# Department of Electronics & Communication Engineering

## Lesson Plan

## Session: Jan – June, 2026

## Semester: 4th

**Name:_____**

**University Roll Number: _____**

**BUDDHA INSTITUTE OF TECHNOLOGY**

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CL-1 Sector - 7, GIDA, Gorakhpur - 273209 (U.P)

Phones : (0551) 2580413-415

# Index

TIME TABLE

# BUDDHA INSTITUTE OF TECHNOLOGY, GIDA, GORAKHPUR

| Dept.: ECE | w.e.f: 29 January 2026 | Semester: 4-A | ROOM NO: 408 |
|---|---|---|---|

| Day / Time | 09:10-10:05 AM | 10:05-11:00 AM | SHORT BREAK (15 Min.) | 11:15-12:10 PM | 12:10-01:05PM | LUNCH BREAK (40 Min.) | 01:45-02:40 PM | 02:40-03:35 PM | 03:35-04:30 PM |
|---|---|---|---|---|---|---|---|---|---|
| Mon | AC (AKM) | SS (AKS) | | CE (AKC) | PP (PS) | | SI (AS) | TECH-EDGE 4(A1)-(RS) ) Innovation Cell | |
| | | | | | | | | CE LAB-4A2-ELC-04(AKC) | |
| Tues | AC LAB-4A1-ELC-05(AKM) | | | SS (AKS) | PP (PS) | | CE (AKC) | SI (AS) | AC (AKM) |
| | SS LAB-4A2-(AKS)-CLC- R. No-301 | | | | | | | | |
| Wed | PYTHON LAB(A1+A2) CLC-R.No-304 | | | CE (AKC) | TC (AS) | | SS (AKS) | AC (AKM) | SI (AS) |
| Thu | SS LAB-4A1-(AKS)-CLC-- R. No-301 | | | SS (AKS) | PP (PS) | | SI (AS) | AC (AKM) | CE (AKC) |
| | AC LAB-4A2-ELC-05(AKM) | | | | | | | | |
| Fri | AC (AKM) | CE (AKC) | | CSEP (AS) | TC (AS) | | SS (AKS) | TECH-EDGE 4(A2)-(RS) ) Innovation Cell | |
| | | | | | | | | CE LAB-4A1-ELC-04(AKC) | |
| Sat | SI (AS) | CE (AKC) | | SS (AKS) | AC (AKM) | | | | |

**EVALUATION SCHEME**

| Subject Code | Subject | Sessional Marks | Exam Marks | Total Marks |
|---|---|---|---|---|
| **THEORY SUBJECTS** | | | | |
| BEC-401 | Communication Engineering | 30 | 70 | 100 |
| BEC-402 | Analog Circuits | 30 | 70 | 100 |
| BEC-403 | Signal System | 30 | 70 | 100 |
| BAS-401 | Technical Communication | 30 | 70 | 100 |
| BCC-402 | Python Programming | 30 | 70 | 100 |
| BOE-405 | Sensor & Instrumentation | 30 | 70 | 100 |
| **PRACTICAL/DESIGN/DRAWING** | | | | |
| BEC 451 | Communication Engineering Lab | 50 | 50 | 100 |
| BEC 452 | Analog Circuits Lab | 50 | 50 | 100 |
| BEC 453 | Signal SystemLab | 50 | 50 | 100 |

# BUDDHA INSTITUTE OF TECHNOLOGY

**Department of Electronics & Communication Engineering**

**ACADEMIC YEAR 2025-26 (Even Semester)**

## LESSON PLAN

| | | | |
|---|---|---|---|
| Semester: IV | Section: A | Course Code: BEC- 401 | Contact Hours /week**: 6** |
| Course name: **COMMUNICATION ENGG.** | | | # of credits: 3 |
| Teacher's name: **ANIL KUMAR CHAUDHARY** | | | Designation: AP |
| Sessional Marks:30 | End Semester Examination Marks:70 | | University Exam Hours: 3 |

| | |
|---|---|
| Prerequisites if any: | |
| NA | |
| Content delivery methods: | Chalk & Board, PPT, Video, Book |

**COURSE SYLLABUS (as prescribed by University / Board)**

| Module No | UNIT Contents | Hours | COs |
|---|---|---|---|
| 1 | Review of signals and systems, frequency domain representation of signals, principles of amplitude modulation systems- DSB, SSB and VSB modulations. | **16** | **CO1** |
| 2 | Angle modulation, representation of FM and PM signals, spectral characteristics of angle modulated signals. | **14** | **CO2** |
| 3 | Review of probability and random process, Gaussian and white noise characteristics, noise in amplitude modulation systems, noise in frequency modulation systems, pre-emphasis and de-emphasis, threshold effect in angle modulation. | **08** | **CO3** |
| 4 | Pulse modulation, sampling process, pulse amplitude and pulse code modulation (PCM), differential pulse code modulation. Delta modulation, noise considerations in PCM, time division multiplexing, digital multiplexers. | **12** | **CO4** |
| 5 | Digital modulation schemes- phase shift keying, frequency shift keying, quadrature amplitude modulation, continuous phase modulation and minimum shift keying. | **10** | **CO5** |

**COURSE OUTCOMES:** At the end of the Course, the Student will be able to:

| | |
|---|---|
| **CO1** | Understand the concepts of amplitude modulation in communication engineering. |
| **CO2** | Utilize the concept of angle modulation to find the parameters like modulation index, bandwidth and frequency components. |
| **CO3** | Apply the concept of probability and random process to find the noise in communication systems. |
| **CO4** | Illustrate the sampling process and various pulse modulation techniques like PCM, PWM, PPM. |
| **CO5** | Explain the concept of digital modulation signals and techniques like ASK, PSK and FSK. |

**Mapping of CO v/s PO**:

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 2 | 2 | 3 | 3 | 1 | - | - | - | - | 1 | - | 1 |
| **CO2** | 1 | 2 | 2 | 3 | 3 | - | - | - | - | | - | 1 |
| **CO3** | 2 | 2 | 2 | 2 | 1 | - | - | - | - | - | - | 1 |
| **CO4** | 2 | 2 | 2 | 2 | 2 | - | - | - | - | - | - | 1 |
| **CO5** | 2 | 2 | 2 | 2 | 1 | - | - | - | - | - | - | 1 |
| **Average** | 1.8 | 2 | 2.1 | 2.4 | 1.6 | - | - | - | - | .2 | - | 1 |

**Correlation levels: 1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)**

| Gap in the syllabus | |
|---|---|

| Topics to be covered beyond syllabus | |
|---|---|

## LESSON PLAN

| Lecture | Module | Scheduled | | | | Conducted | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Topic | *RBT Levels | CO Mapping | Date | Topic | Date | Of Students | Faculty Sign |
| 1 | I | Review of signals and systems | L2 | CO1 | | | | | |
| 2 | | Overview of analog communication system | L2 | | | | | | |
| 3 | | Overview of digital communication system | L2 | | | | | | |
| 4 | | Principles of modulation systems and need of modulation | L2 | | | | | | |
| 5 | | Principles of amplitude modulation systems | L2 | | | | | | |
| 6 | | Frequency domain representation of signals | L2 | | | | | | |
| 7 | | AM Receiver, TRF Receiver | L2 | | | | | | |
| 8 | | Superhetrodyne receiver | L2 | | | | | | |
| 9 | | **Tutorial 1** | | | | | | | |
| 10 | | AM transmitter | L2 | | | | | | |
| 11 | | DSB modulations balance mode | L2 | | | | | | |
| 12 | | DSB modulations ring modulation | L2 | | | | | | |
| 13 | | SSB modulations | L2 | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 14 | | VSB modulations | L2 | | | | | | |
| 15 | | Revision | L2 | | | | | | |
| 16 | | **Tutorial 2** | | | | | | | |
| 17 | | Angle modulation | L2 | | | | | | |
| 18 | | Tone modulated FM signal | L2 | | | | | | |
| 19 | | Representation of FM and PM signals | L2 | | | | | | |
| 20 | | FM Modulators | L2 | | | | | | |
| 21 | | Indirect FM Modulators | L2 | | | | | | |
| 22 | | Spectral characteristics of angle modulated signals | L2 | | | | | | |
| 23 | II | **Tutorial 3** | | CO2 | | | | | |
| 24 | | FM Demodulators | L2 | | | | | | |
| 25 | | Balance Slope Detector | L2 | | | | | | |
| 26 | | Foster-Seeley Discriminator | L2 | | | | | | |
| 27 | | PLL FM demodulator | L2 | | | | | | |
| 28 | | Stereo FM transmitter & Receiver | L2 | | | | | | |
| 29 | | Revision | L2 | | | | | | |
| 30 | | **Tutorial 4** | | | | | | | |
| 31 | | Sampling process | L2 | | | | | | |
| 32 | | Pulse amplitude modulation | L2 | | | | | | |
| 33 | | Pulse position modulation | L2 | CO4 | | | | | |
| 34 | **IV** | Pulse width modulation | L2 | | | | | | |
| 35 | | Pulse width demodulation | L2 | | | | | | |
| 36 | | Pulse code modulation (PCM) | L2 | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 37 | | **Tutorial 5** | | | | | | | |
| 38 | | Differential pulse code modulation | L2 | | | | | | |
| 39 | | Delta modulation | L2 | | | | | | |
| 40 | | Adaptive delta modulation | L2 | | | | | | |
| 41 | | Noise considerations in PCM | L2 | | | | | | |
| 42 | | **Tutorial 6** | | | | | | | |
| 43 | | Digital multiplexers | L2 | | | | | | |
| 44 | | Time division multiplexing | L2 | | | | | | |
| 45 | | Digital modulation schemes | L2 | | | | | | |
| 46 | **V** | Phase shift keying | L3 | | | | | | |
| 47 | | Frequency shift keying | L2 | | | | | | |
| 48 | | **Tutorial 7** | | CO5 | | | | | |
| 49 | | Frequency shift keying | L2 | | | | | | |
| 50 | | Quadrature amplitude modulation | L2 | | | | | | |
| 51 | | Continuous phase modulation and minimum shift keying | L2 | | | | | | |
| 52 | | **Tutorial 8** | L2 | | | | | | |
| 53 | | Review of probability and random process | L2 | | | | | | |
| 54 | | Gaussian and white noise characteristics | L2 | | | | | | |
| 55 | III | Noise in amplitude modulation systems Noise in DSB modulation systems | L2 | CO3 | | | | | |
| 56 | | **Tutorial 9** | L3 | | | | | | |
| 57 | | Noise in SSB modulation systems | L2 | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 58 | | Noise in frequency modulation systems | L3 | | | | | | |
| 59 | | Pre-emphasis and de-emphasis | L2 | | | | | | |
| 60 | | **Tutorial 10** | L2 | | | | | | |

| **Class Test** | **Syllabus** |
|---|---|
| **CT-01** | **Class 1-Class 16** |
| **PRE-AKTU** | **Full Syllabus** |

***Revised Bloom's Taxonomy (RBT) Levels:**
L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analysing; L5 – Evaluating; L6 - Creating

**References:**
**Text books :( As per University / Board syllabus)**
**1.** RP SINGH "Communication System- Modern Digital and Analog' 3rd edition TMH India, 2006.

**Reference Books:(As per University / Board syllabus)**

**R1.** S Taub H. and Schilling D.L., "Principles of Communication Systems, " RP SINGH Tata McGraw Hill,2001..
**R2**. Haykin S., "Communications Systems," John Wiley and Sons, 2001.

**Faculty Sign** **HOD's sign**

# BUDDHA INSTITUTE OF TECHNOLOGY

**Department of Electronics and Communication Engineering**

**ACADEMIC YEAR 2025-26 (Even Semester)**

## LESSON PLAN

| | | | |
|---|---|---|---|
| Semester: **IV** | Section: **NA** | Course Code: **BEC-402** | Contact Hours /week**: 6** |
| Course name: **Analog Circuits** | | | # of credits: 4 |
| Teacher's name: **Mr. Arun Kumar Mishra** | | | Designation: AP |
| Sessional Marks: 30 | End Semester Examination Marks:70 | | University Exam Hours: 3 |

**Prerequisites if any:**

| Code No | Course Name | Description | Semester |
|---|---|---|---|
| BEC-301 | Electronic Devices | Bipolar Junction Transistor, various configurations (such as CE, CB & CC) and their features. DC biasing schemes for BJT, Field Effect Transistor, configurations (such as CS, CD & CG), DC biasing schemes, MOSFET, | III |

| | |
|---|---|
| Content delivery methods: | Chalk & Board, PPT, Video, Book |

**COURSE SYLLABUS (as prescribed by University / Board)**

| Module No | UNIT Contents | Hours | COs |
|---|---|---|---|
| **1** | Amplifier models: Voltage amplifier, current amplifier, trans-conductance amplifier and trans-resistance amplifier. Small signal analysis, low frequency transistor models, estimation of voltage gain, input resistance, output resistance etc., design procedure for particular specifications, low frequency analysis of multistage amplifiers. | 8 | CO1 |
| **2** | Frequency response of Amplifiers: High frequency transistor models, frequency response of single stage and multistage amplifiers, cascade amplifier, Feedback topologies: Voltage series, current series, voltage shunt,<br>current shunt, effect of feedback on gain, bandwidth etc., calculation, concept of stability, gain margin and phase margin. | 8 | CO2 |
| **3** | Oscillators: Review of the basic concept, Barkhausen criterion, RC oscillators (phase shift, Wien bridge etc.), LC oscillators (Hartley, Colpitt,<br>Clapp etc.), Crystal Oscillator. | 8 | CO3 |
| **4** | Current mirror: Basic topology and its variants, V-I characteristics, output resistance and minimum sustainable voltage (VON), maximum usable load,<br>differential amplifier: Basic structure and principle of operation, calculation<br>of differential gain, common mode gain, CMRR and ICMR, Op-Amp design: Design of differential amplifier for a given specification, design of gain stages and output stages, compensation. | 8 | CO4 |
| **5** | Op-Amp applications: Review of inverting and non-inverting amplifiers, integrator and differentiator, summing amplifier, precision rectifier, Schmitt trigger and its applications. Various classes of operation (Class A, B, AB, C etc.), their power efficiency and linearity issues. | 8 | CO5 |

**COURSE OUTCOMES:** At the end of the Course, the Student will be able to:

| | | |
|---|---|---|
| **CO1** | Use transistors in various electronic circuits. | |
| **CO2** | Apply different feedback topologies. | |
| **CO3** | Explain different types of oscillator circuits. | |
| **CO4** | Explain differential amplifier and current mirror circuits. | |
| **CO5** | Apply the concept of Operational amplifier to design linear and non-linear applications. | |

**Mapping of CO v/s PO**:

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 1 | 1 | 1 | 1 | - | - | - | - | - | - | - | 2 |
| **CO2** | 3 | 3 | 2 | 1 | - | - | - | - | - | - | - | 2 |
| **CO3** | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 |
| **CO4** | 3 | 2 | 2 | - | - | - | - | - | - | - | - | - |
| **CO5** | 2 | 2 | 2 | 1 | - | - | - | - | - | - | - | 1 |
| **Average** | 2 | 1.8 | 1.4 | 0.6 | | | | | | | | 1.2 |

| | PSO1 | PSO2 | PSO3 |
|---|---|---|---|
| **CO1** | 2 | 2 | - |
| **CO2** | 2 | 2 | - |
| **CO3** | - | - | - |
| **CO4** | 1 | - | - |
| **CO5** | 2 | 1 | - |
| **Average** | 1.4 | 1 | - |

**Correlation levels: 1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)**

| | |
|---|---|
| **Gap in the syllabus** | |

| | |
|---|---|
| **Topics to be covered beyond syllabus** | NA |

## LESSON PLAN

| Lecture | Module | Scheduled | | | | Conducted | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Topic | *RBT Levels | C O Mapping | Date | Topic | Date | No. Of Students | Faculty Sign |
| 1. | I | Amplifier models: Voltage amplifier, current amplifier | L2 | CO1 | | | | | |
| 2. | | Trans-conductance amplifier and trans-resistance amplifier | L2 | | | | | | |
| 3. | | Small signal analysis, low frequency transistor model | L2 | | | | | | |
| 4. | | Estimation of voltage gain, input resistance, output resistance (CE Amplifier) | L2 | | | | | | |
| 5. | | Estimation of voltage gain, input resistance, output resistance (CB Amplifier) | L2 | | | | | | |
| 6. | | Estimation of voltage gain, input resistance, output resistance (CC Amplifier) | L2 | | | | | | |
| 7. | | **TUTORIAL-1** | | | | | | | |
| 8. | | Estimation of voltage gain, input resistance, output resistance (CS Amplifier) | L2 | | | | | | |
| 9. | | Estimation of voltage gain, input resistance, output resistance (CD Amplifier) | L2 | | | | | | |
| 10. | | Estimation of voltage gain, input resistance, | L2 | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | output resistance (CG Amplifier) | | | | | | | |
| 11. | | design procedure for particular specifications. | L2 | | | | | | |
| 12. | | low frequency analysis of multistage amplifiers. | L2 | | | | | | |
| 13. | | **TUTORIAL-2** | | | | | | | |
| 14. | | Frequency response of amplifiers: High frequency transistor models | L2 | | | | | | |
| 15. | | Frequency response of single stage and multistage amplifiers | L2 | | | | | | |
| 16. | | Cascade amplifier | L2 | | | | | | |
| 17. | | Feedback topologies: Voltage series, Current series, | L2 | | | | | | |
| 18. | | **TUTORIAL-3** | L2 | | | | | | |
| 19. | | Voltage shunt, current shunt | | | | | | | |
| 20. | **II** | Effect of feedback on gain, bandwidth etc | L2 | | | | | | |
| 21. | | Effect of feedback on gain, bandwidth etc | L2 | | | | | | |
| 22. | | Concept of stability | L2 | CO2 | | | | | |
| 23. | | Gain margin and phase margin | L2 | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| 24. | | **TUTORIAL-4** | | | | | | | |
| 25. | III | Oscillators: Review of the basic concept | L2 | CO3 | | | | | |
| 26. | | Barkhausen criterion | L2 | | | | | | |
| 27. | | RC phase shift Oscillator | L2 | | | | | | |
| 28. | | Wien bridge Oscillator | L2 | | | | | | |
| 29. | | **TUTORIAL-5** | L2 | | | | | | |
| 30. | | LC Hartley oscillator | | | | | | | |
| 31. | | Colpitt Oscillator, Clapp Oscillator | L2 | | | | | | |
| 32. | | Clapp Oscillator, | L2 | | | | | | |
| 33. | | Crystal Oscillator | L2 | | | | | | |
| 34. | | **TUTORIAL-6** | L2 | | | | | | |
| 35. | **V** | Op-Amp applications (Introduction) | L2 | CO5 | | | | | |
| 36. | | Inverting Amplifier | L2 | | | | | | |
| 37. | | Non-Inverting Amplifier | L2 | | | | | | |
| 38. | | Integrator & Differentiator | L2 | | | | | | |
| 39. | | Summing amplifier | L2 | | | | | | |
| 40. | | Precision rectifier | L2 | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| 41. | | Schmitt trigger and its applications | | | | | | | |
| 42. | | **TUTORIAL-7** | | | | | | | |
| 43. | | Class-A Amplifier | L2 | | | | | | |
| 44. | | Class B Amplifier | L2 | | | | | | |
| 45. | | Class A B Amplifier | L2 | CO1 | | | | | |
| 46. | | Class C Amplifier | L2 | | | | | | |
| 47. | | **TUTORIAL-8** | | | | | | | |
| 48. | | Differential amplifier: Basic structure and principle of operation. | L2 | | | | | | |
| 49. | | Differential amplifier: Basic structure and principle of operation | L2 | | | | | | |
| 50. | | Calculation of differential gain, Common mode gain, CMRR, ICMR | L2 | | | | | | |
| 51. | | Calculation of differential gain, Common mode gain, CMRR, ICMR | L3 | | | | | | |
| 52. | | CMRR, ICMR | L2 | | | | | | |
| 53. | IV | **TUTORIAL-9** | | | | | | | |
| 54. | | Current mirror: Basic topology and its variants | L2 | CO4 | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 55. | | V-I characteristics | L2 | | | | | | |
| 56. | | Output resistance and minimum sustainable voltage (VON), | L2 | | | | | | |
| 57. | | Maximum usable load | | | | | | | |
| 58. | | **TUTORIAL-10** | L2 | | | | | | |

| **Class Test** | **Syllabus** |
|---|---|
| **CT-01** | **Class 1-Class 25** |
| **PRE-AKTU** | **Full Syllabus** |

***Revised Bloom's Taxonomy (RBT) Levels:**
L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analysing; L5 – Evaluating; L6 - Creating

**References:**

**Text books :( As per University / Board syllabus)**

**T1.** J.V. Wait, L.P. Huelsman and GA Korn, "Introduction to Operational Amplifier theory and applications," Mc Graw Hill, 1992..
**T2.** A.S. Sedra and K.C. Smith, "Microelectronic Circuits," Saunder's College11 Publishing, 4th edition.

**Reference Books:(As per University / Board syllabus)**

**R1.** P. Raja, "Electronic Circuits" Umesh Publication.

**Faculty Sign** **HOD's sign**

# BUDDHA INSTITUTE OF TECHNOLOGY

**Department of Electronics and Communication Engineering**

## ACADEMIC YEAR 2025-26 (Even Semester)

## LESSON PLAN

| | | | |
|---|---|---|---|
| Semester: IV | Section: A | Course Code: BEC 403 | Contact Hours /week**: 8** |
| Course name: Signal System | | | # of credits: 4 |
| Teacher's name: **Mr. Anil Singh** | | | Designation: AP |
| Sessional Marks: 30 | End Semester Examination Marks: 70 | | University Exam Hours: 3 |

| |
|---|
| Prerequisites if any: |
| NA |

| | |
|---|---|
| Content delivery methods: | By Face-to-face delivery, Presentation, Tutorial etc. |

**COURSE SYLLABUS (as prescribed by University / Board)**

| Module No | Contents of Module | Hrs | COs |
|---|---|---|---|
| **1** | Signals and systems as seen in everyday life, and in various branches of engineering and science, energy and power signals, continuous and discrete time signals, continuous and discrete amplitude signals, system properties: linearity, additivity and homogeneity, shift-invariance, causality, stability, realizability. | 8 | CO1 |

| | | | |
|---|---|---|---|
| **2** | Linear shift-invariant (LSI) systems, impulse response and step response, convolution, input-output behaviour with aperiodic convergent inputs, characterization of causality and stability of linear shift invariant systems, system representation through differential equations and difference equations, Periodic and semi-periodic inputs to an LSI system, the notion of a frequency response and its relation to the impulse response | 8 | CO2 |
| **3** | Fourier series representation, Fourier transform, convolution/multiplication and their effect in the frequency domain, magnitude and phase response, Fourier domain duality, Discrete-Time Fourier Transform (DTFT) and the Discrete Fourier transform (DFT), Parseval's Theorem, the idea of signal space and orthogonal bases, the Laplace transform, notion of Eigen functions of LSI systems, a basis of Eigen functions, region of convergence, poles and zeros of system, Laplace domain analysis, solution to differential equations and system behaviour. | 8 | CO3 |
| **4** | The z-Transform for discrete time signals and systems-Eigen functions, region of convergence, z-domain analysis. | 8 | CO4 |
| **5** | The sampling theorem and its implications- spectra of sampled signals, reconstruction: ideal interpolator, zero-order hold, first-order hold, and so on, aliasing and its effects, relation between continuous and discrete time systems. | 8 | CO5 |

**COURSE OUTCOMES:** At the end of the Course, the Student will be able to:

| | |
|---|---|
| **CO1** | Explain different types of signals and system properties. |
| **CO2** | Apply the concept of convolution to find the response of LSI system for different types of inputs and represent the system through differential and difference equations. |
| **CO3** | Explain the idea of Eigen functions, Fourier series representation and different frequency transformation techniques like FT, DTFT, |

| | |
|---|---|
| | DFT, Z- transform and Laplace transform. |
| **CO4** | Analyse the behaviour of discrete and continuous time LSI Systems by using respective frequency transformation techniques and convolution. |
| **CO5** | Explain the process and techniques of sampling and reconstruction, effect of under sampling and relation between continuous and discrete time systems. |

**Mapping of CO v/s PO**:

| **CO** | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 2 | 1 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| **CO2** | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| **CO3** | 2 | 2 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| **CO4** | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| **CO5** | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| **Average** | ***1.6*** | ***1.2*** | ***1.4*** | ***1.0*** | ***1.4*** | ***0.0*** | ***0.0*** | ***0.0*** | ***0.0*** | ***0.0*** | ***0.0*** | ***1.0*** |

| | PSO1 | PSO2 | PSO3 |
|---|---|---|---|
| **CO1** | 2 | 1 | 1 |
| **CO2** | 2 | 1 | 1 |
| **CO3** | 1 | 2 | 1 |
| **CO4** | 2 | 2 | 1 |

| | | | |
|---|---|---|---|
| **CO5** | 2 | 1 | 1 |
| **Average** | ***1.8*** | ***1.4*** | **1.0** |

**Correlation levels: 1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)**

| | |
|---|---|
| **Gap in the syllabus** | Topics related to disintegration of structures and Irrigation Engineering. |

| | |
|---|---|
| **Topics to be covered beyond syllabus** | Bridge topics which are help to solve different competitive Exam such as **GATE, IES** and **State AE** etc. |

**Assessment Methodologies:**

| Sl. No. | Description | Type |
|---|---|---|
| 1 | Student Assignment | Direct |
| 2 | Internal assessment | Direct |
| 3 | University exam | Direct |
| 4 | Student feedback | Indirect |
| 5 | Alumni feedback | Indirect |
| 6 | Employers feedback | Indirect |

**LESSON PLAN**

| Lecture | Module | Scheduled | | | | Conducted | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | **Topics** | ***RBT Levels** | **C O Mapping** | **Date** | **Topic** | **Date** | **No. Of Students** | **Faculty Sign** |
| **1** | **I** | Introduction of signal system | **L2** | **CO1** | | | | | |
| **2** | | Signals and systems as seen in everyday life, and in various branches of engineering and science | | | | | | | |
| **3** | | Signals and systems as seen in everyday life, and in various branches of engineering and science | | | | | | | |
| **4** | | Energy and power signals | | | | | | | |
| **5** | | Continuous and discrete time signals | | | | | | | |
| **6** | | Continuous and discrete amplitude signals | | | | | | | |
| **7** | | **Tutoria1** | | | | | | | |
| **8** | | System properties | | | | | | | |
| **9** | | Linearity, additivity and homogeneity | | | | | | | |
| **10** | | Linearity, additivity and homogeneity | | | | | | | |
| **11** | | Shift-invariance, causality, stability, realizability. | | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **12** | | Shift-invariance,<br>Causality, stability, realizability. | | | | | | | |
| **13** | | **Tutorial 2** | | | | | | | |
| **14** | | Linear shift-invariant (LSI) systems | | | | | | | |
| **15** | | Impulse response and step response | | | | | | | |
| **16** | | Convolution | | | | | | | |
| **17** | | Input-output behaviour with aperiodic convergent inputs | | | | | | | |
| **18** | | Characterization of causality and stability of linear shift invariant systems | | | | | | | |
| **19** | | **Tutorial 3** | | | | | | | |
| **20** | **II** | System representation through differential equations and difference<br>Equations | **L3** | **CO2** | | | | | |
| **21** | | Periodic and semi-periodic inputs to an LSI system | | | | | | | |
| **22** | | The notion<br>Of a frequency response and its relation to the impulse response | | | | | | | |
| **25** | | **Tutorial 4** | | | | | | | |
| **23** | **III** | Fourier series representation | **L3** | **CO3** | | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| **24** | | Fourier series representation | | | | | | | |
| **26** | | Convolution/multiplication<br>And their effect in the frequency domain. | | | | | | | |
| **27** | | Convolution/multiplication<br>And their effect in the frequency domain. | | | | | | | |
| **28** | | Magnitude and phase response | | | | | | | |
| **29** | | Fourier domain duality | | | | | | | |
| **30** | | Discrete-time fourier transform (dtft) | | | | | | | |
| **31** | | Discrete-time fourier transform (dtft) | | | | | | | |
| **32** | | Discrete Fourier transform (DFT) | | | | | | | |
| **33** | | Discrete Fourier transform (DFT) | | | | | | | |
| **34** | | Parseval's theorem | | | | | | | |
| **35** | | The idea of signal<br>Space and orthogonal bases | | | | | | | |
| **36** | | **Tutorial 5** | | | | | | | |
| **37** | | The Laplace transform | | | | | | | |
| **38** | | The Laplace transform | | | | | | | |
| **39** | | The Laplace transform | | | | | | | |
| **40** | | Notion of Eigen | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| | | Functions of LSI systems | | | | | | | |
| **41** | | A basis of Eigen functions | | | | | | | |
| **42** | | Region of convergence | | | | | | | |
| **43** | | Poles and zeros of system | | | | | | | |
| **44** | | Laplace domain analysis | | | | | | | |
| **45** | | Laplace domain analysis | | | | | | | |
| **46** | | Solution to differential equations and system behaviour. | | | | | | | |
| **47** | | Solution to differential equations and system behaviour. | | | | | | | |
| **48** | | **Tutorial 6** | | | | | | | |
| **49** | **IV** | The z-Transform for discrete time signals | **L3** | **CO4** | | | | | |
| **50** | | The z-Transform for discrete time signals | | | | | | | |
| **51** | | The z-Transform for discrete time signals | | | | | | | |
| **52** | | Systems-Eigen functions | | | | | | | |
| **53** | | **Tutorial 7** | | | | | | | |
| **54** | | Region of convergence | | | | | | | |
| **55** | | Z-domain analysis | | | | | | | |
| **56** | | **Tutorial 8** | | | | | | | |
| **57** | **V** | The sampling theorem and its implications | **L3** | **CO5** | | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| **58** | | Spectra of sampled signals | | | | | | | |
| **59** | | Ideal interpolator | | | | | | | |
| **60** | | Zero-order hold | | | | | | | |
| **61** | | First-order hold | | | | | | | |
| **62** | | Aliasing and its effects, | | | | | | | |
| **63** | | **Tutorial 9** | | | | | | | |
| **64** | | Relation between continuous and discrete time systems. | | | | | | | |
| **65** | | Relation between continuous and discrete time systems. | | | | | | | |
| **66** | | **Tutorial 10** | | | | | | | |
| **67** | | Revision | | | | | | | |
| **68** | | Revision | | | | | | | |
| **69** | | Revision | | | | | | | |
| **70** | | Revision | | | | | | | |

***L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analysing; L5 – Evaluating; L6 – Creating**

| **Test** | **No of lectures** |
|---|---|
| **CT-1** | **1-30** |
| **PRE-AKTU** | **Full Syllabus** |

**Literature:**

**Text Books:**

1. A.V. Oppenheim, A.S. Willsky and I.T. Young, "Signals and Systems," Pearson, 2015

**Reference Books:**

1. A. Anand Kumar, “Signals and Systems,” PHI 3rd edition, 2018.
2. J. Nagrath, S. N. Sharan, R. Ranjan, S. Kumar, "Signals and Systems," TMH New Delhi, 2001.

**Faculty Sign** **HOD’s sign**

# BUDDHA INSTITUTE OF TECHNOLOGY

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

**ACADEMIC YEAR 2025-26 (Even Semester)**

## LESSON PLAN

| | | | |
|---|---|---|---|
| Semester: **IV** | Section: | Course Code: **BAS401** | Contact Hours / week**: 2** |
| Course Name: **Technical Communication** | | | # of credits: **3** |
| Teacher's Name: **Mr. Ashutosh Srivastava** | | | Designation: **Assistant Professor** |
| Sessional Marks: **30** | | End Semester Examination Marks:**70** | University Exam Hours: **3** |

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|---|
| Prerequisites if any: |
| NA |

| | |
|---|---|
| Content delivery methods: | By Face to face delivery, Presentation, Tutorial etc. |

**COURSE SYLLABUS (as prescribed by University / Board)**

| Module No | UNIT Contents | Hours | COs |
|---|---|---|---|
| 1 | **Fundamentals of Technical Communication:**<br><br>Technical Communication: Features; Distinction between General and Technical Communication; Language as a tool of Communication; Dimensions of Communication: Reading & comprehension; Technical writing: sentences; Paragraph; Technical style: Definition, types & Methods; The flow of Communication: Downward; upward, Lateral or Horizontal; Barriers to Communication. | **5** | **CO1** |

| | | | |
|---|---|---|---|
| 2 | **Forms of Technical Communication:**<br><br>Technical Report: Definition & importance; Thesis/Project writing: structure & importance; synopsis writing: Methods; Technical research Paper writing: Methods & style; Seminar & Conference paper writing; Expert Technical Lecture: Theme clarity; Analysis & Findings; 7 Cs of effective business writing: concreteness, completeness, clarity, conciseness, courtesy, correctness, consideration, C.V./Resume writing; Technical Proposal: Types, Structure & Draft. | **6** | **CO2** |
| 3 | **Technical Presentation:** Strategies & Techniques Presentation: Forms; interpersonal Communication; Class room presentation; style; method; Individual conferencing: essentials: Public Speaking: method; Techniques: Clarity of substance; emotion; Humour; Modes of Presentation; Overcoming Stage Fear; Audience Analysis & retention of audience interest; Methods of Presentation: Interpersonal; Impersonal; Audience Participation: Quizzes & Interjections. | **7** | **CO3** |
| 4 | **Technical Communication Skills:**<br><br>Interview skills; Group Discussion: Objective & Method; Seminar/Conferences Presentation skills: Focus; Content; Style; Argumentation skills: Devices: Analysis; Cohesion & Emphasis; Critical thinking; Nuances: Exposition narration & Description; effective business communication competence: Grammatical; Discourse competence: combination of expression & conclusion; Socio-linguistic competence: Strategic competence: Solution of communication problems with verbal and non verbal means. | **8** | **CO4** |
| 5 | **Dimensions of Oral Communication & Voice Dynamics:**<br><br>Code and Content; Stimulus & Response; Encoding process; Decoding process; Pronunciation Etiquette; Syllables; Vowel sounds; Consonant sounds; Tone: Rising tone; Falling Tone; Flow in Speaking; Speaking with a purpose; Speech & personality; Professional Personality Attributes: Empathy; Considerateness; Leadership; Competence. | **4** | **CO5** |

**COURSE OUTCOMES:** At the end of the Course, the student will be able to:

| | |
|---|---|
| **CO1** | Understand the nature and objective of Technical Communication relevant for the work place as Engineers. |
| **CO2** | Utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions. |

| | |
|---|---|
| **CO3** | Imbibe inputs by presentation skills to enhance confidence in face of diverse audience. |
| **CO4** | Create a vast know-how of the application of the learning to promote their technical competence. |
| **CO5** | Evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics. |

**Mapping of CO v/s PO**:

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | - | - | - | - | - | - | - | - | - | - | - | - |
| **CO2** | - | - | - | - | - | - | - | - | - | - | - | - |
| **CO3** | - | - | - | - | - | - | - | - | - | - | - | - |
| **CO4** | - | - | - | - | - | - | - | - | - | - | - | - |
| **CO5** | - | - | - | - | - | - | - | - | - | - | - | - |
| **Average** | - | - | - | - | - | - | - | - | - | - | - | - |

| | PSO1 | PSO2 | PSO3 |
|---|---|---|---|
| **CO1** | - | - | - |
| **CO2** | - | - | - |
| **CO3** | - | - | - |
| **CO4** | - | - | - |
| **CO5** | - | - | - |
| **Average** | - | - | - |

**Correlation levels: 1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)**

| | |
|---|---|
| **Gap in the syllabus** | NA |

| | |
|---|---|
| **Topics to be covered beyond syllabus** | NA |

# LESSON PLAN

| Lecture | Module | Scheduled | | | | Conducted | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Topic | *RBT Levels | C O Mapping | Date | Topic | Date | No. Of Students | Faculty Sign |
| 1 | I | **Technical Communication:Features; Distinction between General and Technical Communication; Language as a tool of Communication** | L2 | CO1 | | | | | |
| 2 | | **Dimensions of Communication; Reading & Comprehension** | L2 | | | | | | |
| 3 | | **Technical writing: Sentences; Paragraph; Technical style: Definition, Types & Methods** | L2 | | | | | | |
| 4 | | **The Flow of Communication: Downward; Upward, Lateral or Horizontal** | L2 | | | | | | |
| 5 | | **Barriers to Communication** | L2 | | | | | | |
| 6 | II | **Technical Report: Definition & importance; Thesis/Project Writing: Structure & Importance** | L2 | CO2 | | | | | |
| 7 | | **Synopsis Writing: Methods; Technical Research Paper Writing: Methods & Style** | L2 | | | | | | |
| 8 | | **Seminar & Conference Paper Writing** | L2 | | | | | | |
| 9 | | **Key-Note Speech: Introduction & Summarization** | L2 | | | | | | |
| 10 | | **Expert Technical Lecture: Theme Clarity; Analysis & Findings** | L2 | | | | | | |
| 11 | | **7 Cs of Effective Business Writing: Concreteness, Completeness, Clarity, Conciseness, Courtesy, Correctness, Consideration.** | L2 | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| 12 | III | **Presentation: Forms; Interpersonal Communication; Class Room Presentation; Style; Method** | L2 | CO3 | | | | | |
| 13 | | **Individual conferencing: Essentials** | L2 | | | | | | |
| 14 | | **Public Speaking: Method** | L2 | | | | | | |
| 15 | | **Techniques: Clarity of Substance; Emotion;** | L2 | | | | | | |
| 16 | | **Modes of Presentation; Overcoming Stage Fear: Confident Speaking** | | | | | | | |
| 17 | | **Audience Analysis & Retention of Audience Interest; Methods of Presentation: Interpersonal** | L2 | | | | | | |
| 18 | | **Methods of Presentation: Impersonal; Audience Participation: Quizzes & Interjections.** | L2 | | | | | | |
| 19 | IV | **Interview Skills** | L2 | CO4 | | | | | |
| 20 | | **Group Discussion: Objective & Method** | L2 | | | | | | |
| 21 | | **Seminar/Conferences Presentation Skills: Focus; Content; Style** | L2 | | | | | | |
| 22 | | **Argumentation skills: Devices: Analysis** | L2 | | | | | | |
| 23 | | **Cohesion & Emphasis; Critical Thinking; Nuances: Exposition narration & Description** | L2 | | | | | | |
| 24 | | **Discourse Competence: combination of expression & conclusion; Socio-linguistic Competence** | L2 | | | | | | |
| 25 | | **Strategic Competence: Solution of communication problems with verbal and non verbal means** | L2 | | | | | | |
| 26 | | **Kinesics: Definitions; Importance; Features of Body Language.** | L2 | | | | | | |
| 27 | | **Voice Modulation: Quality, Pitch** | L2 | CO5 | | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| 28 | V | **Rhythm; intonation; Pronunciation; Articulation** | L2 | | | | | | |
| 29 | | **Stress & Accent** | L2 | | | | | | |
| 30 | | **Linguistic Features Of Voice Control: Vowel & Consonant Sounds.** | L2 | | | | | | |

| **Class Test** | **Syllabus** |
|---|---|
| **CT – 01** | **Class 1 – Class 15** |
| **PRE – AKTU** | **Full Syllabus** |

***Revised Bloom's Taxonomy (RBT) Levels:**
L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analysing; L5 – Evaluating; L6 - Creating

**Literature**

**Text Books:**


**T1)** Technical Communication: Principles and Practices by Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2007, New Delhi.
**T2)** Personality Development and Soft Skills by Barun K. Mitra, OUP, 2012, New Delhi.
**T3)** Spoken English- A Manual of Speech and Phonetics by R.K.Bansal & J.B.Harrison, Orient Blackswan, 2013, New Delhi.
**T4)** Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., 2001, New Delhi.


**Reference Books:**


**R1)** Practical Communication: Process and Practice by L.U.B. Pandey; A.I.T.B.S. Publications India Ltd.; Krishan Nagar, 2014, Delhi.
**R2)** Modern Technical Writing by Sherman, Theodore A (et.al); Apprentice Hall; New Jersey; U.S.
**R3)** A Text Book of Scientific and Technical Writing by S.D. Sharma; Vikas Publication, Delhi.
**R4)** Skills for Effective Business Communication by Michael Murphy, Harward University, U.S.
**R5)** Business Communication for Managers by Payal Mehra, Pearson Publication, Delhi


**Faculty Sign** **HOD's sign**

# BUDDHA INSTITUTE OF TECHNOLOGY

**DEPARTMENT OF ELECTRONICS & COMMUNICATION**

**ACADEMIC YEAR 2025-26 (Even Semester)**

## LESSON PLAN DETAILS

| | | | |
|---|---|---|---|
| Semester: IV | Section: A | Course Code: BCC401 | Contact Hours /week**: 12** |
| Course Name: Python Programming | | | # of credits:2 |
| Faculty name: Mrs. Pooja Singh | | | Designation: AssistantProfessor |
| Sessional Marks:30 | | End Semester Examination Marks:70 | University Exam Hours: 2 |

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|---|
| Prerequisites if any: |
| PYTHON |

| | |
|---|---|
| Content delivery methods: | By Face-to-face delivery, Presentation. |

**COURSE SYLLABUS (as prescribed by University / Board)**

| Module No | UNIT Contents | Hours | COs |
|---|---|---|---|
| 1 | **INTRODUCTION TO CYBER CRIME**: Cybercrime- Definition and Origins of the word Cybercrime and Information Security, who are Cybercriminals? Classifications of Cybercrimes, A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens. Cyber offenses: How Criminals Plan the Attacks, Social Engineering, Cyber stalking, Cybercafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector. | **07** | **CO1** |
| 2 | **Python Program Flow Control Conditional blocks:** if, else and else if, Simple for loops in python, For loop using ranges, string, list and dictionaries. Use of while loops in python, Loop manipulation using pass, continue, break and else. Programming using Python conditional and loop blocks. | **09** | **CO2** |
| 3 | **Python Complex data types:** Using string data type and string operations, Defining list and list slicing, Use of Tuple data type. String, List and Dictionary, Manipulations Building blocks of python programs, string manipulation methods, List manipulation. Dictionary manipulation, Programming using string, list and dictionary in-built functions. Python Functions, Organizing python codes using functions. | **20** | **CO3** |

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|---|---|---|---|
| 4 | **Python File Operations:** Reading files, writing files in python, Understanding read functions, read(), readline(), redlines(). Understanding writing functions, write() and write lines() Manipulating file pointer using seek Programming, using file operations | **12** | **CO4** |
| 5 | **Python packages:** Simple programs using the built-in functions of packages matplotlib, numpy, pandas etc. GUI Programming: Tainter introduction, Tainter and Python Programming, Tk Widgets, Tainter | **12** | **CO5** |

**COURSE OUTCOMES:** At the end of the Course, the Student will be able to:

| | | | |
|---|---|---|---|
| **CO1** | **BCC 401** | Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements. | L2 |
| **CO2** | **BCC 401** | Express proficiency in the handling of strings and functions | L2 |
| **CO3** | **BCC 401** | Utilize the concept of SDT, intermediate code generation & three address codes. | L2 |
| **CO4** | **BCC 401** | Classify the concept of symbol table, storage allocation & error detection & recovery. | L2 |
| **CO5** | **BCC 401** | Apply the different code optimization techniques. | L2 |

**Mapping of CO v/s PO**:

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 2 | 2 | 1 | 1 | 1 | - | - | - | - | - | - | 2 |
| **CO2** | 2 | 2 | 1 | 1 | 1 | - | - | - | - | - | - | 2 |
| **CO3** | 2 | 2 | 1 | 1 | 1 | - | - | - | - | - | - | 2 |
| **CO4** | 2 | 2 | 1 | 1 | 1 | - | - | - | - | - | - | 2 |
| **CO5** | 2 | 2 | 1 | 1 | 1 | - | - | - | - | - | - | 2 |
| **Average** | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 | - | - | - | - | - | - | 2.00 |

**Mapping of CO v/s PSO**:

| | PSO1 | PSO2 | PSO3 |
|---|---|---|---|
| **CO1** | 1 | 2 | 1 |

| | | | |
|---|---|---|---|
| **CO2** | 1 | 2 | 1 |
| **CO3** | 1 | 2 | 1 |
| **CO4** | 1 | 2 | 1 |
| **CO5** | 1 | 2 | 1 |
| **Average** | 1.00 | 2.00 | 1.00 |

**Correlation levels: 1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)**

| | |
|---|---|
| **Topics to be covered beyond syllabus** | Peephole Optimization |

**LESSON PLAN**

| Lecture | Module | Topic | *RBT Levels | CO Mapping | Date | Topic | Date | No. Of Stud. | Faculty Sign |
|---|---|---|---|---|---|---|---|---|---|
| 1. | I | Introduction to programming language | L2 | CO1 | | | | | |
| 2. | | Introduction to python | L2 | | | | | | |
| 3. | | Python variables | L2 | | | | | | |
| 4. | | Python basic Operators | L2 | | | | | | |
| 5. | | Understanding python blocks | L2 | | | | | | |
| 6. | | Elements of Python, Type Conversion | L2 | | | | | | |
| 7. | | Python Data Types | L2 | | | | | | |
| 8. | | Declaring and using Numeric data types: int, float etc. | L2 | | | | | | |
| 9. | | Test | L2 | | | | | | |
| 10. | | if, else and else if | L2 | | | | | | |
| 11. | | Simple for loops in python | L2 | | | | | | |
| 12. | | For loop using ranges | L2 | | | | | | |
| 13. | II | string, list and dictionaries | L3 | CO2 | | | | | |
| 14. | | Use of while loops in python | L2 | | | | | | |
| 15. | | Loop manipulation using pass | L2 | | | | | | |
| 16. | | Continue | L2 | | | | | | |
| 17. | | break and else | L2 | | | | | | |
| 18. | . | Programming using Python conditional and loop blocks | L2 | | | | | | |
| 19. | | TEST | L1 | | | | | | |
| 20. | | String | L3 | CO3 | | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| 21. | | String | L3 | | | | | | |
| 22. | | Strings | L3 | | | | | | |
| 23. | | Strings: Length of the string | L3 | | | | | | |
| 24. | | Perform Concatenation and Repeat operations in it | L3 | | | | | | |
| 25. | | Indexing and Slicing of Strings | L4 | | | | | | |
| 26. | | List and dictionary | L2 | | | | | | |
| 27. | | Manipulations Building blocks of python programs | L3 | CO4 | | | | | |
| 28. | | string manipulation methods. | L3 | | | | | | |
| 29. | | Dictionary manipulation | L3 | | | | | | |
| 30. | | Programming using string | L3 | | | | | | |
| 31. | | list and dictionary in-built functions | L3 | | | | | | |
| 32. | | Python Functions | L2 | | | | | | |
| 33. | | Organizing python codes using functions | L2 | | | | | | |
| 34. | | Reading files | L2 | | | | | | |
| 35. | | Python programming with IDE | L2 | | | | | | |
| 36. | | Writing files in python, Understanding read functions | L2 | CO5 | | | | | |
| 37. | | read(), readline(), readlines() | L2 | | | | | | |
| 38. | | Understanding write functions | L2 | | | | | | |
| 39. | | write() and WriteLines() Manipulating file pointer using seek Programming | L2 | | | | | | |
| 40. | | using file operations | L2 | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| 41. | | Simple programs using the built-in functions of packages matplotlib | L2 | | | | | | |
| 42. | | NumPy, pandas etc. | L2 | | | | | | |
| 43. | | GUI Programming: | L2 | | | | | | |
| 44. | | Tkinter introduction | L2 | | | | | | |
| 45. | | Tkinter and Python Programming | L2 | | | | | | |
| 46. | | Tk Widgets | L2 | | | | | | |
| 47. | | Tkinter examples | L2 | | | | | | |
| 48. | | **Revesion** | | | | | | | |

| **Class Test** | **Syllabus** |
|---|---|
| CT-01 | Class 1-Class 25 |
| PRE-AKTU | Full Syllabus |

***Revised Bloom's Taxonomy (RBT) Levels:**
L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analysing; L5 – Evaluating; L6 - Creating

**TextBooks:**

**T1.** Aho, Sethi & Ullman, "Compilers: Principles, Techniques and Tools", PearsonEducation.
**T2.** V Raghvan, "Principles of Compiler Design", TMH.

**Faculty Sign** **HOD's Sign**

# BUDDHA INSTITUTE OF TECHNOLOGY

**Department of Electronics and Communication Engineering**

**ACADEMIC YEAR 2025-26 (Even Semester)**

## LESSON PLAN

| | | | |
|---|---|---|---|
| Semester**: IV** | Section: **A** | Course Code: **BOE-405** | Contact Hours /week**: 5** |
| Course name: **SENSOR AND INSTRUMATATION** | | | # of credits:4 |
| Teacher's name: **Mr. Abhishek Shukla** | | | Designation: AP |
| Sessional Marks:30 | End Semester Examination Marks:70 | | University Exam Hours: 3 |

**Prerequisites if any:**

| Code No | Course Name | Description | Semester |
|---|---|---|---|
| | | | |

| | |
|---|---|
| Content delivery methods: | Chalk & Board, PPT, Video, Book |

**COURSE SYLLABUS (as prescribed by University / Board)**

| Module No | UNIT Contents | Hours | COs |
|---|---|---|---|
| **1** | **Sensors & Transducer**: Definition, Classification & selection of sensors, Measurement of displacement using Potentiometer, LVDT & Optical Encoder, Measurement of force using strain gauge, and Measurement of pressure using LVDT based diaphragm & piezoelectric sensor. | **8** | **CO1** |
| **2** | **Measurement of temperature** using Thermistor, Thermocouple & RTD, Concept of thermal imaging, Measurement of position using Hall effect sensors, Proximity sensors: Inductive & Capacitive, Use of proximity sensor as accelerometer and vibration sensor, Flow Sensors: Ultrasonic & Laser, Level Sensors: Ultrasonic & Capacitive | **8** | **CO2** |
| **3** | **Virtual Instrumentation**: Graphical programming techniques, Data types, Advantage of Virtual Instrumentation techniques, Concept of WHILE & FOR loops, Arrays, Clusters & graphs, Structures: Case, Sequence & Formula nodes, Need of software based instruments for industrial automation. | **8** | **CO3** |
| **4** | **Data Acquisition Methods**: Basic block diagram, Analog and Digital IO, Counters, Timers, Types of ADC : successive approximation and sigma-delta, Types of DAC: Weighted Resistor and R-2R Ladder type, Use of Data Sockets for Networked Communication | **8** | **CO4** |
| **5** | **Intelligent Sensors**: General Structure of smart sensors & its components, Characteristic of smart sensors: Self calibration, Self-testing & self-communicating, Application of smart sensors: Automatic robot control & automobile engine control. | **8** | **CO5** |

**COURSE OUTCOMES:** At the end of the Course, the Student will be able to:

| | |
|---|---|
| **CO1** | Apply the use of sensors for measurement of displacement, force and pressure. |
| **CO2** | Employ commonly used sensors in industry for measurement of temperature, Position, accelerometer, vibration sensor, flow and level. |
| **CO3** | Demonstrate the use of virtual instrumentation in automation industries |
| **CO4** | Use data acquisition methods. |
| **CO5** | Comprehend intelligent instrumentation in industrial automation. |

**Mapping of CO v/s PO**:

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| **CO1** | 3 | 3 | 2 | 3 | 3 | - | - | - | - | 3 | - | 3 |
| **CO2** | 2 | 2 | 3 | 3 | 3 | - | - | - | - | - | - | 3 |
| **CO3** | 2 | 2 | 2 | 3 | 2 | - | - | - | - | - | - | 2 |
| **CO4** | 2 | 3 | 3 | 2 | 2 | - | - | - | - | 3 | - | 3 |
| **CO5** | 2 | 3 | 3 | 3 | 2 | - | - | - | - | 3 | - | 3 |
| **Average** | ***2.4*** | ***2.6*** | ***2.6*** | ***2.8*** | ***2.4*** | ***0.0*** | ***0.0*** | ***0.0*** | ***0.0*** | ***3.0*** | ***0.0*** | ***2.8*** |

| | PSO1 | PSO2 | PSO3 |
|---|---|---|---|
| **CO1** | 1 | - | 2 |
| **CO2** | 2 | 2 | 2 |
| **CO3** | - | 2 | 2 |
| **CO4** | 3 | 3 | 2 |
| **CO5** | 3 | 3 | 2 |
| **Average** | 2.3 | 2.5 | 2.0 |

**Correlation levels: 1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)**

| | |
|---|---|
| **Gap in the syllabus** | Basics of Instrumentation |

| | |
|---|---|
| **Topics to be covered beyond syllabus** | Concept of Instrumentations, development of Robot |

## LESSON PLAN

| Lecture | Module | Scheduled | | | | Conducted | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Topic | *RBT Levels | CO Mapping | Date | Topic | Date | No. Of Students | Faculty Sign |
| 1. | I | Introduction of electronics components | L2 | CO1 | | | | | |
| 2. | | Introduction of electronics components | L2 | | | | | | |
| 3. | | Sensors & Transducer: Definition | L2 | | | | | | |
| 4. | | Classification & selection of sensors, | L2 | | | | | | |
| 5. | | Measurement of displacement using Potentiometer | L2 | | | | | | |
| 6. | | Measurement of displacement using LVDT | L2 | | | | | | |
| 7. | | **Tutorial 1** | L2 | | | | | | |
| 8. | | Measurement of displacement using optical encoder | L2 | | | | | | |
| 9. | | Measurement of force using strain gauge | L2 | | | | | | |
| 10. | | Measurement of pressure using LVDT based diaphragm | L2 | | | | | | |
| 11. | | Measurement of pressure using piezoelectric sensor | | | | | | | |
| 12. | | **Tutorial 2** | L2 | | | | | | |
| 13. | | Measurement of pressure using piezoelectric sensor | L2 | | | | | | |
| 14. | | Measurement of temperature using Thermistor | L2 | | | | | | |
| 15. | | Measurement of temperature using | L2 | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Thermistor | | | | | | | |
| 16. | | Thermocouple | L2 | | | | | | |
| 17. | | **Tutorial 3** | L2 | | | | | | |
| 18. | | Thermocouple | L2 | | | | | | |
| 19. | | RTD | L2 | | | | | | |
| 20. | | Proximity sensors: Inductive & Capacitive, | L2 | | | | | | |
| 21. | | Use of proximity sensor as accelerometer and vibration sensor | L2 | | | | | | |
| 22. | | Revision | L2 | | | | | | |
| 23. | | Flow Sensors: Ultrasonic & Laser, | L2 | | | | | | |
| 24. | | Flow Sensors: Ultrasonic & Laser, | | | | | | | |
| 25. | | Level Sensors: Ultrasonic & Capacitive | L2 | | | | | | |
| 26. | | Level Sensors: Ultrasonic & Capacitive | L2 | | | | | | |
| 27. | | **Tutorial 4** | L2 | | | | | | |
| 28. | **III** | Virtual Instrumentation | L2 | CO3 | | | | | |
| 29. | | Graphical programming techniques | L2 | | | | | | |
| 30. | | Data types, Advantage of Virtual | L2 | | | | | | |
| 31. | | Concept of WHILE & FOR loops, Arrays, Clusters & graphs | L2 | | | | | | |
| 32. | | **Tutorial 5** | L2 | | | | | | |
| 33. | | Structures: Case | L2 | | | | | | |
| 34. | | Sequence & Formula nodes | L2 | | | | | | |
| 35. | | Need of software based instruments for industrial automation | L2 | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 36. | | Need of software based instruments for industrial automation | L2 | | | | | | |
| 37. | | **Tutorial 6** | L2 | | | | | | |
| 38. | | Revision | | | | | | | |
| 39. | IV | Data Acquisition Methods | L2 | CO4 | | | | | |
| 40. | | Basic block diagram | L2 | | | | | | |
| 41. | | Analog and Digital IO | L2 | | | | | | |
| 42. | | Counters, Timers, | L2 | | | | | | |
| 43. | | **Tutorial 7** | L2 | | | | | | |
| 44. | | Types of ADC: successive approximation | | | | | | | |
| 45. | | sigma-delta | L2 | | | | | | |
| 46. | | Types of DAC: Weighted Resistor and R-2R Ladder type, | L2 | | | | | | |
| 47. | | Use of Data Sockets for Networked Communication, | L2 | | | | | | |
| 48. | | **Tutorial 8** | L2 | | | | | | |
| 49. | | Revision | | | | | | | |
| 50. | V | Intelligent Sensors: | L2 | CO5 | | | | | |
| 51. | | General Structure of smart sensors & its components | L2 | | | | | | |
| 52. | | General Structure of smart sensors & its components | L2 | | | | | | |
| 53. | | Characteristic of smart sensors: Self calibration | L2 | | | | | | |
| 54. | | **Tutorial 9** | | | | | | | |
| 55. | | Self-testing & self-communicating smart | L2 | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | sensors | | | | | | | |
| 56. | | Self-testing & self-communicating smart sensors | L2 | | | | | | |
| 57. | | Application of smart sensors: Automatic robot control & automobile engine control | L2 | | | | | | |
| 58. | | Application of smart sensors: Automatic robot control & automobile engine control | L2 | | | | | | |
| 59. | | **Tutorial 10** | L2 | | | | | | |

| **Class Test** | **Syllabus** |
|---|---|
| **CT-01** | **Class 1-Class 20** |
| **PRE-AKTU** | **Full Syllabus** |

***Revised Bloom's Taxonomy (RBT) Levels:**
L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analysing; L5 – Evaluating; L6 - Creating

**References:**
**Text books :( As per University / Board syllabus)**


1. DVS Murthy, Transducers and Instrumentation, PHI 2nd Edition 2013
2. D Patranabis, Sensors and Transducers, PHI 2nd Edition 2013.
3. S. Gupta, J.P. Gupta / PC interfacing for Data Acquisition & Process Control, 2nd ED / Instrument Society ofAmerica, 1994.
4. Gary Johnson / Lab VIEW Graphical Programing II Edition / McGraw Hill 1997.


**Reference Books: (As per University / Board syllabus)**


1. Arun K. Ghosh, Introduction to measurements and Instrumentation, PHI, 4th Edition 2012.
2. A.D. Helfrick and W.D. cooper, Modern Electronic Instrumentation & Measurement Techniques, PHI, 2001
3. Hermann K.P. Neubert, "Instrument Transducers" 2nd Edition 2012, Oxford University Press.


**Faculty Sign** **HOD's sign**

# BUDDHA INSTITUTE OF TECHNOLOGY

**Department of Electronics and Communication Engineering**

**ACADEMIC YEAR 2025-26 (EVEN Semester)**

## LESSON PLAN

| | | | |
|---|---|---|---|
| Semester: **IV** | Section: **NA** | Course Code: **TECHEDGE** | Contact Hours /week**:** |
| Course name: **TECHEDGE** | | | # of credits: |
| Teacher's Name: **Mr. RITESH KUMAR SHARMA** | | | Designation: AP |
| Sessional Marks: | End Semester Examination Marks: | | University Exam Hours: |

| **Prerequisites if any:** | | | |
|---|---|---|---|
| Code No | Course Name | Description | Semester |
| | TECHEDGE | Siemens PLC Programming for Machine & Factory Automation for Electronics Engineering Students. | VI |

| | |
|---|---|
| Content delivery methods: | Chalk & Board, PPT, Video, Book |

# LESSON PLAN

| Lecture | Module | Scheduled | | | | Conducted | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | *RBT Levels | | Date | | Date | No of Students | Faculty Sign |
| 1. | I | Fundamental of Number systems(Binary,Hex,Octal,Etc) | L1 | | | | | | |
| 2. | | Logic Gates(AND OR EXOR NOR NAND NOT) | L1 | | | | | | |
| 3. | | Introduction to S7 200/S7 300 S7 400/S7 1200/S7 1500 | L1 | | | | | | |
| 4. | | Types of Input & output (Sink/Source/Relay) DI/DO ,AI/AO Cards & Devices | L1 | | | | | | |
| 5. | | Wiring & Basic layout of Siemens Controllers | L2 | | | | | | |
| 6. | | **Tutorial 1/Test 2** | L2 | | | | | | |
| 7. | | Programming Software Introduction TIA | L2 | | | | | | |
| 8. | | *Introduction of LADDER Programming* | L2 | | | | | | |
| 9. | | NO/NC LATCH & UNLATCH Instructions Memory mapping | L2 | | | | | | |
| 10. | | Programming Exercises with Real Time Hardware setup S7 1200C DC/DC/DC | L2 | | | | | | |
| 11. | | **Tutorial 2/Test 2** | | | | | | | |
| 12. | | Types of Siemens Timers & IEC Timers, Counters | L3 | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 13. | | Programming of Timers/Counters | L4 | | | | | | |
| 14. | | Compare/Arithmetic Instruction | L4 | | | | | | |
| 15. | | Analog Programming /Industry Program | L5 | | | | | | |
| 16. | | **Tutorial 3/Test 3** | L4 | | | | | | |

***Revised Bloom's Taxonomy (RBT) Levels:**
L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analysing; L5 – Evaluating; L6 - Creating

**References:**

**Faculty Sign** **HOD's sign**

# BUDDHA INSTITUTE OF TECHNOLOGY

**Department of Electronics & Communication Engineering**

**ACADEMIC YEAR 2024-25 (Even Semester)**

**Lab Name-Communication Engineering Lab (BEC-451)**

| Sl. # | Experiment / Program |
|---|---|
| 1. | To study DSB/ SSB amplitude modulation & determine its modulation factor & power in side bands. |
| 2. | To study amplitude demodulation by Envelope detector |
| 3. | To study frequency modulation and determine its modulation factor. |
| 4. | To study sampling and reconstruction of Pulse Amplitude modulation system. |
| 5. | To Study of Pulse Width Modulation and Demodulation. |
| 6 | To Study of Pulse code modulation (PCM) and its demodulation |
| 7. | Study of delta modulation and demodulation. |
| 8. | Study of Amplitude shift keying modulator and demodulator. |
| 9. | Study of Frequency shift keying modulator and demodulator. |

**Analog Circuit Lab (BEC452)**
**INDEX**

| Sl. # | Experiments | |
|---|---|---|
| 1 | Study of BJT in CE configuration | CO-1 |
| 2 | Study Frequency response of single stage BJT amplifiers in CE configurations | CO-2 |
| 3 | Measurement of OP-AMP parameters | CO-3 |
| 4 | Application of OP-AMP as Integrator & Differentiator | CO-3 |
| 5 | Application of OP-AMP as summer and difference amplifier | CO-3 |
| 6 | To measure frequency of Wein Bridge Oscillator | CO-4 |
| 7 | To measure frequency and voltage of Phase Shift Oscillator | *CO-4* |
| 8 | Study ofSingle stage common source FET amplifier | CO-2 |

## Lab Name-Signal System Lab (BEC-453)

| Sl. # | Experiment / Program |
|---|---|
| **1.** | Introduction to MATLAB<br>a. To define and use variables and functions in MATLAB.<br>b. To define and use Vectors and Matrices in MATLAB.<br>c. To study various MATLAB arithmetic operators and mathematical functions.<br>d. To create and use m-files. |
| **2.** | Basic plotting of signals<br>a. To study various MATLAB commands for creating two and three dimensional plots.<br>b. b. Write a MATLAB program to plot the following continuous time and discrete time signals.<br>i. Step Function<br>ii. Impulse Function<br>iii. Exponential Function<br>iv. Ramp Function<br>v. Sine Function |
| **3.** | Time and Amplitude transformations Write a MATLAB program to perform amplitude-scaling, time-scaling and timeshifting on a given signal. |
| **4.** | Convolution of given signals Write a MATLAB program to obtain linear convolution of the given sequences. |
| **5.** | Autocorrelation and Cross-correlation<br>a. Write a MATLAB program to compute autocorrelation of a sequence x(n) and verify the property.<br>b. Write a MATLAB program to compute cross-correlation of sequences x(n) and y(n) and verify the property. |
| **6** | Fourier Series and Gibbs Phenomenon |

| | |
|---|---|
| | a. To calculate Fourier series coefficients associated with Square Wave.<br>b. To Sum the first 10 terms and plot the Fourier series as a function of time.<br>c. To Sum the first 50 terms and plot the Fourier series as a function of time. |
| **7.** | Calculating transforms using MATLAB<br>a. Calculate and plot Fourier transform of a given signal.<br>b. Calculate and plot Z-transform of a given signal. |
| **8.** | Impulse response and Step response of a given system<br>a. Write a MATLAB program to find the impulse response and step response of a system form its difference equation.<br>b. Compute and plot the response of a given system to a given input. |
| **9.** | Pole-zero diagram and bode diagram<br>a. Write a MATLAB program to find pole-zero diagram, bode diagram of a given system from the given system function.<br>b. Write a MATLAB program to find, bode diagram of a given system from the given system function. |
| **10** | Frequency response of a system Write a MATLAB program to plot magnitude and phase response of a given system. |
| **11** | Checking linearity/non-linearity of a system using SIMULINK<br>a. Build a system that amplifies a sine wave by a factor of two.<br>b. Test the linearity of this system using SIMULINK. |