SEMESTER-IV

SEMESTER – IV

ELECTRONIC MEASUREMENT & MEASURING INSTRUMENTS(EC(ID) – 4002)

Course Code	**EC (ID) – 4002**	Credits : 4	L-3, T-1, P-0
Name of the Course	**Electronic Measurement & Measuring Instruments**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
2. **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION – A

ELECTRONIC INSTRUMENTS

Electronic voltmeter, VIVM Transistor voltmeter, Electronic Multimeter, CRO's study of various stages in brief, measurement of voltage, current phase and frequency, special purpose oscilloscope measurement of inductance, capacitance, effective resistance at high frequency, Q meters, LCR meter.

SECTION – B

INSTRUMENTS FOR GENERATION AND ANALYSIS OF WAVEFORMS

Signal generators, function generator, wave analyzer, harmonic distortion analyzer, spectrum analyzer, spectrum analysis.

INSTRUMENT TRANSFORMER

Current and potential transformers, constructional features, ratio and phase angle error.

SECTION – C

TRANSDUCERS

Principles of operation, qualitative treatment of strain gauge, LVDT, thermocouple, piezo-electric crystal and photoelectric transducers.

DATA ACQUISITION SYSTEM: Necessity of recorders, Recording Requirements, Graphic Recorders, Strip chart Recorders, Magnetic tape Recorders, Digital Tape Recorders.

SECTION – D

DISPLAY DEVICES

Electronic Indicating Instruments, seven segment display, Fourteen segmental display Nixie tube.

TELEMETERY: Introduction, Method of data transmission, Types of Telemetery Systems and applications.

BOOKS RECOMMENDED

1. A.K.Sawhney – Electrical and Electronic Measurements and Instrumentation.
2. B.Stout – Basic Electrical Measurements.
3. D.Cooper – Electronic Instrumentation and Measurement Techniques.

SEMESTER – IV

Computer Architecture(IT(ID) – 4001)

Course Code	**IT(ID) – 4001**	Credits : 4	L-3, T-1, P-0
Name of the Course	**Computer Architecture**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/ Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
2. **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION – A

Fundamental of Computer Design : Introduction, Measuring and Reporting Performance, Quantitative principles of Computer design, The Concept of Memory Hierarchy.

Instruction Set Principles and Examples: Classifying Instruction Set Architectures; Memory Addressing; Operations in the Instruction Set, Type and Size of Operands, Encoding an instruction set, The DLX Architecture.

SECTION – B

Pipelining: What is Pipelining? The Basic Pipeline for DLX, the major hurdle of pipelining-pipeline hazards, What makes pipelining hard to implement? The MIPS R4000 pipeline.

Advanced Pipelining and Instruction – Level Parallelism : Instruction – level parallelism: Concepts and Challenges, Overcoming Data Hazards with Dynamic Scheduling, Reducing Branch Penalties with Dynamic Hardware prediction, Taking advantage of more ILP with multiple issue, Compiler support for exploiting ILP.

SECTION – C

Memory Hierarchy Design : Introduction ,The concept of Cache memory, reducing cache misses, Reducing Cache miss penalty, Reducing Hit Time Main Memory, Virtual Memory, and memory protection.

Storage systems : Type of storage devices, Buses-connecting I/O Devices to CPU/Memory, I/O Performance Measures, Reliability, Availability and RAID, UNIX File system performance.

SECTION – D

Interconnection Networks: A simple network, connecting the interconnection network to the computer, interconnection network media, connecting more than two computers, practical issues for commercial interconnection networks, examples of interconnection networks.

Multiprocessors: Characteristics of Application Domains, Centralized Shared Memory Architectures, Distributed Shared-Memory Architectures, Synchronization.

Books:

1. Computer Architecture A Quantitative Approach, John L. Hennessy & David A. Patterson, 2nd Edition, Harcourt Asia Pte. Ltd., 1996.
2. Computer Architecture & Organisation, Mc Graw Hill, 3rd Edition, John Hayes, 1998.
3. Computer System Architecture PHI, 3rd edition, M.Morris Mano.
4. Computer Architecture and Parallel Processing, McGraw Hill Book Company, Hwang and Briggs.
5. Advanced Computer Architecture: Parallelism, Scalability, Programmability, Kai Hwang, McHill, Inc. 1993.

Suggested Text Books & References:

- Computer Organization & Design 2nd Ed. By David A. Peterson and John L. Hennessy.
- Computer Architecture & Organization 3rd Ed. By John P. Hays.
- Operating System Internals & Design Principal by William Stallings.
- Structured Computer Organization by A.S.Tannenbaum.
- Computer Organization & Architecture : Designing for performance by W.Stellings.
- Computer Architecture & Organization by M.Mano.

SEMESTER – IV

SYSTEM ANALYSIS & DESIGN(IT(ID) – 4004)

Course Code	**IT(ID) – 4004**	Credits : 4	L-3, T-1, P-0
Name of the Course	**System Analysis & Design**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
2. **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION- A

Introduction To System (Overview): Definition of System, Common types of systems, Natural systems, Man made system, Automated systems, General systems principles

Participants to system development: Users, Management, Auditors, System analysts, System designers, Programmers, Operations, Personnel,.

System Development Life Cycle: phase 1: System Planning, phase 2: System Analysis, phase 3: Systems Design, phase 4: Systems Implementation, phase 5: Systems operation and support

PHASE 1: System Planning

Preliminary Investigation: Objectives and steps, Evaluation of system request, Evaluation of projects, Overview of Feasibility, Operational Feasibility, Economic Feasibility, Organizational Chart, Review current documentation

Feasibility and Cost Analysis Tools: Classification of Costs and Benefits, Cost Benefit Analysis (Payback analysis, ROI & Present value analysis)

Section-B

PHASE2: Systems Analysis

Determining Requirements: Role and requirement of system analysis, system requirements, Users requirements, Technical requirements, Interviews, Other fact finding techniques, Recording and facts

Analyzing Requirements: Structured System Analysis, Functional Diagram, Data Flow Diagrams, Entity relationship diagrams, Identifying attributes, Data Dictionary: Documenting the data elements, data flows, data stores, processes, external entities, records and reports

Section-C

PHASE 3: Systems Design: Introduction to output design, Types of Output and information delivery, Designing printed reports Designing screen outputs Designing other outputs, Tools and Techniques of design

Input Design: Introduction to input design, Source document design, input record designing ,screen design, automated design tools.

Database design: The common problem of database design, An ideal database structure, Physical database design, Designing process, Physical storage structure design

System Architecture: Processing methods, Processing functions, Processing support and software design

Section-D

PHASE 4: System Implementation

Application Development: Documentation review and application design, coding and testing the application.

Documentation: Program documentation, System documentation, Operations documentation and user documentation.

Phase 5: System Operation and Support

Overview: Systems support and maintenance activities

Support Activities : User training and assistance , maintenance activities , Corrective maintenance, Adaptive maintenance , Perfective maintenance.

Managing systems operation and support: Maintenance team, Configuration management, managing system performance.

Books

1. Element of System Analysis, Marvin Gore, John Stubbe. Galgotia Book Source. 1994
2. Systems Analysis and design Methods. Whitten, Bently and Barlow. Galgotia Publication,1995
3. System Analysis and Design, Elias M. Awad. Galgotia publication, 1995.
4. System analysis and Design, P.S.Grover, BPB Publication, 1994
5. System analysis and Design, Harry Edwards. McGraw Hill International Ed., 1995
6. Introduction to System analysis and Design I.T. Hawryszkiewyez, Prentice Hill of India, 1994

SEMESTER – IV

SYSTEM SOFTWARE (CS (ID) – 4001)

Course Code	**CS(ID) – 4001**	Credits-4	L-3, T-1, P-0
Name of the Course	**SYSTEM SOFTWARE**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min.Pass Marks: 40**
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
2. **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION- A

Machine Architecture, instruction set, addressing modes of the chosen machine, arithmetic & logic operations, floating point operations.

C Programming: Reviews of syntax of C with emphasis on feature like pointers. Bit operations, Pre-processor, files.

SECTION - B

Assemblers, Cross Assemblers: Two pass assembler design. Data structure and algorithms.

Macro processor: Definitions, nested macro – definitions, macro expansion, conditional macro-expansion.

SECTION – C

Linking, Loading, and Relocation, Static and Dynamic linking, Loading and relocation. Editors, debuggers, interactive programming environments.

SECTION – D

DOS: Introduction to interrupts, structure of the interrupt vector table, interrupt types, software interrupts, Hardware interrupts, interrupts at a glance, interrupts calls from C, internal structure of DOS, Booting Dos, Com & Exe Programs, BIOS, Memory resident programs. Running Batch file.

Programming Examples of Text handling, file management, interface and device drivers, programming in C.

Suggested Text Books & References

- Donovan, J.J., "System Programming", Tata McGraw Hill.
- Dhamdhare, D.M., " Introduction to System Software", Tata McGraw Hill.
- Dhamdhare, D.M., " System Programming & Operating System", Tata McGraw Hill.

SEMESTER – IV

Discrete Structures (CS – 4002)

Course Code	**CS – 4002**	Credits : 4	L-3, T-1, P-0
Name of the Course	**Discrete Structures**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests (2) 50%, Tutorials Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
2. **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION – A

Set theory: Introduction to set theory, set operation, Algebra of set, Duality, finite and infinite sets Classes of sets, Power Sets Multi Sets Cartesian product, Representation of relation, Types of relation , Equivalence relation and partition, partial ordering relations and lattices.
Functions and its types, Composition of function and relations, cardinality and inverse relations

SECTION – B

Prepositional calculus: Basic operations: AND (^), OR (v), NOT (~), truth-value of a compound statement, propositions, tautologies, contradictions.
Techniques of Counting: permutations with and without repetition, Combination.

SECTION – C

Recursion And Recurrence Relation: polynomials and their evaluation, sequences, Introduction of AP, GP and AG series, partial fractions, linear recurrence relation with constant coefficients, Homogeneous solutions, particular solutions, total solutions of a recurrence relation using generating functions.
Algebraic structures: Definition and examples of a monoid, Semi group and Undirected graphs, Homographic and isomorphic graphs, Sub graphs, Cut points and normal subgroups, cyclic groups, integral domain and fields, Cossets Lagrange‘s theorems

SECTION – D

Graphs and Trees: Introduction to graphs, Directed undirected graphs, Homomorphism and isomorphic graphs, Cut points and bridges, Multigraphs and Weighted graph, Paths and circuit , Shortest path in weighted graph, Eurelian path and circuit. Hamilton path and circuit, Planar graphs, Euler ‘s formula, Trees, Spanning trees, Binary tees and its traversals.

Suggested Text Books & References:

1. Elements of discrete mathematics C.L. Liu, McGraw HillConcrete mathematics: A foundation for computer science, Ronald Graham,
2. Donald Knuth and oren patashic, 1989, Addison- Wesley.
3. Mathematical Structure for Computer Science, Judith L. Gersting, 193. Computer Science Press.
4. Applied Discrete Structures for computer Science, Doerr and Levasseur.

SEMESTER – IV

Theory of Automata & Computation (CS – 4003)

Course Code	**CS – 4003**	Credits : 4	L-3, T-1, P-0
Name of the Course	**Theory of Automata & Computation**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min.Pass Marks: 40**
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

1. **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
2. **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION- A

Finite Automata and Regular Expression : Finite State System , Basic Definitions Non-Deterministic finite Automata (NDFA), Deterministic finite Automata(DFA),Equivalence of DFA and NDFA Finite Automata with E-moves, Regular expression, Equivalence of finite Automata and expression, Regular expression conversion and vice –versa.

SECTION - B

Introduction to Machines: Concept of basic machines, Properties and limitation of FSM, Moore and Mealy Machines, Equivalence of Moore and Mealy Machines, Conversion of NFA to DFA by Arden's method.

Properties of Regular Sets: The Pumping Lemma for Regular sets, Application of the pumping lemma, Closure properties of regular sets, Myhill-Nerode Theorem and minimization of Finite Automata, Minimization Algorithm.

SECTION – C

Grammars: Definition, Context Free and context sensitive grammar, Ambiguity regular grammar, Reduced forms, Removal of useless Symbols and unit production, Chomsky Normal Form(CNF), Griebach Normal Form(GNF).

Pushdown Automata: Introduction to push-down machines, Application of pushdown machines.

SECTION – D

Turing Machines: Deterministic and Non-Deterministic Turing Machines, Design of T.M, Halting problem of T.M., PCP problem.

Chomsky Hierarchy : Chomsky hierarchies of grammars, Unrestricted grammar, Context sensitive Language, Relation between language of classes.

Computability: Basic Concepts, Primitive Recursive Functions.

Suggested Text Books & References:

- Introduction to Automata Theory, languages & computations – Hopcroaft & O.D.Ullman, R.Motwani.

- Theory of Computer Sc. (Automata, Language & Computation): K.L.P.Mishra & N.Chandershekaran.

- Introduction to formal language & Automata – Peter Linz.

SEMESTER – IV

Electronics Measurement & Measuring Instrument Lab (EC(ID)-4007)

Course Code	**EC(ID)-4007**	Credits : 2	**L-0, T-0, P-2**
Name of the Course	**Electronics Measurement & Measuring Instrument Lab**		
Lectures to be delivered	**26 hours of Lab sessions**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 50**	**Min. Pass Marks : 20**
Laboratory	**Continuous Assessment (based on Lab work 30%, Lab record 25%, Viva 25%, Attendance 20%)**	**Max. Marks: 50**	**Min. Pass Marks: 25**

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

i) Performing a practical examination assigned by the examiner (25 marks).
ii) Viva-voce examination (25 marks).

Viva-voce examination will be related to the practical performed/projects executed by the candidate related to the paper during the course of the semester.

1. Measurement of displacement using LVDT.
2. Measurement of distance using LDR.
3. Measurement of temperature using R.T.D.
4. Measurement of temperature using Thermocouple.
5. Measurement of pressure using Strain Guage.
6. Measurement of pressure using Piezo – Electric Pick up.
7. Measurement of distance using Capacitive Pick up.
8. Measurement of distance using inductive.
9. Measurement of speed of DC Motor using Magnetic Pick up.
10. Measurement of speed of DC Motor using Photo Electric Pick up.

SEMESTER – IV

SAD Project (IT(ID) – 4007)

Course Code	**IT(ID) – 4007**	Credits-2	**L-0, T-0, P-2**
Name of the Course	**SAD Project**		
Lectures to be delivered	**26 hours of Lab sessions**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 50**	**Min. Pass Marks: 20**
Laboratory	**Continuous Assessment (based on Lab work 30%, Lab record 25%, Viva 25%, Attendance 20%)**	**Max. Marks: 50**	**Min. Pass Marks: 25**

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

i. Performing a practical examination assigned by the examiner (25 marks).
ii. Viva-voce examination (25 marks).

Viva-voce examination will be related to the practical performed/projects executed by the candidate related to the paper during the course of the semester.

Aim of this Project

Aim of this Project is to equip students in the methodology of System Analysis and Design of a Live Project in the institute in which he is studying or in a place of work such as Bank, School, College and office in the vicinity of the institute.
This will be a guide Project under the Close supervision of the faculty of the institute.
Project should be presented in the form of a project report giving a candidate system for solving a life problem.

SEMESTER – IV

MAT LAB (CS – 4004)

Course Code	**CS – 4004**	Credits-2	**L-0, T-0, P-2**
Name of the Course	**MAT LAB**		
Lectures to be delivered	**26 hours of Lab sessions**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 50**	**Min. Pass Marks: 20**
Laboratory	**Continuous Assessment (based on Lab work 30%, Lab record 25%, Viva 25%, Attendance 20%)**	**Max. Marks: 50**	**Min. Pass Marks: 25**

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

i) Performing a practical examination assigned by the examiner (25 marks).

ii) Viva-voce examination (25 marks).

Viva-voce examination will be related to the practicals performed/projects executed by the candidate related to the paper during the course of the semester.

List of Experiments:

i. Roots of Quadratic Equation.

ii. Guessing a number.

iii. Units Conversion.

iv. Factorial Program.

v. Simulation of an RC circuit.

vi. I-V Characteristics of a MOSFET.

vii. Finding average with a dynamic array.

viii. Writing a binary File.

ix. Reading a binary File.

x. Plotting one and two-dimensional graphs using various MATLAB 2-D Plot types.

xi. Using functions in MATLAB environment.

The Teacher concerned will give at least 10 more exercise to solve non-trivial problems using MATLAB environment.

BOOKS:

1.Programming in MATLAB,Marc E. Herniter, Thomson ASIA Ptc Ltd. Singapore(2001).

2.MATLAB,The Language of Computing; The Math work Inc.