROGRAMMING CONCEPTS AND EMBEDDED  
PROGRAMMING IN C, C++      9**

Programming in Assembly Language (ALP) vs high level language – C program elements – Macros and functions – Use of pointers – NULL pointers – Use of function calls – Multiple function calls in a cyclic order in the main function pointers – Function queues and interrupt service routines – Queue pointers – Concepts of embedded programming in C++ – Objected oriented programming – Embedded programming in C++ – C program compilers – Cross compiler – Optimization of memory codes.

**UNIT IV      REAL TIME OPERATING SYSTEMS – PART 1      9**

Definitions of process, tasks and threads – Clear cut distinction between functions – ISRS and tasks by their characteristics – Operating system services – Goals – Structures – Kernel – Process management – Memory management – Device management – File system organization and implementation – I/O subsystems – Interrupt routines handling in RTOS.

**REAL TIME OPERATING SYSTEMS :** RTOS task scheduling models – Handling of task scheduling and latency and deadlines as performance metrics – Co-operative round robin scheduling – Cyclic scheduling with time slicing (Rate monotonic co-operative scheduling) – Preemptive scheduling model strategy by a scheduler – Critical section service by a preemptive scheduler – Fixed (Static) real time scheduling of tasks.

**INTER PROCESS COMMUNICATION AND SYNCHRONISATION:** Shared Data problem – Use of semaphore(s) – Priority inversion problem and deadlock situations – Inter process communications using signals – Semaphore flag or mutex as resource key – Message queues – Mailboxes – Pipes – Virtual (Logical) sockets – Remote Procedure Calls (RPCs).

Study of micro C/OS II or VX works or any other popular RTOS – RTOS system level functions – Task service functions – Time delay functions – Memory allocation related functions – Semaphore related functions – Mailbox related functions – Queue related functions – Case studies of programming with RTOS – Understanding case definition – Multiple tasks and their functions – Creating a list of tasks – Functions and IPCS – Exemplary coding steps.

**L: 45 T: 15 Total: 60**

**TEXT BOOKS**

1. Wayne Wolf, “Computer as Components – Principles of Embedded Computing System Design”, Morgan Kaufmann Publishers, Harcourt India Private Limited, First Indian Reprint, 2001.
2. Rajkamal, “Embedded Systems Architecture - Programming and Design”, Tata McGraw - Hill, First reprint, 2003.

**REFERENCES**

1. Steve Heath, “Embedded Systems Design”, Newnes, 2nd Edition, 2003.
2. David E. Simon, “An Embedded Software Primer”, Pearson Education, First Indian Reprint, 2000.
3. Frank Vahid and Tony Givargis, “Embedded Systems Design - A Unified Hardware / Software Introduction”, John Wiley, 2002.
4. Heath, “Embedded System Design”, 2nd Edition, Elsevier India Private Limited, 2005.

## CS1310 – OBJECT ORIENTED ANALYSIS AND DESIGN

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### UNIT I FUNDAMENTALS 8

An overview of object oriented systems development – Object basics – Object oriented systems development life cycle.

### UNIT II OBJECT ORIENTED METHODOLOGIES 12

Rumbaugh methodology – Booch methodology – Jacobson methodology – Patterns – Frameworks – Unified approach – Unified modeling language – Use case diagram – Class diagram – Interaction diagram – Package diagram – State diagram – Activity diagram – Implementation diagram.

### UNIT III OBJECT ORIENTED ANALYSIS 9

Identifying use cases – Object analysis – Classification – Identifying object relationships – Attributes and methods.

### UNIT IV OBJECT ORIENTED DESIGN 8

Design axioms – Designing classes – Access layer – Object storage – Object interoperability.

### UNIT V SOFTWARE QUALITY AND USABILITY 8

Designing interface objects – Software quality assurance – System usability – Measuring user satisfaction .

**Total: 45**

### TEXT BOOKS

1. Ali Bahrami, “Object Oriented Systems Development”, Tata McGraw - Hill, 1999.
2. Martin Fowler, “UML Distilled”, 2nd Edition, Prentice Hall of India / Pearson Education, 2002.

### REFERENCES

1. Stephen R. Schach, “Introduction to Object Oriented Analysis and Design”, Tata McGraw - Hill, 2003.
2. James Rumbaugh, Ivar Jacobson and Grady Booch “The Unified Modeling Language Reference Manual”, Addison Wesley, 1999.
3. Hans - Erik Eriksson, Magnus Penker, Brian Lyons and David Fado, “UML Toolkit”, OMG Press Wiley Publishing Inc., 2004.
4. Barclay, “ Object-Oriented Design with UML and Java”, Elsevier,2008

## CS1302 – COMPUTER NETWORKS

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

### **UNIT I DATA COMMUNICATIONS 8**

Components – Direction of data flow – Networks – Components and categories – Types of connections – Topologies – Protocols and standards – ISO / OSI model – Transmission media – Coaxial cable – Fiber optics – Line coding – Modems – RS232 interfacing sequences.

### **UNIT II DATA LINK LAYER 10**

Error – Detection and correction – Parity – LRC – CRC – Hamming code – Flow control and error control – Stop and wait – Go back-N ARQ – Selective repeat ARQ – Sliding window – HDLC – LAN – Ethernet IEEE 802.3 – IEEE 802.4 – IEEE 802.5 – IEEE 802.11 – FDDI – SONET – Bridges.

### **UNIT III NETWORK LAYER 10**

Internetworks – Packet switching and datagram approach – IP addressing methods – Subnetting – Routing – Distance vector routing – Link state routing – Routers.

### **UNIT IV TRANSPORT LAYER 9**

Duties of transport layer – Multiplexing – Demultiplexing – Sockets – User Datagram Protocol (UDP) – Transmission Control Protocol (TCP) – Congestion control – Quality of Services (QOS) – Integrated services.

### **UNIT V APPLICATION LAYER 8**

Domain Name Space (DNS) – SMTP – FTP – HTTP – WWW – Security – Cryptography.

**Total: 45**

### **TEXT BOOKS**

1. Behrouz A. Forouzan, “Data communication and Networking”, Tata McGraw Hill, 2004.
2. James F. Kurose and Keith W. Ross, “Computer Networking: A Top - Down Approach Featuring the Internet”, Pearson Education, 2003.

### **REFERENCES**

1. Larry L. Peterson and Peter S. Davie, “Computer Networks”, 2nd Edition, Harcourt Asia Pvt. Ltd.,1996.
2. Andrew S. Tanenbaum, “Computer Networks”, 4th Edition, Prentice Hall of India, 2003.
3. William Stallings, “Data and Computer Communication”, 6th Edition, Pearson Education, 2000.
4. Peterson, “Computer Networks: A System Approach”,4th Edition, Elsevier India Private Limited, 2007.

## IT1301 – INFORMATION CODING TECHNIQUES

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### UNIT I INFORMATION ENTROPY FUNDAMENTALS 9

Uncertainty - Information and entropy – Source coding theorem – Huffman coding – Shannon Fano coding – Discrete memory less channels – Channel capacity – Channel coding theorem – Channel capacity theorem.

### UNIT II DATA AND VOICE CODING 9

Differential pulse code modulation – Adaptive differential pulse code modulation – Adaptive sub-band coding – Delta modulation – Adaptive delta modulation – Coding of speech signal at low bit rates (Vocoders – LPC).

### UNIT III ERROR CONTROL CODING 9

Linear block codes – Syndrome decoding – Minimum distance consideration – Cyclic codes – Generator polynomial – Parity check polynomial – Encoder for cyclic codes – Calculation of syndrome – Convolutional codes.

### UNIT IV COMPRESSION TECHNIQUES 9

Principles – Text compression – Static Huffman coding – Dynamic Huffman coding – Arithmetic coding – Image compression – Graphics interchange format – Tagged image file format – Digitized documents – Introduction to JPEG standards.

### UNIT V AUDIO AND VIDEO CODING 9

Linear predictive coding – Code excited LPC – Perceptual coding – MPEG audio coders – Dolby audio coders – Video compression – Principles – Introduction to H.261 & MPEG video standards.

**Total: 45**

### TEXT BOOKS

1. Simon Haykin, “Communication Systems”, 4th Edition, John Wiley and Sons, 2001.
2. Fred Halsall, “Multimedia Communications - Applications Networks Protocols and Standards”, Pearson Education, 2002.

### REFERENCES

1. Mark Nelson, “Data Compression Book”, BPB, 1992.
2. Watkinson J, “Compression in Video and Audio”, Focal Press, London, 1995.

## CS1311 – CASE TOOLS LABORATORY

L	T	P	C
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Prepare the following documents for two or three of the experiments listed below and develop the software engineering methodology.

1. Program Analysis and Project Planning.  
Thorough study of the problem – Identify project scope, Objectives, Infrastructure.
2. Software requirement Analysis  
Describe the individual Phases / Modules of the project, Identify deliverables.
3. Data Modeling  
Use work products – Data dictionary, Use diagrams and activity diagrams, build and test class diagrams, Sequence diagrams and add interface to class diagrams.
4. Software Development and Debugging
5. Software Testing  
Prepare test plan, perform validation testing, Coverage analysis, memory leaks, develop test case hierarchy, Site check and Site monitor.

### SUGGESTED LIST OF APPLICATIONS

Student Marks Analyzing System  
Quiz System  
Online Ticket Reservation System  
Payroll System  
Course Registration System  
Expert Systems  
ATM Systems  
Stock Maintenance  
Real - Time Scheduler  
Remote Procedure Call Implementation

**Total: 45**



## CS1306 – NETWORKS LABORATORY

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### LIST OF EXPERIMENTS (All the Programs to be written using C )

1. Write a socket Program for Echo / Ping / Talk commands.
2. Create a socket (TCP) between two computers and enable file transfer between them.
3. Write a program to implement Remote Command Execution (Two M/Cs must be used)
4. Write a program to implement CRC and Hamming code for error handling.
5. Write a code simulating Sliding Window Protocols.
6. A Client – Server application for chat.
7. Write a program for File Transfer in client–server architecture using following methods.
  - a. USING RS232C
  - b. TCP/IP
8. Perform a case study about the different routing algorithms to select the network path with its optimum and economical during data transfer.
  - a. Shortest path routing
  - b. Flooding
  - c. Link State
  - d. Hierarchical
- 9 and 10 Study of Network Simulators like NS2 / Glomosim / OPNET.

**Total: 45**

## HS1301 – COMMUNICATION AND SOFT SKILLS LABORATORY

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(Common to All Branches of III Year B.E./ B.Tech students of Anna University Tiruchirappalli and affiliated colleges)

The aim of the course is two-fold: to enable the students to develop communication skills in the language laboratory and to arrange discussions for developing soft skills in the lab and/or the classroom. Each lab session shall last for three periods.

**List of activities that are to be carried out: (15 sessions x 3 periods = 45)**

Lab session # 1: Listening and speaking practice exercises with communicative functions. Learning material: the ACD of Spoken English: A Foundation Course for Speakers of Indian Languages (Orient Longman, 2008)

Lab session # 2: Practice with more advanced communicative functions. Learning material: the ACD of Spoken English: A Foundation Course for Speakers of Indian Languages (Orient Longman, 2008)

Lab session # 3: Pronunciation exercises with Oxford Advanced Learners' Dictionary of Current English or any other standard Dictionary

Lab session # 4: Making an oral presentation in English. Learning Material: Professional Presentations VCD (Cambridge University Press)

Lab session # 5: Listening to telephone conversations in English and completing the tasks. Learning material: Essential Telephoning in English ACD (Cambridge University Press)

Lab session # 6: Giving an exposure to and practice with model group discussion and interviews. Learning material: How to Prepare for Group Discussion and Interview Audio Cassette (McGraw-Hill)

Lab session # 7: Giving insights into the format and the task types in the IELTS (International English Language Testing System). Learning Material: Objective IELTS, Intermediate Level (CUP)

Lab session # 8: Understanding the format and the task types in the TOEFL (Test of English as a Foreign Language). Learning Material: Understanding the TOEFL (Educational Testing Services, Princeton)

Lab session # 9: Administering the BEC (Business English Certificate) Diagnostic Test. Learning Material: BEC Practice Materials (British Council, Chennai)

Lab session # 10: Completing the steps involved in Career, Life Planning and Change Management. Learning Material: Developing Soft Skills (Pearson Education)

Lab session # 11: Setting goals and objectives exercises. Learning Material: Developing Soft Skills (Pearson Education)

Lab session # 12: Prioritizing and time planning exercises. Learning Material: Managing Time Multimedia Program CD

Lab session # 13: Taking a Personality Typing/ Psychometric Test Learning Material: 200 Psychometric Test prepared by the CUIC, Anna University Chennai

Lab session # 14: Critical and creative thinking exercises.

Lab session # 15: Improving body language and cross-cultural communication with pictures. Learning material: Body Language (S. Chand and Co.)

For a detailed plan, refer to the topics given below;

### **UNIT I LISTENING AND SPEAKING PRACTICE IN COMMUNICATIVE FUNCTIONS**

Introductions and meetings – Talking about studies and/or job – Expressing likes and dislikes – Describing daily routines and current activities – Talking about past states and events – Talking about future plans and intentions – Expressing preferences – Giving reasons – Expressing opinions, agreement and disagreement – Seeking and giving advice – Making suggestions.

### **UNIT II SPEAKING APPLICATIONS**

Making an oral presentation – Preparing the presentation – Performing the presentation – Beginning – Language – Visual aids and body language – Voice – Ending – Questions – Telephone conversations – Group discussion and interview.

### **UNIT III UNDERSTANDING AND PREPARING FOR INTERNATIONAL ENGLISH LANGUAGE EXAMINATIONS**

International English Language Testing System (IELTS) – Test of English as a Foreign Language (TOEFL) – Business English Certificate (BEC)

### **UNIT IV SOFT SKILLS (1)**

Preparing for and dealing with change – Motivation, goal-setting and self-esteem – Managing time and stress – Career and life planning – Team work – Leadership traits.

### **UNIT V SOFT SKILLS (2)**

Multiple intelligences – Learning styles and personality typing – Critical and creative Thinking – People, cultures and self – intercultural communication.

## RESOURCES

1. Kamalesh Sadanand and Susheela Punitha, “Spoken English: A Foundation Course” for Speakers of Indian Languages, Part 2 Audio CD, Hyderabad: Orient Longman, 2008
2. Malcome Goodale, “Professional Presentations”, (VCD) New Delhi: Cambridge University Press, 2005
3. Barbara Garside and Tony Garside, Essential Telephoning in English (Audio CD), Cambridge: Cambridge University Press, 2002
4. Hari Mohan Prasad and Rajnish Mohan, “How to Prepare for Group Discussion and Interview (Audio Cassette)”, Tata McGraw-Hill Publishing
5. International English Language Testing System Practice Tests, CUP
6. Business English Certificate Materials, Cambridge University Press
7. Understanding the TOEFL. Educational Testing Services, Princeton, US
8. Interactive Multimedia Programs on Managing Time and Stress
9. Robert M. Sherfield and et al “Developing Soft Skills”,4th Edition, New Delhi, Pearson Education, 2009.

**Total: 45**