**CHAITANYA BHARATI INSTITUTE OF TECHNOLOGY**

**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**

**Stake holder involvement in Curriculum Development**

**AY 2017-18**

**Action taken and implementation in Curriculum**

# INDEX



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DEPARTMENT OF ECE
Chaitanya Bharathi Institute of Technolog
Hyderabad-500 075

# DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

## Stakeholder involvement in Curriculum Development

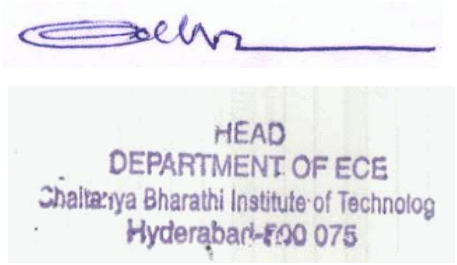
## (AY 2017-18)

## Action taken and implementation in Curriculum

### 1) Industry

| S.no. | Suggestions & opinion | Actions Taken |
|---|---|---|
| 1 | In the subject Network Theory, there is lack of design aspects. | It is included in the syllabus. |
| 2 | For the subject Electronic Measurement and Simulation lab, there is lack of practical knowledge on various transducers. | It is included in the syllabus. |

### 1) Industry (proof)



18EC C03

# NETWORK THEORY

| | |
|---|---|
| Instruction | 3 L Hours per week |
| Duration of SEE | 3 Hours |
| SEE | 70 Marks |
| CIE | 30 Marks |
| Credits | 3 |

**Prerequisite:** Knowledge on Elements of Electrical Engineering.

**Course Objectives:**
This course aims to:
1. Make understand the concepts of Electric Circuits, Network Theorems and the transients.
2. Make understand the concept of steady state and applying phasor analysis to AC circuits and analyzing magnetic coupled circuits.
3. Familiarize resonant circuits, two port network parameters, concept of Passive Filters and Network Synthesis.

**Course Outcomes:**
Upon completion of this course, students will be able to:
1. Recall basics of electrical circuits with nodal and mesh analysis
2. Illustrate electrical theorems for AC and DC Circuits.
3. Perform time domain and frequency domain analysis for networks.
4. Analyze the electrical network and two port network parameters for different applications i.e., magnetic coupled circuits, Filters.
5. Build different networks using various synthesis methods.

**UNIT-I**
**Network Theorems:** Network reduction techniques, Super Nodal and Super Mesh Analysis, Superposition, Thevenin's and Norton's theorems. Reciprocity, Maximum Power Transfer, Compensation, Millman's, Duality and Tellegen's Theorems using dependent and independent sources.

**UNIT-II**
**Transients:** Introduction, Study of initial conditions, DC transients RL, RC circuits, RLC circuits, Formulation of integral, differential equations. Circuit analysis using Laplace Transform and inverse Laplace Transform, Pole-Zero Plots, Zero Input Response, Zero State Response.

**UNIT-III**
**Steady State Analysis of AC circuits:** Phasor and vector representations, impedance and admittance, Average power, Apparent Power, Complex Power, Power triangle.
**Coupled circuits:** Concept of self, mutual inductance, co-efficient of coupling, dot convention rules and analysis of simple circuits.

**UNIT-IV**
**Frequency Domain Analysis:** Concept of complex frequency, impedance and admittance functions, Series and parallel resonance, Q-factor, selectivity, bandwidth.
**Two Port Networks:** Z, Y, h, g, ABCD and Inverse ABCD parameters, equivalence of two port networks. Interconnection of two port networks.

**UNIT-V**
**Filters:** Introduction to Filters and classification of Filters (Low pass, High pass, Band pass and Band stop) and their design aspects. **Network Synthesis:** Elements of circuit synthesis, Foster and Cauer forms of LC Networks, Synthesis of RC and RL networks.

**18EC C30**

## ELECTRONICS MEASUREMENT AND SIMULATION LAB

| | |
|---|---|
| Instruction | 2 P Hours per Week |
| Duration of SEE | 2 Hours |
| SEE | 35 Marks |
| CIE | 15 Marks |
| Credits | 1 |

**Prerequisite:** Concepts of Electronic Instrumentation and expected to have logical and programming skills.

**Course Objectives:**

This course aims to:

1. Demonstrate various Bridges & transducers using hardware set ups.
2. Understand the importance and applications of virtual instrumentation
3. Develop real time applications using LabVIEW.

**Course Outcomes:**

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

1. Understanding of the operational features of various analog and digital test and measurement equipment.
2. Analysis of various standard bridges and ability to measure temperature
3. Learn how to develop basic applications in the LabVIEW graphical programming environment.
4. Develop ability for programming in LabVIEW using various data structures, program structures, plotting the graphs and charts for system monitoring, processing and controlling.
5. Apply knowledge of mathematics and engineering to formulate and study or solve engineering problems, including problems at the interface of engineering.

### List of Experiments

1. Designing DC bridge for Resistance measurement (Quarter, Half and Full bridge).
2. Designing of AC bridge circuit for capacitance measurement.
3. Designing of signal conditioning circuit for Temperature measurement
4. Experimental study for the characteristics of ADC and DAC.
5. Familiarization with LabVIEW simulation tool.
6. Loops, Structures and Math-script in LabVIEW.
7. Implementation of Combinational circuits (Multiplexer and Demultiplexer) using my RIO.
8. Design of Sequential circuits (Flip flops and counters) with LabVIEW.
9. FIR and IIR Filter design in LabVIEW.
10. Implementation of Analog modulation and Demodulation schemes (AM and FM) using myRIO.
11. Digital carrier modulation and demodulation schemes (ASK, FSK and PSK) with LabVIEW
12. State variable analysis with LabVIEW.
13. Frequency domain analysis (Nyquist and Bode plots) with LabVIEW.
14. Sensor data acquisition using myDAQ.
15. Voltage / Current Sweep generation using myDAQ.

Additional Experiments based on

Structured enquiry

a) Digital IIR Notch filter design / ALU design / PLL design using LabVIEW

Open-ended enquiry

b) Develop any application in Control Systems/Signal Processing/ Communication Systems using LabVIEW

## 2) Alumni

| S.no. | Suggestions & opinion | Action taken |
|---|---|---|
| 1 | In Antennas and Wave Propagation, the names of the non-uniform linear arrays and the topics on ionosphere may be reviewed. | The topics are added in the syllabus |

## 2) Alumni (Proof)



**18EC C09**

### ANTENNAS AND WAVE PROPAGATION

| | |
|---|---|
| Instruction | 3 L Hours per Week |
| Duration of SEE | 3 Hours |
| SEE | 70 Marks |
| CIE | 30 Marks |
| Credits | 3 |

**Prerequisite:** Students should have prior knowledge about Electromagnetics theory and Maxwell's equations.

**Course Objectives:**
This course aims to:
1. The basic principles of an antenna and its parameters for characterizing its performance.
2. The fundamental concepts of various types of antennas, arrays for customizing the pattern parameters.
3. The propagation behaviour of the radio wave in both troposphere and ionosphere.

**Course Outcomes:**
Upon completion of this course, students will be able to:
1. Understand the basic parameters of an antenna.
2. Analyze the antenna using current distribution concept in order to estimate the field patterns.
3. Appraise and compare the concepts of broad side and end fire arrays.
4. Understand the working principle and characteristics of various antennas.
5. Classify and study of radio wave propagation.

**UNIT-I**
Principles of radiation, retarded potential. Isotropic, Directional and Omni-directional radiators. Basic antenna parameters: Radiation patterns, radiation intensity, far field, near field, gain and directivity, Antenna Polarization, effective aperture area and efficiency. Point sources, current distribution, Friis transmission formula.

**UNIT-II**
Analysis of Infinitesimal dipole, Half-wave dipole, quarter wave monopole, loop antenna and their far field patterns, calculation of radiation resistance and directivity.

**UNIT- III**
Concept of Antenna Array. Uniform linear array: Broadside and End fire arrays and calculation of directivity and beamwidth. Two element arrays of Infinitesimal dipole. Qualitative treatment of nonlinear arrays: Binomial and chebyschef arrays

**UNIT-IV**
Qualitative treatment of Helical Antennas: Normal and Axial mode patterns, wideband characteristics. Characteristics, radiation principles and applications of Rhombic Antenna, Yagi-Uda antenna, pyramidal Horn antenna, Parabolic antenna system, Log-Periodic antenna. Microstrip antennas: Radiation mechanism, different types, advantages and disadvantages. Design of rectangular Microstrip antenna.

**UNIT-V**
Ground wave propagation, Space and Surface waves, Tropospheric refraction and reflection, Duct propagation. Sky wave propagation: Critical frequency, Maximum Usable Frequency (MUF) and Skip distance, Line of sight propagation.

**Text Books:**
1. Constantine A. Balanis, "Antenna Theory: Analysis and Design", 4th Edition, John Wiley, 2016.
2. Edward C. Jordan and Kenneth G. Balmain, "Electromagnetic Waves and Radiating Systems", 2nd Edition, PHI, 2001.

**Suggested Reading:**
1. John D. Kraus, Ronald J. Marhefka & Ahmad S. Khan, "Antennas and Wave Propagation", 4th Edition, TMH, 2010.
2. Dennis Roody and John Coolen, "Electronic Communications", 4th Edition, Prentice Hall, 2008.





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**18EC C09**

## ANTENNAS AND WAVE PROPAGATION

| | |
|---|---|
| Instruction | 3 L Hours per Week |
| Duration of SEE | 3 Hours |
| SEE | 70 Marks |
| CIE | 30 Marks |
| Credits | 3 |

**Prerequisite:** Students should have prior knowledge about Electromagnetics theory and Maxwell's equations.

**Course Objectives:**
This course aims to:
1. The basic principles of an antenna and its parameters for characterizing its performance.
2. The fundamental concepts of various types of antennas, arrays for customizing the pattern parameters.
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**Course Outcomes:**
Upon completion of this course, students will be able to:
1. Understand the basic parameters of an antenna.
2. Analyze the antenna using current distribution concept in order to estimate the field patterns.
3. Appraise and compare the concepts of broad side and end fire arrays.
4. Understand the working principle and characteristics of various antennas.
5. Classify and study of radio wave propagation.

**UNIT-I**
Principles of radiation, retarded potential. Isotropic, Directional and Omni-directional radiators. Basic antenna parameters: Radiation patterns, radiation intensity, far field, near field, gain and directivity, Antenna Polarization, effective aperture area and efficiency. Point sources, current distribution, Friis transmission formula.

**UNIT-II**
Analysis of Infinitesimal dipole, Half-wave dipole, quarter wave monopole, loop antenna and their far field patterns, calculation of radiation resistance and directivity.

**UNIT- III**
Concept of Antenna Array. Uniform linear array: Broadside and End fire arrays and calculation of directivity and beamwidth. Two element arrays of Infinitesimal dipole. Qualitative treatment of nonlinear arrays: Binomial and chebyschef arrays

**UNIT-IV**
Qualitative treatment of Helical Antennas: Normal and Axial mode patterns, wideband characteristics. Characteristics, radiation principles and applications of Rhombic Antenna, Yagi-Uda antenna, pyramidal Horn antenna, Parabolic antenna system, Log-Periodic antenna. Microstrip antennas: Radiation mechanism, different types, advantages and disadvantages. Design of rectangular Microstrip antenna.

**UNIT-V**
Ground wave propagation, Space and Surface waves, Tropospheric refraction and reflection, Duct propagation. Sky wave propagation: Critical frequency, Maximum Usable Frequency (MUF) and Skip distance, Line of sight propagation.

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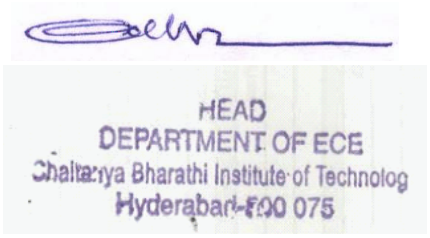
**3) Parent**

| S.no. | Suggestions &opinion | Action Taken |
|---|---|---|
| 1 | Introduce a practical course on VLSI design tools like Cadence so that the Students will have better hands on experience to acquire good core placement in VLSI domain. | VLSI design course and EDA lab is included in the curriculum in VII Semester |

**3) Parent (proof)**



# CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY (A)

**AICTE Model Curriculum with effect from AY 2021-22**

**B.E (Electronics and Communication Engineering)**

**SEMESTER – VII**

| S. No | Course Code | Title of the Course | Scheme of Instruction | | | Scheme of Examination | | | Credits |
|---|---|---|---|---|---|---|---|---|---|
| | | | Hours per week | | | Duration of SEE in Hours | Maximum Marks | | |
| | | | L | T | P/D | | CIE | SEE | |
| **THEORY** | | | | | | | | | |
| 1 | 18ECC26 | Computer Networks | 3 | - | - | 3 | 30 | 70 | 3 |
| 2 | 18ECC27 | VLSI Design | 3 | - | - | 3 | 30 | 70 | 3 |
| 3 | | Program Elective-IV | 3 | - | - | 3 | 30 | 70 | 3 |
| 4 | | Program Elective-V | 3 | - | - | 3 | 30 | 70 | 3 |
| 5 | | Open Elective-II | 3 | - | - | 3 | 30 | 70 | 3 |
| **PRACTICALS** | | | | | | | | | |
| 6 | 18ECC28 | Computer Networks Lab | - | - | 2 | 2 | 15 | 35 | 1 |
| 7 | 18ECC29 | Electronic Design and Automation Lab | - | - | 2 | 2 | 15 | 35 | 1 |
| 8 | 18ECC30 | Electronics Measurement and Simulation Lab | - | - | 2 | 2 | 15 | 35 | 1 |
| 9 | 18ECC31 | Project: Part-1 | - | - | 4 | - | 50 | - | 2 |
| | | **Total** | **15** | **-** | **10** | **-** | **245** | **455** | **20** |
| **Clock Hours Per Week: 25** | | | | | | | | | |

**L: Lecture** **D: Drawing** **CIE: Continuous Internal Evaluation**

**T: Tutorial** **P: Practical/Project Seminar/Dissertation** **SEE: Semester End Examination**



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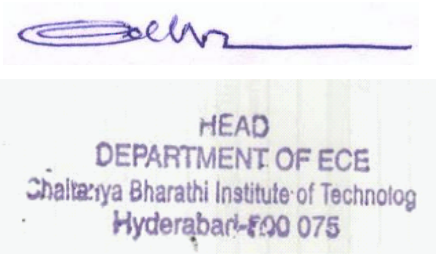
**4) Faculty feedback**

| S. no | Suggestions/Feedback | Action Plan |
|---|---|---|
| 1 | Topics on Advance wireless standards 4G and 5G technology can be included | Included in possible courses |
| 2 | Topics on Diversity Techniques may be included | Diversity techniques are included in Spread Spectrum technique course in PE-III |
| 3 | In Digital Communication course acquisition and tracking topics can be removed. | The topics are removed. |
| 4 | Due to limitation of 160 credit as per AICTE, MWE (3 units) and RADAR Systems(2 Units) are to be merged and should be named as Microwave and Radar Engineering | It is implemented in the curriculum in the VI Semester. |
| 5 | The course name of DCCN can be changed to Computer Networks. | The title of the course has been changed. |

**4) Faculty feedback (Proof)**



# CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY (A)

**AICTE Model Curriculum with effect from AY 2021-22**

**B.E (Electronics and Communication Engineering)**

| List of Courses in Program Elective-IV | | List of Courses in Program Elective-V | | List of Courses in Open Elective-II | |
|---|---|---|---|---|---|
| Course Code | Title of the Course | Course Code | Title of the Course | Course Code | Title of the Course |
| 18ECE15 | Cryptography and Blockchain Technology | 18ECE20 | CMOS RF IC Design | 18CE O02 | Disaster Mitigation and Management |
| 18ECE16 | DSP Processors and Architectures | 18ECE21 | Digital Image Processing | 18ME O04 | Entrepreneurship |
| 18ECE17 | Principles of Computational Electromagnetics | 18ECE22 | Embedded Systems | 18CS O06 | Fundamentals of DBMS |
| 18ECE18 | Semiconductor Memory Design and Testing | 18ECE23 | Software Defined Radio | 18IT O02 | Python Programming |
| 18EC E19 | Speech Processing | 18EC E24 | 5G Communications | 18EG O01 | Technical Writing Skills |

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**18EC E14**

## SPREAD SPECTRUM COMMUNICATION

(Program Elective-III)

| | |
|---|---|
| Instruction | 3 L Hours per week |
| Duration of SEE | 3 Hours |
| SEE | 70 Marks |
| CIE | 30 Marks |
| Credits | 3 |

**Prerequisite**: A prior knowledge of digital communication is required.

**Course Objectives:**

This course aims to:

1. Introduce the fundamental concepts of Spread Spectrum Communication Systems.
2. Train the students with various key issues related to synchronization in Spread Spectrum Communication Systems.
3. Familiarize with various code generators.

**Course Outcomes:**

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

1. Understand the fundamental concepts of Spread Spectrum Communication Systems.
2. Interpret the requirement of diversity in fading channels.
3. Integrate various synchronization techniques in Spread Spectrum Communication.
4. Analyze various multiple access schemes.
5. Devise various code generators required for estimating tracking loops.

**UNIT-I:** Introduction to Various Multiple Access Techniques: FDMA, TDMA, CDMA, SDMA, CSMA and OFDMA. Merits and demerits of multiple access schemes and their Comparison. Introduction to Spread Spectrum Communication Systems and its types.

**UNIT-II**: Direct Sequence Spread Spectrum: BPSK Direct Sequence Spread Spectrum. Frequency Hop Spread Spectrum: Coherent Slow Frequency Hop Spread Spectrum, Non-Coherent Slow Frequency Hop Spread Spectrum, Non-Coherent Fast Frequency Hop Spread Spectrum.

**UNIT-III** Binary Shift Register Sequences for Spread Spectrum Systems: Maximal Length Sequences: Properties of m-Sequences, Power Spectrum of m-Sequences, Gold Codes, Code Tracking Loops: Optimum Tracking of Wide Band Signals,

**UNIT-IV** Synchronization of the Receiver Spreading Code: Problem Definition and the Optimum Synchronizer, Serial Search Synchronization Techniques: Calculation of Mean and Variance of Synchronization Time, Modified Sweep Strategies, Generalized Analysis of Average Synchronization Time, Synchronization Using a Matched Filter.

**UNIT-V** Fading Channels: Statistical Model of Fading: General Fading Channel Model, WSSUS Fading Channels, Doubly Spread Channels, Requirement for Diversity in Fading Channels: Diversity Approaches, Diversity Combining Methods, Performance of Maximal Ratio Combining, The Rake Receiver.

**Text Books:**

1. R. L. Peterson, R. Ziemer and D. Borth, "Introduction to Spread Spectrum Communications", PHI, 1995.
2. Vijay K Garg "IS95 CDMA and CDMA 2000", Low price Edition, 2002.
3. Rappaport Theodore S, "Wireless Communications Principles and Practice", 2nd Edition, 2002.

**Suggested Reading:**

1. J. Viterbi, "CDMA - Principles of Spread Spectrum Communications", Addison-Wesley, 1997.
2. M. K. Simon, J. K. Omura, R. A. Scholts and B. K. Levitt, "Spread Spectrum Communications Handbook", McGraw Hill, 1994.
3. G. R. Cooper and C. D. McGillem, "Modern Communications and Spread Spectrum", McGraw - Hill, 1985

**18EC C16**

## DIGITAL COMMUNICATION

| | |
|---|---|
| Instruction | 3 L Hours per Week |
| Duration of SEE | 3 Hours |
| SEE | 70 Marks |
| CIE | 30 Marks |
| Credits | 3 |

**Prerequisite:** Fundamentals of probability theory and analog communication systems is required.

**Course Objectives:**
This course aims to:

1. Make the student learn the different techniques involved in digital transmission of analog signals.
2. Give the student an understanding of the various concepts of information theory, source coding and Channel coding schemes.
3. Enable the student to interpret the performance of digital modulation schemes and learn various spread spectrum techniques.

**Course Outcomes:**
Upon completion of this course, students will be able to:

1. Understand the concept of pulse digital modulation schemes and compare their performance.
2. Interpret the concept of information theory and apply source coding schemes.
3. Demonstrate various error control schemes and develop the encoding and decoding techniques to detect and correct the errors.
4. Analyze different digital modulation schemes and can compute the bit error performance.
5. Apply various spread spectrum modulation techniques.

**UNIT-I** Digital Transmission of Analog Signals: Elements of a digital communication system, Uniform quantization, PCM system, Bandwidth requirement of PCM system, Noise in PCM Systems, Non- uniform quantization, TDM-PCM system. Differential quantization, Differential PCM system, Delta Modulation, Noise in DM system, ADM. Comparison of PCM, DPCM, DM and DM schemes.

**UNIT-II** Information Theory: Uncertainty, Information and Entropy, Source coding: Source coding theorem, Shannon – Fano algorithm and Huffman coding. Discrete memory-less channels, Types of channels, cascaded channels, mutual information, Channel capacity, Information rate and Information capacity, Rate distortion theory.

**UNIT-III** Error Control Coding: Need for error control coding, Types of transmission errors. Linear Block Codes (LBC): description of LBC, generation, Syndrome and error detection, minimum distance of a block code, error detecting capabilities and error correcting, Hamming codes, Standard array and syndrome decoding. Binary cyclic codes (BCC): description of cyclic codes, encoding, decoding and error correction of cyclic codes using shift registers, Convolution codes: description, encoding, decoding: Exhaustive search method and sequential decoding.

**UNIT-IV** Digital Carrier Modulation Schemes: Optimum receiver for Binary Digital Modulation Schemes, Binary ASK, PSK, DPSK, FSK signaling schemes and their error probabilities. Introduction to MSK, Comparison of Digital Modulation Schemes. Introduction to M-ary Signaling Schemes: QPSK, Synchronization methods.

**UNIT–V** Spread-Spectrum Modulation: Need for spreading a code, generation and properties of PN sequence. Direct Sequence Spread Spectrum, Frequency Hopping spread spectrum systems and their applications.

# CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY (A)

**AICTE Model Curriculum with effect from AY 2020-21**

**B.E (Electronics and Communication Engineering)**

**SEMESTER – VI**

| S. No | Course Code | Title of the Course | Scheme of Instruction | | | Scheme of Examination | | | Credits |
|---|---|---|---|---|---|---|---|---|---|
| | | | Hours per week | | | Duration of SEE in Hours | Maximum Marks | | |
| | | | L | T | P/D | | CIE | SEE | |
| **THEORY** | | | | | | | | | |
| 1 | 18ECC20 | Digital Signal Processing | 3 | - | - | 3 | 30 | 70 | 3 |
| 2 | 18ECC21 | Microcontrollers | 3 | - | - | 3 | 30 | 70 | 3 |
| 3 | 18ECC22 | Microwave and Radar Engineering | 3 | - | - | 3 | 30 | 70 | 3 |
| 4 | | Program Elective-II | 3 | - | - | 3 | 30 | 70 | 3 |
| 5 | | Program Elective-III | 3 | - | - | 3 | 30 | 70 | 3 |
| 6 | 18MBC01 | Engineering Economics and Accountancy | 3 | - | - | 3 | 30 | 70 | 3 |
| **PRACTICALS** | | | | | | | | | |
| 7 | 18ECC23 | Digital Signal Processing Lab | - | - | 2 | 2 | 15 | 35 | 1 |
| 8 | 18ECC24 | Microcontrollers Lab | - | - | 2 | 2 | 15 | 35 | 1 |
| 9 | 18ECC25 | Microwave Engineering Lab | - | - | 2 | 2 | 15 | 35 | 1 |
| **Total** | | | **18** | **-** | **06** | - | **225** | **525** | **21** |
| **Clock Hours Per Week: 24** | | | | | | | | | |

**L: Lecture** **D: Drawing** **CIE: Continuous Internal Evaluation**

**T: Tutorial** **P: Practical/Project Seminar/Dissertation** **SEE: Semester End Examination**



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# CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY (A)

**AICTE Model Curriculum with effect from AY 2021-22**

**B.E (Electronics and Communication Engineering)**

**SEMESTER – VII**

| S. No | Course Code | Title of the Course | Scheme of Instruction | | | Scheme of Examination | | | Credits |
|---|---|---|---|---|---|---|---|---|---|
| | | | Hours per week | | | Duration of SEE in Hours | Maximum Marks | | |
| | | | L | T | P/D | | CIE | SEE | |
| **THEORY** | | | | | | | | | |
| 1 | 18ECC26 | Computer Networks | 3 | - | - | 3 | 30 | 70 | 3 |
| 2 | 18ECC27 | VLSI Design | 3 | - | - | 3 | 30 | 70 | 3 |
| 3 | | Program Elective-IV | 3 | - | - | 3 | 30 | 70 | 3 |
| 4 | | Program Elective-V | 3 | - | - | 3 | 30 | 70 | 3 |
| 5 | | Open Elective-II | 3 | - | - | 3 | 30 | 70 | 3 |
| **PRACTICALS** | | | | | | | | | |
| 6 | 18ECC28 | Computer Networks Lab | - | - | 2 | 2 | 15 | 35 | 1 |
| 7 | 18ECC29 | Electronic Design and Automation Lab | - | - | 2 | 2 | 15 | 35 | 1 |
| 8 | 18ECC30 | Electronics Measurement and Simulation Lab | - | - | 2 | 2 | 15 | 35 | 1 |
| 9 | 18ECC31 | Project: Part-1 | - | - | 4 | - | 50 | - | 2 |
| | | **Total** | **15** | - | **10** | - | **245** | **455** | **20** |
| **Clock Hours Per Week: 25** | | | | | | | | | |

**L: Lecture** **D: Drawing** **CIE: Continuous Internal Evaluation**

**T: Tutorial** **P: Practical/Project Seminar/Dissertation** **SEE: Semester End Examination**



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