



**J.B Institute of Engineering & Technology**  
Department of Information Technology

**ACADEMIC PLANNING FOR**  
**II B.Tech I Semester**  
**Academic Year ( 2010-11)**

- 1. Data Communication System**
- 2. Mathematical Foundations of Computer Science**
- 3. Data Structures through C ++**
- 4. Digital Logic Design and Computer Organization**
- 5. Electronic Devices and Circuits**
- 6. Basic Electrical Engineering**
- 7. Electrical & Electronics Lab**
- 8. Data Structures Through C++**

# 1. Data Communication System

## JNTU Syllabus:-

### Unit I:

#### **INTRODUCTION TO DATA COMMUNICATIONS AND NETWORKING:**

Standards Organizations for Data Communications, Layered Network Architecture, Open Systems Interconnection, Data Communications Circuits, Serial and parallel Data Transmission, Data communications Circuit Arrangements, Data communications Networks, Alternate Protocol Suites.

#### **SIGNALS, NOISE, MODULATION, AND DEMODULATION:**

Signal Analysis, Electrical Noise and Signal-to-Noise Ratio, Analog Modulation Systems, Information Capacity, Bits, Bit Rate, Baud, and  $M$ -ary Encoding, Digital Modulation.

### Unit II:

#### **METALLIC CABLE TRANSMISSION MEDIA:**

Metallic Transmission Lines, Transverse Electromagnetic Waves, Characteristics of Electromagnetic Waves, Transmission Line Classifications, Metallic Transmission Line Types, Metallic Transmission Line Equivalent Circuit, Wave Propagation on Metallic Transmission Lines, Metallic Transmission Line Losses.

#### **OPTICAL FIBER TRANSMISSION MEDIA:**

Advantages of Optical Fiber Cables, Disadvantages of Optical Fiber Cables, Electromagnetic spectrum, Optical Fiber Communications System Block Diagram, Optical Fiber construction, The Physics of Light, Velocity of Propagation, Propagation of Light Through an Optical fiber Cable, Optical Fiber Modes and Classifications, Optical Fiber Comparison, Losses in Optical Fiber Cables, Light sources, Light Detectors, Lasers.

### Unit III:

#### **DIGITAL TRANSMISSION:**

Pulse Modulation, Pulse code Modulation, Dynamic Range, Signal Voltage –to-Quantization Noise Voltage Ration, Linear Versus Nonlinear PCM Codes, Comparing, PCM Line Speed, Delta Modulation PCM and Differential PCM.

#### **MULTIPLEXING AND T CARRIERS:**

Time- Division Multiplexing, T1 Digital Carrier System, North American Digital Multiplexing Hierarchy, Digital Line Encoding, T Carrier systems, European Time-Division Multiplexing, Statistical Time – Division Multiplexing, Frame Synchronization, Frequency- Division Multiplexing, Wavelength- Division Multiplexing, Synchronous Optical Network.

#### **Unit IV:**

##### **WIRELESS COMMUNICATIONS SYSTEMS:**

Electromagnetic Polarization, Rays and Wave fronts, Electromagnetic Radiation, Spherical Wave front and the Inverse Square Law, wave Attenuation and Absorption, Optical Properties of Radio Waves, Terrestrial Propagation of Electromagnetic Waves, Skip Distance, Free-Space Path Loss, Microwave Communications Systems, Satellite Communications Systems.

#### **Unit V:**

##### **TELEPHONE INSTRUMENTS AND SIGNALS:**

The Subscriber Loop, Standard Telephone Set, Basic Telephone Call Procedures, Call Progress Tones and Signals, Cordless Telephones, Caller ID, Electronic Telephones, Paging systems.

##### **THE TELEPHONE CIRCUIT:**

The Local Subscriber Loop, Telephone Message- Channel Noise and Noise Weighting, Units of Powers Measurement, Transmission Parameters and Private-Line Circuits, Voice-Frequency Circuit Arrangements, Crosstalk.

#### **Unit VI:**

##### **CELLULAR TELEPHONE SYSTEMS:**

First- Generation Analog Cellular Telephone, Personal Communications system, Second-Generation Cellular Telephone Systems, N-AMPS, Digital Cellular Telephone, Interim Standard, North American Cellular and PCS Summary, Global system for Mobile Communications, Personal Communications Satellite System.

#### **Unit VII:**

##### **DATA COMMUNICATIONS CODES, ERROR CONTROL, AND DATA FORMATS:**

Data Communications Character Codes, Bar Codes, Error Control, Error Detection, Error Correction, Character Synchronization.

## **DATA COMMUNICATIONS EQUIPMENT:**

Digital Service Unit and Channel Service Unit, Voice- Band Data Communication Modems, Bell Systems-Compatible Voice- Band Modems, Voice- Band Modern Block Diagram, Voice- Band Modem Classifications, Asynchronous Voice-Band Modems, Synchronous Voice-Band Modems, Modem Synchronization, ITU-T Voice-Band Modem Specifications, 56K Modems, Modem Control: The AT Command Set, Cable Modems, Probability of Error and Bit Error Rate.

### **Unit VIII:**

## **DATA –LINK PROTOCOLS:**

Data –Link Protocol Functions, Character –and Bit- Oriented Protocols, Data Transmission Modes, Asynchronous Data – Link Protocols, Synchronous Data – Link Protocols, Synchronous Data – Link Control, High – Level Data – Link Control.

### **Text Books/ Material:-**

- ❖ **Introduction to Data Communications and Networking, Wayne Tomasi, Pearson Education.**

### **Suggested/ Reference Books:-**

- ❖ **Data Communications and Networking, Behrouz A Forouzan, Fourth Edition. TMH.**
- ❖ **Computer Communications and Networking Technologies, Gallow, Second Edition Thomson**
- ❖ **Computer Networking and Internet, Fred HalsII, Lingana Gouda Kulkarni, Fifth Edition, Pearson Education.**

### **Web sites:**

**W1** = Web resource1 = <http://www.google.com>

**W2** = Web resource2 = <http://www.wikipedia.com>

## **Course Schedule**

<b><u>Number of Hours / lectures available in this Semester / Year</u></b>	<b><u>65</u></b>
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**Distribution of Hours Unit – Wise**

<b><u>Unit</u></b>	<b><u>Topic</u></b>	<b><u>Total No. of Hours</u></b>
<b><u>I</u></b>	Standards Organizations for Data Communications	<b><u>11</u></b>
	Layered Network Architecture	
	Open Systems Interconnection	
	Data Communications Circuits	
	Serial and parallel Data Transmission	
	Data communications Circuit Arrangements	
	Data communications Networks	
	Alternate Protocol Suites	
	SIGNALS, NOISE, MODULATION, AND DEMODULATION	
	Signal Analysis, Electrical Noise and Signal-to-Noise Ratio	
	Bit Rate, Baud, and <i>M</i> -ary Encoding, Digital Modulation	
<b><u>II</u></b>	METALLIC CABLE TRANSMISSION MEDIA	<b><u>12</u></b>
	Metallic Transmission Lines, Transverse Electromagnetic Waves	
	Characteristics of Electromagnetic Waves	
	Transmission Line Classifications	
	Metallic Transmission Line Types	
	Metallic Transmission Line Equivalent Circuit	
	Wave Propagation on Metallic Transmission Lines	

	<p>Metallic Transmission Line Losses</p> <p>Advantages of Optical Fiber Cables, Disadvantages of Optical Fiber Cables</p> <p>Electromagnetic spectrum, Optical Fiber Communications System Block Diagram</p> <p>Optical Fiber construction, The Physics of Light, Velocity of Propagation</p> <p>Propagation of Light Through an Optical fiber Cable</p>	
<b><u>III</u></b>	<p>Pulse Modulation, Pulse code Modulation</p> <p>Dynamic Range</p> <p>Signal Voltage –to-Quantization Noise Voltage Ration</p> <p>Linear Versus Nonlinear PCM Codes</p> <p>Companding</p> <p>PCM Line Speed</p> <p>Delta Modulation PCM</p> <p>Differential PCM</p> <p>Time- Division Multiplexing, T1 Digital Carrier System, North American Digital Multiplexing Hierarchy</p> <p>T Carrier systems, European Time- Division Multiplexing, Statistical Time – Division Multiplexing</p> <p>Frame Synchronization</p> <p>Wavelength- Division Multiplexing</p>	<b><u>12</u></b>
<b><u>IV</u></b>	<p>Electromagnetic Polarization</p> <p>Rays and Wave fronts</p> <p>Electromagnetic Radiation</p> <p>Spherical Wave front and the Inverse Square</p>	<b><u>09</u></b>

	Law	
	wave Attenuation and Absorption	
	Optical Properties of Radio Waves	
	Terrestrial Propagation of Electromagnetic Waves	
	Skip Distance, Free-Space Path Loss	
	Microwave Communications Systems	
<b><u>V</u></b>	The Subscriber Loop, Standard Telephone Set, Basic Telephone Call Procedures	<b><u>07</u></b>
	Call Progress Tones and Signals	
	Cordless Telephones	
	Caller ID	
	Electronic Telephones	
	Paging systems	
	The Local Subscriber Loop	
Telephone Message- Channel Noise and Noise Weighting		
<b><u>VI</u></b>	Units of Powerd Measurement, Transmission Parameters and Private-Line Circuits	<b><u>04</u></b>
	Voice-Frequency Circuit Arrangements, Crosstalk	
	First- Generation Analog Cellular Telephone	
<b><u>VII</u></b>	Data Communications Character Codes, Bar Codes, Error Control, Error Detection, Error Correction, Character Synchronization	<b><u>06</u></b>
	Digital Service Unit and Channel Service Unit	
	Voice- Band Modern Block Diagram, Voice-Band Modem Classifications, Asynchronous Voice-Band Modems	
	56K Modems, Modem Control	

	Cable Modems, Probability of Error and Bit Error Rate	
<b><u>VIII</u></b>	Data –Link Protocol Functions, Character – and Bit- Oriented Protocols	<b><u>04</u></b>
	Data Transmission Modes, Asynchronous Data – Link Protocols	
	Synchronous Data – Link Protocols	
	Synchronous Data – Link Control, High – Level Data – Link Control	
	<b><u>Total</u></b>	<b><u>65</u></b>

**Topic wise Coverage:**

**Unit I :**

**INTRODUCTION TO DATA COMMUNICATIONS AND NETWORKING:  
SIGNALS, NOISE, MODULATION, AND DEMODULATION:**

**LECTURE PLAN:**

**Total no of classes: 11**

<b><u>S.No</u></b>	<b><u>Name of the Topic</u></b>	<b><u>Text/Reference book code</u></b>	<b><u>No. of classes required</u></b>
<b><u>1</u></b>	Standards Organizations for Data Communications	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>2</u></b>	Layered Network Architecture	<b><u>T/R</u></b>	<b><u>1</u></b>
<b><u>3</u></b>	Open Systems Interconnection	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>4</u></b>	Data Communications Circuits	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>5</u></b>	Serial and parallel Data Transmission	<b><u>I</u></b>	<b><u>1</u></b>

<b><u>6</u></b>	Data communications Circuit Arrangements	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>7</u></b>	Data communications Networks	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>8</u></b>	Alternate Protocol Suites	<b><u>T/R</u></b>	<b><u>1</u></b>
<b><u>9</u></b>	SIGNALS, NOISE, MODULATION, AND DEMODULATION	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>10</u></b>	Signal Analysis, Electrical Noise and Signal-to-Noise Ratio	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>11</u></b>	Bit Rate, Baud, and <i>M</i> -ary Encoding, Digital Modulation	<b><u>I</u></b>	<b><u>1</u></b>

**UNIT-II :**

**METALLIC CABLE TRANSMISSION MEDIA:**

**OPTICAL FIBER TRANSMISSION MEDIA:**

**LECTURE PLAN:**

**Total No of Classes: 12**

<b><u>S.No</u></b>	<b><u>Name of the Topic</u></b>	<b><u>Reference book code</u></b>	<b><u>No. of classes required</u></b>
<b><u>12</u></b>	METALLIC CABLE TRANSMISSION MEDIA	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>13</u></b>	Metallic Transmission Lines, Transverse Electromagnetic Waves	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>14</u></b>	Characteristics of Electromagnetic	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>15</u></b>	Transmission Line Classifications	<b><u>T/R</u></b>	<b><u>1</u></b>
<b><u>16</u></b>	Metallic Transmission Line Types	<b><u>I</u></b>	<b><u>1</u></b>

<b><u>17</u></b>	Metallic Transmission Line Equivalent Circuit	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>18</u></b>	Wave Propagation on Metallic Transmission Lines	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>19</u></b>	Metallic Transmission Line Losses	<b><u>T/R</u></b>	<b><u>1</u></b>
<b><u>20</u></b>	Advantages of Optical Fiber Cables, Disadvantages of Optical Fiber Cables	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>21</u></b>	Electromagnetic spectrum, Optical Fiber Communications System Block Diagram	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>22</u></b>	Optical Fiber construction, The Physics of Light, Velocity of Propagation	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>23</u></b>	Propagation of Light Through an Optical fiber Cable	<b><u>T/R</u></b>	<b><u>1</u></b>

**UNIT-III :**

**DIGITAL TRANSMISSION:**

**MULTIPLEXING AND T CARRIERS:**

**LECTURE PLAN:**

**Total No of Classes: 12**

<b><u>S.No</u></b>	<b><u>Name of the Topic</u></b>	<b><u>Text/Reference book code</u></b>	<b><u>No. of classes required</u></b>
<b><u>24</u></b>	Pulse Modulation, Pulse code Modulation	<b><u>I</u></b>	<b><u>1</u></b>

<b><u>25</u></b>	Dynamic Range	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>26</u></b>	Signal Voltage –to-Quantization Noise Voltage Ration	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>27</u></b>	Linear Versus Nonlinear PCM Codes	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>28</u></b>	Companding	<b><u>T/R</u></b>	<b><u>1</u></b>
<b><u>29</u></b>	PCM Line Speed	<b><u>T/R</u></b>	<b><u>1</u></b>
<b><u>30</u></b>	Delta Modulation PCM	<b><u>T/R</u></b>	<b><u>1</u></b>
<b><u>31</u></b>	Differential PCM	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>32</u></b>	Time- Division Multiplexing, T1 Digital Carrier System, North American Digital Multiplexing Hierarchy	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>33</u></b>	T Carrier systems, European Time- Division Multiplexing, Statistical Time – Division Multiplexing	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>34</u></b>	Frame Synchronization	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>35</u></b>	Wavelength- Division Multiplexing	<b><u>I</u></b>	<b><u>1</u></b>

#### **UNIT-IV :**

#### **WIRLESS COMMUNICATIONS SYSTEMS:**

#### **LECTURE PLAN:**

**Total No. of Classes: 09**

<b><u>S.No</u></b>	<b><u>Name of the Topic</u></b>	<b><u>Text/Reference book code</u></b>	<b><u>No. of classes required</u></b>
<b><u>36</u></b>	Electromagnetic Polarization	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>37</u></b>	Rays and Wave fronts	<b><u>I/R</u></b>	<b><u>1</u></b>
<b><u>38</u></b>	Electromagnetic Radiation	<b><u>I/R</u></b>	<b><u>1</u></b>
<b><u>39</u></b>	Spherical Wave front and the Inverse Square Law	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>40</u></b>	wave Attenuation and Absorption	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>41</u></b>	Optical Properties of Radio Waves	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>42</u></b>	Terrestrial Propagation of Electromagnetic Waves	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>43</u></b>	Skip Distance, Free-Space Path Loss	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>44</u></b>	Microwave Communications Systems	<b><u>I/R</u></b>	<b><u>1</u></b>

**UNIT-V:**

**TELEPHONE INSTRUMENTS AND SIGNALS:**

**THE TELEPHONE CIRCUIT:**

**LECTURE PLAN:**

**Total No. of Classes: 07**

<b><u>S.No</u></b>	<b><u>Name of the Topic</u></b>	<b><u>Text/Reference book code</u></b>	<b><u>No. of classes required</u></b>
<b><u>45</u></b>	The Subscriber Loop, Standard Telephone Set, Basic Telephone Call Procedures	<b><u>T/R</u></b>	<b><u>1</u></b>
<b><u>46</u></b>	Call Progress Tones and Signals	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>47</u></b>	Cordless Telephones	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>48</u></b>	Caller ID	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>49</u></b>	Electronic Telephones	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>50</u></b>	Paging systems	<b><u>T/R</u></b>	<b><u>1</u></b>
<b><u>51</u></b>	The Local Subscriber Loop	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>52</u></b>	Telephone Message- Channel Noise and Noise Weighting	<b><u>I</u></b>	<b><u>1</u></b>

**UNIT-VI:**

**CELLULAR TELEPHONE SYSTEMS:**

**LECTURE PLAN:**

**Total No. of Classes: 03**

<b><u>S.No</u></b>	<b><u>Name of the Topic</u></b>	<b><u>Text/Reference book code</u></b>	<b><u>No. of Lecture classes required</u></b>
<b><u>53</u></b>	Units of Power Measurement, Transmission Parameters and Private-Line Circuits	<b><u>I</u></b>	<b><u>1</u></b>
<b><u>54</u></b>	Voice-Frequency Circuit	<b><u>T/R</u></b>	<b><u>1</u></b>

	Arrangements, Crosstalk		
<b><u>55</u></b>	First- Generation Analog Cellular Telephone	<b><u>I</u></b>	<b><u>1</u></b>

## **UNIT-VII**

**DATA COMMUNICATIONS CODES, ERROR CONTROL, AND DATA FORMATS:**

**DATA COMMUNICATIONS EQUIPMENT:**

### **LECTURE PLAN:**

**Total No. of Classes: 05**

<b><u>S.No</u></b>	<b><u>Name of the Topic</u></b>	<b><u>Text/Reference book code</u></b>	<b><u>No. of classes required</u></b>
<b><u>56</u></b>	Data Communications Character Codes, Bar Codes, Error Control, Error Detection, Error Correction, Character Synchronization	<b><u>T/W1/W2</u></b>	<b><u>1</u></b>
<b><u>57</u></b>	Digital Service Unit and Channel Service Unit		<b><u>1</u></b>
<b><u>58</u></b>	Voice- Band Modem Block Diagram, Voice- Band Modem Classifications, Asynchronous Voice-Band Modems		<b><u>1</u></b>
<b><u>59</u></b>	56K Modems, Modem Control		<b><u>1</u></b>
<b><u>60</u></b>	Cable Modems, Probability of Error and Bit Error Rate		<b><u>1</u></b>

**UNIT VIII:****DATA –LINK PROTOCOLS:****LECTURE PLAN:****Total No of Classes: 04**

<b><u>S.No</u></b>	<b><u>Name of the Topic</u></b>	<b><u>Text/Reference book code</u></b>	<b><u>No. of classes required</u></b>
<b><u>61</u></b>	Data –Link Protocol Functions, Character –and Bit- Oriented Protocols		<b><u>1</u></b>
<b><u>62</u></b>	Data Transmission Modes, Asynchronous Data – Link Protocols		<b><u>1</u></b>
<b><u>63</u></b>	Synchronous Data – Link Protocols		<b><u>1</u></b>
<b><u>64</u></b>	Synchronous Data – Link Control, High – Level Data – Link Control		<b><u>1</u></b>



**J.B Institute of Engineering & Technology**  
Department of Information Technology

**ACADEMIC PLANNING FOR**  
**II B.Tech I Semester**  
**Academic Year ( 2010-11)**

- 1. Data Communication System**
- 2. Mathematical Foundations of Computer Science**
- 3. Data Structures through C ++**
- 4. Digital Logic Design and Computer Organization**
- 5. Electronic Devices and Circuits**
- 6. Basic Electrical Engineering**
- 7. Electrical & Electronics Lab**
- 8. Data Structures Through C++**

## 2. Mathematical Foundations of Computer Science

### JNTU Syllabus

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<b>Unit – I</b>	<b>Mathematical Logic:</b> Statements and Notations, Connectives, Well formed formulas, Truth Tables, Tautology, Equivalence implications, Normal forms, Quantifiers, Universal quantifiers.
<b>Unit – II</b>	<b>Predicates:</b> Predicative logic, Free & Bound variables, Rules of Inference, Consistency, Proof of Contradiction, Automatic Theorem Proving.
<b>Unit – III</b>	<b>Relations:</b> Properties of Binary Relations, Equivalence, Transitive Closure, Computability and Partial Ordering relations, Lattices, Hasse Diagrams.  <b>Functions:</b> Inverse Function Composition of functions, Recursive Functions, Lattice and its Properties.
<b>Unit – IV</b>	<b>Algebraic Structures:</b> Algebraic Systems Examples and General properties, Semi groups and Monads, Groups sub groups, Homomorphism, Isomorphism.
<b>Unit – V</b>	<b>Elementary Combinatory:</b> Basics of counting, Combinations and Permutations with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, The principles of Inclusion – Exclusion, Pigeon hole principles and its applications.
<b>Unit - VI</b>	<b>Recurrence Relation:</b> Generating Functions, Function of Sequences, Calculating Coefficient of generating function, Recurrence Relation, Solving recurrence relations by substitution and Generating funds. Characteristics roots solution of In homogeneous recurrence relation.
<b>Unit - VII</b>	<b>Graph Theory:</b> Representation of Graph, DFS, BFS, Spanning Trees, Planar Graphs.
<b>Unit - VIII</b>	Graph Theory and Applications, Basic Concepts Isomorphism and Sub graphs, Multi graphs and Euler circuit, Hamiltonian graphs, Chromatic Numbers.

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## Guidelines to Students

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Where will this subject help?

## Books / Material

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<b>Text Books</b>
Elements of Discrete Mathematics – A Computer Oriented Approach, C L Liu, D P Mohapatra. Third Edition, Tata McGraw Hill.

<b>Suggested / Reference Books</b>
1. Discrete Mathematics with Applications, Thomas Koshy, Elsevier 2. Logic and Discrete Mathematics, Grass Man & Trembly, Pearson Education.



## Course Schedule

<b>Number of Hours / Lectures available in this Semester / Year</b>
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<b>65</b>
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### Distribution of Hours Unit – Wise

<b>Unit</b>	<b>Topic</b>	<b>Total No. of Hours</b>
I	<b>Mathematical Logic:</b> Statements and Notations, Connectives, Well formed formulas, Truth Tables, Tautology, Equivalence implications, Normal forms, Quantifiers, Universal quantifiers	<b>05</b>

II	<b>Predicates:</b> Predicative logic, Free & Bound variables, Rules of Inference, Consistency, Proof of Contradiction, Automatic Theorem Proving.	08
III	<b>Relations:</b> Properties of Binary Relations, Equivalence, Transitive Closure, Computability and Partial Ordering relations, Lattices, Hasse Diagrams.  <b>Functions:</b> Inverse Function Composition of functions, Recursive Functions, Lattice and its Properties.	8
IV	<b>Algebraic Structures:</b> Algebraic Systems Examples and General properties, Semi groups and Monads, Groups sub groups, Homomorphism, Isomorphism.	11
V	<b>Elementary Combinatory:</b> Basics of counting, Combinations and Permutations with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, The principles of Inclusion – Exclusion, Pigeon hole principles and its applications.	09
VI	<b>Recurrence Relation:</b> Generating Functions, Function of Sequences, Calculating Coefficient of generating function, Recurrence Relation, Solving recurrence relations by substitution and Generating funds. Characteristics roots solution of In homogeneous recurrence relation.	09
VII	<b>Graph Theory:</b> Representation of Graph, DFS, BFS, Spanning Trees, Planar Graphs.	08
VIII	Graph Theory and Applications, Basic Concepts Isomorphism and Sub graphs, Multi graphs and Euler circuit, Hamiltonian graphs, Chromatic Numbers.	06
	<b>Total</b>	<b>65</b>

## Topic wise Coverage:

### Unit I: Mathematical Logic:

Statements and Notations, Connectives, Well formed formulas, Truth Tables, Tautology, Equivalence implications, Normal forms, Quantifiers, Universal quantifiers

### LECTURE PLAN:

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Total no\_ of classes: 08

S.No	Name of the Topic	Reference book code	No. of classes required
1	Statements and Notations	3	2
2	Connectives	1,3	2
3	Well formed formulas	3	1
4	Truth Tables, Tautology	3	1
5	Equivalence implications	3	1
6	Normal forms, Quantifiers	3	1
7	Universal quantifiers	3	2

### ASSIGNMENT-1

1. Explain about Connectives ?
2. Explain about Tautology and WFF ?
3. Explain about Normal Forms ?

**UNIT-II: Predicates:** Predicative logic, Free & Bound variables, Rules of Inference, Consistency, Proof of Contradiction, Automatic Theorem Proving.

**LECTURE PLAN:****Total No\_ of Classes: 08**

S.No	Name of the Topic	Reference book code	No. of classes required
8	Predicative logic, Free & Bound variables	4	2
9	Rules of Inference, Consistency	4	2
10	Proof of Contradiction	4	2
11	Automatic Theorem Proving	4	2

**ASSIGNMENT-II**

1. Explain about Automatic Theorem Proving ?
2. Explain about Predicative logic?

**UNIT-III: Relations:** Properties of Binary Relations, Equivalence, Transitive Closure, Computability and Partial Ordering relations, Lattices, Hasse Diagrams.

**Functions:** Inverse Function Composition of functions, Recursive Functions, Lattice and its Properties.

**LECTURE PLAN:****Total No\_ of Classes: 08**

S.No	Name of the Topic	Reference book code	No. of classes required
12	Properties of Binary Relations	1,3	2
13	Equivalence, Transitive Closure	1,3	1
14	Computability and Partial Ordering	1,3	2

	relations		
15	Lattices, Hasse Diagrams	1,3	1
16	Inverse Function Composition of functions	1,3	1
17	Recursive Functions, Lattice and its Properties.	1,3	1

**UNIT-IV : Algebraic Structures:** Algebraic Systems Examples and General properties, Semi groups and Monads, Groups sub groups, Homomorphism, Isomorphism.

**LECTURE PLAN:**

**Total No\_ of Classes: 11**

S.No	Name of the Topic	Reference book code	No. of classes required
18	Algebraic Systems Examples and General properties	1,4	2
19	Algebraic Systems Examples and General properties	1,4	1
20	Algebraic Systems Examples and General properties	1,4	1
21	Semi groups	1,4	1
22	Monads	1,4	1
23	Groups sub groups	1,4	2
24	Homomorphism	1,4	2
25	Isomorphism	1,4	1

**UNIT-V: Elementary Combinatory:** Basics of counting, Combinations and Permutations with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, The principles of Inclusion – Exclusion, Pigeon hole principles and its applications.

**LECTURE PLAN:**

**Total No\_ of Classes: 09**

S.No	Name of the Topic	Reference book code	No. of classes required
26	Basics of counting, Combinations and Permutations with repetitions	4	2
27	Constrained repetitions, Binomial Coefficients	4	2
28	Binomial Multinomial Theorems	4	2
29	The principles of Inclusion – Exclusion	1,3	2
30	Pigeon hole principles and its applications	1,3	1

**UNIT-VI: Recurrence Relation:** Generating Functions, Function of Sequences, Calculating Coefficient of generating function, Recurrence Relation, Solving recurrence relations by substitution and Generating funds. Characteristics roots solution of In homogeneous recurrence relation.

**LECTURE PLAN:****Total No\_ of Classes: 09**

S.No	Name of the Topic	Reference book code	No. of Lecture classes required
31	Generating Functions, Function of Sequences	1	2
32	Calculating Coefficient of generating function	1	1
33	Recurrence Relation	1	2
34	Solving recurrence relations by substitution and Generating funds	1	2
35	Characteristics roots solution of In homogeneous recurrence relation.	1	2

**UNIT-VII: Graph Theory:** Representation of Graph, DFS, BFS, Spanning Trees, Planar Graphs.**LECTURE PLAN:****Total No\_ of Classes: 09**

S.No	Name of the Topic	Reference book code	No. of classes required
36	Representation of Graph	1,3	1
37	Representation of Graph	1,3	2
38	DFS	1,3	2
39	BFS	1,3	2
40	Spanning Trees	1	1
41	Planar Graphs	1	1

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**UNIT VIII:** Graph Theory and Applications, Basic Concepts Isomorphism and Sub graphs, Multi graphs and Euler circuit, Hamiltonian graphs, Chromatic Numbers.

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**LECTURE PLAN:**

**Total No\_ of Classes: 06**

<b>S.No</b>	<b>Name of the Topic</b>	<b>Reference book code</b>	<b>No. of classes required</b>
42	Graph Theory and Applications	1,4,5	2
43	Basic Concepts Isomorphism and Sub graphs	1	2
44	Multi graphs and Euler circuit	1	1
45	Hamiltonian graphs	1,3	2
46	Chromatic Numbers.	1,3	2



**J.B Institute of Engineering & Technology**  
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**ACADEMIC PLANNING FOR**  
**II B.Tech I Semester**  
**Academic Year ( 2010-11)**

- 1. Data Communication System**
- 2. Mathematical Foundations of Computer Science**
- 3. Data Structures through C ++**
- 4. Digital Logic Design and Computer Organization**
- 5. Electronic Devices and Circuits**
- 6. Basic Electrical Engineering**
- 7. Electrical & Electronics Lab**
- 8. Data Structures Through C++**

### 3. Data Structures through C ++

#### JNTU Syllabus

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<b>Unit – I</b>	C++ class overview – Basic OOP concepts, Class Definition, Objects ,Class Members, Access Control, Class Scope, Constructors and Destructors ,Parameter passing methods, Inline functions, static class members, this pointer , friend functions, dynamic memory allocation and de-allocation, exception handling
<b>Unit – II</b>	Function overloading, Operator Overloading, Generic Programming- Function and Class templates, Inheritance basics, base and derived classes, inheritance types, base class access control, runtime polymorphism using virtual functions, abstract classes , streams I/O
<b>Unit – III</b>	Algorithms, performance analysis- time complexity and space complexity, Review of basic data structures- The list ADT, Stack ADT, Queue ADT, array and linked implementations using template classes in C++. Trees – Basic Terminology, Binary Tree ADT, array and linked representations, traversals, threaded binary trees.
<b>Unit – IV</b>	Dictionaries, linear list representation, skip list representation, operations insertion, deletion and searching, Hashing – hash table representation, hash functions, collision resolution- separate chaining, open addressing –linear probing, quadratic probing, double hashing , rehashing, extendible hashing, comparison of hashing and skip lists.
<b>Unit – V</b>	Priority Queues – Definition, ADT, Realizing a Priority Queue using Heaps, Definition, insertion, Deletion, Heap sort, External Sorting- Model for external sorting , Multiway merge, polyphase merge.
<b>Unit - VI</b>	Search Trees(Part I) : Binary search trees, Definition, ADT, Implementation, operations- searching , insertion and deletion, AVL Trees, Definition, operations- Insertion and searching.

<b>Unit - VII</b>	Search Trees(Part II); B-Trees, Definition, B-Tree of order m, insertion, deletion and searching, comparison of search Trees . Graphs – Basic Terminology, representations of Graphs, Graph search methods – DFS, BFS.
<b>Unit - VIII</b>	Text Processing- Pattern matching algorithms – Brute force, The Knuth Morri-Pratt algorithm. Tries – Standard Tries, Compressed Tries, Suffix Tries

### Books / Material

<b>Text Books</b>
<ol style="list-style-type: none"> <li>1. Data Structures and Algorithm and Applications in C++,S.Sahni,University Press(India)Pvt. Ltd.</li> <li>2. Data Structures and Algorithms in C++, Micheal T.Goodrich,R.Tamassia and D.Mount, Wiley Student edtion, Jofn Wiley and Sons</li> </ol>

<b>Suggested / Reference Books</b>
<ol style="list-style-type: none"> <li>1. Data Structures and Algorithms in C++, Mark Allen Weiss,Pearson Education</li> <li>2. Data Structures and Algorithms in C++, Adam Drozdek, Cengage learning</li> <li>3. Data Structures using C and C++, Langsam, Augenstein and Tenenbaum, PHI</li> <li>4. Problem Solving with C++, The OOP, W.Savitch, Pearson education.</li> <li>5. Advanced Data Strucures &amp; Algorithms in C++, V.V.Munuswamy, Jaico publisher</li> </ol>

### Course Schedule

<b>Number of Hours / lectures available in this Semester / Year</b>	<b>67</b>
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## Distribution of Hours Unit – Wise

Unit	Topic	Total No. of Hours
I	C++ class overview	9
II	OOP concepts	9
III	Algorithms and performance analysis	7
IV	Dictionaries, Hashing	8
V	Priority Queues, External Sorting	7
VI	Search Trees(Part I)	7
VII	Search Trees(Part II)	12
VIII	Text Processing	7
	<b>Total</b>	<b>64</b>

### Topic wise Coverage:

#### Unit I: C++ class overview

#### LEARNING OBJECTIVES:

- ❖ To learn OOP concepts.
- ❖ To learn developing programs using classes.

#### LECTURE PLAN:

Total no\_ of classes: 09

S.No	Name of the Topic	Reference book code	No. of classes required
1	C++ overview Basic OOP concepts,	3	1

2	classes, objects, members	1,3	1
3	Access control, scope, constructors and destructors	3	1
4	Parameter passing, inline functions	3	1
5	Static members, this pointer, friend functions	3	1
6	Dynamic memory allocation.	3	2
7	Exception handling	3	2

### **ASSIGNMENT-1**

1. Discuss friend functions in C++
2. What are constructors and destructors?
3. Write a C++ program that demonstrates the use of these.
4. What about inline functions in C++.
5. Write about exception handling in C++.

### **UNIT-II :**

#### **LEARNING OBJECTIVES:**

- ❖ To learn Polymorphism,
- ❖ Learn Generic Programming - Templates
- ❖ To learn Inheritance and implement using base and derived classes.

#### **LECTURE PLAN:**

**Total No\_ of Classes: 09**

S.No	Name of the Topic	Reference book code	No. of classes required
8	Function overloading,	1,4	1
9	Operator overloading,	1,4	2
10	Generic programming, template functions and classes	1,4	1
11	Inheritance-basics, types, base class access control	4	2
12	Runtime polymorphism- virtual functions	3	1
13	Abstract classes	3	1
14	Stream I/O	3	1

**ASSIGNMENT-II**

1. Explain the concept of streams.
2. Explain in detail the stream class hierarchy.
3. What is console I/O AND formatted I/O?
4. what are manipulators?

**UNIT-III****LEARNING OBJECTIVES:**

- ❖ To know and analyze Algorithms
- ❖ Lists
- ❖ Stack
- ❖ Queues
- ❖ Trees

## LECTURE PLAN:

Total No\_ of Classes: 07

S.No	Name of the Topic	Reference book code	No. of classes required
15	Algorithms, performance analysis	1,3	1
16	Lists ADT & implementation	1,3	1
17	Stack ADT & implementation	1,3	1
18	Queue ADT & implementation	1,3	2
19	Trees – Basics, Binary Tree ADT array and linked representations	1,3	1
20	Tree traversals	1,3	1

## ASSIGNMENT-II

1. what are pointers? Are they data types justify.
2. what is meant by linear data structure?explain any one of the linear data structure in detail.
3. give an ADT for stack.
4. Give an ADT for queue.

## UNIT-IV :

### LEARNING OBJECTIVES:

- ❖ To learn about Dictionaries.
- ❖ Skip Lists and Operations on skip lists.
- ❖ Creating Hash Tables.

## LECTURE PLAN:

**Total No\_ of Classes: 08**

S.No	Name of the Topic	Reference book code	No. of classes required
22	Dictionaries linear list representation	1,4	1
23	Skip list representation & operations	1,4	1
24	Deletion and searching operations	1,4	1
25	Hashing – hash table representation	1,4	1
26	Hash functions collision resolution	1,4	1
27	Open addressing –linear probing , quadratic probing	1,4	1
28	Double hashing, rehashing	1,4	1
29	Extendible hashing ,comparison b/w hashing and skip lists	1,4	1

**ASSIGNMENT-IV**

1. Explain the performance Analysis of Algorithms
2. What are various types of hash functions?
3. What is double hashing?
4. What is rehashing? Explain.

## UNIT-V:

### LEARNING OBJECTIVES:

- ❖ To learn Priority Queues.
- ❖ External Sorting

### LECTURE PLAN:

Total No\_ of Classes: 07

S.No	Name of the Topic	Reference book code	No. of classes required
30	Priority Queues- ADT, representation	4	1
31	Heaps , insertion & deletion	4	2
32	Heap sort	4	2
33	External sorting- Multi-way merge	1,3	2
34	Polyphase merging	1,3	1

### ASSIGNMENT-V

1. What are the application of priority queue?
2. Give an ADT for priority queue.
3. What is heap?
4. Explain various types of priority queues.

## UNIT-VI:

### LEARNING OBJECTIVES:

- ❖ To learn about Search Trees and their operations
- ❖ AVL Trees and their operations

### LECTURE PLAN:

**Total No\_ of Classes: 07**

S.No	Name of the Topic	Reference book code	No. of Lecture classes required
35	Search trees(part 1) binary search trees-ADT, implementation	1	2
36	Insertion operations	1	1
37	Deletion operations	1	1
38	AVL Trees –Definition	1	1
39	Operations- insertion	1	1
40	Searching operations	1	1

### ASSIGNMENT-VI

1. What is binary search tree?
2. Write an ADT for BST.
3. What is AVL tree?
4. What are applications of AVL tree?

## UNIT-VII:

### LEARNING OBJECTIVES:

- ❖ To learn B-Trees and operations on B-Trees
- ❖ Graphs and Graph

### LECTURE PLAN:

**Total No\_ of Classes: 12**

S.No	Name of the Topic	Reference book code	No. of classes required
41	Search Trees (part-2) – definition and ADT	1,3	1
42	B-Trees-definition	1,3	1
43	B-Tree of order m	1,3	1
44	Insertion operation on b-tree	1,3	1
45	Deletion operation on B-Tree	1	1
46	Searching operations on B-Tree	1	1
47	Comparison of Search Trees	1,3	1
448	Graphs – Basics and Terminology	1,3	1
49	Graph Representations	1,3	1
50	Graph Search Methods	1,3	1
51	DFS method	1	1
52	BFS method	1	1

## ASSIGNMENT-VII

1. What is Red-black trees? Give representation for same.
2. Explain various operations on Red Black Tree.
3. What is splay tree explain various operations on splay tree
4. What is B-tree? Explain operations along with time complexities.

## UNITVIII:

### ❖ LEARNING OBJECTIVES:

To learn string matching and pattern matching techniques for text processing.

### LECTURE PLAN:

Total No\_ of Classes: 07

S.No	Name of the Topic	Reference book code	No. of classes required
54	Pattern matching Algorithms	1	1
55	Brute Force Algorithm	1	1
56	Knuth-Morris-pratt Algorithm	1,3	1
57	Tries – standard Tries	1,3	1
58	Compressed Tries	1,3	1
59	Suffix Tries	1,3	1



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- 5. Electronic Devices and Circuits**
- 6. Basic Electrical Engineering**
- 7. Electrical & Electronics Lab**
- 8. Data Structures Through C++**

## 4. Digital Logic Design and Computer Organization

### JNTU Syllabus

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<u>Unit No:</u>	<u>Topic:</u>
<b>Unit I</b>	Computer types
	Functional units
	Basic operational concepts
	Bus structures, software, performance
	Multiprocessors, multi computers
	Computer generations, binary numbers
	Fixed point representation, floating point representation
	Number base conversions, octal and hexadecimal numbers, complements
	Signed binary numbers, binary codes
<b>Unit II</b>	Basic logic functions, logic gates
	Universal logic gates
	Minimization of logic expressions
	Flip flops
<b>Unit III</b>	Registers
	Shift registers, binary counters
	Decoders, multiplexers
	Programmable logic devices
	Algorithms for fixed point and floating point addition

<b>Unit IV</b>	Subtraction, multiplication and division operations
	Hardware implementation of arithmetic and logic operations
	High performance arithmetic
<b>Unit V</b>	Memory locations and addresses
	Machine addresses and sequencing
	Various addressing modes
	Instruction formats, basic machine instructions
	IA-32 pentium example
<b>Unit VI</b>	Introduction to cpu, register transfers
	Execution of instructions
	Multiple bus organization
	Hard wired control
	Micro programmed control
<b>Unit VII</b>	Concept of memory, RAM ROM memories
	Memory hierarchy, cache memories, virtual memory
	Secondary storage, memory management requirements
<b>Unit VIII</b>	Introduction to I/O, interrupts hardware
	Enabling and disabling interrupts
	Device control, direct memory access
	Buses, interface circuits
	Standard I/O interfaces

## Guidelines to Students

### Where will this subject help?

. Principles of Computer Organization answers the question "How do computers work?". It examines the underlying components and the basic organizing principles in the construction of computer systems. It includes an examination of transistors and simple logic circuits, micro-processor components, microcode, machine language, assembly language, operating systems, and a variety of machine architectures. By studying the fundamental organizing principles of computer systems, we are better able to understand, design, and implement complex systems

### Books / Material

Text Books
<p><b>T1:</b> COMPUTER ORGANIZATION-Carl Hamacher, Zvonko Vranesic, safwat zaky, 5<sup>th</sup> edition, McGraw hill.</p>
<p><b>T2:</b> COMPUTER ARCHITECTURE AND ORGANIZATION- an integrated approach, miles murdocca, Vincent heuring, second edition, wiley india</p>
<p><b>T3:</b> COMPUTER SYSTEMS ARCHITECTURE-M.Moris mano, 3<sup>rd</sup> edition pearson</p>

### Suggested / Reference Books

**R1:** computer organization and architecture- william stallings 6<sup>th</sup> edition  
pearson

**R2:**computer organization and design- david a.paterson and john  
l.hennessy-elsevier

**R3:**fundamentals or computer organization and design- sivarama  
dandamudi springer int. edition

**R4:** digital design – 3<sup>rd</sup> edition m.morris mano, pearson education/phi

**R5:** fundamentals of logic design, roth, 5<sup>th</sup> edition thomson

### Course Schedule

Number of Hours / lectures available in this Semester / Year	65
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#### Distribution of Hours Unit – Wise

Unit	Topic	Total No. of Hours
I	Computer types, functional units, basic operational concepts	10
	Bus structures, software, performance	
	Multiprocessors and multi computers, computer generations	
	Binary numbers, fixed point representation	

	Number base conversions	
	Complements, signed binary numbers, binary codes	
	Octal and hexadecimal numbers	
	Floating point representation	
<b>II</b>	Basic logic functions, logic gates	<b>07</b>
	Universal logic gates	
	Minimization of logic expressions	
	Flip flops	
<b>III</b>	Registers, shift registers	<b>07</b>
	Binary counters	
	Decoders	
	multiplexers	
	Programmable logic devices	
<b>IV</b>	Algorithms for fixed point and floating point addition	<b>10</b>
	Subtraction, multiplication, and division operations	
	Hardware implementation of arithmetic and logic operations	
	High performance arithmetic	
<b>V</b>	Memory locations and addresses	<b>7</b>
	Machine addresses and sequencing	
	Various addressing modes	
	Instruction formats	
	Basic machine instructions	
	IA-32 Pentium example	

<b>VI</b>	Introduction to CPU	<b>7</b>
	Register transfer	
	Execution of instructions	
	Multiple bus organization	
	Hardwired control, micro programmed control	
<b>VII</b>	Concept of memory	<b>10</b>
	RAM, ROM memories	
	Memory hierarchy	
	Cache memories	
	Virtual memory	
	Secondary storage	
	Memory management requirements	
<b>VIII</b>	Introduction to I/O	<b>7</b>
	Interrupts hardware	
	Enabling and disabling interrupts	
	Device control	
	Direct memory access, buses	
	Interface circuits, standard I/O interfaces	
	<b>Total</b>	<b>65</b>

## Topic wise Coverage:

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### Unit I : Basic structure of computers and data representation

**LEARNING OBJECTIVES:** Deals with basic units and internal structure of computer. Students will be learning all the number base conversions

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### LECTURE PLAN:

Total no\_ of classes: 10

S.No	Name of the Topic	Text/Reference book code	No. of classes required
1	Computer types, functional units, operational concepts	T1	1
2	Bus structures, software, performance, computer generations	T1	1
3	Number base conversions, complements	T1	1
4	Signed binary numbers, binary codes	T1	1
5	Fixed pt representation, floating pt representation	T1	1

### ASSIGNMENT-1

1.

### UNIT-II : DIGITAL LOGIC CIRCUITS-I

## **LEARNING OBJECTIVES:**

Learn about logic gates and logic expressions

## **LECTURE PLAN:**

**Total No\_ of Classes: 07**

<b>S.No</b>	<b>Name of the Topic</b>	<b>Reference book code</b>	<b>No. of classes required</b>
06	Basic logic functions	T2	1
07	Logic gates	T2	1
08	Universal logic gates	T2	1
09	Minimization of logic expressions	T2	1
10	Minimization of logic expressions	T2	1
11	Flip flops	T2	1
12	Flip flops	T2	1

## **ASSIGNMENT-II**

## **UNIT-III : DIGITAL LOGIC CIRCUITS-II**

## **LEARNING OBJECTIVES:**

## **LECTURE PLAN:**

**Total No\_ of Classes: 07**

S.No	Name of the Topic	Text/Reference book code	No. of classes required
13	Registers	T2	1
14	Shift registers	T2	1
15	Binary counters	T2	1
16	Decoders, multiplexers	T2	1
17	Programmable logic devices	T2	1

#### **UNIT-IV : COMPUTER ARITHMETIC**

##### **❖ LEARNING OBJECTIVES:**

##### **LECTURE PLAN:**

**Total No\_ of Classes: 10**

S.No	Name of the Topic	Text/Reference book code	No. of classes required
18	Algorithms for fixed pt and floating pt. addition	T2	2
19	Subtraction, multiplication, division operations	T2	1
20	Hardware implementation of arithmetic and logic operations	T2	1
21	High performance	T2	1

## **UNIT-V: INSTRUCTION SET AND ADDRESSING**

### **❖ LEARNING OBJECTIVES:**

#### **LECTURE PLAN:**

**Total No\_ of Classes: 7**

<b>S.No</b>	<b>Name of the Topic</b>	<b>Text/Reference book code</b>	<b>No. of classes required</b>
22	Memory locations and addresses machine addresses and sequencing	T2	1
23	Various addressing modes	T2	1
24	Instruction formats	T2	2
25	Basic machine instructions	T2	2
26	IA-32 Pentium example	T2	2
27	addresses	T2	2

## **UNIT-VI: PROCESSOR ORGANIZATION**

### **❖ LEARNING OBJECTIVES:**

#### **LECTURE PLAN:**

**Total No\_ of Classes: 07**

S.No	Name of the Topic	Text/Reference book code	No. of Lecture classes required
28	Introduction to CPU, register transfers	R3	1
29	Execution of instructions	R3	1
30	Multiple bus organization	R3	1
31	Hardwired control	R3	1
32	Micro programmed control	R3	1

## UNIT-VII: MEMORY ORGANIZATION

### ❖ LEARNING OBJECTIVES

**LECTURE PLAN: Basic Design Using a RTOS:**

**Total No\_ of Classes: 10**

S.No	Name of the Topic	Text/Reference book code	No. of classes required
37	Concepts of memories RAM, ROM memories	R3	1
38	Memory hierarchy	R3	1
39	Cache memories	R3	1
40	Virtual memory	R3	1
41	Secondary storage	R3	1
42	Memory management requirements	R3	1

43	Memory hierarchy	R3	1
44	Virtual memory	R3	1
45	Memory management	R3	1

## UNITVIII: I/O ORGANIZATION

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### ❖ LEARNING OBJECTIVES:

### LECTURE PLAN:

**Total No\_ of Classes: 7**

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S.No	Name of the Topic	Text/Reference book code	No. of classes required
50	INTRODUCTION TO I/O	T1	1
51	Interrupts hardware	T1	2
52	Enabling and disabling interrupts	T1	1
53	Device control	T1	1
54	Direct memory access	T1	1
55	Interface circuits	T1	1
56	Standard I/O interfaces	T1	1

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- 6. Basic Electrical Engineering**
- 7. Electrical & Electronics Lab**
- 8. Data Structures Through C++**

## 6. Basic Electrical Engineering

### JNTU Syllabus

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<b>Unit – I</b>	ohm's Law, basic circuit components, kirchhoff's laws.
<b>Unit – II</b>	types of elements, types of sources, series parallel circuits, Star-Delta transformation, network theorems
<b>Unit – III</b>	Fundamentals of AC quantities, average RMS values of AC quantities, form factor, peak factor, about J operator, phasor algebra, analysis of AC single element & series circuits
<b>Unit – IV</b>	<b>TRANSFORMERS:</b> Construction, principle of operation, ideal & practical transformers, losses, tests & efficiency calculations, regulations
<b>Unit – V</b>	<b>DC GENERATORS:</b> principle of operation, types of DC generators, e.m.f equation
<b>Unit - VI</b>	<b>DC MOTORS:</b> Principle of operation, types, losses & torque equation, efficiency calculations
<b>Unit - VII</b>	<b>AC MACHINES:</b> Three phase induction motor, principle of

	operation, slip & rotor frequency, torque
<b>Unit - VIII</b>	<b>INSTRUMENTATION:</b> Classification, essential features, PMMC, MI meters

### Guidelines to Students

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Where will this subject help?

### Books / Material

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<b>Text Books</b>
1. Principles of electrical & electronics engg by V.K.Mehta & Rohit Mehta

<b>Suggested / Reference Books</b>
1. Basic electrical engg by:T.K.Nagaskar

## Course Schedule

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Number of Hours / Lectures available in this Semester / Year	65
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### Distribution of Hours Unit – Wise

Unit	Topic	Total No. of Hours
I	ohm's Law, basic circuit components, kirchhoff's laws.	08
II	types of elements, types of sources, series parallel circuits, Star-Delta transformation, network theorems	13
III	. Fundamentals of AC quantities, average RMS values of AC quantities, form factor, peak factor, about J operator, phasor algebra, analysis of AC single element & series circuits	09
IV	<b>TRANSFORMERS:</b> Construction, principle of operation, ideal & practical transformers, losses, tests & efficiency calculations, regulations	11
V	<b>DC GENERATORS:</b> principle of operation, types of DC generators, e.m.f equation	07

	.	
<b>VI</b>	<b>DC MOTORS:</b> Principle of operation,types,losses & torque equation, efficiency calculations	<b>08</b>
<b>VII</b>	<b>AC MACHINES:</b> Three phase induction motor, principle of operation, slip & rotor frequency, torque	<b>06</b>
<b>VIII</b>	<b>. INSTRUMENTATION:</b> Classification, essential features,PMMC,MI meters	<b>04</b>
	<b>Total</b>	<b>66</b>

### Topic wise Coverage:

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**Unit -1 :** ohm's Law, basic circuit components,kirchhoff's laws.

S.No	Topic Name	Number of lecture
1	Introduction BEE	1
2	Basic circuit components	3
3	Kirchhoff's laws	2
4	numerical	2

### Unit -2 :

Types of elements, types of sources, series parallel circuits, Star-Delta transformation, network theorems

S.No	Topic Name	Number of lecture
1	types of elements	1

2	types of sources	1
3	series parallel circuits	2
4	Star-Delta transformation	2
5	network theorems	4
6	numerical	

### Unit -3:

Fundamentals of AC quantities, average RMS values of AC quantities, form factor, peak factor, about J operator, phasor algebra, analysis of AC single element & series circuits

S.No	Topic Name	Number of lecture
1	Fundamentals of AC quantities	1
2	average RMS values of AC quantities	1
3	form factor, peak factor	1
4	about J operator	1
5	phasor algebra	2
6	analysis of AC single element & series	3

### Unit 4:

#### TRANSFORMERS:

Construction, principle of operation, ideal & practical transformers, losses, tests & efficiency calculations, regulations

S.No	Topic Name	Number of lecture
1	Construction	2
2	principle of operation	1
3	ideal & practical transformers	3
4	losses, tests & efficiency calculations	5

**Unit -5:DC GENERATORS:** principle of operation, types of DC generators, e.m.f equation

S.No	Topic Name	Number of lecture
1	Principle of operation & types	4
2	e.m.f equation	3

**Unit -6:****DC MOTORS:**

Principle of operation,types,losses & torque equation, efficiency calculations

S.No	Name	Number of lecture
1	Principle of operation	1
2	Types of DC motors	1
3	torque equation, efficiency calculations	3
4	Numerical	3

**Unit -7:****AC MACHINES:**

Three phase induction motor, principle of operation, slip & rotor frequency, torque

S.No	Topic Name	Number of lecture
1	Three phase induction motor	1
2	principle of operation	1
3	slip	1
4	Rotor frequency	1
5	Torque calculations	2

**Unit -8:INSTRUMENTATION:**

Classification, essential features,PMMC,MI meters

S.No	Topic Name	Number of lecture
1	Classification,	1
2	essential features	1
3	PMMC	1
4	MI meters	1