RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Information Technology, IV-Semester

BE-3001 Energy, Environment, Ecology & Society

Unit –I

Energy- Sources of Energy : Renewable & Non Renewable, Fossil fuel, Biomass Geothermal, Hydrogen, Solar, Wind, hydal, nuclear sources.

Unit –II

Ecosystem – Segments of Environment: Atmosphere, hydrosphere, Lithosphere, biosphere. Cycles in Ecosystem – Water, Carbon, Nitrogen. Biodiversity: Threats and conservation,

Unit –III

Air Pollution & Sound Pollution -

Air Pollution: Air pollutants, classification, (Primary & secondary Pollutants) Adverse effects of pollutants. Causes of Air pollution chemical, photochemical, Green house effect, ozone layer depletion, acid Rain.

Sound Pollution: Causes, controlling measures, measurement of sound pollution (deciblage), Industrial and non – industrial.

Unit –IV

Water Pollution– Water Pollution: Pollutants in water, adverse effects. Treatment of Domestic & Industrial water effluent.

Soil Pollution – Soil Profile, Pollutants in soil, their adverse effects, controlling measures.

Unit –V

Society, Ethics & Human values– Impact of waste on society. Solid waste management Nuclear, Thermal, Plastic, medical, Agriculture, domestic and e-waste). Ethics and moral values, ethical situations, objectives of ethics and its study . Preliminary studies regarding Environmental Protection Acts , introduction to value education, self exploration, sanyam & swasthya.

References:

1. Harris, CE, Prichard MS, Rabin's MJ, "Engineering Ethics"; Cengage Pub.
2. Rana SVS ; "Essentials of Ecology and Environment"; PHI Pub.
3.Raynold, GW "Ethics in information Technology"; Cengage.
4. Svakumar; Energy Environment & Ethics in society; TMH
5. AK De "Environmental Chemistry"; New Age Int. Publ.
6 BK Sharma, "Environmental Chemistry" ; Goel Publ. House.
7. Bala Krishnamoorthy; "Environmental management"; PHI
8. Gerard Kiely, "Environmental Engineering" ; TMH
9. Miller GT JR; living in the Environment Thomson/cengage
10. Cunninghan WP and MA; principles of Environment Sc; TMH

11. Pandey, S.N. & Mishra, S.P. Environment & Ecology, 2011, Ane Books , Pvt. Ltd, New Delhi
12. Joseph, B. Environmental Studies, 2009 Tata Mcgraw Hill, Edu India Ltd. New Delhi.
13. Gour R.R, Sangal, R &Bagaria, G.P. , Excel Books, A-45, Naraina Phase-I New Delhi.-110028

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Information Technology, IV-Semester

IT-4002 Data Base Management System

Course Objectives:

The main objectives of the course are

1. To understand fundamental knowledge of file system, database concepts and use of relational database.
2. To study of different data model and conceptual design using ER diagram.
3. Students can use SQL operations to manipulate the database and learn how to design and create a good database using functional dependencies and normalization.
4. The course provides an overview of transaction management, concurrency control, distributed database and Big Data.

Basic Concepts: Introduction to DBMS, File system vs DBMS, Advantages of database systems, Database System architecture, Data models, Schemas and instances, Data independence, Functions of DBA and designer, Entities and attributes, Entity types, Key attributes, Relationships, Defining the E-R diagram of database.

Relational Model: Structure of relational databases, Domains, Relations, Relational algebra – fundamental operators and syntax, relational algebra queries, Entity-Relationship model :Basic concepts, Design process, constraints, Keys, Design issues, E-R diagrams, weak entity sets, extended E-R features –generalization, specialization and aggregation

SQL: Data definition in SQL, update statements and views in SQL: Data storage and definitions, Data retrieval queries and update statements, Query Processing & Query Optimization: Overview, measures of query cost, selection operation, sorting, join, evaluation of expressions, transformation of relational expressions, estimating statistics of expression results, evaluation plans. Case Study of ORACLE and DB2.

Relational Database design: Functional Dependency –definition, trivial and non-trivial FD, closure of FD set, closure of attributes, irreducible set of FD, Normalization –1NF, 2NF, 3NF, Decomposition using FD-dependency preservation, lossless join, BCNF, Multi-valued dependency, 4NF, Join dependency and 5NF

Introduction of transaction, transaction processing and recovery, Concurrency control: Lock management, specialized locking techniques, concurrency control without locking, Protection and Security Introduction to: Distributed databases, Basic concepts of object oriented data base system.

Course Outcomes:

After successful completion of this course, the students would be able to:

1. Compare file system and DBMS and explain how DBMS is better than traditional File Processing Systems.
2. Analyze the physical and logical database designs, database modeling, relational, hierarchical, and network models

3. Analyze and renovate an information model into a relational database schema and to use a DDL, DML and DCL utilities to implement the schema using a DBMS.
4. Formulate data retrieval queries in SQL and Relational Algebra.
5. Demonstrate an understanding of functional dependencies, normalization theory and apply such knowledge to the design of a database.
6. Demonstrate and explain terms like Transaction Processing, Concurrency Control, distributed database and big data.

Reference Books:

1. Korth, Silbertz, Sudarshan, "Database Concepts", McGraw Hill.
2. Elmasri, Navathe, "Fundamentals of Database Systems", Pearson.
3. Ivan Bayross, "SQL, PL/SQL the Programming Language of Oracle", BPB publications.
4. S. Sharma, J. Agrawal, S. Agrawal, "Advanced Database Management System", Dreamtech Press.
5. Leon & Leon, "Fundamental of Data Base Management System", TMH

List of Experiments:

1. To perform various SQL Commands of DDL, DML, DCL.
2. Write SQL Commands such as Insertion, deletion and updation for any schema.
3. To execute Nested Queries, Join Queries, order-by, having clause and string operation.
4. To perform set operators like Union, Intersect, Minus on a set of tables.
5. To execute various commands for GROUP functions (avg, count, max, min, Sum).
6. Write a PL/SQL block for transaction application using Triggers.
7. Write a DBMS program to prepare report for an application using function.
8. Designing of various Input screens/Forms.
9. Create reports using database connectivity of Front end with back end.
10. Create database Design with normalization and implementing in any application.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Information Technology, IV-Semester

IT-4003 Operating System

Course Objectives:
This course provides a comprehensive introduction to understand the fundamental principles, techniques and approaches related to CPU, memory and files which requires the complete knowledge of operating systems. The course will highlight the various functionality of CPU scheduling, memory management, disk management and security of operating system.

Software, type of software, introduction to Operating Systems, function, services, types of operating systems, kernel, system call, process concept, process states, process control block, type of scheduler, context switching, threads, type of threads, multithreading model.

Process management, concepts of CPU scheduling, scheduling criteria, scheduling algorithms, algorithm evaluation, multiple processors scheduling, cooperating process, Interprocess communication, process synchronization, critical section problem, semaphores, classical problems of synchronization.

Deadlock, necessary conditions, resource allocation graph, deadlock prevention, deadlock avoidance, deadlock detection, deadlock recovery, introduction to memory management, address binding, logical and physical addressing, MMU, contiguous memory allocation, memory management techniques, single partition, multi-partition, best fit, worst fit, first fit.

Paging, paging issues, TLB, page fault, segmentation, segmentation with paging, effective access time, concepts of virtual memory, demand paging, demand segmentation, page replacement algorithms, allocation of frames, thrashing, security in operating system, security techniques.

File system, file and directory concepts, attributes, operation, file type, directory structure, LINUX file system, FAT, I-node, file access methods, allocation methods, free space managements, disk management, disk access time, disk scheduling algorithm.

Course Outcomes:
On the completion of this course students will be able to understand:
1. The services and functions of operating systems.
2. Design issues associated with operating systems.
3. Various process management concepts including scheduling, synchronization, deadlocks.
4. The concept of multithreading, memory management, disk management and file system.
5. Protection and security mechanisms.
6. Various types of operating systems including Linux.

Reference Books:

1. Silberschatz,"Operating system", Willey Pub.
2. S.Haldar and Alex A. Arvind " Operating Systems" 2nd Edition Pearson.
3. D. M. Dhamdhere, "Operating System- A concept- Based Approach", TMH.
4. Pabitra Pal Choudhury, "Operating System-Principle and Design", PHI Learning.

List of Experiment

1. Program to implement FCFS CPU scheduling algorithm.
2. Program to implement SJF CPU scheduling algorithm.
3. Program to implement Priority CPU Scheduling algorithm.
4. Program to implement Round Robin CPU scheduling algorithm.
5. Program to implement classical inter process communication problem (producer consumer).
6. Program to implement classical inter process communication problem (Reader Writers).
7. Program to implement classical inter process communication problem (Dining Philosophers).
8. Program to implement FIFO page replacement algorithm.
9. Program to implement LRU page replacement algorithm
10. Program to implement LFU and optimal page replacement.

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Credit Based Grading System

Information Technology, IV-Semester

IT-4004 Communication Systems

Course Objectives:
The study of communication systems starts with the concept of analog communication. In this course time and frequency representation of information is given. The objective of this course is to be familiar with the basic building blocks of communication systems such as modulator and demodulator. Different types of analog modulation techniques are given in this course.

Signals and Systems: Block diagram of a communication system, signal-definition, types of signals continuous, discrete, deterministic, non-deterministic, periodic, non-periodic, energy, power, analog and digital signals. Electromagnetic Spectra, Standard signals- DC, sinusoidal, unit step, ramp, signum, rectangular pulse, impulse(delta) signal. System definition, classification of systems, linear, nonlinear, time variant, time invariant, causal, non causal, stable and unstable systems. Transmission media-Guided and unguided media, twisted pair, Unshielded twisted pair and Shielded twisted pair, coaxial cable and fiber optic cable, radio waves, microwaves and infrared transmission.

Fourier transforms: Time domain and frequency domain representation of signal, Fourier Transform and its properties, conditions for existence, Transform of Gate, unit step, constant, impulse, sine and cosine wave. Shifting property of delta function, convolution, time and frequency convolution theorems.

Amplitude modulation: Modulation, need of modulation, types of modulation techniques, amplitude modulation (DSB-FC), modulation index, frequency spectrum of AM wave, linear and over modulation, power relation in AM, transmission efficiency, modulation by a complex signal, bandwidth of AM, AM modulators, square law and switching modulator, advantages and disadvantages of AM.

Demodulation of AM: Suppressed carrier amplitude modulation systems, DSB-SC, SSB-SC, VSB-SC systems, comparison of various amplitude modulation systems. Demodulation of AM, square law and envelope detector, synchronous detection of AM, Low and high power AM transmitters, AM receivers, TRF and superheterodyne receivers, sensitivity, selectivity and fidelity of receivers.

Angle modulation: Introduction and types of angle modulation, frequency modulation, frequency deviation, modulation index, deviation ratio, bandwidth requirement of FM wave, types of FM. Phase modulation, difference between FM and PM, Direct and indirect method of FM generation, FM demodulators- slope detector, Foster seeley discriminator, ratio detector. Introduction to pulse modulation systems, PAM, PPM, PWM systems, frequency and time division multiplexing.

Course Outcomes:

At the end of this course students will be able to understand the communication of information over the communication channel. Students will understand how information signal of low frequency can be transmitted with the help of modulation techniques over a long distance. Students will be able to differentiate different modulation techniques such as AM, SSB, DSB and FM.

Reference Books:

1. Singh & Sapre, "Communication Systems", TMH.
2. W. Tomasi "Electronic Communications Systems", Pearson Education Pvt. Ltd.
3. Taub & shilling, "Communication Systems", TMH.
4. Abhay Gandhi, "Analog and Digital Communication", CENGAGE Learning.

List of Experiments:

1. AM Modulation and Demodulation (Envelope Detector)
2. Frequency modulation using reactance modulator.
3. Frequency modulation using varactor modulator.
4. Pulse Amplitude Modulation and Demodulation
5. Pre-emphasis and De-emphasis
6. Analog Multiplexing.
7. Amplitude Modulation using Pspice
8. Receiver characteristics (selectivity, sensitivity, fidelity).
9. Operation of foster-seeley loop detector.
10. Operation of ratio detector.

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Credit Based Grading System

Information Technology, IV-Semester

IT-4005 Computer Architecture

Course Objectives

The objective of course is to understand the basic structure and operation of computer system. Students will be able to know the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division. To study the different ways of communicating with I/O devices and standard I/O interfaces, hierarchical memory system including cache memories and virtual memory, concept of pipeline.

Computer architecture and organization, computer generations, von Neumann model, CPU organization, CPU organization, Register organization, Various CPU register, Register Transfer, Bus and Memory Transfers, Arithmetic, Logic and Shift micro-operations, Arithmetic logic shift unit.

The arithmetic and logic unit, Fixed-Point representation: integer representation, sign-magnitude, 1's and 2's complement and range, Integer arithmetic: negation, addition and subtraction, multiplication, division, Floating-Point representation, Floating-Point arithmetic, Hardwired micro-programmed control unit, Control memory, Micro-program sequence.

Central Progressing Unit (CPU), Stack Organization, Memory Stack, Reverse Polish Notation. Instruction Formats, Zero, One, Two, Three- Address Instructions, RISC Instructions and CISC Characteristics, Addressing Modes, Modes of Transfer, Priority Interrupt, Daisy Chaining, DMA, Input-Output Processor (IOP).

Computer memory system, Memory hierarchy, main memory: RAM, ROM chip, auxiliary and associative memory, Cache memory: associative mapping, direct mapping, set-associative mapping, write policy, cache performance, Virtual memory: address space, memory space, address mapping, paging and segmentation, TLB, page fault, effective access time, replacement algorithm.

Parallel Processing, Pipelining General Consideration, Arithmetic Pipeline, and Instruction Pipeline, Vector Operations, Matrix Multiplication, and Memory Interleaving, Multiprocessors, Characteristics of Multiprocessors.

Course Outcomes

On the completion of this course students will be able to understand:

1. Basic structure of computer system, arithmetic operations,
2. The organization of the Control unit, Memory unit, I/O unit.
3. The concept of memory management, interleaving and mapping.
4. The concept of DMA and pipeline.

Reference Books:-

1. M. Morris Mano, “Computer System Architecture”, Pearson.
2. Dr. M. Usha, T.S. Srikanth, “Computer System Architecture and Organization”, Willey India.
3. William Stallings, ”Computer Organization and Architecture”, Pearson.
4. V. Rajaraman, T. Radhakrishnan, “Computer Organization and Architecture”, PHI.

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Credit Based Grading System

Information Technology, IV-Semester

IT-4006 Computer Programming-II (Dot Net Technology)

Introduction .NET framework, features of .Net framework, architecture and component of .Net, elements of .Net.

Basic Features Of C# Fundamentals, Classes and Objects, Inheritance and Polymorphism, Operator Overloading, Structures. **Advanced Features Of C#** Interfaces, Arrays, Indexers and Collections; Strings and Regular Expressions, Handling Exceptions, Delegates and Events.

Installing ASP.NET framework, overview of the ASP .net framework, overview of CLR, class library, overview of ASP.net control, understanding HTML controls, study of standard controls, validations controls, rich controls. **Windows Forms:** All about windows form, MDI form, creating windows applications, adding controls to forms, handling Events, and using various Tolls

Understanding and handling controls events, **ADO.NET-** Component object model, ODBC, OLEDB, and SQL connected mode, disconnected mode, dataset, data-reader **Data base controls:** Overview of data access data control, using grid view controls, using details view and frame view controls, ado .net data readers, SQL data source control, object data source control, site map data source.

XML:
Introducing XML, Structure, and syntax of XML, document type definition (DTD), XML Schema, Document object model, Presenting and Handling XML. xml data source, using navigation controls, introduction of web parts, using java script, Web Services

References:

1. C# for Programmers by Harvey Deitel, Paul Deitel, Pearson Education
2. Balagurusamy; Programming in C#; TMH
3. **Web** Commerce **Technology** Handbook by Daniel **Minoli**, Emma **Minoli** , TMH
4. Web Programming by Chris Bates, Wiley
5. XML Bible by Elliotte Rusty Harold ,
6. ASP .Net Complete Reference by McDonald, TMH.
7. ADO .Net Complete Reference by Odey, TMH

List of Experiments/ program (Expandable):
1. Working with call backs and delegates in C#
2. Code access security with C#.
3. Creating a COM+ component with C#.
4. Creating a Windows Service with C#
5. Interacting with a Windows Service with C#
6. Using Reflection in C#
7. Sending Mail and SMTP Mail and C#
8. Perform String Manipulation with the String Builder and String Classes and C#:
9. Using the System .Net Web Client to Retrieve or Upload Data with C#
10. Reading and Writing XML Documents with the XML Text-Reader/-Writer Class and C#
11. Working with Page using ASP .Net.
12. Working with Forms using ASP .Net
13. Data Sources access through ADO.Net,
14. Working with Data readers , Transactions
15. Creating Web Application.