SHRI SHANKARACHARYA TECHNICAL CAMPUS, BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai)

SCHEME OF TEACHING AND EXAMINATION (Effective from 2020-2021 Batch)

B.Tech. (Electronics and Telecommunication Engineering) Fourth Semester

Sl. No.	Board of Studies(BOS)	Courses (Subject)	Course Code	Period per Week			Scheme of Examination			Total Marks	Credit
							Theory/Lab				
				L	T	P	ESE	CT	TA		
1.	Electronics & Telecommunication	Analog Communication	ET105401	3	1	-	100	20	30	150	4
2.	Electronics & Telecommunication	Analog Electronics	ET105402	2	1	-	100	20	30	150	3
3.	Electronics & Telecommunication	Electromagnetic Field Theory	ET105403	3	-	-	100	20	30	150	3
4.	Electronics & Telecommunication	Microcontroller & Embedded Systems	ET105404	3	-	-	100	20	30	150	3
5.	Electronics & Telecommunication	IOT & Instrumentation	ET105405	3	-	-	100	20	30	150	3
6.	Electronics & Telecommunication	Analog Communication Lab	ET105491	-	-	2	25	-	25	50	1
7.	Electronics & Telecommunication	Analog Electronics Lab	ET105492	-	-	2	25	-	25	50	1
8.	Electronics & Telecommunication	Microcontroller & Embedded Systems Lab	ET105493	-	-	2	25	-	25	50	1
9.	Electronics & Telecommunication	Mini Project-II Lab	ET105494	-	-	2	50	-	25	75	1
10.	Chemistry	Biology for Engineers	AC100495	-	-	-	-	-	25	25	-
Total				**14**	**2**	**8**	**625**	**100**	**275**	**1000**	**20**

Note:

(a) Abbreviations used : L-Lecture, T- Tutorial, P- Practical, ESE- End Semester Exam, CT- Class Test, TA- Teacher's Assessment

(b)The duration of end semester examination of all theory papers will be of three hours.

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B.Tech. (Electronics and Telecommunication Engineering) Fourth Semester

Subject Code :- ET105401	Analog Communication	L = 3	T = 1	P = 0	Credits = 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objective	Course Outcomes
1. The student will be able to draw spectral plots and visualize signals in frequency domain. 2. Understand the amplitude modulation process and effect of noise in AM systems. 3. Understand the angle modulation process and effect of noise in FM/PM systems. 4. Get the overview of transmitters and receivers for both AM and FM systems	On successful completion of the course, the student will be able to: **CO1:-**Understand the signal analysis performed in communication. **CO2:-**To gain knowledge of amplitude Modulation and Demodulation Techniques. **CO3.**. To gain knowledge of Frequency Modulation and Demodulation Techniques. **CO4.** To gain knowledge of Various Receivers that used in the Communication. **CO5.** To study about various Noise sources and its impact on analog communication system

UNIT-I: Introduction to Communication System: **[CO1]**

Introduction: Overview of Communication system, Communication channels , Need for modulation, Baseband and Pass band signals , Classification of signals and study of Fourier transforms for standard signals, Introduction to Convolution and correlation of signals, comparison between correlation and convolution. Frequency division multiplexing. **[10Hrs]**

UNIT-II: Amplitude Modulation: **[CO2]**

Amplitude Modulation: full carrier system and Suppressed carrier system . Double side band with full Carrier, Generation and Detection of Double side band without Carrier (DSB-SC), SSB-SC, VSB-SC, Single Side Band Modulation, Phasor representation, Bandwidth, Modulation Index Superposition Theorem of Spectra. Power Content in AM signal. Generation of AM using LTI circuits and Non-linear circuits. Demodulation of AM waves: Square law detectors and Envelope detectors. **[10Hrs]**

UNIT-III : Angle Modulation: **[CO3]**

Angle modulation, Phase & frequency modulation, Relationship between phase and frequency modulation, Phase and frequency deviation, Spectrum of an FM signal, Bandwidth and power of a sinusoidal modulated FM signal, Types of FM: Narrowband FM and Wideband FM. Phasor diagram for FM signals. FM generation: Parameter-variation method, an indirect method of frequency modulation (Armstrong system), Frequency multiplication, and Frequency multiplication applied to FM signals, FM demodulators : Slope detectors and Phase difference discriminators. Comparison of AM and FM. **[10Hrs]**

UNIT-IV: Transmitters and Receivers: **[CO4]**

AM Transmitters: Generation of AM, low level and high level modulation, comparison of levels, AM transmitter block diagram, collector class C modulator, Base Modulator, DSB -SC modulator. **FM transmitter**: Direct Method , Armstrong Indirect Method , **Radio Receivers and Demodulators** :Introduction, Performances characteristic of receivers: Sensitivity, Selectivity, Fidelity, Image frequency and IFRR, Tracking and Double spotting, TRF, Super heterodyne receivers AGC. **[10Hrs]**

UNIT-V: Noises in Analog Communication: **[CO5]**

Noise Introduction, Sources of Noise, Classification of noise, Noise calculations (thermal noise), SNR, Noise figure for cascaded amplifiers, Noise Factor, Effective input Noise Temperature. Noise calculation (SNR, FOM) of Various AM system: DSB-SC, SSB-SC, AM-FC system (Envelope detector) Threshold Effect in Envelope detector. **[8Hrs]**

Text Books:

S.No.	Title	Authors	Publisher
1	Principles of Communication Systems	Taub and Schilling	Tata McGraw Hill
2	Electronic Communication Systems	George F Kennedy	Tata McGraw Hill
3	Communication Systems	Simon Haykins	Wiley India.
4	Communication Systems,	R P singh ,S D Sapre	Tata McGraw Hill

Reference Books:

S. No.	Title	Authors	Publisher
1	Communication Systems Engineering	Proakis	Pearson Education
2	Digital and Analog Communication	B.P. Lathi	Oxford University Press.

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SCHEME OF TEACHING AND EXAMINATION (Effective from 2020-2021 Batch)

B.Tech. (Electronics and Telecommunication Engineering) Fourth Semester

Subject Code :- ET105402	Analog Electronics	L = 2	T = 1	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objective	Course Outcomes
At the end of this course the students will learn and apply 1. To understand Operating point calculations and working of BJTs at low and high frequencies. 2. To study Frequency response of BJT. 3. To study the design of power amplifiers. 4. To understand the working of different types of feedback amplifiers.	On successful completion of the course, the student will be able to: **CO1:** Student is able to understand ac analysis of BJT amplifier at Low frequencies. **CO2:** Student is able to understand ac analysis of BJT amplifier at High Frequencies. **CO3:** Student gets knowledge of multistage amplifier and power amplifier. **CO4:** The concepts of feedback used in amplifier are understood. **CO5:** Student is able to understand the concepts of Oscillator

UNIT- I: BJT at Low Frequency: **[CO1]**

Review of hybrid parameters, Analysis of CE, CB and CC using simplified hybrid model. Analysis of CE amplifier with collector to base bias. Miller's Theorem and its dual. Cascading transistor Amplifiers. Simplified Models and Calculation of CE and CC Amplifiers. The Common Emitter Amplifier with an Emitter Resistance. Cascade Amplifiers. High Input resistance Transistor Circuits. **[8Hrs]**

UNIT-II: BJT at High Frequency: **[CO2]**

CE hybrid- model, Hybrid –π Conductances and Capacitances. Validity and parameter Variation, CE Short Circuit Current Gain, Current Gain with Resistive load. Frequency response of a single stage CE Amplifier, Gain-Bandwidth product, CC stage High frequencies. **[7Hrs]**

UNIT- III: Multistage Amplifiers: **[CO3]**

Introduction, Distortion in Ampli1iers, Frequency Response, Step Response of an amplifier, Band Pass of Cascaded Stages. Coupling Types: Direct, RC and Transformer. RC Coupled Amplifier, Low Frequency response of an RC-coupled Stage, Effect of an Emitter bypass capacitor, High Frequency response of two cascaded CE Transistor stages.

Power Amplifiers: Class A Large signal amplifiers and Class B Amplifier: Conversion Efficiency and Distortion. Class AB Operation, Push pull amplifiers. **[7Hrs]**

UNIT-IV:Feedback Amplifiers: **[CO4]**

Classification, Feedback concept, Transfer gain with Feedback, Characteristics of Negative Feedback Amplifiers, Analysis of Input and output Resistance. Topologies: Method of Analysis of Feedback amplifiers, Voltage series Feedback, Voltage series Feedback pair, Current series, Current shunt and Voltage shunt feedback. Concept of positive Feedback. **[7Hrs]**

UNIT-V:Oscillator (BJT): **[CO5]**

Barkhausen criterion for oscillation, Mechanism for start of oscillation and Stabilization of amplitude, Analysis of RC and LC oscillators. Sinusoidal oscillator: Phase shift oscillators, Wien Bridge oscillator, Resonant circuit oscillators, Colpitts and Hartley oscillator. Amplitude Frequency and Phase stability analysis of all Oscillators, General form of Oscillator Configuration. Crystal oscillator. **[7Hrs]**

Text Books:

S.No.	Title	Authors	Publisher
1	Integrated Electronics	Millman & Halkias	Tata McGraw Hill.
2	Microelectronics	Millman and Grabel	Tata McGraw Hill.
3	Electronic Devices & Circuits	Donald A Neaman,	Tata McGraw Hill.

Reference Books:

S. No.	Title	Authors	Publisher
1	Electronic devices and circuits	A.K. Maini & Varsha Agrawal	1st Edition ,Wiley Publication.
2	Electronic Devices & Circuits	David A. Bell	PHI
3	Microelectronic Circuits	Sedra and Smith	Oxford University Press.

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SCHEME OF TEACHING AND EXAMINATION (Effective from 2020-2021 Batch)

B.Tech. (Electronics and Telecommunication Engineering) Fourth Semester

Subject Code :- ET105403	Electromagnetic Field Theory	L = 2	T = 1	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objective	Course Outcomes
The students will learn and understand 1. Behavior of Electrostatic and electromagnetic field and their application in electric and electronics Engineering fields. 2. Maxwell's equations in differential and integral form their interpretation and applications. 3. Propagation of Electromagnetic wave in free space, conductors and dielectrics.	On successful completion of the course, the student will be able to: **CO1:-** Understand the phenomenon of Basic tools for Electromagnatics. **CO2:-**Calculate electric field, Potential, from stationary and dynamic charge and solve simple electrostatic boundary problems. **CO3:- :-**Calculate Magnatic field, Potential, from stationary and dynamic charge. **CO4:-** Calculate Magnatic force, torque and solve simple magnatostatic boundary problems. **CO5:-**Understand the phenomenon of wave propagation with the aid of Maxwell's equations. Gain Knowledge of time varying field.

Unit I: Coordinate Systems and Transformation: **[CO1]**

Cartesian coordinate system, Circular cylindrical coordinate system, Spherical coordinates, Vector calculus, Differential length, area and volume, line, surface and volume integral, Del operator: Gradient of a scalar, Divergence and Curl of a vector, Divergence and Stokes theorem, Laplacian form of a scalar. **[7Hrs]**

Unit II: Electrostatics: **[CO2]**

Coulombs law and field intensity, Electrostatic fields: Electric field due to charge distribution, Electric flux density, Energy stored in Electric field, Electric Potential: Potential at any point due to discrete and distributed charge, Relationship between E and V, Gauss law: Application of Gauss's law for some symmetrical charge distribution, Maxwell's equation for static field, Boundary conditions: Dielectric-dielectric, Conductor-free space, Poisson's and Laplace equations. **[8Hrs]**

Unit III : Magnetostatics: **[CO3]**

Biot Savart law, Amperes circuit: Applications of amperes law, Maxwell's equations for static field, Magnetic scalar and vector potential, Magnetic flux and flux density. **[6Hrs]**

Unit IV: Magnetic forces: **[CO4]**

Magnetic forces, Material and Devices: Force due to magnetic field, Magnetic Torque and moment, A magnetic dipole, Magnetization in Materials, Magnetic Boundary Conditions, Energy stored in magnetic field. **[7Hrs]**

Unit V : Waves and Applications: **[CO5]**

Maxwell's equations: Faradays law, Displacement current, Maxwell's Equations in Differential and Integral Form, Electromagnetic Wave Propagation: Wave propagation in lossy dielectrics, plane wave in lossless dielectric, Plane wave in free space, plane wave in good conductor, Power and Poynting vector, Reflection and transmission of plane wave at normal and oblique incidence. **[8Hrs]**

Text Books:

S.No.	Title	Authors	Publisher
1	Elements of Electromagnetic	M.N.O. Sadiku	Oxford University Press
2	Electromagnetic field theory and Transmission line	G.S.N. Raju	Pearson Education

Reference Books:

S. No.	Title	Authors	Publisher
1	Electromagnetic field Theory	W.H. Hayt and J A Buck	Tata Mcgraw Hill
2	Electromagnetic Fields	Jordan & Ballman	PHI
3	Antenna and Wave Propagation	K. D. Prasad	Satya Prakashan

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SCHEME OF TEACHING AND EXAMINATION (Effective from 2020-2021 Batch)

B.Tech. (Electronics and Telecommunication Engineering) Fourth Semester

Subject Code :- ET105404	IOT AND INSTRUMENTATION	L = 2	T = 1	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objective	Course Outcomes
The students will learn and understand 1.Basic Measurement System 2 Basics of Transducers and Primary Sensing Elements 3.Different types of Transducers relating with Non Electrical Parameter. 4.Temperature and Pressure measurement. 5.Different phenomena of Flow measurement and Photo Electricity. 6.IOT concepts, IOT Standards Components of IOT System.	On successful completion of the course, the student will be able to: **CO1:-**Students will be acquainted with basics of measurement system and Transducers. **CO2:-**Students are able to acquire knowledge of measurement of velocity, temperature, pressure and flow. **CO3:-** Understand general concepts of Internet of Things. **CO4:-** Apply design concept to IoT solutions, Analyze various M2M and IoT architectures **CO5:-** Students are able to acquire knowledge of measurement IoT Architechture and its applications

Unit I: Measurement System and Transducers: [CO1]

Introduction to Measurement Systems: Elements of Generalized Measurement System.Primary Sensing Elements And Transducers: Basics of Transducers: Transducer Performance, Transducers Classification. Static and Dynamic Characteristics. Theroy of Strain Gauges and its types. Variable Inductance type Transducer: LVDT and RVDT. Capacitive Transducer, Measurement of Linear Velocity, Measurement of Humidity. **[8Hrs]**

Unit II: Measurement of Temperature, Pressure & Flow: [CO2]

Temperature Measurement: Bimetallic Thermometer, Platinum Resistance Thermometer, Thermistor, Thermocouple: Laws, Construction and its Types. Pressure Measurement: U-Tube Double Column and Single Column Manometer, U-Tube Differential Manometer, Bourdan Gauge. Flow Measurement: Classification of fluid flow measurement techniques, Theory of Variable head meters: Theory for incompressible fluids.Photoelectric Transducers**.** **[7Hrs]**

Unit III: Introduction to IoT: [CO3]

Sensing, Actuation, Networking basics, Communication Protocols, Sensor Networks, Machine-to-Machine Communications, IoT Definition, Characteristics. IoT Functional Blocks, Physical design of IoT, Logical design of IoT, Communication models & APIs. **[6Hrs]**

Unit IV : IOT Protocols: [CO4]

Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFIDProtocols – Issues with IoT Standardization – Unified Data Standards – Protocols – IEEE802.15.4–BACNet Protocol– Modbus – KNX – Zigbee– Network layer – APS layer – Security-. **[7Hrs]**

Unit V : IOT Architecture and Application: **[CO5]**

IoT Open source architecture (OIC)- OIC Architecture & Design principles- IoT Devices and deployment models- IoTivity : An Open source IoT stack - Overview- IoTivity stack architecture- Resource model and Abstraction

IOT Applications - IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications. Study of existing IoT platforms /middleware, IoT- A, Hydra. **[8Hrs]**

Text Books:

S.No.	Title	Authors	Publisher
1	Electrical and Electronic Measurements & Measuring Instrumentation	A.K. Sawhney	Khanna Publication
2	Mechanical Measurements & Control	D.S. Kumar	Metropolitan Book Company Pvt. Ltd
3	From Machine-to-Machine to the Internet of Things:Introduction to a New Age of Intelligence	Jan Holler, Vlasios Tsiatsis, Catherine Mulligan,	Academic Press
4.	The Internet of Things in the Cloud: A Middleware Perspective	Honbo Zhou	CRC Press

Reference Books:

S. No.	Title	Authors	Publisher
1	Mechanical and Industrial Measurements	R.K. Jain	Khanna Publication
2	Internet of Things (A Hands-on- Approach)	Vijay Madisetti and Arshdeep Bahga	VPT
3	Rethinking the Internet of Things: A Scalable Approach to Connecting Everything	Francis daCosta	Apress Publications

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SCHEME OF TEACHING AND EXAMINATION (Effective from 2020-2021 Batch)

B.Tech. (Electronics and Telecommunication Engineering) Fourth Semester

Subject Code :- ET105405	Microcontroller & Embedded System	L = 2	T =1	P = 0	Credits = 3
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objective	Course Outcomes
• To make students familiar with the basic blocks of microcontroller device and Embedded system in general. • To provide comprehensive knowledge of the architecture, features and interfacing with 8051 microcontroller. • To use assembly and high level languages to interface the microcontrollers to various applications.	On successful completion of the course, the student will be able to: **CO1:-** To understand Microcontroller 8051 its architecture and its instruction set. **CO2:-** Gain knowledge about Counter/timer and interrupts in 8051 Microcontroller and Programming concepts. **CO3:-** Students will be able to do serial communication programming and gain knowledge of serial communication. **CO4:-** Students will be able to understand interfacing Microcontroller 8051 with devices. **CO5:-** Students will be able to understand embedded system and its real time applications.

UNIT-I: Introduction to Microcontroller: **[CO1]**

A brief History of Microcontrollers, Harvard Vs Von-Neumann Architecture; RISC Vs CISC, Classification of MCS-51family based on their features (8051,8052, 8031, 8751, AT89C51), Pin configuration of 8051.

8051 Processor Architecture and Instruction Set: Registers of 8051, Inbuilt RAM, Register banks, stack, on-chip and external program code memory ROM, power reset and clocking circuits, I/O port structure, Addressing modes, Instruction set and programming. **[8Hrs]**

UNIT-II: Counter/Timer and Interrupts of 8051: **[CO2]**

Introduction, Registers of timer/counter, Different modes of timer/counter Timer/counter programming, Interrupt *Vs* Polling, Types of interrupts and vector addresses, register used for interrupts initialization, programming of external interrupts, Timer interrupts. **[7Hrs]**

UNIT-III: Asynchronous Serial Communication and Programming: **[CO3]**

Introduction to serial communication, RS232 standard, GPIB, Max 232/233 Driver, 8051 Serial Port Programming to transfer and receive data serially, SBUF register, SCON register, interrupt programming. **[7Hrs]**

UNIT-IV: Interfacing with 8051: **[CO4]**

Interfacing and programming of: ADC (0804,0808/0809,0848) & DAC (0808), stepper motor , 4x4 keyboard matrix, LCD, Interfacing (only) of different types of Memory , Address decoding techniques. **[7Hrs]**

UNIT-V:Embedded Systems: **[CO5]**

Introduction to an Embedded Systems, Defining the Embedded System, Real Life Examples of Embedded Systems, Characteristics of Real-Time Embedded Systems, Basics Of Developing For Embedded Systems. **[7Hrs]**

Text Books:

S. No.	Title	Authors	Publisher
1	The 8051 Microcontroller and Embedded Systems using Assembly and C, , 2nd Ed.,PHI.(Unit-I,II,III)	Mazidi, Mazidi & McKinlay	PHI Publication .(Unit-I,II,III, IV)
2	Embedded system	Frank Vahid	PHI Publication (Unit v)

Reference Books:

S. No.	Title	Authors	Publisher
1	8051 Programming, Interfacing and Applications	K. J. Ayala	Penram Pub
2	Microcontrollers: Architecture, Programming, Interfacing and System Design	Rajkamal	Pearson Education.

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B.Tech. (Electronics and Telecommunication Engineering) Fourth Semester

Subject Code: ET105491	Analog Communication Laboratory	L = 0	T = 0	P = 2	Credits = 1
Evaluation Scheme	ESE	CT	TA	Total	Lab Period
	25	00	25	50	24Hrs

Course Objective	Course Outcomes
The student will be able to Learn and Understand 1. How various Signals Generated for the Signal Transmission. 2. How these signals are affected by the noise Signal 3. How can analysis the Performance of Continuous Signal communication	On successful completion of the course, the student will be able to: **CO1:-** Understand the Calculation of Amplitudes and Frequency of Various Continuous Signals. **CO2:-** Understand the use of Cathode Ray Oscilloscope for the Representation of the Continuous and Discrete Signal. **CO3.** Understand the Modulation Process in the Transmitter side by using differ Orders of analog Filters. **CO4.** Understand the Demodulation Process in the Receiver side by Eliminating the Noise and Extracting the Modulating Signal Again.

List of Experiments: (At least Ten experiments are to be performed by each student)

1. To study Amplitude Modulation on trainer kit.
2. To study Amplitude Demodulation on trainer kit.
3. To study Frequency Modulation and to trace the frequency modulated waveform on CRO using trainer kits.
4. To study Frequency Demodulation using trainer kits.
5. Design of a Frequency Demodulator Using PLL
6. To study a radio receiver having medium frequency reception.
7. To plot amplitude modulated signal and to calculate modulation index
8. To design and obtain characteristics of a mixer Circuit.
9. To generate SSB-SC signal and to study its characteristics.
10. To generate DSB-SC signal using Balanced Modulator and to study its characteristics.
11. To design a Ring Modulator and to study its characteristics.
12. To design a Square Law Detector using diode and to study its V-I characteristics.
13. To design and study an Envelope Detector.
14. To study the Frequency division multiplexing and de-multiplexing.
15. 15. To observe the effect of pre-emphasis and de-emphasis on a given input signal.

Laboratory Project : Design of a Communication System*

***Note: Laboratory Project is compulsory to all students.**

List of Equipments/Machine Required:

Function Generator, Power Supply, CRO, Communication trainer kits, Modulated Signal Generator, Transmission Line.

Reference Books:

S. No.	Title	Authors	Publisher
1	Radio Communication	G.K Mithal	Khanna Publishers

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Subject Code :- ET105492	Analog Electronics Lab	L = 0	T = 0	P = 2	Credits = 1
Evaluation Scheme	ESE	CT	TA	Total	Lab Period
	25	00	25	50	24Hrs

Course Objective	Course Outcomes
The students will learn and understand 1. To understand the characteristics of Transistor using hybrid model 2. To study the frequency response of amplifiers. 3. To understand the different types of oscillators and their frequency of oscillations.	On successful completion of the course, the student will be able to: **CO1:-** Students are able to find out the hybrid parameters of amplifier circuits. **CO2:-** Students are able to design the frequency response of a single stage and double stage of an amplifier. **CO3:-** Students able to find the input and output impedances of an amplifier. **CO4:-** Students are able to find out the frequency of oscillations of different oscillator circuits.

List of Experiments: (At least Ten experiments are to be performed by each student)

1. To draw Static input characteristics curves of CE transistor and determine its h-parameter values.
2. To draw Static output characteristic curve CE transistor and determine its h-parameter values.
3. To draw Static input characteristic curve of CB transistor and determine its h-parameter values.
4. To draw Static output characteristic curve of CB transistor and determine its h-parameter values.
5. To design and study the frequency response of single stage CE transistor amplifier and determine its Bandwidth.(with andwithout bypass capacitor).
6. To find input and Output impedances of single stage CE amplifier.
7. To study the frequency response of RC coupled double stage CE transistor amplifier and determine its Bandwidth.
8. To study the frequency response of RC coupled double stage CE transistor amplifier with voltage feedback and determine itsBandwidth.
9. To study the frequency response of RC coupled double stage CE transistor amplifier with current feedback and determine itsBandwidth.
10. To Design Wein Bridge Oscillator and determine the frequency of Oscillation.
11. General study of pushpull audio power amplifier.
12. To Design RC phase shift oscillator and determine the frequency of Oscillation.
13. Study of various topologies of feedback amplifier.
14. Experiment with Darlington pair amplifier.

Laboratory Project : Design any Analog Circuit*
***Note: Laboratory Project is compulsory to all students.**

List of Equipments/Machine Required:

Circuit components, Power supply, CRO, Function generator, Multimeter, Breadboard.

Reference Book:

S. No.	Title	Authors	Publisher
1	Lab Manual Of Electronic Devices	Paul B Zbar	EIA
2	Lab Manual of Basic Electronics	David Bell.	PHI
3	Electronic Devices Systems and Applications	Robert Diffenderfer, Cengage learning.	Thomson

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Subject Code :- ET105493	Microcontroller & Embedded System Laboratory	L = 0	T = 0	P = 2	Credits = 1
Evaluation Scheme	ESE	CT	TA	Total	Lab Period
	25	00	25	50	24Hrs

Course Objective	Course Outcomes
• To make students familiar with the instructions of microcontroller device and Embedded system in general. • To provide comprehensive knowledge of the architecture, features and interfacing with 8051 microcontroller. • To use assembly and high level languages to interface the microcontrollers to various applications.	On successful completion of the course, the student will be able to understand: **CO1:-** To understand Microcontroller 8051 its architecture and its instruction set. **CO2:-** Gain knowledge about Counter/timer and interrupts in 8051 Microcontroller and Programming concepts. **CO3:-** Students will be able to do serial communication programming and gain knowledge of serial communication. **CO4:-** Students will be able to understand interfacing Microcontroller 8051 with devices.

List of Experiments: (At least Ten experiments are to be performed by each student)

1. Write a microcontroller 8051 program to transfer the bytes into RAM locations starting at 50H,assuming that ROM space starting at 240H contains CHHATTISGARH by using – a) Counter, b) null char. for end of string .
2. Write a microcontroller 8051 program to get hex data on the range of 00-FFh from port 0 and convert it to decimal. Save the digits in R7, R6 and R5, where the least significant digit is in R7.
3. Write a microcontroller 8051 program to add two 16 Bit unsigned numbers. Operands are two RAM variables. Results to be in R1-R0 pair
4. Write a microcontroller 8051 program to subtract an unsigned 16 Bit number from another. Operands are two RAM variables. Results to be in R1-R0 pair.
5. Write a microcontroller 8051 program to add two unsigned 32-bit numbers. Operands are two RAM variables. Results to be in R1-R0 pair.
6. Write a microcontroller 8051 program to add two 16 Bit signed numbers.
7. Write a microcontroller 8051 program to convert a binary number to equivalent BCD
8. Write a microcontroller 8051 program to convert a packed BCD number to two ASCII numbers and place them in R5 and R6.
9. Write a microcontroller 8051 program to calculate the square root of an 8-bit number using iterative method.
10. Write a microcontroller 8051 program that generates 2kHz square wave on pin P1.0, 2.5 kHz on pin P1.2and 25 Hz on pin P1.3.
11. Write a microcontroller 8051 program for counter 1 in mode 2 to count the pulses and display the state on the TL1 count on P2. Assume that the clock pulses are fed to pin T1.
12. Write a microcontroller 8051 program to transfer letter “N” serially at 9600 baud, continuously. Assume crystal frequency to be 11.0592 MHz.
13. Write a microcontroller 8051 program to transfer word “CSVTU” serially at 4800 baud and one stop bit, continuously. Assume crystal frequency to be 11.0592 MHz.
14. Write a microcontroller 8051 program to receive bytes of data serially, and put them in P1. Set the baud rate at 2400 baud, 8-bit data, and 1 stop bit. Assume crystal frequency to be 11.0592 MHz.

Laboratory Project : Design any microcontroller based Project*

***Note: Laboratory Project is compulsory to all students.**

List of Equipments/Machine Required:

Microcontroller kit, Interfacing kit, Keyboard, Monitor, SMPS for Microcontroller

Reference Books:

S. No.	Title	Authors	Publisher
1	The 8051 Microcontroller and Embedded Systems using Assembly and C, , 2nd Ed.,PHI.(Unit-I,II,III)	Mazidi, Mazidi & McKinlay	PHI Publication
2	8051 Programming, Interfacing and Applications	K. J. Ayala	Penram Pub

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B.Tech. (Electronics and Telecommunication Engineering) Fourth Semester

Subject Code :- ET105493	Mini Project-II Lab	L = 0	T = 0	P = 2	Credits = 1
Evaluation Scheme	ESE	CT	TA	Total	Lab Period
	50	00	25	75	24Hrs

Course Objective	Course Outcomes
The main objective IOT & Instrumentation applications in Electronics and Telecommunication engineering laboratory is to know the different real time sensors used to measure the different electronics parameters and to control the different electronics devices from anywhere through IOT.	On successful completion of the course, the student will be able to: **CO1:-**List out the different IOT applications. **CO2:** List the application of Arduino and Node MCU **CO3:** Design a digital frequency meter to measure the frequency in an AC circuit. **CO4:** Design a system to control the traffic signals through IOT.

List of Experiments:

1. To design a Digital DC Voltmeter and Ammeter to measure the voltage and current in DC electrical circuits using Arduino and display the values in LCD display.
2. To design a Digital AC Voltmeter and Ammeter to measure the voltage and current in AC electrical circuits using Arduino and display the values in LCD display.
3. To design a system to control the direction of three phase induction motor through IOT.
4. To design a Digital frequency meter to measure the frequency in any AC electrical circuit using Arduino and display the values in LCD display.
5. To measure the power and energy in electrical circuit using Arduino and display the values in LCD display.
6. To measure the phase shift and power factor in an electrical circuit for different loads using Arduino and display the value in LCD display.
7. To design an over current relay for distribution system and displaying the tripping status of the relay in substation through IOT.
8. Design a system to protect home appliances from over and under voltages using Arduino.
9. Design a system for protecting the three phase induction motor from over voltages, over currents, temperature and displaying the status of the motor at remote location using IOT.
10. To design a traffic control system using IOT.
11. To design a railway gate control using stepper motor using IOT.

12. To control the speed and direction of a DC motor using Arduino and display the status of the motor at the remote location using IOT.

Laboratory Project: Design any IOT based circuit*

***Note: Laboratory Project is compulsory to all students.**

List of Equipment's/Machine/Software Required:

- Software Tools: Arduino Uno, Computer with Arduino IDE software.

Reference Books:

S. No.	Title	Authors	Publisher
1	From Machine-to-Machine to the Internet of Things:Introduction to a New Age of Intelligence	Jan Holler, Vlasios Tsiatsis, Catherine Mulligan	Academic Press
2	Rethinking the Internet of Things: A Scalable Approach to Connecting Everything	Francis daCosta	Apress Publications

SHRI SHANKARACHARYA TECHNICAL CAMPUS, BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai)

SCHEME OF TEACHING AND EXAMINATION (Effective from 2020-2021 Batch)

B.Tech. (Electronics and Telecommunication Engineering) Fourth Semester

Subject Code :- AC100492	BIOLOGY FOR ENGINEERS	L = 0	T = 0	P = 0	Credits = 0
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	Workshop ,Quiz, Seminar And By Organize Guest Lecture	-	25	25	-

Course Objectives	Course Outcomes
The objective of this course is to impart an understanding of fundamentals ofbiological systems and its applicationstowards industries to solve the problemsin the real life. • To convey that Biology is as important scientific discipline as Mathematics, Physics, Chemistry, and Engineering and technology. • To convey that classification *per se* is not what biology is all about. The underlying criterion, such as morphological, biochemical or ecological be highlighted. Discuss the concept human genetics. • To convey that all forms of life has the same building blocks and yet the manifestations are as diverse as one can imagine. The molecular basis of coding and decoding genetic information is universal • How to analyses biological processes at the reductionist level. Concept of Energy change. • The fundamental concept and principles of Microbiology	**On successful completion of the course, the student will be ableto:** **CO1:**Describe how biological observations of 18th Century that lead to major discoveries.. **CO2:** Convey that classification *per se* is not what biology is all about but highlight the underlying criteria, such as morphological, biochemical and ecological. Highlightthe the concepts of genetic material and its segregation and independent assortment. **CO3:** Convey that all forms of life have the same building blocks and yet the manifestations are as diverse as one can imagine. Classify enzymes and distinguish between different mechanisms of enzyme action. Concept of genetic code. Universality and degeneracy of genetic code **CO4:** Identify DNA as a genetic material in the molecular basis of information transfer. The fundamental principles of energy transactions in physical and biological world. Thermodynamics properties of different biological systems. **CO5:** Apply thermodynamic principles to biological systems. Identify and classify microorganisms. A Brief Account of Evolution

Unit 1. INTRODUCTION **CO1**

Bring out the fundamental differences between science and engineering by drawing a comparison between eye and camera, Bird flying and aircraft. Mention the most exciting aspect of biology as an independent scientific discipline. Why we need to study biology? Discuss how biological observations of 18th Century that lead to major discoveries. Examples from Brownian motion and the origin of thermodynamics by referring to the original observation of Robert Brown and Julius Mayor. These examples will highlight the fundamental importance of observations in any scientific inquiry.**[2 Hrs.]**

Unit 2. CLASSIFICATION &GENETICS **CO2**

Hierarchy of life forms at phenomenological level. A common thread weaves this hierarchy.Classification. Discuss based on (a) cellularity- Unicellular or multicellular (b) ultrastructure-prokaryotes or eucaryotes. (c) Energy and Carbon utilization -Autotrophs,Heterotrophs, Lithotropes (d) Ammonia excretion – Aminotelic, Uricotelic, Ureotelic (e) Habitataacquatic or terrestrial (e) Molecular taxonomy- three major kingdoms of life. A given organism can come under different category based on classification. Model organisms for the study of biology come from different groups. E.coli, S.cerevisiae, D. Melanogaster, C. elegance, A. Thaliana, M.musculus.

interaction, Epistasis. Meiosis and Mitosis be taught as a part of genetics. Emphasis to be give not to the mechanics of cell division nor the phases but how genetic material passes from parent to offspring. Concepts of recessiveness and dominance. Concept of mapping of phenotype to genes. Discuss about the single gene disorders in humans. Discuss the concept of complementation using human genetics.**[3Hrs.]**

Unit 3. **BIOMOLECULES &INFORMATION TRANSFER** **CO3**

Molecules of life. In this context discuss monomeric units and polymeric structures. Discuss about sugars, starch and cellulose. Amino acids and proteins. Nucleotides and DNA/RNA. Two carbon units and lipids.

Molecular basis of information transfer. DNA as a genetic material. Hierarchy of DNA structure from single stranded to double helix to nucleosomes. Concept of genetic code. Universality and degeneracy of genetic code. Define gene in terms of complementation and recombination**.[4 Hrs.]**

Unit 4. **MACROMOLECULAR ANALYSIS & ITS METABOLISM** **CO4**

Proteins- structure and function. Hierarch in protein structure. Primary secondary, tertiary and quaternary structure. Proteins as enzymes, transporters, receptors and structural elements.

Thermodynamics as applied to biological systems. Exothermic and endothermic versus endergonic and exergoinc reactions. Concept of Keq and its relation to standard free energy. Spontaneity. ATP as an energy currency. This should include the breakdown of glucose to CO_2 + H_2O (Glycolysis and Krebs cycle) and synthesis of glucose from CO_2 and H_2O (Photosynthesis). Energy yielding andEnergy consuming reactions. Concept of Energy change.**[3 Hrs.]**

Unit 5. **MICROBIOLOGY EVOLUTION** **CO5**

Concept of single celled organisms. Concept of species and strains. Identification and classification of microorganisms. Microscopy. Ecological aspects of single celled organisms. Sterilization and media compositions. Growth kinetics.

Origin of Universe, Origin of Life, Evolution of Life Forms, Evidences of Evolution, Adaptive Radiation, Theories of Evolution BiologicalEvolution, Hardy–Weinberg Principle. **[3 Hrs.]**