



SEMESTER I

Paper Name: Mathematics for Computer Science

Code:

Contact: 3L+1T

Credits:

Allotted Hrs: 36

UNIT I: Modern algebra

Binary Operation; Addition Modulo n ; Multiplication modulo n ; semi group; properties of groups; subgroup.

UNIT II: Trigonometry

Radian or circular Measure; Trigonometric Functions; Trigonometric ratios of angle θ when θ is acute; trigonometric ratios of certain standard angles; allied angles; compound angles; multiple and sub- multiple angles.

UNIT III: Limits and Continuity

The real number system; The concept of limit; concept of continuity.

UNIT IV: Differentiation

Differentiation of powers of x ; Differentiation of e^x and $\log x$; differentiation of trigonometric functions; Rules for finding derivatives; Different types of differentiation; logarithmic differentiation; differentiation by substitution; differentiation of implicit functions; differentiation from parametric equation. Differentiation from first principles.

UNIT V: Integrations

Integration of standard Functions; rules of Integration; More formulas in integration; Definite integrals.

UNIT VI: Differential equations

First order differential equations; practical approach to Differential equations; first order and first degree differential equations; homogeneous equations. Linear equations; Bernoulli's equation; Exact Differential Equations.

UNIT VII: Complex Numbers

Complex Numbers; Conjugate of a complex number; modulus of a complex Number; geometrical representation of complex number; De Moivre's theorem; nthroots of a complex number.

UNIT VIII: Matrices and Determinants

Definition of a matrix; Operations on matrices; Square Matrix and its inverse;



determinants; properties of determinants; the inverse of a matrix; solution of equations using matrices and determinants; solving equations using determinants.

UNIT IX: Infinite Series

Convergence and divergence; series of positive terms; binomial series; exponential series; logarithmic series.

UNIT X: Probability

Concept of probability; sample space and events; three approaches of probability; kolmogorov's axiomatic approach to probability; conditional probability and independence of events; bay's theorem.

UNIT XI: Basics Statistics

Measures of central Tendency; Standard Deviation; Discrete series. Methods; Deviation taken from assumed mean; continuous series; combined standard deviation; coefficient of variation; variance.

Reference Books:

1. Banerjee A., De S.K. and Sen S.: Mathematical Probability, U.N. Dhur& Sons.
2. Gupta S. C and Kapoor V K: Fundamentals of Mathematical Statistics, Sultan Chand & Sons.



Paper Name: Programming for Problem Solving

Code:

Contact: 3L

Credits:

Allotted Hrs: 36

Unit I:

Introduction to Computers: Computer Systems, Computing Environments, Computer Languages, Creating and Running Programs, Software Development, Flow charts. Number Systems: Binary, Octal, Decimal, Hexadecimal Introduction to C Language - Background, C Programs, Identifiers, Data Types, Variables, Constants, Input / Output Statements Arithmetic Operators and Expressions: Evaluating Expressions, Precedence and Associativity of Operators, Type Conversions.

Unit II:

Conditional Control Statements: Bitwise Operators, Relational and Logical Operators, If, If- Else, Switch-Statement and Examples. Loop Control Statements: For, While, DoWhile and Examples. Continue, Break and Goto statements Functions: Function Basics, User-defined Functions, Inter Function Communication, Standard Functions, Methods of Parameter Passing. Recursion- Recursive Functions.. Storage Classes: Auto, Register, Static, Extern, Scope Rules, and Type Qualifiers.

Unit III:

Preprocessors: Preprocessor Commands Arrays - Concepts, Using Arrays in C, Inter-Function Communication, Array Applications, Two- Dimensional Arrays, Multidimensional Arrays, Linear and Binary Search, Selection and Bubble Sort.

Unit IV:

Pointers - Introduction, Pointers for Inter-Function Communication, Pointers to Pointers, Compatibility, Lvalue and Rvalue, Arrays and Pointers, Pointer Arithmetic and Arrays, Passing an Array to a Function, Memory Allocation Functions, Array of Pointers, Programming Applications, Pointers to void, Pointers to Functions, Command Line Arguments. Strings - Concepts, C Strings, String Input/Output Functions, Arrays of Strings, String Manipulation Functions.

Unit V:

Structures: Definition and Initialization of Structures, Accessing Structures, Nested Structures, Arrays of Structures, Structures and Functions, Pointers to Structures, Self Referential Structures, Unions, Type Definition (typedef), Enumerated Types. Input and Output: Introduction to Files, Modes of Files, Streams, Standard Library Input/Output Functions, Character Input/Output Functions.



Reference Books :

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
2. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill
3. Gary J. Bronson, A First Book of ANSI C, 4th Edition, ACM
4. Kenneth A. Reek, Pointers on C, Pearson
5. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

Introduction to Financial Technology

Code:

CONTAC

TS: 3L

CREDITS: 3

Unit I : Use of computers for managerial applications, Technology issues and data processing in organisations, Introduction to Information Systems, shift in Information system thinking, latest trends in Information Technology

Unit I I : Computer Based Information Systems- office automation systems. Decision making and MIS, transaction processing systems. Decision support system, Group Decision Support, Executive Information systems, DSS generator

Unit I I I : Introduction to: Artificial Intelligence Based Systems, End user computing, Distributed data processing. Deciding on IS architecture, IT leadership & IS strategic planning.

Unit I V : Introduction to: IS strategy and effects of IT on competition. Introduction to: ERP, re-engineering work processes for IT applications, Business Process Redesign Knowledge engineering and data warehouse.

Books:

1. Management Information System, O'Brien, TMH
2. Management Information System: A Concise Study, Kelkar, PHI 3. Decision support Systems, Janaki Raman, PHI
3. Business Information Systems, Munish Kumar, VIKAS 5. Business Application of Computers, M.M. Oka, EPH



E-commerce

CONTACTS: 3L

CREDITS: 3

Unit I Introduction to E-Commerce : E-commerce: The revolution is just beginning, Ecommerce : A Brief History, Understanding E-commerce: organizing Themes

Unit II E-commerce business models and concepts, The internet and World Wide Web: Ecommerce infrastructure

E-commerce Business Models, Major Business to Consumer (B2C) business models, Major Business to Business (B2B) business models, Business models in emerging E-commerce areas, How the Internet and the web change business: strategy, structure and process, The Internet: Technology Background, The Internet Today, Internet II- The Future Infrastructure, The World Wide Web, The Internet and the Web : Features .

Unit III Building an ecommerce web site, Security and payment

Building an E-commerce Web Site: A systematic Approach, The e-commerce security environment, Security threats in the e-commerce environment, Technology solution, Management policies, Business procedures, and public laws, Payment system, E-commerce payment system, Electronic billing presentment and payment

Unit IV E-commerce marketing concepts, Online retailing and services

Consumer online: The Internet Audience and Consumer Behaviour, Basic Marketing Concepts, Internet Marketing Technologies, B2C and B2B E-commerce marketing and business strategies, The Retail sector, Analyzing the viability of online firms, E-commerce in action: E-tailing Business Models, Common Themes in online retailing, The service sector: offline and online, Online financial services, Online Travel Services, Online career services

Unit V Social networks, auctions, and portals

Social networks and online communities, Online auctions, E-commerce portals

Books Reference:

1. Kenneth C. Laudon, E-Commerce : Business, Technology, Society, 4th Edition, Pearson
2. E-Commerce: Tulasi Ram Kandula, Himalaya Publishing House.
3. E-Commerce: An Indian Perspective: P.T. Joseph, S.J, PHI
4. Electronic Commerce, Framework Technologies & Applications: Bharat Bhasker, McGraw Hill
5. Introduction To E-Commerce: Jeffrey F Rayport, Bernard J. Jaworski: Tata McGraw Hill
6. Electronic Commerce, A Managers' Guide: Ravi Kalakota, Andrew B Whinston
7. E-Commerce & Computerized Accounting: Rajinder Singh, Er. Kaiser Rasheed, Kalyani
8. E-Commerce & Mobile Commerce Technologies: Pandey, Saurabh Shukla, S. Chand
9. E-Business 2.0, Roadmap For Success: Ravi Kalakota, Marcia Robinson, Pearson
10. Electronic Commerce: Pete Loshin / John Vacca, Firewall Media
11. E-Commerce, Strategy, Technologies And Applications : David Whiteley, Tata Mcgraw Hill
12. Digital Commerce and Its Applications (Student's Handbook): K Goyal, Kalyani Publication



Paper Name: English Communication

Code:

Contact: 3L

Credits:

Allotted Hrs: 36

Unit I: Grammar (5 lectures)

Correction of sentence, Vocabulary / word formation, Single word for a group of words, Fill in the blank, transformation of sentences, Structure of sentences – Active / Passive Voice – Direct / Indirect Narration

Unit II: (7 lectures)

Essay – Descriptive – Comparative – Argumentative – Thesis statement- Structure of opening / concluding paragraphs – Body of the essay

Unit III: (8 lectures)

Reading Comprehension – Global – Contextual – Inferential – Select passages from recommended text

Unit IV: (7 lectures)

Business Correspondence – Letter Writing – Formal. Drafting. Biodata- Resume'- Curriculum Vitae

Unit V: (8 lectures)

Report Writing – Structure , Types of report – Practice Writing

Unit VI: (7 lectures)

Communication / Public Speaking skills , Features of effective speech, verbal-nonverbal

Unit VII: (6 lectures)

Group discussion – principle – practice

Reference Books:

1. Mark MaCormack : “Communication”
2. John Metchell“ How to write reports”
3. S R Inthira& V Saraswathi“ Enrich your English – a) Communication skills b)

Academic

skills “ Publisher CIEFL & OUP

4. R.C. Sharma and K.Mohan , “Business Correspondence and Report Writing “ , Tata McGraw Hill , New Delhi , 1994

5. L.Gartside , “Model Business Letters” , Pitman , London , 1992

6. Longman , “Longman Dictionary of Contemporary English” (or ‘Oxford Advanced Learner’s Dictionary of Current English’ , OUP , 1998.

7. Maxwell Nurnberg and RosenblumMorris , “All About Words” , General Book Depot, New Delhi , 1995

8. A Text Book for English foe Engineers & Technologists



Programming for Problem Solving Lab:

Contacts:

Credits: 2

Exercises should include but not limited to:

1. DOS System commands and Editors (Preliminaries)
2. UNIX system commands and vi (Preliminaries)
3. Simple Programs: simple and compound interest. To check whether a given number is a palindrome or not, evaluate summation series, factorial of a number , generate Pascal's triangle, find roots of a quadratic equation
4. Programs to demonstrate control structure : text processing, use of break and continue, etc.
5. Programs involving functions and recursion
6. Programs involving the use of arrays with subscripts and pointers
7. Programs using structures and files.

Language laboratory :

contacts:

Credit: 2

- a) Honing 'Listening Skill' and its sub skills through Language Lab Audio device; 3P
- b) Honing 'Speaking Skill' and its sub skills; 2P
- c) Helping them master Linguistic/Paralinguistic features (Pronunciation/Phonetics/Voice modulation/ Stress/ Intonation/ Pitch &Accent) of connected speech; 2P 17
- j) Honing 'Conversation Skill' using Language Lab Audio –Visual input; Conversational Practice Sessions (Face to Face / via Telephone , Mobile phone & Role Play Mode); 2P
- k) Introducing 'Group Discussion' through audio –Visual input and acquainting them with key strategies for success; 2P
- f) G D Practice Sessions for helping them internalize basic Principles (turn- taking, creative intervention, by using correct body language, courtesies & other soft skills) of GD; 4P
- g) Honing 'Reading Skills' and its sub skills using Visual / Graphics/Diagrams /Chart Display/Technical/Non Technical Passages; Learning Global / Contextual / Inferential Comprehension; 2P
- h) Honing 'Writing Skill' and its sub skills by using Language Lab Audio –Visual input; Practice Sessions 2P

Total Practical Classes 17

Books :

Dr. D. Sudharani: Manual for English Language Laboratory Pearson Education (WB edition),2010 Board of Editors: Contemporary Communicative English for Technical Communication Pearson Longman, 2010.



CONTACTS: 3P

CREDITS: 3

E-Commerce Lab

Lab work: Using Microsoft Front Page Editor and HTML in Designing a Static Webpage/Website.

SEMESTER II

Paper Name: Discrete Mathematics

Code:

Contact: 3L+1T

Credits:

Allotted Hrs: 36

Unit I: Set Theory:

Definition of Sets, Venn Diagrams, complements, Cartesian products, power sets, counting principle, cardinality and countability (Countable and Uncountable sets), proofs of some general identities on sets, pigeonhole principle. Relation: Definition, types of relation, composition of relations, domain and range of a relation, pictorial representation of relation, properties of relation, partial ordering relation. Function: Definition and types of function, composition of functions, recursively defined functions.

Unit II: Propositional logic:

Proposition logic, basic logic, logical connectives, truth tables, tautologies, contradictions, normal forms (conjunctive and disjunctive), modus ponens and modus tollens, validity, predicate logic, universal and existential quantification. Notion of proof: proof by implication, converse, inverse, contrapositive, negation, and contradiction, direct proof, proof by using truth table, proof by counter example.

Unit III: Combinatorics

Mathematical induction, recursive mathematical definitions, basics of counting, permutations, combinations, inclusion-exclusion, recurrence relations (nth order recurrence relation with constant coefficients, Homogeneous recurrence relations, Inhomogeneous recurrence relation), generating function (closed form expression, properties of G.F., solution of recurrence relation using G.F, solution of combinatorial problem using G.F.)

Unit IV: Algebraic Structure:

Binary composition and its properties definition of algebraic structure; Groyas Semi group, Monoid Groups, Abelian Group, properties of groups, Permutation Groups, Sub



Group, Cyclic Group, Rings and Fields (definition and standard results).

Unit V: Graphs

Graph terminology, types of graph connected graphs, components of graph, Euler graph, Hamiltonian path and circuits, Graph coloring, Chromatic number. Tree: Definition, types of tree (rooted, binary), properties of trees, binary search tree, tree traversing (preorder, inorder, post order). Finite Automata: Basic concepts of Automation theory, Deterministic finite Automaton (DFA), transition function, transition table, Non Deterministic Finite Automata (NFA), Mealy and Moore Machine, Minimization of finite Automaton.

Reference Books:

1. Kenneth H. Rosen, "Discrete Mathematics and its Applications", Mc.Graw Hill, 2002.
2. J.P.Tremblay & R. Manohar, "Discrete Mathematical Structure with Applications to PDF created with pdfFactory Pro trial version www.pdffactory.com Computer Science" Mc.Graw Hill, 1975.
3. V. Krishnamurthy, "Combinatorics: Theory and Applications", East-West Press.
4. Seymour Lipschutz, M.Lipson, "Discrete Mathematics" Tata McGraw Hill, 2005.
5. Kolman, Busby Ross, "Discrete Mathematical Structures", Prentice Hall International.



BCT203: OOPS and C++

Contact: 3hours

Credit: 3

Unit 1 : Introduction to Object Oriented Programming Basic concept of OOP, Comparison of Procedural Programming and OOP, Benefits of OOP, C++ compilation, Abstraction, Encapsulation, Inheritance, Polymorphism, Difference between C and C++.

Unit 2 : Elements of C++ Language Tokens and identifiers: Character set and symbols, Keywords, C++ identifiers; Variables and Constants: Integer, character and symbolic constants; Dynamic initialization of variables, Reference variables, Basic data types in C++, Streams in C++.

Unit 3 : Operators and Manipulators Operators, Types of operators in C++, Precedence and associativity of operators, Manipulators.

Unit 4 : Decision and Control Structures if statement, if-else statement, switch statement, Loop: while, do-while, for; Jump statements: break, continue, go to.

Unit 5 : Array, Pointer and Structure Arrays, pointers, structures, unions;

Unit 6 : Functions main() function, components of function: prototype, function call, definition, parameter; passing arguments; types of function, inline function, function overloading.

Unit 7: Introduction to Classes and Objects Classes in C++, class declaration, declaring objects, Defining Member functions, Inline member function, Array of objects, Objects as function argument, Static data member and member function, Friend function and friend class.

Unit 8: Constructors and Destructors, Constructors, Instantiation of objects, Default constructor, Parameterized constructor, Copy constructor and its use, Destructors, Constraints on constructors and destructors, Dynamic initialization of objects.

Unit 9: Operator Overloading Overloading unary operators: Operator keyword, arguments and return value; overloading unary and binary operators: arithmetic operators, manipulation of strings using operators; Type conversions.

Unit 10: Inheritance Derived class and base class: Defining a derived class, Accessing the base class member, Inheritance: multilevel, multiple, hierarchical, hybrid; Virtual base class, Abstract class

Unit 11: Virtual Functions and Polymorphism Virtual functions, pure virtual functions;

Polymorphism, Categorization of polymorphism techniques: Compile time polymorphism, Run time polymorphism

Unit 12: File Handling File classes, Opening and Closing a file, File modes, Manipulation of file pointers, Functions for I/O operations.

Text books:

1. E.Balagurusamy: Object oriented programming with C++
2. K.R.Venugopal: Mastering C++
3. BjarneStroustrup: The C++ programming language.

Ethereum

CONTACTS: 3L

CREDITS: 3

Basics: Ethereum network, EVM , Transaction fee, Smart Contracts, Nodes, Transactions, Gas and Fees, Ethereum Structure



MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL
NH-12 (Old NH-34), Simhat, Haringhata, Nadia -741249
Department of Information Technology

Traditional and Decentralized Applications: Decentralized Application Development, Similarities and Differences, Development Environment Setup, Key Developer Tools

Smart Contracts: Introductory Smart Contracts, Inter-Contract Execution, Inheritance, Libraries and the Ethereum Package Manager, Smart Contract System Design

Interaction with End Users: Introduction to Web3, Building Truffle for the Web, Integrating with React, Integrating with Metamask + Infura, Design and issue Cryptocurrency, Mining, DApps, DAO

Paper Name: Data Structure and Algorithm with Python

Code:

Contact: 3L+1T

Credits:

Allotted Hrs: 36

Unit I: Introduction to Data Structure:

Abstract Data Type.

Unit II: Arrays

1D, 2D and Multi-dimensional Arrays, Sparse Matrices. Polynomial representation (Polynomial Representation as Application).

Unit III: Linked Lists

Singly, Doubly and Circular Lists; Normal and Circular representation of Self Organizing Lists; Skip Lists, Polynomial representation (Polynomial Representation as Application).



Unit IV: Stacks

Implementing single / multiple stack/s in an Array; Prefix, Infix and Postfix expressions, Utility and conversion of these expressions from one to another; Applications of stack; Limitations of Array representation of stack

Unit V: Queues

Array and Linked representation of Queue, Circular Queue, De-queue, Priority Queues

Unit VI: Recursion

Developing Recursive Definition of Simple Problems and their implementation; Advantages and Limitations of Recursion; Understanding what goes behind Recursion (Internal Stack Implementation)

Unit VII: Trees

Introduction to Tree as a data structure; Binary Trees (Insertion, Deletion, Recursive and Iterative Traversals of Binary Search Trees); Threaded Binary Trees (Insertion, Deletion, Traversals); Height-Balanced Trees (Various operations on AVL Trees).

Unit VIII: Searching and Sorting

Linear Search, Binary Search, Comparison of Linear and Binary Search, Selection Sort, Insertion Sort, Merge Sort, Quick sort, Shell Sort, Comparison of Sorting Techniques

Unit IX: Hashing

Introduction to Hashing, Deleting from Hash Table, Efficiency of Rehash Methods, Hash Table Reordering, Resolving collision by Open Addressing, Coalesced Hashing, Separate Chaining, Dynamic and Extendible Hashing, Choosing a Hash Function, Perfect Hashing Function.

Reference Books:

1. Fundamentals of Data Structures in C, Ellis Horowitz, SartajSahni, Susan AndersonFreed, Silicon Pr.
2. Data Structures: A Pseudocode Approach with C, Richard F. Gilberg and Behrouz A. Forouzan, Cengage Learning
3. Data Structures In C, Noel Kalicharan, CreateSpace Independent Publishing Platform.
4. Adam Drozdek, Data Structures and algorithm in C, Cengage Learning.
5. The C Programming Language, Brian W. Kernighan and Dennis Ritchie, Prentice Hall.
6. SartajSahni, Data Structures, Algorithms and applications in C++, Second Edition, Universities Press, 2011.
7. Aaron M. Tanenbaum, Moshe J. Augenstein, YedidyahLangsam, Data Structures Using C and C++, 2nd ed., PHI, 2009.



Paper Name: Principles of Electrical & Electronics Engineering

Code:

Contact: 3L+1T

Credits:

Allotted Hrs: 36

Unit I: ELECTRICAL CIRCUITS & MEASUREMENTS

Fundamental laws of electric circuits, Steady State Solution of DC Circuits – Introduction to AC Circuits -Sinusoidal steady state analysis, Power and Power factor - Single Phase and Three Phase Balanced Circuits. Classification of instruments - Operating Principles of indicating Instruments

Unit II: ELECTRICAL MACHINES

Construction, Principle of Operation, Basic Equations and Applications of DC Generators, DC Motors, Single Phase Transformer, single phase induction Motor.

Unit III: SEMICONDUCTOR DEVICES AND APPLICATIONS

Introduction - Characteristics of PN Junction Diode – Zener Effect - Zener Diode and its Characteristics - Half wave and Full wave Rectifiers - Voltage Regulation. Bipolar Junction Transistor - CB, CE, CC Configurations and Characteristics - Elementary Treatment of Small Signal Amplifier.

Unit IV: DIGITAL ELECTRONICS

Binary Number System – Boolean algebra theorems, Digital circuits - Introduction to sequential Circuits, Flip-Flops - Registers and Counters – A/D and D/A Conversion - digital processing architecture.

Unit V: FUNDAMENTALS OF COMMUNICATION ENGINEERING

Introduction - Elements of Communication Systems, Modulation and Demodulation: Principles of Amplitude and Frequency Modulations. Digital Communication - Communication Systems: Radio, Antenna, TV, Fax, ISDN, Microwave, Satellite and Optical Fibre (Block Diagram Approach only).

Reference Books:

1. DP Kothari and 1.J Nagarath, "Electrical Machines "Basic Electrical and Electronics Engineering", McGraw Hill Education(India) Private Limited, Third Reprint,2016
2. S.K. Bhattacharya "Basic Electrical and Electronics Engineering", Pearson India, 2011



MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL
NH-12 (Old NH-34), Simhat, Haringhata, Nadia -741249
Department of Information Technology

3. Sedha R.S., "Applied Electronics", S. Chand & Co., 2006
4. A.E.Fitzgerald, David E Higginbotham and Arvin Grabel, "Basic Electrical Engineering",
McGraw Hill Education(India) Private Limited, 2009
5. Del Toro, "Electrical Engineering Fundamentals", Pearson Education, New Delhi, 2007
6. "Foundations of Electrical Engineering", Oxford University Press, 2013
7. MahmoodNahvi and Joseph A. Edminister, "Electric Circuits", Schaum' Outline Series,
McGraw Hill, 2002.
8. Mehta V K, "Principles of Electronics", S.Chand& Company Ltd, 1994.

Paper Name: IoT sensors device and components

Code:

Contact: 3L+1T

Credits:

Allotted Hrs: 36

Unit I: INTRODUCTION

Internet of Things Promises–Definition– Scope–Sensors for IoT Applications–Structure of IoT– IoT Map Device

Unit II: SEVEN GENERATIONS OF IOT SENSORS TO APPEAR

Industrial sensors – Description & Characteristics–First Generation – Description & Characteristics–Advanced Generation – Description & Characteristics–Integrated IoT Sensors – Description & Characteristics– Polytronics Systems – Description & Characteristics–Sensors' Swarm – Description & Characteristics–Printed Electronics – Description & Characteristics–IoT Generation Roadmap

Unit III: TECHNOLOGICAL ANALYSIS

Wireless Sensor Structure–Energy Storage Unit–Power Management Unit–RF Unit–Sensing Unit

Unit IV: IOT DEVELOPMENT EXAMPLES

ACOEM Eagle – EnOcean Push Button – NEST Sensor – Ninja Blocks - Focus on Wearable Electronics

Unit V: PREPARING IOT PROJECTS

Creating the sensor project - Preparing Raspberry Pi - Clayster libraries - Hardware-Interacting with the hardware - Interfacing the hardware- Internal representation of sensor values - Persisting data - External representation of sensor values - Exporting sensor data - Creating the actuator project Hardware - Interfacing the hardware -



MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL
NH-12 (Old NH-34), Simhat, Haringhata, Nadia -741249
Department of Information Technology

Creating a controller - Representing sensor values - Parsing sensor data - Calculating control states - Creating a camera - Hardware -Accessing the serial port on Raspberry Pi - Interfacing the hardware - Creating persistent default settings - Adding configurable properties - Persisting the settings - Working with the current settings - Initializing the camera

Reference Books:

1. Dr. Guillaume Girardin , Antoine Bonnabel, Dr. Eric Mounier, 'Technologies & Sensors for the Internet of Things Businesses & Market Trends 2014 - 2024',Yole Développement Copyrights ,2014
2. Peter Waher, 'Learning Internet of Things', Packt Publishing, 2015
3. Editors OvidiuVermesan Peter Friess,'Internet of Things – From Research and Innovation to Market
4. Deployment', River Publishers, 2014 5. N. Ida, Sensors, Actuators and Their Interfaces, Scitech Publishers, 2014.



Paper Name: Environmental Science

Code:

Contact: 1L

Credits:

Allotted Hrs: 36

Unit I: General

Basic ideas of environment, basic concepts, man, society & environment, their interrelationship. 1L

Mathematics of population growth and associated problems, Importance of population study in environmental engineering, definition of resource, types of resource, renewable, non-renewable, potentially renewable, effect of excessive use vis-à-vis population growth,

Sustainable Development. 2L

Materials balance: Steady state conservation system, steady state system with non conservative pollutants, step function. 1L

Environmental degradation: Natural environmental Hazards like Flood, earthquake, Landslide-causes, effects and control/management; Anthropogenic degradation like Acid rain-cause, effects and control. Nature and scope of Environmental Science and Engineering. 2L

Unit II: Ecology

Elements of ecology: System, open system, closed system, definition of ecology, species, population, community, definition of ecosystem- components types and function. 1L

Structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems, Mangrove ecosystem (special reference to Sundar

ban); Food chain [definition and one example of each food chain], Food web. 2L

Biogeochemical Cycle- definition, significance, flow chart of different cycles with only elementary reaction [Oxygen, carbon, Nitrogen, Phosphate, Sulphur]. 1L

Biodiversity- types, importance, Endemic species, Biodiversity Hot-spot, Threats to biodiversity, Conservation of biodiversity. 2L

Unit III: Air pollution and control

Atmospheric Composition: Troposphere, Stratosphere, Mesosphere, Thermosphere, Tropopause and Mesopause. Energy balance: Conductive and Convective heat transfer, radiation heat transfer, simple global temperature model [Earth as a black body, earth as albedo], Problems. Green house effects: Definition, impact of greenhouse gases on the global climate and consequently on sea water level, agriculture and marine food. Global warming and its consequence, Control of Global warming. Earth's heat budget. Lapse rate: Ambient lapse rate Adiabatic lapse rate, atmospheric stability, temperature inversion (radiation inversion). Atmospheric



dispersion: Maximum mixing depth, ventilation coefficient, effective stack height, smokestack plumes and Gaussian plume model. Definition of pollutants and contaminants, Primary and secondary pollutants: emission standard, criteria pollutant. Sources and effect of different air pollutants- Suspended particulate matter, oxides of carbon, oxides of nitrogen, oxides of sulphur, particulate, PAN. Smog, Photochemical smog and London smog. Depletion Ozone layer: CFC, destruction of ozone layer by CFC, impact of other green house gases, effect of ozone modification. Standards and control measures: Industrial, commercial and residential air quality standard, control measure (ESP. cyclone separator, bag house, catalytic converter, scrubber (ventury), Statement with brief reference).

Unit IV:Water Pollution and Control

Hydrosphere, Hydrological cycle and Natural water. Pollutants of water, their origin and effects: Oxygen demanding wastes, pathogens, nutrients, Salts, thermal application, heavy metals, pesticides, volatile organic compounds. River/Lake/ground water pollution: River: DO, 5 day BOD test, Seeded BOD test, BOD reaction rate constants, Effect of oxygen demanding wastes on river[deoxygenation, reaeration], COD, Oil, Greases, pH. Lake: Eutrophication [Definition, source and effect]. Ground water: Aquifers, hydraulic gradient, ground water flow (Definition only) Standard and control: Waste water standard [BOD, COD, Oil, Grease], Water Treatment system [coagulation and flocculation, sedimentation and filtration, disinfection, hardness and alkalinity, softening] Wastewater treatment system, primary and secondary treatments [Trickling filters, rotating biological contractor, Activated sludge, sludge treatment, oxidation ponds] tertiary treatment definition. Water pollution due to the toxic elements and their biochemical effects: Lead, Mercury, Cadmium, and Arsenic

Unit V:Land Pollution

Lithosphere; Internal structure of earth, rock and soil 1L Solid Waste: Municipal, industrial, commercial, agricultural, domestic, pathological and hazardous solid wastes; Recovery and disposal method- Open dumping, Land filling, incineration, composting, recycling. Solid waste management and control (hazardous and biomedical waste).

Unit VI: Noise Pollution

Definition of noise, effect of noise pollution, noise classification [Transport noise, occupational noise, neighbourhood noise] Definition of noise frequency, noise pressure, noise intensity, noise threshold limit value, equivalent noise level, 10 L (18hr Index), Ldn.Noise pollution control.

Unit VII:Environmental Management:

Environmental impact assessment, Environmental Audit, Environmental laws and protection act of India, Different international environmental treaty/ agreement/ protocol.

Reference Books

1. Masters, G. M., "Introduction to Environmental Engineering and Science", Prentice-Hall of India Pvt. Ltd., 1991.



2. De, A. K., "Environmental Chemistry", New Age International.

Basic Electrical and Electronics Engineering-I

Contacts:

Credits: 2

Basic Electrical Engineering Laboratory-I

List of Experiments: Sl. No Name of the Experiments

1. Characteristics of Fluorescent lamps
2. Characteristics of Tungsten and Carbon filament lamps
3. (a) Verification of Thevenin's theorem. (b) Verification of Norton's theorems.
4. Verification of Maximum power theorem.
5. Verification of Superposition theorem
6. Study of R-L-C Series circuit
7. Study of R-L-C parallel circuit

Basic Electronics Engineering Laboratory-I

There will be a couple of familiarization lectures before the practical classes are undertaken where basic concept of the instruments handled Eg: CRO, Multimeters etc will be given. Lectures on measurement techniques and error calculation will also have to be organized. 3 hours per week must be kept, initially for practical lectures, and later for tutorials.

List of Experiments:

Familiarisation with passive and active electronic components such as Resistors, Inductors, Capacitors, Diodes, Transistors (BJT) and electronic equipment like DC power supplies, multimeters etc. Familiarisation with measuring and testing equipment like CRO, Signal generators etc. Study of I-V characteristics of Junction diodes. Study of I-V characteristics of Zener diodes. Study of Half and Full wave rectifiers with Regulation and Ripple factors. Study of I-V characteristics of BJTs.

Data Structure with Python Lab

Contact: 3P

Credit: 2

Experiments should include but not limited to :



Implementation of array operations: Stacks and Queues: adding, deleting elements
Circular Queue: Adding & deleting elements Merging Problem : Evaluation of
expressions operations on Multiple stacks & queues : Implementation of linked lists:
inserting, deleting, inverting a linked list. Implementation of stacks & queues using linked
lists: Polynomial addition, Polynomial multiplication Sparse Matrices : Multiplication,
addition. Recursive and Nonrecursive traversal of Trees Threaded binary tree traversal.
AVL tree implementation Application of Trees. Application of sorting and searching
algorithms Hash tables implementation: searching, inserting and deleting, searching &
sorting techniques.

Computer Aided Design and Drawing

contacts:

Credit: 2

LIST OF EXPERIMENT:

1. INTRODUCTION to CAD
2. AutoCAD – BASICS
 - 2.1 Starting with AutoCAD
 - 2.2 Layout and sketching
 - 2.3 Drawing environment
 - 2.4 Elements of drawing
 - 2.4.1 Draw commands
 - 2.5 3D functions
3. 2D – FIGURES for practice USING AutoCAD
4. ISOMETRIC DRAWING for practice USING AutoCAD
5. 3-D SOLID FIGURES USING ACAD 2013
6. INTRODUCTION TO CREO 3.0
 - 6.1 Learning Different Operations like Threading, Sweep, Sweptblend.
 - 6.2 Modeling
 - 6.3 Assembling

Books :

1. Engineering graphics with Auto CAD- R.B. Choudary/Anuradha Publishes