SCHEME OF INSTRUCTIONS
BE II YEAR I SEMESTER
(COMPUTER SCIENCE AND ENGINEERING)

THEORY

Sl. No.	Syllabus Ref. No.	Subject
1.	M T 201	Mathematics – III
2.	C S 201	Data Structures Using C++
3.	C S 202	Discrete Structures
4.	C S 203	Logic and Switching Theory
5.	C S 204	Computer Organization & Architecture
6.	E C 222	Basic Electronics

PRACTICALS

Sl. No.	Syllabus Ref. No.	Subject
1.	C S 231	Data Structures Lab Using C++
2.	E C 242	Basic Electronics Lab

With effect from Academic Year 2015-2016

MT201

MATHEMATICS-III
(Common to all Branches)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

Course Objectives:

- To introduce the concepts of Fourier series, partial differential equations and applications
- To provide the knowledge of some probability distributions, tests of significance, curve fitting, correlation and regression

UNIT – I

Partial differential Equations : Formation of partial-differential equations, Linear first order equations, Lagrange's equations, Non linear first order equations, Charpit's method, Standard forms.

UNIT – II

Fourier Series and its applications to partial differential equations : Expansion of a function in Fourier series for a given range, Fourier series for odd and even functions, change of interval, Half range sine and cosine series, Solution of wave equations, Heat equation and Laplace's equation by the method of separation of variables and their use in problems of vibrating string, One dimensional unsteady state heat flow and two dimensional steady state heat flow.

UNIT – III

Statistics: Solution Introduction to Probability, Baye's theorem, Random variables, Density functions, Mathematical expectation, Expected values, Moments and Moment generating functions, Characteristic functions.

UNIT - IV

Distributions: Poisson, Normal, Gamma and Chi-Square distributions, Tests of significance, Chi-Square, F and T-tests.

UNIT – V

Curve Fitting : Introduction, Fitting of curves by the method of least squares(straight line, parabola, exponential curves), Correlation and Regression, Lines of regression.

Suggested Reading:

1.R.K. Jain & S.R.K. Iyengar,*Advance Engineering Mathematics,*Narosa4th Edition, 2014.

2. Dr B.S. Grewal, *Higher Engineering Mathematics,* Khanna Publications, 43rd Edition, 2014.
3. Dr.M.D.Raisinghania, *Ordinary and Partial differential equations*, S.CHAND, 17th Edition 2014.
4. Erwin Kreyszig, *Advanced Engineering Mathematics*, 9th Edition, 2012.
5. S.C.Gupta, V.K.Kapoor, *Fundamentals of Mathematical Statistics,* S.Chand &Sonss.

With effect from Academic Year 2015-2016

CS 201

DATA STRUCTURES USING C++

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

Course Objectives:

- To introduce the concepts of Abstract data Type, data structure, performance measurement, time and space complexities of algorithms.
- To discuss the implementation linear data structures such as stacks, queues and lists and their applications.
- To discuss the implementation of different non linear data structures such as trees and graphs.
- To introduce various search data structures such as hashing, binary search trees, red black trees, splay trees and b-trees.
- To introduce various internal sorting techniques and analyze their time complexities.

UNIT-I

Algorithm Specification, Performance Analysis and Measurement. **Arrays:** Abstract Data Types and the C++ Class, The Array as an Abstract Data Type, The Polynomial Abstract Data Type, Sparse Matrices, Representation of Arrays, The String Abstract Data Type.

UNIT–II

Stacks and Queues: Templates in C++, The Stack Abstract Data Type, The Queue Abstract Data type, Subtyping and Inheritance in C++, A Mazing Problem, Evaluation of Expressions, Additional Exercises.

UNIT-III

Linked Lists: Singly Linked Lists and Chains, Representing Chains in C++, The Template Class Chain, Circular Lists, Available Space Lists, Linked Stacks and Queues, Polynomials, Equivalence Classes, Sparse Matrices, Doubly Linked Lists, Generalized Lists.

UNIT-IV

Hashing: Static Hashing.

Trees: Introduction, Binary Trees, Binary Tree Traversal and Tree Integrators, Copying Binary Trees, Threaded Binary Trees, Heaps, Binary Search Trees.

Efficient Binary Search Trees: AVL Trees, Red-Black Trees, Splay Trees, m-way Search Trees, B-Trees.

UNIT-V

Sorting: Insertion sort, Quick sort, How Fast Can We Sort, Merge sort, Heap sort, Sorting on Several Keys, List and Table Sorts, Summary of Internal Sorting.

Graphs: The Graph Abstract Data Type, Elementary Graph operations (dfs and bfs), Minimum Cost Spanning Trees (Prim's and Kruskal's Algorithms).

Suggested Reading:

1. Ellis Horowitz, Dinesh Mehta, S. Sahani. *Fundamentals of Data Stuctures in C++,* Universities Press. 2007.
2. T.H. Cormen, C.E. Leiserson, and R.L. Rivest.*Introduction toAlgorithms,*Prentice Hall of India 1996.
3. Mark Allen Weiss, *Data Structures and Algorithm Analysis in C++,* Pearson Education 2006.

With effect from Academic Year 2015-2016

CS 202

DISCRETE STRUCTURES

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

Course objectives:

- To introduce fundamentals of logic to evaluate elementary mathematical arguments and identify fallacious reasoning.
- Use of mathematical and logical notation to define and formally reason about mathematical concepts such as sets, relations, functions, integers and algebraic structures
- Use of mathematical and logical notation to define and formally reason about discrete structures like trees, graphs and partial orders.
- To introduce generating functions and recurrence relations to find asymptotic growth rates of different functions.

UNIT-I

Fundamentals of Logic: Basic Connectives and Truth Tables, Logical Equivalence, Logical Implication, Use of Quantifiers, Definitions and the Proof of Theorems.

Set Theory: Set and Subsets, Set Operations, and the Laws of Set theory, Counting and Venn Diagrams.

Properties of the Integers: The well – ordering principle, Recursive definitions, the division algorithms, fundamental theorem of arithmetic.

UNIT-II

Relations and Functions: Cartesian Product, Functions onto Functions, Special Functions, Pigeonhole Principle, Composition and Inverse Functions, Computational Complexity.

Relations: Partial Orders, Equivalence Relations and Partitions.

Principle of Inclusion and Exclusion: Principles of Inclusion and Exclusion, Generalization of Principle, Derangements, Rock Polynomials, Arrangements with Forbidden Positions.

UNIT-III

Generating Functions: Introductory examples, definition and example Partitions of Integers, exponential generating function, summation operator. **Recurrence**

Relations: First – order linear recurrence relation, second – order linear homogenous recurrence relation with constant coefficients, Non homogenous recurrence relation, divide and conquer algorithms.

UNIT-IV

Algebraic Structures: Algebraic System – General Properties, semi groups, Monoids, homomorphism, Groups, Residue arithmetic, group codes and their applications.

UNIT-V

Graph Theory: Definitions and examples, subgraphs, complements and graph Isomorpshim, Vertex degree, Planar graphs, Hamiltonian paths and Cycles, Graph Coloring.

Trees: Definitions, properties and Examples, Rooted Trees, Spanning Trees and Minimum Spanning Trees.

Suggested Reading:

1.Ralph P.Grimaldi, *Discrete and Combinatorial Mathematics,* 4th edition, 2003, Pearson Education.

2.J.P.Tremblay, R.Manohar, *Discrete Mathematical Structure with Applications to Computer Science*, McGraw Hill, 1987.

3.Joe L.Mott, A.Kandel, T.P.Baker, *Discrete Mathematics for Computer Scientists & Mathematicians,* Prentice Hall N.J., 1986.

4.Thomas Koshy, *Discrete Mathematics with Applications,* Elsevier Inc.2004.

With effect from Academic Year 2015-2016

CS 203

LOGIC AND SWITCHING THEORY

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

Course objective:

- To introduce number systems and operation of electronic logic elements
- To introduce minimization of Boolean functions and implementation using NAND and NOR Gates.
- To introduce the design of combinatorial and sequential circuits.
- To introduce design of registers and counters.

UNIT-I

Digital Computers and Information: Information representation, Computer Structure.

Number Systems: Binary Numbers, Octal and Hexadecimal Numbers, Number Ranges.

Arithmetic Operations: Conversion from Decimal to other bases. **Decimal Codes:** BCD Addition. Alphanumeric Codes: ASCII Character Code, Parity Bit.

Binary Logic and Gates: Binary Logic, Logic Gates. Boolean Algebra: Basic Identifiers, Algebraic Manipulation, Complement of a Function.

Standard Forms: Minterms and Maxterms, Sum of Product and Products of Sums.

UNIT-II

Minimization of Switching Functions: Introduction, the map method, Minimal Functions and Their Properties, the tabulation procedure, the prime implicant chart.

NAND and NOR Gates: Nand Circuits, Two-level Implementation, Multilevel NAND Circuits, NOR Circuits. Exclusive OR Gates: Odd Function, Parity Generation and Checking.

UNIT-III

Combination Logic Design: Combinational Circuits, Design Topics: Design Hierarchy, Top –Down design, Computer Aided Design, Hardware Description Languages, Logic Synthesis. Analysis Procedure: Derivation of Boolean Functions, Derivation of the Truth Table, Logic Simulation, Design Procedure, Decoders, Encoders, Multiplexers, Binary Adders, Binary subtraction, Binary Multipliers, HDL Representations- VHDL.

UNIT-IV

Sequential Circuits: Sequential Circuit definitions. Latches, Flip Flops, sequential circuit analysis, sequential circuit design, design with D Flip Flops, designing with JK Flip-Flops, HDL representation for sequential circuits-VHDL.

UNIT-V

Registers and Counters: Registers, Shift registers, Synchronous Binary counters, Ripple Counter.

Symmetric Networks: Properties of Symmetric Functions, Synthesis of Symmetric networks, identification of symmetric functions.

Suggested Reading:

1.M. Moris Mano, Charles R. Kime, *Logic and Computer Design Fundamentals,* 2nd edition, Pearson Education Asia, 2001.

2.Zvi Kohavi, *Switching and Finite Automata Theory,* 2nd edition, Tata McGraw Hill, 1995.

3.Charles H. Roth, J*r Fundamentals of Logic Design,* 5th edition, Thomson, Brook,Cole, 2005.

With effect from Academic Year 2015-2016

CS 204

COMPUTER ARCHITECTURE

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

Course Objective:

- To introduce stored program organization of computer and instruction set architecture.
- To introduce design of control unit using microprogramming, RISC and interrupt handling.
- To introduce different microarchitectural designs such as pipelining.Vector processing and SIMD array processor.
- To introduce different algorithms used in the design of ALU
- To introduce different I/O organization mechanisms and modes of data transfer from I/O subsystem to CPU.
- To introduce various parts of a system memory hierarchy.

UNIT-I

Register Transfer and Microoperations: Register transfer language, Register Transfer, Bus and, Memory Transfers, Arithmetic Microoperations: Binary Adder, Subtractor, Binary Incrementer, Arithmetic Circuit**.** Logic Microoperations: List of Logic Microoperations, hardware Implementation. Arithmetic. Logic Shift unit.

Basic Computer Organization and Design: Instruction Codes: Stored program organization, Indirect Address. Computer Registers: Common Bus System. Computer Instructions: Instruction Set Completeness. Timing and Control, Instruction Cycle: Fetch and Decode, Register Reference Instructions. Memory Reference Instructions: Example Instructions, Control Flow Chart. Input-Output and Interrupt: Configuration, Instructions, Program Interrupt, Interrupt Cycle. Complete Computer Description. Design of Basic Computer, Basics of Accumulator Logic.

UNIT-II

Microprogrammed Control: Control Memory, Address Sequencing: Control Branching Mapping of Instruction, Subroutines. Microprogram Example: Computer Configuration, Microinstruction Format, Symbolic Microinstructions.The Fetch Routine, Symbolic Microprogram, Binary Microprogram. Design of Control Unit: Microprogram Sequencer Central Processing Unit: General Register Organization: Control World Stack Organization: Register Stack, Memory Stack, Reverse Polish Notation, Evaluation of Expressions. Instruction Formats: Three, Two, One, Zero Address Instructions, RISC Instructions. Addressing Modes. DataTransfer and Manipulation: Data Transfer Instructions, Data Manipulation Instruction, Arithmetic Instruction Logical, Shift and Bit Manipulation Instructions.

Program Control: Status Bit Conditions, Conditional Branch Instructions Subroutine Call and Return, Program Interrupt, Types of Interrupts, Reduced Instruction Set Computer: CISC.
Characteristics, RISC Characteristics, Overlapped Register Windows.

UNIT-III

Pipeline and Vector Processing: Parallel Processing, Pipelining, Instruction Pipeline, RISC Pipeline, Vector Processing: Vector Operations, Matrix Multiplication, Memory Interleaving, Super Computers. Array Processors: Attached Array Processor, SIMD Array Processor.

Computer Arithmetic: Addition and Subtraction: With Signed Magnitude Data, Implementation and algorithm, Addition and Subtraction with 2's Complement Data. Multiplication Algorithms with signed magnitude data, algorithm, Booth's algorithm, Array multiplier. Division Algorithms with
signed magnitude data, divide overflow, algorithm. Floating Point Arithmetic Operations, Decimal Arithmetic Unit: BCD Adder, Subtractor.

UNIT-IV

Input Output Organization: Input-Output Interface: I/O Bus and Interface Modqles, I/O Versus Memory Bus, Isolated vs Memory Mapped I/O. Asynchronous Data Transfer: Strobe Control, Handshaking, Asynchronous Serial Transfer, Asynchronous Communication Interface.

Modes of Transfer: Programmed I/O, Interrupt driven I/O. Priority Interrupt: Daisy Chaining, Parallel Priority Interrupt, priority Encoder. Direct Memory Access**:** DMA Controller and Transfer. Input-Output Processor (lOP): CPU-IOP Communication, IBM 370 I/O Channel, Intel 8089-IOP. Serial Communication.

UNIT-V

Memory Organization: Memory Hierarchy, Main Memory**:** RAM and ROM Chips, Address Map, Memory Connection to CPU. Auxiliary Memory**:** Disks and Tapes. Associative Memory**:** Hardware Organization, Match Logic, Read. Operation and Write Operation. Cache

Memory: Associative Mapping, Direct. Mapping, Set-Associative Mapping, Writing into Cache Initialization. Virtual Memory**:** Address and Memory Space, Address Mapping, Page Replacement.

Suggested Reading:

1.M. Morris Mano, *Computer System Architecture,* 3rd edition, Pearson Education Asia, 2002.

2.William Stallings, *Computer Organization & Architecture*, 6th Edition, Pearson Education Asia, 2003.

3.V.Carl Hamacher, Z.G Vranesic, S.G. Zaky, *Computer Organization,* McGraw Hill, 2004.

4.David A. Patterson, John L. Hennessy, *Computer Organization and Design.* Morgan, Elsevier Inc, 2009.

With effect from Academic Year 2015-2016

EC 222

BASIC ELECTRONICS
(For Mech., Prod., and CSE)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

Course objectives:

- Analyze the behavior of semiconductor diodes in Forward and Reverse bias.
- Design of Half wave and Full wave rectifiers with L,C, LC & CLC Filters.
- Explore V-I characteristics of b\Bipolar Junction Transistor n CB, CE & CC configurations.
- Explain feedback concept and different oscillators.
- Analyze Digital logic basics and Photo Electric devices.

UNIT-I

Semi Conductor Theory: Energy Levels, Intrinsic and Extrinsic Semiconductors, Mobility, Diffusion and Drift current. Hall Effect, Characteristics of P-N Junction diode, Parameters and Applications.

Rectifiers: Half wave and Full wave Rectifiers (Bridge, center tapped) with and without filters, ripple regulation and efficiency. Zener diode regulator.

UNIT-II

Bipolar Junction Transistor:BJT, Current components, CE, CB, CC configurations, characteristics, Transistor as amplifier. Analysis of CE,CB,CC Amplifiers(qualitative treatment only).

JEET: Construction and working, parameters, CS, CG, CD Characteristics, CS amplifier.

UNIT-III

Feedback Concepts – Properties of Negative Feedback Amplifiers,Classification, Parameters .

Oscillators – Barkhausen Criterion, LC Type and RC Type Oscillators and Crystal Oscillators. (Qualitative treatment only)

UNIT-IV

Operational Amplifiers – Introduction to OP Amp, characteristics and applications – Inverting and Non-inverting Amplifiers, Summer, Integrator, Differentiator, Instrumentation Amplifier.

Digital Systems: Basic Logic Gates, half, Full Adder and Subtractors.

UNIT-V

Data Acquisition systems: Study of transducer (LVDT, Strain gauge, Temperature, Force).

Photo Electric Devices and Industrial Devices: Photo diode, Photo Transistor, LED, LCD, SCR, UJT Construction and Characteristics only.

Display Systems: Constructional details of C.R.O and Applications.

Suggested Reading:

1.Jocob Millman, Christos C. Halkias and Satyabrata Jit, Electronics Devices and Circuits, 3rd edition, McGraw Hill Education(india) Private Limited, 2010.
2. Rama Kanth A. Gaykward, *Op-AMPS and Linear Integrated Circuits* 4th Edition Prentice Hall of India 2000.
3. M. Morris Mano, *Digital Design, 3rd Edition,* Prentice Hall of India 2002.
4.William D Cooper, and A.D. Helfrick, *Electronic Measurements and Instrumentations Techniques, 2nd ed.,* Prentice Hall of India 2008
5.S. Shalivahan, N. Suresh Kumar, A. Vallava Raj, *Electronic Devices and Circuits,* 2nd ed., McGraw Hill Education(India) Private Limited, 2007.

With effect from Academic Year 2015-2016

CS 231

DATA STRUCTURES LAB USING C++

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessional	25 Marks

Course Objectives:

- Write programs that implement linear data structures such as stacks, queues and lists and their applications.
- Write programs that implement of different non linear data structures such as trees and graphs.
- Write programs to implement algorithms for searching using hash tables and binary search trees.
- Write programs to implement sorting algorithms such as selection, shell, merge, quick and heap sorts.

List of Experiments:

1.Implementation of Stacks, Queues.

2.Infix to Postfix Conversion, evaluation of postfix expression.

3.Polynomial arithmetic using linked list.

4.Implementation of Binary Search and Hashing.

5.Implementation of Selection, Shell, Merge and Quick sorts.

6.Implementation of Tree Traversals on Binary Trees.

7.Implementation of Heap Sort.

8.Implementation of operations on AVL Trees.

9.Implementation of Traversal on Graphs.

10.Implementation of Splay Trees.

Note: For each of the problems PSP (Personal Software Process) Principles should be applied.

With effect from Academic Year 2015-2016

EC 242

BASIC ELECTRONICS LAB
(For Mech., Prod. & CSE)

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessional	25 Marks

Course objectives:

1.Demonstrate the characteristics of Semiconductor diodes
2.Realize the filters and Rectifiers.
3.Verify the characteristics of different transistor Configurations.
4.Design of Biasing Circuits for BJT and FET Amplifiers.
5.Design different circuits using Operational Amplifiers.

List of Experiments:

List of Experiments:

1.CRO-Applications, Measurements of R, L and C using LCR meter, Color code methodsoldering practice.
2. Characteristics of Semiconductors diode(Ge, Si and Zener).
3. Static characteristics of BJT-Common Emitter.
4. Static characteristics of BJT-Common Base.
5. Static characteristics of FET.
6. RC-Phase Shift Oscillator.
7. Hartley and Colpitt's Oscillators.
8. Common Emitter Amplifier.
9. A stable Multivibrator.
10. Full-wave rectifier with and without filters using BJT.
11. Operational Amplifier applications.
12. Strain Guage Measurement.
13. Analog-to-Digital and Digital to Analog Converters.

Suggested Reading :

1.David Bell A., Operational Amplifiers and Linear ICS, Prentice Hall of India, 2005.
2.David Bell A.,*Laboratoryfor Electronic Devices and Circuits,* Prentice Hall of India, 2007.
3.Boylested R.L. and Nashelsky*, Electronics Devices and Circuit Theory*, Prentice HallIndia,2006.

SCHEME OF INSTRUCTIONS
BE II YEAR II SEMESTER
(COMPUTER SCIENCE AND ENGINEERING)

THEORY

Sl. No.	Syllabus Ref. No.	Subject
1.	M T 251	Mathematics – IV
2.	C S 251	Object oriented Programming Using Java
3.	C S 252	Microprocessors and Interfacing
4.	C S 253	Principles of Programming Languages
5.	E E 221	Electrical Circuits and Machines
6.	C E 222	Environmental Studies

PRACTICALS

Sl. No.	Syllabus Ref. No.	Subject
1.	C S 281	Java Lab
2.	C S 282	Microprocessor Lab

With effect from Academic year 2015-2016

MT 251

MATHEMATICS-IV
(CSE, ECE, EEE, Mech. & Production)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

Course Objectives:

1.To impart the knowledge of essential mathematics tool like functions of complex variables and their properties.
2.To introduce the concepts of Z-transforms, Fourier transforms and their properties.
3.To introduce a few numerical methods to solve certain types of problems.

UNIT–I

Functions of Complex variables : Limit and Continuity of function, Analytic functions, Cauchy-Reimann equations, Cartesian and Polar forms, Harmonic functions, Complex integration, Cauchy's theorem, Derivative of Analytic functions, Cauchy's integral formula and it's applications.

UNIT–II

Residue theory and Transformations: Taylor's and Laurent's Series Expansions, Zeroes and Singularities, Residues, Residue theorem, Evaluation of real Integrals using Residue theorem, Conformal Mapping, Bilinear transformation.

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UNIT–III

Z-Transforms : Introduction, Basic Theory of Z-transforms, Z-transform of some standard sequences, Existence of Z-transform, Linearity property, Translation theorem, Scaling property, Initial and Final value theorems, Differentiation of Z-transforms, Convolution theorem, Solution of difference equations using Z-transforms.

UNIT–IV

Fourier Transforms: Introduction, Fourier integrals, Fourier sine and cosine integrals, Complex form of Fourier integral, Fourier transform, Fourier sine and cosine transforms, Finite Fourier sine and cosine transforms, Properties of Fourier transforms, Convolution theorem for Fourier transforms.

UNIT–V

Numerical Methods: Solutions of Algebraic and Transcendental equations, Bisection method and Newton-Raphson's method, Interpolation, Newton's Forward and Backward difference interpolation, Lagrange's interpolation, Newton's divided difference interpolation, Numerical differentiation, Solution of differential equations by Euler's method and Runge-Kutta method of order four.

***Suggested Reading**:*

1.R.K. Jain & S.R.K. Iyengar, *Advanced Engineering Mathematics*, Narosa Publications 4th Edition 2014

2.B.S. Grewal, *Higher Engineering Mathematics,* Khanna Publications, 43rd Edition, 2014.

3.Erwin Kreyszig, *Advanced Engineering Mathematics,* 9th Edition, 2012.

4.James Brown and Ruel Churchill, *Complex variables and Applications*, 9th edition, 2013.

5.Vasishtha and Gupta, *Integral Transforms*, Krishnan Prakashan Publications, 2014.

With effect from Academic year 2015-2016

CS 251

OBJECT ORIENTED PROGRAMMING USING JAVA

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

Course objective:

- To introduce fundamental object oriented concepts of java programming such as classes, inheritance, packages and interfaces.
- To introduce concepts of exception handling and multi threading.
- To use various classes and interfaces in java collection framework and utility classes.
- To introduce GUI programming using AWT controls.
- To introduce Java I/O streams and serialization.

UNIT-I

Object Oriented System Development: Understanding Object Oriented Development, Understanding Object Concepts, Benefits of Object Oriented Development.
Java Programming Fundamentals: Introduction. Overview of Java, Data Type, Variables and Arrays, Operators, Control statements, Classes, Methods , Inheritance, Packages and Interfaces.

UNIT-II

Exceptions Handling, Multithreaded Programming, I/O basics, Reading Console input and output, Reading and Writing Files, Print Writer Class, String Handling.

UNIT-III

Exploring Java Language, Collections Overview, Collections Interfaces, Collections Classes, Iterators, Random Access Interface, Maps, Comparators, Arrays, Legacy classes and interfaces, Sting tokenizer, BitSet, Date, Calendar, Timer.

UNIT-IV

Introducing AWT working With Graphics: AWT Classes, Working with Graphics.
Event Handling: Two Event Handling Mechanisms, The Delegation Event Model, Event Classes, Source of Events, Event Listener Interfaces.
AWT Controls: Control Fundamentals, Labels, Using Buttons, Applying Check Boxes, CheckboxGroup, Choice Controls, Using Lists, Managing Scroll Bars, Using TextField, Using TextArea, Understanding Layout Managers, Menu bars and Menus, Dialog Boxes, FileDialog, Handling events by Extending AWT Components, Exploring the controls, Menus and Layout Managers.

UNIT-V

Java I/O classes and interfaces, Files, Stream and Byte classes, Character Streams, Serialization.

Suggested Reading:

1.Herbert Schildt, The Complete Reference Java, 7th Edition, Tata McGraw Hill, 2005.

2.James M Slack, Programming and Problem solving with JAVA, Thomson Learning, 2002

3.C Thomas Wu, An Introduction to Object Oriented programming with Java, Tata McGraw Hill, 2005.

With effect from Academic year 2015-2016

CS252

MICROPROCESSORS AND INTERFACING

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

Course objectives:

- To introduce 8085 architecture and programming in assembly language.
- To introduce basic concepts of interfacing memory and peripheral devices to a microprocessor.
- To introduce serial and parallel bus standards.
- To introduce 8051 microcontroller.
- To introduce various advanced processor architectures such as 80X86, Pentium and Multi-core Processors.

UNIT-I

8085 Architecture: Introduction to microprocessors and microcontrollers,

8085 Processor Architecture, Internal operations, Instructions and timings,

Programming the 8085 – Introduction to 8085 instructions, addressing modes and Programming techniques with Additional instruction.

UNIT-II

Stacks and subroutines, interfacing peripherals - Basic interfacing concepts, interfacing output displays, interfacing input keyboards. Interrupts - 8085 Interrupts, Programmable Interrupt Controller (8259A). Direct Memory Access (DMA) – DMA Controller (Intel 8257), Interfacing 8085 with Digital to Analog and Analog to Digital converters.

UNIT-III

Programmable peripheral interface (Intel 8255A), Programmable communication interface (Intel 8251), Programmable. Interval timer (Intel 8253 and 8254), Programmable Keyboard / Display controller (Intel 8279). Serial and parallel bus standards RS 232 C, IEEE 488.

UNIT-IV

Introduction to Microcontrollers, 8051 – Architecture – Instruction set, Addressing modes and Programming Techniques. Comparison of various families of 8-bit micro controllers. System Design Techniques Interfacing of LCD, ADC, Sensors, Stepper motor, keyboard and DAC using microcontrollers Communication standards – serial RS232 and USB

UNIT-V

Microprocessor Applications and trends in microprocessor Technology – 8-bit, 16-bit and 32-bit microprocessors. Advanced Processor Architecture – Register structure, Instruction set,

Addressing modes of 8086. Features of advanced microprocessors. 80386, 80486, Pentium and Multi-Core Processors.

Suggested Readings:

1. Ramesh S Gaonkar, Microprocessor architecture, Programming and applications with 8085, 5/E Prentice Hall, 2002.
2. Barry B. Brey, The Intel Microprocessor, 8086/8088,8018/80188, 80286, 80386, 80486, Pentium and Pentium pro-processors – architecture, Programming and interfacing, 4 Edition, Prentice Hall 1993.
3. Kenneth Ayala " The 8051 Microcontroller" West publishing company.
4. Myke Predko, programming and customizing the 8051 Microcontroller, Tata McGraw-Hill, 1994.

With effect from Academic year 2015-2016

CS 253

PRINCIPLES OF PROGRAMMING LANGUAGES

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

Course objectives:

- TO introduce the major programming paradigms, and the principles and techniques involved in design and implementation of modern programming languages.
- To introduce notations to describe syntax and semantics of programming languages.
- To analyze and explain behavior of simple programs in imperative languages using concepts such as binding, scope, control structures, subprograms and parameter passing mechanisms.
- To introduce the concepts of ADT and object oriented programming for large scale software development.
- To introduce the concepts of concurrency control and exception handling.

UNIT I :

Preliminary Concepts: Reasons for Studying Concepts of Programming Languages, Programming Domains, Language Evaluation Criteria, Influences on Language Design, Language Categories, Language Design Trade-offs, Implementation Methods, Programming Environments, Evolution of the Major Programming Languages.

Describing Syntax and Semantics: General Problem of Describing Syntax, Formal Methods of Describing Syntax, Attribute Grammars, Describing the Meaning of Programs.

UNIT II :

Names, Binding, Type Checking, and Scopes: Names, Variables, The Concept of Binding, Type Checking, Strong Typing, Type Compatibility, Scope, Scope and Lifetime, Referencing Environments, Named Constants.

Data Types: Primitive Data Types, Character String Types, User- Defined Ordinal Types, Array Types , Associative Arrays, Record Types, Union Types, Pointer and Reference Types.

Expressions and Assignment Statements: Arithmetic Expressions, Overloaded Operators, Type Conversions, Relational and Boolean Expressions, Short-Circuit Evaluation, Assignment Statements, Mixed- Mode Assignment.

UNIT III

Statement-Level Control Structures: Selection Statements, Iterative Statements, Unconditional Branching, Guarded Commands.

Subprograms: Fundamentals and Design Issues for Subprograms, Local Referencing Environments, Parameter –Passing Methods, Parameters That are Subprograms Names, Overloaded Subprograms, Generic Subprograms, Design Issues for Functions, User-Defined Overloaded Operators.

Implementing Subprograms: The General Semantics of Calls and Returns, Implementing "Simple" Subprograms, Implementing Subprograms with Stack-Dynamic Local Variables, Nested Subprograms, Blocks, Implementing Dynamic Scoping.

Abstract Data Types: The Concept of Abstraction, Introduction to Data Abstraction, Design Issues for Abstract Data Types, Language Examples, Parameterized ADT, Encapsulation Constructs, Naming Encapsulation.

UNIT IV

Object Oriented Programming: Design Issues, Object Oriented Programming in Smalltalk, C++, Java, C#, Ada 95, Ruby, The Object Model of JavaScript, Implementation of Object Oriented Constructs.

Concurrency: Subprogram level Concurrency, Semaphores, Monitors, Massage Passing, Ada Support for Concurrency, Java Threads, C# Threads, Statement-Level Concurrency.

Exception Handling and Event Handling: Introduction to Exception Handling, Exception Handling in Ada, C++ and Java, Introduction to Event Handling, Event Handling with Java.

UNIT V :

Functional Programming Languages: Introduction, Mathematical Functions, Fundamentals of FPL, LISP, Introduction to Scheme, COMMON LISP, ML, Haskell, Application of Functional Programming Languages and A Comparison of Functional and Imperative Languages.

Logic Programming Languages: Introduction to Predicate Calculus, Predicate Calculus and Proving Theorems, An Overview of Logic Programming. The Origins, Basic Elements and Deficiencies of Prolog, Applications of Logic Programming.

Scripting Languages: Key concepts, Case Study: Python(From the Suggested Reading 2).

Suggested Reading:

1. Concepts of Programming Languages Robert .W. Sebesta 8/e, Pearson

Education, 2008.

2. Programming languages –Watt, Wiley Dreamtech, 2004.

3. Programming Languages –Louden, Second Edition, Cengage, 2003.

4. Programming languages –Ghezzi, 3/e, John Wiley, 1998.

5. Programming Languages Design and Implementation – Pratt and

Zelkowitz, Fourth Edition PHI/Pearson Education, 2001.

With effect from Academic Year 2015-2016

EE 221

ELECTRICAL CIRCUITS AND MACHINES

(Common to CSE, ME and PE)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

***Course objectives*:**

- To acquire knowledge in electrical circuits.
- To be able to understand the basic principle operation and performance of electrical machines.

Unit-I

DC & AC Circuits: Analysis of circuits using loop current method, Thevenin's and Norton's theorems, Sinusoidal sources, Phasor representation of sinusoidal quantities, Average and rms values, Active power, Reactive power, Energy stored in inductance and capacitance, Mutual inductance, Dot convention, analysis of simple coupled circuits.

Unit-II

Production of 3-Phase Voltages: Analysis of 3-phase balanced circuits, 3-phase power measurement by two-wattmeter method. Transformers: Principle of transformation of voltages and currents, Equivalent circuit of transformer on no load and load, Efficiency and regulation of transformer, OC and SC tests, Auto-transformer.

Unit - III

DC Machines: Construction and working principle of a DC machine, Production of emf in a generator, Types of excitation, Characteristics of series, shunt and compound motors, Speed control and application of DC motors, Losses and efficiency, three point starter.

Unit-IV

Induction Motors: Production of rotating magnetic field, Construction and principle of operation of induction motors, Speed-torque characteristics, Methods of starting and Speed control of 3-phase induction motors,

Unit-V

Single-Phase & Special Motors: Various types of single phase motors, Spilt phase, Capacitor start and Capacitor run, Basic features of Stepper motor and Brushless DC motor.

Suggested Reading:

1. Naidu M.S. & Kamakshiah S, *Introduction to Electrical Engineering*, Tata McGraw Hill, 1995.
2. Jhon Bird, Electrical Circuit theory and Technology, Routledge Taylor & Francis Group, Fourth Edition, 2012.
3. Mehtu V.K., *Principles of Electrical Engineering and Electronics*, S.Chand & Co.,1999.
4. A.Chakrabarti, Sudipta Nath,Chandan Kumar Chanda, 'Basic Electrical Engineering" Tata McGraw Hill Education PVT. LTD., 2009.

With effect from Academic Year 2015-2016

CE 222

ENVIRONMENTAL STUDIES
(Common to all Branches)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

Course objective:

- To study the sources of water, floods and its impact on environment.
- To know about the ecosystem and energy resource system.
- To understand the biodiversity concepts and its advantages.
- To study different types of pollution and its impact on environment.
- To know the social and environment related issues and their preventive measures.

UNIT-I

Environmental studies: Definition, scope and importance, need for public awareness. Natural resources: Water resources; use and over utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems. Effects of modern agriculture, fertilizer-pesticide problems, water logging salinity. Energy resources, growing energy needs, renewable and non-renewable energy sources. Land Resources, land as a resource, land degradation, soil erosion and desertification.

UNIT-II

Ecosystems: Concepts of an ecosystem, structure and functions of an ecosystem, producers, consumers and decomposers, energy flow in ecosystem, food chains, ecological pyramids, aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries).

UNIT-III

Biodiversity: Genetic species and ecosystem diversity, bio-geographical classification of India. Value of biodiversity, threats to biodiversity, endangered and endemic species of India, conservation of biodiversity.

UNIT-IV

Environmental Pollution: Causes, effects and control measures of air pollution, water pollution, soil pollution, noise pollution, thermal pollution and solid waste management.

Environment Protection Act: Air, water, forest and wild life acts, issues involved in enforcement of environmental legislation.

UNIT-V

Social Aspects and the Environment: Water conservation, watershed management, and environmental ethics. Climate change, global warming, acid rain, ozone layer depletion. Environmental protection act, population explosion.

Disaster Management: Types of disasters, impact of disasters on environment, infrastructure and development. Basic principles of disaster mitigation, disaster management, and methodology, disaster management cycle, and disaster management in India.

Suggested Reading :

1.A. K. De, *Environmental Chemistry*, New Age Publications, 2002.

2.E. P. Odum, *Fundamentals of Ecology*, W.B. Sunders Co., USA.

3.GL. Karia and R.A. Christian, *Waste Water Treatment, Concepts and Design Approach*, Prentice Hall of India, 2005.

4.Benny Joseph, *Environmental Studies*,TataMcGraw-Hill, 2005

5.V. K. Sharma, *Disaster Management*, National Centre for Disaster Management, IIPE, Delhi,

With effect from Academic Year 2015-2016

CS 281

JAVA LAB

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessional	25 Marks

Course objectives:

- Write programs using classes, inheritance and abstract classes.
- Write multi threaded programs with synchronization.
- Write real world applications using java collection frame work and I/O classes
- Write Event driven GUI programs using AWT/Swing

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1.A program to illustrate the concept of class with constructors, methods and overloading.

2.A program to illustrate the concept of inheritance and dynamic polymorphism.

3.A program to illustrate the usage of abstract class.

4.A program to illustrate multithreading.

5.A program to illustrate thread synchronization.

6.A program using StringTokenizer.

7.A program using Linked list class.

8.A program using TreeSet class.

9.A program using HashSet and Iterator classes.

10.A program using map classes.

11.A program using Enumeration and Comparator interfaces.

12.A program to illustrate the usage of filter and Buffered I/O streams.

13.A program to illustrate the usage of Serialization.

14.An application involving GUI with different controls, menus and event handling.

15.A program to implement AWT/Swing.

With effect from Academic Year 2015-2016

CS 282

MICROPROCESSOR LAB

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessional	25 Marks

Course objectives:

- Write simple assembly language program using 8085 instruction set
- Write programs to interface various peripheral devices with 8085.
- Design simple applications using 8051 Micro controller.

PART A: 8085 PROGRAMMING USING MICROPROCESSOR TRAINER KIT

1.Simple programming examples using 8085 instruction set. To understand the use of various instructions and addressing modes.

2.Interfacing and programming of 8255. (E.g. traffic light controller).

3.Interfacing and programming of 8254.

4.Interfacing and programming of 8279.

PART B: 8051 PROGRAMMING

1.Simple Programming examples using 8051 Micro Controller.

2.A/D and D/A converter interface.

3.Stepper motor interface.

4.Display