Subject: Operating Systems (Code: ITT250)	Year & Semester: B. Tech Information Technology Engineering 2nd Year & 4th Semester	Total Course Credit: 4		
		L	T	P
		3	1	0
Evaluation Policy	Mid-Term/Class Assessment (40 Marks)	Final-Term (60 Marks)		

Course Outcomes (COs):

At the end of the course students will be able to understand the:
CO1: Functions of operating System.
CO2: Operating System processes, management and coordination.
CO3: Interprocess Communication and process control.
CO4: Deadlocks detection, prevention and avoidance mechanisms.
CO5: Process Scheduling Algorithms.
CO6: Memory and I/O Device Management.

Syllabus:

UNIT I

INTRODUCTION:

Computer System Overview-Basic Elements, Instruction Execution, Operating system functions and structure, Interrupts, Memory Hierarchy, Cache Memory, Direct Memory Access, Multiprocessor and Multicore Organization. Operating system overview-objectives and functions, Evolution of Operating System, Distributed OS.

UNIT II

PROCESS MANAGEMENT AND COORDINATION:

Process concept, Process States, Process Description and Process Control, Interprocess Communication, Processes and Threads, Types of Threads, Multicore and Multithreading,

UNIT III

CONCURRENCY AND SCHEDULING:

Principles of Concurrency - Mutual Exclusion, Semaphores, Monitors, Readers/Writers problem. Deadlocks – prevention- avoidance – detection, Scheduling- Types of Scheduling – Scheduling algorithms.

UNIT IV

MEMORY MANAGEMENT:

Memory management requirements, Partitioning, Paging and Segmentation, Virtual memory - Hardware and control structures, operating system software, Linux memory management, Windows memory management. Virtual memory management.

UNIT V

INPUT/OUTPUT AND FILE SYSTEMS:

I/O management and disk scheduling – I/O devices, organization of I/O functions; OS design issues, I/O buffering, disk scheduling, Disk cache. File management – Organization, Directories, File sharing, and Record blocking, secondary storage management.

Text Books:

1. Silberschatz, Peter Galvin, Greg gagne "Operating System Principles".
2. William Stallings, "Operating Systems – internals and design principles", Prentice Hall.

Reference Books:

1. Andrew S. Tannenbaum & Albert S. Woodhull, "Operating System Design and Implementation", Prentice Hall.
2. Andrew S. Tannenbaum, "Modern Operating Systems", Prentice Hall.
3. Gary J.Nutt, "Operating Systems", Pearson/Addison Wesley.
4. Pramod Chandra P.Bhatt, "An Introduction to Operating Systems Concepts and Practice".

<table>
<tr><td rowspan="2">Subject: Database Management System (Code: ITT251)</td><td rowspan="2">Year & Semester: B. Tech Information Technology Engineering
2nd Year & 4th Semester</td><td colspan="3">Total Course Credit: 4</td></tr>
<tr><td>L</td><td>T</td><td>P</td></tr>
<tr><td>Evaluation Policy</td><td>Mid-Term/Class Assessment
(40 Marks)</td><td colspan="3">Final-Term
(60 Marks)</td></tr>
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Course Outcomes (COs):

CO1: Identify the basic concepts and various data model used in Database design.

CO2: Apply relational database theory and be able to describe relational algebra expression, tuple and domain relation expression for queries and SQL for implementing the queries.

CO3: Recognize and identify the use of normalization and functional dependency.

CO4: Apply and relate the concept of transaction, concurrency control and recovery in database.

CO5: Recognize / identify the purpose of query processing and optimization, indexing and hashing technique used in database design.

Syllabus:

UNIT I

INTRODUCTION:

Introduction to database management, data abstraction and system structure, Purpose of database system , uses of database approach, database applications, Views of data, Database languages, Database system – Concepts and architecture, Database users and administrator, database types.

UNIT II

DATA MODELLING:

Data models definition and types, Entity- Relationship Model (E-R Model), E-R diagrams, entity set, relationship sets, mapping, cardinalities. Introduction to relational databases, The relational model - Keys, Relational algebra – Domain relational calculus – Tuple relational calculus – Fundamental operations – Additional operations – SQL fundamentals, Views, Introduction to distributed databases and client/server databases.

UNIT III

DATABASE DESIGN:

Relational database design, Functional dependencies, Non-loss decomposition, First, Second, Third Normal Forms – Dependency Preservation – Boyce/Codd Normal Form, Multi-Valued Dependencies and higher normal Forms.

UNIT IV

TRANSACTIONS:

Transaction Concepts, Transaction Recovery, ACID Properties, System Recovery, Media recovery, Two phase commit, Save points, SQL facilities for recovery, Concurrency, Need for concurrency, Locking protocols - Two phase locking, Intent locking, Deadlock, Serializability, Recovery isolation levels, SQL facilities for concurrency**.**

UNIT V

IMPLEMENTATION TECHNIQUES:

Overview of physical storage media – Magnetic disks, Tertiary storage, File organization – Organization of records in files, Indexing and hashing, ordered indices, B trees index files, Static hashing, dynamic hashing, RAID organization and levels. Data warehouse and data mining- basic concepts and overview.

Text Books:

1. R. and Navathe, S.B., "Fundamentals of Database Systems", Pearson Education.

Reference Books:

1. Abraham, H. and Sudershan, S., "Database System Concepts",McGraw-Hill.Elmasri.
2. Ramakrishnan, R. and Gekhre, J., "Database Management Systems", McGraw-Hill.

Subject: Digital Electronics & Logic Design (Code: ECT251)	Year & Semester: B. Tech Information Technology Engineering 2nd Year & 4th Semester	Total Course Credit: 4		
		L	T	P
		3	1	0
Evaluation Policy	Mid-Term/Class Assessment (40 Marks)	Final-Term (60 Marks)		

Course Objectives

To study number systems, simplification and implementation of digital functions, design & analysis of various combinational and sequential circuits, memory organization & its types and also understand basics of VHDL programming.

Learning Outcomes

The student will be able to:

- Use number systems, binary addition and subtraction.
- Understand the different switching algebra theorems and apply them for logic functions.
- Use the Karnaugh map for reduction of logic functions.
- Design the combinational circuits.
- Design the sequential circuits.
- Derive the state-machine analysis or synthesis.

Course Outline / Content	
Unit	**Topics**
1.	**Binary Systems:** Number Systems (binary, octal, hexadecimal), conversion from one system to another, addition and subtraction using different number systems, complements and codes.
2.	**Boolean algebra & Logic Gates:** Basic Definitions, Theorems and Properties of Boolean Algebra, Boolean functions, Canonical and Standard Forms, Logic Operations & Gates
3.	**Simplification of Boolean Functions:** K-Map Method and Tabulation Method (2, 3, 4, 5 variables)
4.	**Combinational Logic:** Design Procedure, Logic gates and Arithmetic Circuits
5.	**Combinational Logic with MSI & LSI:** Adder, Subtractor, Encoders, Decoders, Multiplexers, De-multiplexers ,ROMs, PLA‘s
6.	**Sequential Logic:** Moore and Mealy Machine Design Procedure state machine as a sequential controller, Flip-Flops (FF), Triggering, Analysis, State Reduction &Assignment. FF Excitation Tables, ASM Charts, Design Procedure, Design of Counters, Design with State Equations.
7.	**Registers, Counters:** Shift Registers, Synchronous and Asynchronous Counters **Data Converters:** ADC, DAC and their types.
8.	**VHDL Programming:** Introduction, Code Structure, Data Types Operators &Attributes, Concurrent Code, Sequential Code, Signals & Variables, Basic Circuit Designs.

Text Books

1. Digital Logic & Computer Design by M Morris Mano
2. Digital Electronics by Gupta & Singhal
3. Circuit Design with VHDL, V A Pedroni.

References

1. Digital principles and applications by A. P. Malvino
2. Switching Circuits by Marcus

Subject: Communication System (Code: ECT253)	Year & Semester: B. Tech Information Technology Engineering 2nd Year & 4th Semester	Total Course Credit: 4		
		L	T	P
		3	1	0
Evaluation Policy	Mid-Term/Class Assessment (40 Marks)	Final-Term (60 Marks)		

Objectives:
The main objective of this course is to explain to undergraduate students basic fundamental principles of analog and digital communication systems.

Course Outcomes:
Upon successful completion of the course, the student should be able to:

CO1:
To understand the concept of spectral analysis and bandwidth of signals.

CO2:
To have knowledge of the various analog modulation schemes like AM, FM etc. Also to have knowledge of different building blocks of communication systems.

CO3:
To understand the effect of noise on the performance of different communication systems.

CO4:
To have fundamental knowledge about the basics of digital communications like Sampling, quantization, PCM coding Digital modulation techniques like ASK, OOK, FSK, PSK, QAM etc. Digital signal formatting (Line Coding Techniques)

Details of the syllabus:

S.No.	Particulars
1.	**Fourier Analysis of Signals:** Fourier series analysis of periodic signals, Fourier Transform of aperiodic signals, concepts of Amplitude spectrum, power spectrum, Power spectral density of signals, Bandwidth of signals
2.	**Amplitude modulation:** Why modulation, DSB-AM, DSB/SC, SSB/SC, Quadrature amplitude modulation. Detection of AM signals; diode detector, synchronous detector. AM Transmitter Block diagram.
3.	**Frequency Modulation:** Analysis of FM Signals, Carlson Bandwidth, WBFM, NBFM, FM generation, Armstrong method of FM generation, FM transmitters
4.	**Communication Receivers:**Basic terms related to communication receivers, Tuned RF receiver, heterodyne radio receiver, and its advantages.
5.	**Performance Analysis of Different Systems:** Noise, band limited noise, Signal to Noise ratio, Evaluation of SNR for SSB, DSB/SC, DSB/FC, FM systems, pre-emphasis and de-emphasis
6.	**Digital Communication:** Analog to Digital conversion, Sampling, Quantization and Quantization noise. Concepts of TDM. PAM,PWM and PPM, Pulse Code Modulation (PCM); differential PCM, Delta Modulation and ADPCM. Relative advantages and dis-advantages of above techniques
7	**Digital Modulation Techniques:** ASK, OOK, FSK, Mary-FSK, PSK, BPSK, QPSK, Mary-PSK, QAMetc their advantages and disadvantages.
8	**Digital Signal formatting (Line Coding Techniques):** Need for line coding,NRZ, RZ, Bipolar NRZ and RZ, AMI coding, Manchester Coding etc. Their advantages and disadvantages

Recommended Books:

S.No	Name of Reference Book	Author
1.	**Modern Analog and Digital Communication**	**B. P. Lathi**
1.	**Principles ofCommunicationSystems**	**Taub &schling**
2.	**Communicationsystems**	**Simon Haykins**
3.	**Electronic CommunicationSystems**	**G. Kennedy**

Subject: Control System (Code: EET258)	Year & Semester: B. Tech Information Technology Engineering 2nd Year & 4th Semester	Total Course Credit: 3		
		L	T	P
		3	0	0
Evaluation Policy	Mid-Term/Class Assessment (40 Marks)	Final-Term (60 Marks)		

Course Objectives

- To develop an understanding of principles and applications of control systems in everyday life.
- To understand the basic concepts of block diagram reduction, time domain analysis solutions to time invariant systems.
- To develop an understanding of different aspects of stability analysis of systems in frequency domain and time domain.
- Design controllers to meet specifications.

Learning Outcomes

Upon completion of this course, students will be able to do the following:

- Should have knowledge on open loop and closed loop control systems, concept of feedback in control systems etc.
- Should be able to apply the conceptual things to real-world electrical and electronics problems and applications.
- Test a linear system for stability by determining the system's pole locations.
- Test a linear system for controllability and observability.
- Should be able to develop and run a computer simulation of a control system using MATLAB.

Course Outline / Content	
Unit	**Topics**
1.	**Introduction:** Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects of feedback. Mathematical models – Differential equations, Impulse Response and transfer functions. **Transfer Function Representation:** Block diagram representation of systems considering electrical systems as examples -Block diagram algebra – Representation by Signal flow graph - Reduction using mason's gain formula.
2.	**Time Response Analysis:** Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants – Effects of proportional derivative, proportional integral systems.
3.	**Stability Analysis in S-Domain:** The concept of stability – Routh's stability criterion – qualitative stability and conditional stability – limitations of Routh's stability. **Root Locus Technique:** The root locus concept - construction of root locieffects of adding poles and zeros to G(s) H(s) on the root loci.
4.	**Frequency Response Analysis:** Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and Phase margin and Gain margin-Stability Analysis from Bode Plots. Polar Plots, Nyquist Plots Stability Analysis. Compensation techniques – Lag, Lead, Lead-Lag Controllers design in frequency Domain, PID Controllers.

5.	**State Space Analysis of Continuous Systems:** Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and it's Properties – Concepts of Controllability and Observability.

Text Books

1. Control Systems Theory and Applications - S. K. Bhattacharya, Pearson.
2. Control Systems - N. C. Jagan, BS Publications.
3. Modern Control Systems by Ogatta
4. Automatic Control systems by B C Kuo

References

1. Control Systems - A. Ananad Kumar, PHI.
2. Control Systems Engineering - S. Palani, TMH.
3. Control Systems - Dhanesh N. Manik, Cengage Learning.
4. Control Systems Engineering - I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers.
5. Control Systems - N. K. Sinha, New Age International (P) Limited Publishers.

Subject: Database Management System Lab (Code: ITL253)	Year & Semester: B. Tech Information Technology Engineering 2nd Year & 4th Semester	Total Course Credit: 1		
		L	T	P
		0	0	2
Evaluation Policy	Mid-Term/Class Assessment (40 Marks)	Final-Term (60 Marks)		

Course Outcomes (COs):

CO1: Transform an information model into a relational database schema and to use a data definition language and/or utilities to implement the schema using a DBMS.

CO2: Analyze the database using queries to retrieve records.

CO3: Formulatequery, using SQL, solutions to a broad range of queries, and data update problems.

CO4: Applying PL/SQL for processing database.

CO5: Analyse front end tools to design forms, menus, etc and establish back-end connectivity **CO6:** Develop solutions using database concepts for real-time requirements.

List Of Experiments:

1. Creation of a database and writing SQL queries to retrieve information from the database.
2. Performing Insertion, Deletion, Modifying, Altering, Updating and Viewing records based on conditions.
3. Creation of Views for different users.
4. Creating an Employee database to set various constraints.
5. Creating relationship between the databases.
6. Study of PL/SQL block.
7. Creation of Procedures.
8. Creation of database triggers, cursors and functions.
9. Mini project (Application Development using Oracle/ Mysql/DB2)

a)Inventory Control System.

b) Material Requirement Processing.

c) Hospital Management System.

d) Railway Reservation System.

e) Personal Information System.

f) Web Based User Identification System. g) Timetable Management System.

h) Hotel Management System

Subject: Web Programming (Code: ITL254)	Year & Semester: B. Tech Information Technology Engineering 2nd Year & 4th Semester	Total Course Credit: 2		
		L	T	P
		0	0	4
Evaluation Policy	Mid-Term/Class Assessment (40 Marks)	Final-Term (60 Marks)		

Course Outcomes (COs):

CO1: Students will be able to create HTML Documents with formatting, images, tables, frames, embed multi-media objects and develop a static website using Hyper Text Mark-up Language.

CO2: Students will learn how to Create web pages using Cascading Style Sheets.

CO3: Students will design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's.

Syllabus:

UNIT I - HTML & Introduction to CSS

HTML for structure, CSS for layout, and JavaScript for client-side programming; Suggestions for learning. Web Site Basics: Dreamweaver, HTML: Elements. Attributes and values.HTML Tables: Table, heading, row, data elements and attributes. Table structure not for page layout. Links and server-side includes: HTML links and anchors. Linking to external files to modularize html, build script libraries, or share styles; Server-side Includes. Standards: W3C, the World Wide Web Consortium: W3C recommendations as standards.HTML rules: Extensible markup languages; Frames: A glance at a common but deprecated element; advantages and disadvantages; frame and frameset properties. Images:
Image types (JPG, GIF, PNG). Inline, embedded, and external styles. Writing Style Rules: Writing CSS selectors and rules to tie style attributes and values to html elements. The cascade: Inheritance, specificity, and the cascade.CSS positioning: Static, relative, and absolute positioning.

UNIT II - Introduction to JavaScript:

Client-side programming for browsers. Event Handlers. JavaScript Overview: Language characteristics. Variables. Assignment and comparison operators; expressions.HTML Forms: The form element and inputs: textbox, radio buttons, checkbox, text area.

UNIT III - Advanced HTML & CSS:

HTML Form Basics, JavaScript, JavaScript Functions: Writing blocks of separate, reusable code, Getting started with developing simple functions for form validators. Form Validation: JavaScript for Simple Form Validation, The DOM and JavaScript Object Models: The W3C

Document Object Model; using nodes; DHTML: JavaScript + CSS = Dynamic HTML, Advanced form validation: Javascript'sinner HTML and dynamic CSS for advanced form validation

UNIT IV - JavaScript Programming:

Tracking the Mouse: Reporting the x and y position of the mouse, Annotating text: Adding hidden text and accessing through JavaScript, Advanced JavaScript—Super Hypertexts: Finding. JavaScript's Built-in Objects: Arrays. Dates. Math. Number and String Objects, Web Site Design / Redesign: Overview of site redesign. Client survey.

Text Books:

1. Dietel & Dietel "Internet & Web Designing".
2. John Duckett. "JavaScript and Jquery: Interactive Front-end Web Development".

Reference Books:

1. Greenlaw R and Hepp E "Fundamentals of Internet and www".
2. B. Underdahle and K.Underdahle, "Internet and Web Page / WebSite Design", IDG Books India (P) Ltd.
3. D. Comer, "The Internet Book", Prentice Hall of India.
4. David Flanagan. "JavaScript: The Definitive Guide".