MADANAPALLE INSTITUTE OF TECHMOLOGY & SCIENCE
(UGC-AUTONOMOUS)
Affiliated to JNTUA, Ananthapuramu & Approved by AICTE, New Delhi
Recognized Research Center, Accredited by NBA, NAAC for CSE, ECE, EEE, ME & MB
World Bank Funded Institute, Recognized by UGC under the sections 2(f) and 12(B) of the UGC
Recognized as Scientific & Industrial Research Organization by DSIR of DST
Department of Electronics & Communication Engineering

DAB
M

Date: 13-08-2021

Departmental Advisory Board

Department Advisory Board (DAB) has been formed to monitor the progress of the program. The committee develops and recommends new or revised goals and objectives of the program. The DAB consists of HOD and faculty members of the department to evaluate the performance of a program, review/monitor/assess a specific program.

Composition and approval of DAB

Following members are nominated and approved for constitution of Department Advisory Board for the **AY-2021-22.**

S.No.	Name of Faculty Members	Designation	Position
1	Dr. S. Rajasekaran	Professor and Head	Chairman
2	Dr. Kumar Manoj	Professor	Secretary
3	Dr. Remashan Kariyadan	Senior Professor	Member
4	Dr. P. Ramanathan	Professor	Member
5	Dr. Brijesh Kumar Singh	Professor	Member
6	Dr. Satrughan Kumar	Professor	Member
7	Dr. Veeraiyah Thangasamy	Professor	Member
8	Dr. K. Sathesh	Associate Professor	Member
9	Dr. Sumit Gupta	Associate Professor	Member
10	Dr. Sampath Kumar	Assistant Professor	Member

Roles and responsibilities of the DAB

1. Suggest improvement in academic plans and recommend standard practices/systems for attainment of Program Educational Objectives (PEOs)
2. Redefine existing PEO's, aligning of PEO's to the mission statements and defining program specific outcomes.
3. To propose necessary action plan for skill development of students, required for entrepreneurship development and quality improvement.
4. To identify and suggest thrust areas to conduct various activities (final year projects, training courses and additional experiments to meet PEOs.

HOD/ECE

Head of the Department
Electronics & Communication Engineering
Madanapalle Institute of Technology & Science
Angallu, MADANAPALLE - 517 325
Chittoor (Dist.) A.P

Principal

PRINCIPAL
Madanapalle Institute of Technology & Science
PO Box NO 14, Kadiri Road, Angallu
MADANAPALLE 517 325 A.P

Copy to
- The Principal
- Vice Principal Academics
- Departmental Advisory Board
- Department File

MADANAPALLE INSTITUTE OF TECHMOLOGY & SCIENCE
(UGC-AUTONOMOUS)
Affiliated to JNTUA, Ananthapuramu & Approved by AICTE, New Delhi
Recognized Research Center, Accredited by NBA, NAAC for CSE, ECE, EEE, ME & MBA
World Bank Funded Institute, Recognized by UGC under the sections 2(f) and 12(B) of the UGC act 1956
Recognized as Scientific & Industrial Research Organization by DSIR of DST
Department of Electronics & Communication Engineering

Date: 23/08/2021

Circular

A meeting of Department Advisory Board (DAB) of Electronics and Communication Engineering Department will be held on **27/08/2021** at 11.00 A.M in EB214. All the members of the DAB are requested to kindly attend the same.

Agenda:

The meeting is scheduled to discuss the following:

1. Review of previous meeting
2. Analyzing the report of the Program Assessment Committee and monitoring the progress of the program
3. Modifications in Course structure from R18 to R20.
4. Department academic calendar execution
5. Result analysis and result improvement measures
6. Any other point with permission from chair person.

HOD/ECE
Head of the Department
Electronics & Communication Engineering
Madanapalle Institute of Technology & Science
Angallu, MADANAPALLE - 517 325
Chittoor (Dist.) A.P

Copy to:

All members of DAB

MADANAPALLE INSTITUTE OF TECHMOLOGY & SCIENCE
(UGC-AUTONOMOUS)
Affiliated to JNTUA, Ananthapuramu & Approved by AICTE, New Delhi
Recognized Research Center, Accredited by NBA, NAAC for CSE, ECE, EEE, ME & MBA
World Bank Funded Institute, Recognized by UGC under the sections 2(f) and 12(B) of the UGC act 1956
Recognized as Scientific & Industrial Research Organization by DSIR of DST
Department of Electronics & Communication Engineering

Date: 30/08/2021

Minutes of Meeting for Department Advisory Board

The Department Advisory Board meeting was held on **27-08-2021** in the ECE department. The meeting was presided over by Chairperson Dr.S.Rajasekaran. He extended a warm welcome to the Department Advisory Board members and confirmed the minutes of previous meeting.

Chairman discussed the following agendas:

- Attainment of POs, PSOs, Quality objectives and Program effectiveness Changes / revision needed (if any)
- Report submitted by Program Assessment Committee (PAC) is analyzed and reviewed the progress of the program.
- The modifications in Course structure were discussed in the meeting (changes from R-18 regulation to R-20 regulation)
- In IV-I Professional Core Course Embedded System Design Theory and Embedded System Design Laboratory are replaced by Microwave Engineering Theory and Microwave Engineering Laboratory. Computer Communication Networks is introduced in the place of Mobile Telecommunication Networks. Also Computer Communication Networks Laboratory is also introduced.
- In IV-II (R14), Technical Seminar is removed and more focus is given for Project Work Phase-II in R18 regulations.
- In II-I (R20), a Professional Core Course Networks and Simulation Laboratory is introduced. Skill Oriented Courses are also introduced additionally from II- I semester onwards.
- Execution of academic calendar for the department for the academic year 2021-22 is reviewed.
- Members reviewed stakeholder's feedback for the academic year 2020-21 and recommended to prepare the action taken report for continuous improvements.
- Secretary discussed the academic year 2020-2021 semester result analysis and improvement measures.
- Chairperson asked suggestion to improve Course Outcomes (CO), Program Outcomes (PO), Program Specific Outcomes (PSO) attainment from members.
- Committee suggested to monitor continuous improvement in Placement Activities.

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE
(UGC-AUTONOMOUS)

Affiliated to JNTUA, Ananthapuramu & Approved by AICTE, New Delhi
Recognized Research Center, Accredited by NBA, NAAC for CSE, ECE, EEE, ME & MBA
World Bank Funded Institute, Recognized by UGC under the sections 2(f) and 12(B) of the UGC act 1956
Recognized as Scientific & Industrial Research Organization by DSIR of DST

Department of Electronics & Communication Engineering

The following faculty members attended the meeting.

S.NO	Name of the Faculty	Designation	Position
1.	Dr.S.Rajasekaran	Professor & HOD	Chairman
2.	Dr.Kumar Manoj	Professor	Secretary
3.	Dr.Remashan Kariyadan	Senior Professor	Internal Member
4.	Dr.P.Ramanathan	Professor	Internal Member
5.	Dr.Brijesh Kumar Singh	Professor	Internal Member
6.	Dr.Satrughan Kumar	Professor	Internal Member
7.	Dr.Veeraiyah Thangasamy	Professor	Internal Member
8.	Dr.K.Sathesh	Assoc.Professor	Internal Member
9.	Dr.Sumit Gupta	Assoc.Professor	Internal Member
10.	Dr.S.Sampath Kumar	Assistant Professor	Internal Member

HOD/ECE

Head of the Department
Electronics & Communication Engineering
Madanapalle Institute of Technology & Science
Angallu, MADANAPALLE - 517 325
Chittoor (Dist.) A.P.

MADANAPALLE INSTITUTE OF TECHNOLOGY AND SCIENCE, MADANAPALLE-517 325

Department of Electronics & Communication Engineering

Comparison of *B.Tech.II Year(Regular) R18 and R20 Regulations*

B.Tech.(Regular) R18 Regulations

B. Tech II- I Semester		B. Tech II- II Semester	
Course Code	Course Name	Course Code	Course Name
18HUM101	Economics And Financial Accounting For Engineers	18HUM102	Principles of Management
18BIO101	Life sciences for engineers	18MAT109	Probability and Stochastic Processes
18ECE101	Network Theory	18ECE104	Principles of Signals and Systems
18ECE102	Digital System design	18ECE105	Analog Circuits
18ECE103	Electronic Devices And Circuits	18ECE106	Control System Engineering
18ENG201	English Communication – listening & speaking laboratory	18ECE107	Microprocessor and Microcontroller
18ECE201	Digital System Design Laboratory	18ECE203	Analog Circuits Lab
18ECE202	Electronics Device And Circuits Laboratory	18ECE204	Simulation and Control Systems Laboratory
18HUM902	Indian Constitution	18ECE205	Microprocessor Lab
			Mandatory Course – II

B.Tech.(Regular) R20 Regulations

B. Tech II- I Semester			B. Tech II- II Semester		
Course Code	Course Name	% change	Course Code	Course Name	
20HUM101	Economics and Accounting for Engineers	0	20MAT109	Probability Theory And Stochastic Process	0
20BIO101	Life Sciences for Engineers	0	20ECE104	Control Systems Engineering	15
20ECE101	Network Theory	5	20ECE105	Principles of Signals and Systems	0
20ECE102	Digital System Design	20	20ECE106	Analog Circuits	26
20ECE103	Electronic Devices and Circuits	5	20ECE107	Microprocessors and Microcontrollers	25
20ENG202	Corporate Communication Laboratory	0	20ECE204	Simulation and Control Laboratory	0
20ECE201	Networks and Simulation Laboratory	100	20ECE205	Analog Circuits Laboratory	0
20ECE202	Digital System Design Laboratory	22	20ECE206	Microprocessors and Microcontrollers Laboratory	40
20ECE203	Electronic Devices and Circuits Laboratory	20	20CHE901	Mandatory Course – I (Environmental Sciences)	0

18HUM101 Economics And Financial Accounting For Engineers **UNIT I:** **DEMAND ANALYSIS:** Scope and Significance of Economics- Understanding the problem of scarcity and choice - Elements of market Economy: Demand, Supply and Market Equilibrium- Theory of Demand, Elasticity of Demand, Supply and Law of Supply. **UNIT II:** **PRODUCTION AND COST ANALYSIS** Production Function – Short-run and long- run production – Cost Analysis: Cost concepts - CostStructure of Firms and output decision- Break-Even Analysis (BEA) – Managerial significance and limitations of BEA - Determination of Break Even Point (Simple Problems). **UNIT III:** **MARKET STRUCTURE:** Classification of Markets - General Equilibrium and efficiency of Perfect competition, Monopoly, Monopolistic, Oligopoly, Duopoly – Price determination and various market conditions. **UNIT IV:** **BASICS OF ACCOUNTING:** Uses of Accounting - Book Keeping Vs Accounting - Double Entry System - Accounting Principles - Classification Of Accounts - Rules Of Debit & Credit. Accounting Cycle: Journal, Ledger, Trial Balance. Final Accounts: Trading Account - Profit & Loss Account - Balance Sheetwith Adjustments, (Simple Problems). **UNIT V:** **BASICS OF FINANCIAL ANALYSIS** Ratio Analysis - Liquidity, Leverage, Solvency and Profitability Ratios - Interpretation of Financial Statements - FundS Flow Statement - Capital Budgeting	**20HUM101 Economics And Financial Accounting For Engineers** **UNIT I** **DEMAND ANALYSIS** Scope and Significance of Economics- Understanding the problem of scarcity and choice - Elements of market Economy: Demand, Supply and Market Equilibrium-Theory of Demand, Elasticity of Demand, Supply and Law of Supply. **UNIT II** **PRODUCTION AND COST ANALYSIS** Production Function – Short-run and long- run production – Cost Analysis: Cost concepts - Cost Structure of Firms and output decision- Break-Even Analysis (BEA) – Managerial significance and limitations of BEA - Determination of Break Even Point (Simple Problems). **UNIT III** **MARKET STRUCTURE AND PRICING** Classification of Markets - General Equilibrium and efficiency of Perfect competition, Monopoly, Monopolistic, Oligopoly, Duopoly – Price determination under various market conditions- Pricing objectives- Methods. **UNIT IV** **BASICS OF ACCOUNTING** Uses of Accounting - Book Keeping Vs Accounting - Double Entry System - Accounting Principles - Classification Of Accounts - Rules Of Debit & Credit- Accounting Cycle: Journal, Ledger, Trial Balance. Final Accounts: Trading Account - Profit & Loss Account - Balance Sheet with Adjustments, (Simple Problems). **UNIT V** **FINANCIAL RATIO ANALYSIS AND CAPITAL BUDGETING** Ratio Analysis - Liquidity, Leverage, Solvency, Activity and Profitability Ratios - Capital Budgeting. (Simple Problems).	0%
18BIO101 Life Sciences for Engineers **UNIT I:** **INTRODUCTION TO LIFE SCIENCES & LIVING ORGANISMS** Why we need to study Life Sciences? Comparison and differences of biological organisms with manmade systems (Eye & Camera, Bird flying & Aircraft), Biological observations of 18th Century that led to major discoveries. Classification of living organisms, Cellular basis of life, differences between prokaryotes and eukaryotes, classification on the basis of carbon and energysources. **UNIT II:** **BIO-MOLECULES & MACROMOLECULES** Molecules of life: Water, Sugars, Starch, Cellulose, Amino acids, Structure and functions of proteins (primary, secondary, tertiary and quaternary structure), Structure and functions of nucleotides, nucleic acids, DNA (single and double strand) & RNA, hemoglobin, antibodies andenzymes, Industrial applications of enzymes and Fermentation process. **UNIT III:**	**20BIO101 Life Sciences for Engineers** **UNIT I** **INTRODUCTION TO LIFE SCIENCES& LIVING ORGANISMS** Why we need to study Life Sciences? Comparison and differences of biological organisms with manmade systems (Eye & Camera, Bird flying & Aircraft), Classification of living organisms, Cellular basis of life, differences between prokaryotes and eukaryotes, classification on the basis of carbon and energy sources **UNIT II** **BIOMOLECULES & MACROMOLECULES** Molecules of life: Water, Sugars, Starch, Cellulose, Amino acids, Structure and functions of proteins (primary, secondary, tertiary and quaternary structure), nucleotides, nucleic acids, DNA & RNA, hemoglobin, antibodies and enzymes, Industrial applications of enzymes and Fermentation process **UNIT III** **HUMAN PHYSIOLOGY**	0%

HUMAN PHYSIOLOGY Bioenergetics, Respiration: Glycolysis and TCA cycle, Electron transport chain and oxidative phosphorylation, Mechanism of photosynthesis, Human physiology, Neurons, Synaptic and Neuromuscular junctions. **UNIT IV:** **GENES, DNA & RNA** Mendel's laws, gene mapping, Mitosis and Meiosis, single gene disorders in humans, Genetic code, DNA replication, Transcription, Translation. Discuss the concept of complementation using human genetics. Recombinant DNA Technology: recombinant vaccines, transgenic microbes, plants and animals, animal cloning, biosensors, biochips. **UNIT V:** **METABOLISM** Thermodynamics as applied to biological systems. Exothermic and endothermic versus endergonic and exergoinc reactions. Concept of Keq and its relation to standard free energy. 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).	Bioenergetics, Cellular Respiration: Glycolysis and TCA cycle, Electron transport chain and oxidative phosphorylation, Human physiology: Introduction to Cardiovascular system, Neurons and Neuromuscular junctions. **UNIT IV** **GENETICS** Mendel's laws, Mitosis and Meiosis, Introduction to gene sequencing, single gene disorders in humans, Genetic code, DNA replication, Transcription, Translation. Recombinant DNA Technology: recombinant vaccines, transgenic microbes, plants and animals, animal cloning, biosensors, biochips. **UNIT V** **METABOLISM** Thermodynamics as applied to biological systems. Exothermic and endothermic versus endergonic and exergonic reactions. Concept of K_{eq} and its relation to standard free energy, Introduction to Lymphatic system, ATP as an energy currency. Energetics of breakdown of glucose into $CO_2 + H_2O$ (Glycolysis and Krebs cycle), Mechanism of Photosynthesis.	
18ECE101 Network Theory **UNIT I: NETWORK THEOREMS** Network Theorems-Linearity and Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power Transfer, Milliman, Miller & Tellegan's Theorems. Source Transformation. Network Topology Formation of Incidence Matrix, Tieset and Cutset Matrix formation. **UNIT II: RESONANCE** Definition of 'quality factor Q' of inductor and capacitor, Series resonance, Bandwidth of the series resonant circuits, Parallel resonance (or anti-resonance), Conditions for maximum impedance, Currents in parallel resonance, Impedance variation with frequency; universal resonance curves, Bandwidth of parallel resonant circuits, General case of parallel resonance circuit, Anti-resonance at all frequencies, variable phase angle circuit, reactance curves, Impedance Transformation. **UNIT III: APPLICATION OF LAPLACE TRANSFORM TO ELECTRIC CIRCUITS** Laplace transforms and properties: Partial fractions, singularity functions, waveform synthesis, analysis of RC, RL, and RLC networks with and without initial conditions with Laplace transforms evaluation of initial conditions. **UNIT IV: TWO PORT NETWORK** Relationship of two port variables, Short circuit Admittance parameters, Open circuit Impedance parameters, Transmission Parameters, Hybrid Parameters, Relationship	**20ECE101 Network Theory** **UNIT I: NETWORK THEOREMS** Network Theorems-Linearity and Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power Transfer, Milliman, Miller & Tellegan's Theorems. Source Transformation. Network Topology Formation of Incidence Matrix, Tieset and Cutset Matrix formation. **UNIT II: RESONANCE** Definition of 'quality factor Q' of inductor and capacitor, Series resonance: Impedance variation with frequency; universal resonance curves, Q factor and Bandwidth of the series resonant circuits, Parallel resonance (or anti-resonance): Impedance variation with frequency, Q factor and Bandwidth of parallel resonant circuits, Resonance between parallel RC and RL circuit. **UNIT III: APPLICATION OF LAPLACE TRANSFORM TO ELECTRIC CIRCUITS** Laplace transforms and properties: Partial fractions, singularity functions, waveform synthesis, analysis of RC, RL, and RLC networks with and without initial conditions with Laplace transforms evaluation of initial conditions **UNIT IV: TWO PORT NETWORK** Relationship of two port variables, Short circuit admittance parameters, Open circuit impedance parameters, Transmission parameters, Hybrid parameters, Relationship between parameter sets, Series, Cascade and Parallel connection of two port networks.	05%

between parameter sets, Parallel connection of two port networks. **UNIT V: FILTER DESIGN** Introduction, the Neper & decibel, Characteristic Impedance of symmetrical networks, the propagation constant, Properties of symmetrical networks, Filter fundamentals; pass and stop bands, Behavior of characteristic impedance, The constant – k low pass filter, the constant – k high pass filter, The m-derived T section, The *m*-derived π section. Variation of characteristic impedance over the pass band, Termination with *m* –derived half sections, Band-pass filters, Band elimination filters, Illustrative problems.	**UNIT V: FILTER AND ATTENUATORS** Introduction, the Neper & decibel, , Properties of symmetrical T and π networks, the Filter fundamentals; pass and stop bands, Behavior of characteristic impedance, Variation of characteristic impedance over the pass band, The constant – k filters T and π section. Attenuators: T-Type, Pi-Type, Bridged T-Type. Equalizers: Inverse impedances. Series and Shunt equalizers, T-equalizers and Bridged T-equalizers.	
18ECE102 Digital System Design **UNIT I: LOGIC SIMPLICATION** Logic Simplification and Combinational Logic Design: Review of Boolean Algebra and De Morgan's Theorem, SOP & POS forms, Canonical forms, Karnaugh maps upto 6 variables, Binary codes, Code Conversion. **UNIT II: COMBINATIONAL LOGIC DESIGN** MSI devices like Comparators, Multiplexers, Encoder, Decoder, Driver & Multiplexed Display, Half and Full Adders, Subtractors, Serial and Parallel Adders, BCD Adder, Barrel shifter and ALU **UNIT III: SEQUENTIAL LOGIC DESIGN** Sequential Logic Design: Building blocks like S-R, JK and Master-Slave JK FF, Edge triggered FF, Ripple and Synchronous counters, Shift registers, Finite state machines, Design of synchronous FSM, Algorithmic State Machines charts. Designing synchronous circuits like Pulse train generator, Pseudo Random Binary Sequence generator, Clock generation **UNIT IV: LOGIC FAMILIES AND SEMICONDUCTOR MEMORIES** Logic Families and Semiconductor Memories: TTL NAND gate, Specifications, Noise margin, Propagation delay, fan-in, fan-out, Tristate TTL, ECL, CMOS families and their interfacing, Memory elements, Concept of Programmable logic devices like FPGA. Logic implementation using Programmable Devices **UNIT V: VLSI DESIGN FLOW** VLSI Design flow: Design entry: Schematic, FSM & HDL, different modeling styles in VHDL, Data types and objects, Dataflow VHDL constructs and codes for combinational and sequential circuits, Behavioural and Structural Modeling, Synthesis and Simulation	**20ECE102 Digital System Design** **UNIT I: LOGIC SIMPLICATION** **Binary Systems:** Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Compliments, Signed Binary Numbers, Binary Codes. **Boolean Algebra:** Basic Definitions, Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Boolean Functions, SOP & POS forms, Canonical forms, Karnaugh maps up to 5 variables, Other Logic Operations, **Logic Gates:** Digital Logic Gates, NAND and NOR Implementation Integrated Circuits **UNIT II: COMBINATIONAL LOGIC DESIGN** **Combinational Circuits:** Analysis Procedure, Design Procedure, Half and Full Adders, Subtractors, Serial and Parallel Adders, BCD Adder, Decoder, Encoder, Multiplexers **Combinational Logic Design:** BCD to Seven Segment Decoder, Barrel Shifter and ALU **UNIT III: SEQUENTIAL LOGIC DESIGN** **Sequential Logic Design:** Clock Triggering, Basics of Latch and Flip Flops, Building blocks like S-R, JK , D, T and Master-Slave JK FF, Ripple and Synchronous counters, Shift registers, Finite state machines, Design of synchronous FSM **Designing Synchronous Circuits:** Pulse train generator, Pseudo Random Binary Sequence generator, Clock generation **UNIT IV: LOGIC FAMILIES AND SEMICONDUCTOR MEMORIES** **Logic Families and Semiconductor Memories: Digital Integrated Circuits,** Different logic familes (RTL, DTL, TTL), and their specifications, Noise margin, Propagation delay, fan-in, fan-out, TTL based NAND gate, Totem Pole TTL, CMOS logic families **Memory Hierarchy & different types of memories: Analog-to-Digital and Digital-to-Analog Converters** **Programmable logic devices:** Programmable Logic Array, Programmable Array Logic, and FPGA **UNIT V: VLSI DESIGN FLOW** VLSI Design flow: Y-chart, Design entry: Schematic, HDL, Different modeling styles in VHDL: Structural, Data Flow and Behavioural Data types and objects, Codes for combinational (Adder/Subtractor/Multiplexers) and sequential circuits (Flip Flops/Counters), Synthesis and Simulation	20%

18ECE103 Electronic Devices and Circuits **UNIT I: SEMICONDUCTOR DEVICES AND CHARACTERISTICS** Introduction to Semiconductor Physics: Energy bands in semiconductor, E-k diagrams, Direct and Indirect band-gap semiconductors, carrier concentration in semiconductor, Drift and Diffusion current, Hall effect, mobility and resistivity, Generation and recombination of carriers; P-N junction Diode: formation of P-N junction, working of diode, I-V characteristics, and small signal switching models. Avalanche breakdown, Operation and Characteristics of Zener diode, Schottky diode, Tunnel diodes, Varactor diode, PIN diode. **UNIT II: TRANSISTORS** BJT- Structure, operation, characteristics and biasing, bias compensation techniques – Ebers-Moll Model, JFET- Structure, operation, characteristics and biasing - MOSFET- Structure, operation, MOS capacitor, characteristics and biasing – Types of MOSFET. **UNIT III: APPLICATIONS OF DIODES AND TRANSISTORS** Diode circuits: half wave, full wave and bridge rectifiers - filters, voltage multiplier, clipper circuits, clamper circuits, Voltage regulator circuit using Zener diode. Transistor amplifiers: BJT and MOS amplifiers. **UNIT IV: LOW FREQUENCY ANALYSIS OF TRANSISTOR AMPLIFIERS** Transistor as a two-port device and its Hybrid Model: Models for CB, CE, CC configurations and their Interrelationship, Small signal analysis of BJT amplifiers, analysis of low frequency transistor model, estimation of voltage gain, current gain, input resistance and output resistance. Small Signal operation and model of MOSFET, Single stage MOSFET Amplifiers **UNIT V: HIGH FREQUENCY ANALYSIS OF TRANSISTOR AMPLIFIERS** High frequency models of BJT, frequency response of CE amplifier, cascade amplifier, multistage amplifiers and its frequency response, MOSFET high frequency model and internal capacitance, frequency response of CS amplifier.	**20ECE103 Electronic Devices and Circuits** **UNIT I: FUNDAMENTALS OFSEMICONDUCTORS** Review of Band Theory of solids, intrinsic semiconductors, Direct and Indirect band-gap semiconductors, carrier concentration in semiconductor, Drift and Diffusion current, Hall effect, mobility and resistivityGeneration and Recombination of electrons and holes. Thermal equilibrium, Doped semiconductors n and p types, Fermi level and carrier concentrations of n and p type semiconductors. Carrier mobility and conductivity, diffusion, Continuity equation, Hall Effect and its applications. **UNIT II: SEMICONDUCTOR DIODES** Band structure of pn junction, current components, Quantitative theory of pn diode, Volt-ampere characteristics and its temperature dependence, Transition and diffusion capacitance of p-n junction diodes, Breakdown of junctions on reverse bias, Zener and Avalanche breakdowns, Tunnel diode and its V-I characteristics, The principles of photo diode, photo transistor, LED & LCD. **UNIT III: TRANSISTORS** PNP and NPN junction transistors, Characteristics of the current flow across the base regions, Minority and majority carrier profiles, Transistor as a device in CB, CE and CC configurations, and their characteristics, Ebers-Moll Model of BJT. JFET- Structure, operation, characteristics and biasing - MOSFET- Structure, operation, MOS capacitor, characteristics and biasing – Types of MOSFET. **UNIT IV: APPLICATIONS OF DIODES AND TRANSISTORS** Diode circuits: half wave, full wave and bridge rectifiers - filters, voltage multiplier, clipper circuits, clamper circuits, Voltage regulator circuit using Zener diode. Transistor amplifiers: BJT and MOS amplifiers. **UNIT V: LOW FREQUENCY ANALYSIS OF TRANSISTOR AMPLIFIERS** Transistor as a two-port device and its Hybrid Model: Models for CB, CE, CC configurations and their Interrelationship, Small signal analysis of BJT amplifiers, analysis of low frequency transistor model, estimation of voltage gain, current gain, input resistance and output resistance. Small Signal operation and model of MOSFET, Single stage MOSFET Amplifiers	5%
18ENG201 English Communication – listening & speaking laboratory **UNIT 1:** Listening; Understanding key vocabulary; Listening for main ideas; Listening in detail;	**20ENG202 Corporate CommunicationLaboratory** **UNIT I** **Listening and Speaking Skills**	0

Syllable stress; Sentence stress; Presentation. **UNIT 2:** Vocabulary for important places (bank, library, restaurant, etc.); Prepositions for places; Stress determiners (this & that); Intonation. **UNIT 3:** Using background knowledge; Collocations; Pronouncing clusters of consonants (e.g. –gh, -ing, ph, ck); Mapping ideas; Pronunciation of phrases; Listening for opinion; Vocabulary and collocations for jobs. **UNIT 4:** Listening for lecture organization; Text organization features; Phrases with make; Evaluating and proposing ideas; Expressing attitudes **UNIT 5:** Identifying opposing viewpoints; Silent letters; Idioms; Fixed expressions; Phrasal verbs.	1. Conversational skills (Formal and Informal); 2. Group Discussion; 3. Making effective presentations using Computers; 4. Listening/watching interviews, conversations, documentaries, etc.; 5. Listening to lectures, discussions from TV/Radio/Podcast. **UNIT II** **Reading and Writing Skills** 1. Reading different genres of texts ranging from newspapers to creative writing; 2. Writing job applications and resume; 3. Emails; Letters; Memorandum; Reports; 4. Writing abstracts and summaries; 5. Interpreting visual texts. **UNIT III** **Interview Skills** 1. Different types of interviews: 2. Answering questions and offering information; 3. Mock interviews; 4. Body Language; 5. Articulation of sounds; 6. Intonation **UNIT IV** **Acclimatizing students with other exams** 1. Test of English as a Foreign Language (TOEFL); 2. Civil Service Examinations; 3. Verbal- -ability	
	20ECE201 Networks and Simulation Laboratory **LIST OF EXPERIMENTS** **1.** A) Verification of Kirchhoff's Law. B) Apply Mesh and Node Analysis Techniques for Solving Electrical Circuits. **2.** Verification of Superposition and Reciprocity Theorem. **3.** A) Verification of Thevenin's and Norton Theorem. B) Verification Maximum Power Transfer Theorem. **4.** Verification of Miller Theorem and Millman's Theorem **5.** Verification of Tell Egan's Theorem **6.** Design A Series RLC Circuit. Plot Frequency Response and Find Resonance Frequency, Bandwidth.	100%

	Q-Factor. **7.** Design a Parallel RLC Circuit. Plot Frequency Response and Find Resonance Frequency, Bandwidth, Q-Factor. **8.** A) Design A RC Time Constant for A Given RC Circuit. B) Design A RL Time Constant for A Given RL Circuit. **9.** Design and analyse (settling time, overshoot, undershoot, etc.) step response of for a given series RLC circuit for following cases: i) $\zeta = 1$ (critically damped system) ii) $\zeta = 1$ (critically damped system) iii) $\zeta < 1$ (Under damped system) Choose appropriate values of R, L, and C to obtain each of above cases one at a time. **10.** Design and analyze Z, Y parameters of two-port network. **11.** Design and analyze ABCD & h parameters of two-port network. **12.** Design a Constant-K, T and π section of low pass and high pass filters for the following cutoff frequency. i)50 Hz ii)30 kHz	
20ECE202 Digital System Design Laboratory PART A: EXPERIMENTS USING VHDL 1. Design all gates using VHDL 2. Write VHDL programs for the following circuits, check the wave forms i. Half adder ii. Full adder 3. Write VHDL programs for the following circuits, check the wave forms i. Half subtractor ii. Full subtractor 4. Write VHDL programs for the Decoder circuits, check the wave forms 5. Write VHDL programs for the Encoder circuits, check the wave forms 6. Write VHDL programs for the Magnitude Comparator, check the wave forms 7. Write VHDL programs for the D Latch and D Flip Flop, check the wave forms 8. Write VHDL programs for the J K and T Flip Flop, check the wave forms 9. Write VHDL programs for the Shift Registers, Serial in parallel out (SIPO), check the wave forms **PARTB: EXPERIMENT USING 74 xx ICs** 1. Implementation of Boolean functions using logic gates 74xxICs 2. Design of Adders using 74 xx ICs 3. Design of Subtractors using 74 xx ICs 4. Design of 3-8 decoder-74138 & 8-3 encoder-74x148 5. Design of 8x1 Multiplexers-74x151 and 2x4demultiplexers-74x155	**20ECE202 Digital System Design Laboratory** **PART A: EXPERIMENT USING 74 xx ICs** **1. Logic gates using 74xx ICs** **(i) Verification of truth table of basic logic gates** **(ii) Realization of basic Logic gates using Universal Logic Gates (NAND/NOR)** **(iii)Implementation of different Boolean functions** **2. Binary Adders using 74 xx ICs** **(i) Half Adder** **(ii) Full Adder** **3. Binary Subtractors using 74 xx ICs** **(i) Half Subtractor** **(ii)Full Subtractor** **4. Decoder and Encoder Implementation** **(i) 3:8 decoder using IC 74138** **(ii) 8:3 encoder using IC 74x148** **5. Multiplexer and Demultiplexer** **(i) Realization of 8:1 Multiplexers using IC 74x151** **(ii) Realization of 2:4 Demultiplexer using IC 74139** **6. Latches and Flip Flops** **(i)Realization of D Latch using IC 7474** **(ii) Implementation of Master Slave JK Flip-Flop using IC 7476**	22%

6. Design of Latches & Flip-flops: D-flipflop 74x74, JK flipflop 74x109 7. Design of 4-bit comparators 74x85 8. Design of Decade counters-74x90 9. Design of universal shift registers 74x194	**7. Realization of 4-bit comparators using IC 74x85** **8. Analysis of Decade counters using IC 74x90** **9. Implementation of universal shift registers using IC 74x194** **PART B: EXPERIMENTS USING XILINX TOOL** 1. Logic gates using Verilog HDL (i) Realization of basic logic gates. (ii) Implementation of Universal logic gates (NAND/NOR) 2. Binary Half/Full Adder using VHDL (i) Gate Level Modeling (ii) Data Flow Modeling (iii) Behavioural Modeling 3. Binary Half/Full subtractor using VHDL (i) Gate Level Modeling (ii) Data Flow Modeling (iii) Behavioural Modeling 4. Realization of Full adder (substractor) using half adder (subtractor) in Verilog HDL using Data Flow/Behavioural modeling. 5. Design and realization of 3:8 Decoder in VHDL using Data Flow Modeling. 6. Design and realization 8:1 Multiplexer circuit using Structural Modeling and test bench. 7. Realization of SR and D Latch in Verilog HDL using Behavioural Modeling and test bench. 8. Realization of J K and D Flip Flop using Behavioural Modeling and test bench. 9. Design and Implementation of adder subtractor circuits on FPGA board using Verilog HDL.	
20ECE203 Electronic Devices and Circuits Laboratory **Part-A (Hardware)** 1. Forward and reverse bias I-V characteristics of p-n junction diode 2. Zener diode I-V characteristics. Zener as a voltage regulator. 3. JFET/MOSFET characteristics 4. Input and output characteristics of BJT in CB, CE, CC configuration. 5. Half and full wave rectifiers with and without RC filter. 6. Clipper and clamper circuits design and analysis. 7. Frequency response of CE and CC amplifier **Part-B (Software)**	**20ECE203 Electronic Devices and Circuits Laboratory** **Part-A (Hardware)** 1. Forward and reverse bias I-V characteristics of p-n junction diode 2. Zener diode I-V characteristics of Zener diode. 3. Zener diode as a voltage regulator (Line and load). 4. Half and full wave rectifiers with and without RC filter. 5. Clipper and clamper circuits design and analysis. 6. Input and output characteristics of BJT in CB, CE, CC configuration. 7. JFET drain and transfer characteristics.	20%

8. Simulation of nodal analysis for DC Circuits 9. Simulation of transient and parametric analysis of series RLC circuits using step, pulse and sine inputs 10. Simulation of Thevenin's and Norton's theorems for DC circuits 11. Simulation of maximum power transfer theorem for DC circuits 12. Simulation of reciprocity and superposition theorem for DC circuits 13. Simulation of input and output characteristics of transistor in CB, CE and CC configuration 14. Simulation of frequency response of CE and CC amplifiers.	8. JFET amplifier based on CS configuration. 9. MOSFET drain and transfer characteristics 10. **Frequency response of CE and CC amplifier.** **Part-B (Software)** 11. **Forward and reverse bias I-V characteristics of p-n junction diode using Multisim.** 12. **Zener diode I-V characteristics of Zener diode using Multisim.** 13. **Zener diode as a voltage regulator (Line and load) using Multisim.** 14. **Simulation of input and output characteristics of transistor in CB, CE and CC configuration using Multisim** 15. **Simulation of frequency response of CE and CC amplifiers using Multisim.**	
18HUM902 Indian Constitution **UNIT I: INTRODUCTION (6)** Historical Background – Constituent Assembly of India – Philosophical foundations of the Indian Constitution – Preamble – Fundamental Rights – Directive Principles of State Policy – Fundamental Duties – Citizenship – Constitutional Remedies for citizens. **UNIT II: STRUCTURE AND FUNCTION OF CENTRAL GOVERNMENT (6)** Union Government – Structures of the Union Government and Functions – President – Vice President – Prime Minister – Cabinet – Parliament – Supreme Court of India – Judicial Review. **UNIT III: STRUCTURE AND FUNCTION OF STATE GOVERNMENT (6)** State Government – Structure and Functions – Governor – Chief Minister – Cabinet – State Legislature – Judicial System in States – High Courts and other Subordinate Courts. **UNIT IV CONSTITUTION FUNCTIONS (6)** Indian Federal System – Center – State Relations – President's Rule – Constitutional Amendments – Constitutional Functionaries - Assessment of working of the Parliamentary System in India. **UNIT V INDIAN SOCIETY (6)** Society: Nature, Meaning and definition; Indian Social Structure; Caste, Religion, Language in India Constitutional Remedies for citizens – Political Parties and Pressure Groups; Right of Women, Children and Scheduled Castes and Scheduled Tribes and other Weaker Sections.		
	20ECE5M01 Data Science for Engineers	
	20ECE501 Electronic Measurements	
	20ECE502 Sensors and Transducers	
	20ECE503 MATLAB for Engineers	

18HUM102 **Principles of Management** **UNIT I: INTRODUCTION** Introduction to Management and Organizations- Management definition, skills, roles, goals and functions of a manager, organization, value of studying management - Managing in a Global Environment- Global Perspective, Understanding global environment, - Social Responsibility and Managerial Ethics. **(9)** **UNIT II: PLANNING** Decision-making process, Types of decisions and decision making conditions, styles, biases and errors, Planning: Meaning of planning, establishing goals and developing plans, contemporary issues in planning - Strategic Management-Importance of strategic management, strategic management process, types of organizational strategies, current issues in strategic management. **(9)** **UNIT III: ORGANIZING** Organizational structures - HRM process, Contemporary issues in HRM – Departmentation – decentralization – delegation of Authority - Managing Change and Innovations. **UNIT IV: COMMUNICATION, MOTIVATION AND LEADING** Functions of communication, Inter-personal communication, Barriers of Communication – Understanding Information Technology - Motivation: Theories of motivation and current issues in motivation. Leading: Leaders and Leadership, Leadership theories - Leadership issues in twenty first century. **(9)** **UNIT V: CONTROLLING** Process of control – Types of Control - feed-forward, concurrent and feedback controls, contemporary issues in control – Strategic role of Operations Management - Value Chain Management.		
18MAT109 **Probability and Stochastic Processes** **UNIT 1: PROBABILITY AND RANDOM VARIABLES** Probability introduced through sets and relative frequency, joint and conditional probability, independent events, combined experiments and Bernoulli trials. **(9)** **UNIT 2: ONE DIMENSIONAL RANDOM VARIABLE** Random variable concept, distribution function, density function, Gaussian, binomial, Poisson, uniform, exponential and Rayleigh distributions. Expected value of a random variable, moments, Chebychev's inequality, characteristic function, moment generating function and Chernoff's bounds. **(9)** **UNIT 3: MULTIPLE RANDOM VARIABLES** Vector random variables, joint distribution function, joint density function and its properties, conditional distribution and conditional density functions. Statistical independence, joint moments, joint characteristic function. **(9)** **UNIT 4: TRANSFORMATION OF RANDOM VARIABLES AND RANDOM SEQUENCES** Jointly Gaussian random variables. Transformation of one and multiple random variables.	**20MAT109 Probability Theory And Stochastic Process** **UNIT I** **Probability and random variables** Probability – Classical and introduced through sets, joint and conditional probability, independent events, combined experiments and Bernoulli trials. **UNIT II** **One dimensional random variable** Random variable concept, distribution function, density function, Gaussian, binomial, Poisson, uniform, exponential and Rayleigh distributions. Expected value of a random variable, moments, characteristic function and moment generating function. **UNIT III** **Multiple random variables** Vector random variables, joint distribution function, joint density function and its properties, conditional distribution and conditional density functions. Statistical independence, joint moments, joint characteristic function. **UNIT IV** **Transformation of random variables and Random sequences**	

Random sequences and modes of convergence (everywhere, almost everywhere, probability, distribution and mean square); Limit theorems; Strong and weak laws of large numbers, central limit theorem. **UNIT 5: RANDOM PROCESSES** Random process, stationarity and independence, correlation functions, measurement of correlation functions, Gaussian random processes. Power spectrum density and its properties. Linear system fundamentals and random signal response of linear systems.	Jointly Gaussian random variables. Transformation of one and multiple random variables. Chebychev's inequality. Random sequences and modes of convergence (everywhere, almost everywhere, probability, distribution and mean square); Limit theorems; Strong and weak laws of large numbers, central limit theorem. **UNIT V** **Random processes** Random process, stationarity and independence, correlation functions, measurement of correlation functions, Gaussian random processes. Power spectrum density and its properties. Linear system fundamentals and random signal response of linear systems.	
18ECE106 **Control System Engineering** **UNIT I: CONTROL SYSTEMS MODELLING AND REPRESENTATION** A brief on history, evolution and scope of control systems, Practical control examples, System and its classification, Mathematical modelling of physical systems, Representation of linear systems using differential equations and transfer functions. Block diagram and its reduction rules, Signal flow graph and Masson's gain formula. **UNIT II: TIME DOMAIN ANALYSIS** Transient and steady state response of feedback control systems, Time domain specifications, Location of poles on s-plane and the transient response, Steady-state errors and error constants. Introduction to P, PI and PID control actions. PID tuning and implementation using passive network, Performance indices (IAE and ISE). Simulation practices using MATLAB. **UNIT-III: STABILITY ANALYSIS AND CONTROLLER DESIGN** Concept of system stability, Routh-Hurwitz stability criterion, Relative stability, Concept of root locus and its procedure. Introduction to compensation technique, Lead-lag compensator design using root locus, Simulation practices using MATLAB. **UNIT-IV: FREQUENCY DOMAIN ANALYSIS** Bode plot, Frequency-domain Specifications, Correlation between time and frequency domain specifications, Concept of stability and relative stability, Polar plots, Nyquist plots, Nyquist stability criterion. Lead-lag compensator design in frequency domain, Simulation practices using MATLAB. **UNIT V: MODERN CONTROL THEORY** Introduction to state variables and state space models of linear systems, State transition matrix, Solution of	**20ECE104 Control Systems Engineering** **UNIT I: CONTROL SYSTEMS MODELLING AND REPRESENTATION** Introduction to Control Systems: Basic Concepts of Control Systems, Open loop and closed loop systems, Practical examples, Mathematical modelling of physical systems, Introduction to control system components: Actuators, Sensors, Transducers, Servo Mechanism/Tracking System, Representation of linear systems using differential equations and transfer functions. Block diagram and its reduction rules, Signal flow graph and Masson's gain formula. **UNIT II: TIME DOMAIN ANLYSIS** Transient and steady state response of feedback control systems, Time domain specifications, Location of poles on s-plane and the transient response, Time response of first order systems, Time Response of second order systems, Steady-state errors and error constants, Performance indices (IAE and ISE). **UNIT-III: STABILITY ANALYSIS AND CONTROLLER DESIGN** Concept of system stability, Routh-Hurwitz stability criterion, Relative stability, Concept of root locus and its procedure. Introduction to compensator and controllers, Lead and lag compensator, P, PI and PID control actions **UNIT-IV: FREQUENCY DOMAIN ANALYSIS** Bode plot, Frequency-domain specifications, Correlation between time and frequency domain specifications, Concept of stability and relative stability, All Pass and Minimum- Phase Systems, Non-minimum phase system, Polar plots, Nyquist plots, Nyquist stability criterion. **UNIT V: MODERN CONTROL THEORY** Introduction to state variables and state space models of linear systems, State transition matrix, Solution of state equations (homogenous and non-homogenous), Concept of Controllability & Observability	15%

state equations, Controllability & Observability, Simulation practices using MATLAB.		
18ECE104 **Principles of Signals and Systems**	**20ECE105 Principles of Signals and Systems**	
18ECE105 **Analog Circuits** **UNIT I: Feedback Amplifiers and Oscillators:** Feedback amplifiers: feedback topologies, voltage series, current series, voltage shunt, current shunt, effect of feedback on stability, gain, bandwidth, noise and distortion. Oscillators, Barkhausen criterion, RC oscillators: phase shift and Wien bridge oscillators, LC Oscillators: Hartley and Colpitts oscillators **UNIT II: Power Amplifiers and Tuned Amplifiers:** Power amplifiers: Class A, Class B, Class AB and Class C, estimation of power efficiency. Tuned amplifiers: Single Tuned amplifier, Double Tuned amplifier, Stagger Tuned amplifier – Q factor – Stability – applications **UNIT III: Operational Amplifiers:** Principle of operation differential amplifier, calculation of differential gain, common mode gain and CMRR – DC and AC characteristics, Inverting – Non-inverting amplifier – Summing and difference amplifiers, Integrators and Differentiators circuits. **UNIT IV: Applications of Operational Amplifier:** Nonlinear Op-amp circuits: Log and antilog Amplifiers, Analog switch - Sample and Hold circuit - Analog multipliers, Precision rectifiers, - Comparators and Schmitt Trigger - Active filters **UNIT V: Special IC's and Data Converters:** IC voltage regulators – 555 Timer – operation – Astable and Monostable modes and their applications – VCO – PLL – D/A converters – weighted resistor and R/2R ladder type converters - A / D converters – Flash type and Successive approximation converter.	**20ECE106 Analog Circuits** **UNIT I: DIFFERENTIAL AND POWER AMPLIFIERS** **Differential amplifiers:** Operation of BJT and MOS differential amplifiers and its small signal equivalent circuit analysis, MOS differential amplifier with active load, Basic MOS current mirror circuits, MOS current mirror circuits with improved performance. Steering circuits. **Power amplifiers:** Class A, Class B, Class AB and Class C, estimation of power efficiency. **UNIT II: FEEDBACK AMPLIFIERS AND OSCILLATORS:** **Feedback amplifiers:** Basics of feedback, positive and negative feedback. Properties of negative feedback, Feedback topologies, series- shunt, shunt-series, series-series, shunt-shunt. Analysis of feedback voltage amplifiers. **Oscillators:** Barkhausen criteria, RC oscillators: Phase-shift and Wien bridge oscillators, LC oscillators: Hartley and Colpitts oscillators, Crystal oscillator. **UNIT III: OPERATIONAL AMPLIFIERS:** Block diagram and symbol of op-amp, Ideal op-amp, differential gain, common-mode gain and CMRR, Inverting and non-inverting configurations, Practical op-amp: Input offset voltage, input bias current, input offset current, slew rate. Summing and difference amplifiers, basic and practical integrators and basic and practical differentiators, voltage follower. **UNIT IV: APPLICATIONS OF OPERATIONAL AMPLIFIER:** IC Voltage regulators – Linear regulators and switching regulators. Fixed (78XX and 79XX) and adjustable voltage regulators (IC 723). - Monolithic switching regulator, 555 Timer: Functional block diagram, astable and monostable mode of operations, Voltage controlled oscillator (VCO), Phase locked loop (PLL), Monolithic PLL IC 565, applications of PLL. **UNIT V: SPECIAL FUNCTION ICs:** **IC Voltage regulators:** Fixed (78XX and 79XX) and adjustable voltage regulators (IC 723). - Monolithic switching regulator, 555 Timer: Functional block diagram and operation, astable and monostable mode of operations, Voltage controlled oscillator (VCO), Phase locked loop (PLL), Monolithic PLL IC 565, applications of PLL.	26%
18ECE107 **Microprocessor and Microcontroller** **UNIT I: 8086 MICROPROCESSOR:** Introduction to 8086 – Microprocessor architecture – Addressing modes – Instruction set and assembler directives – Assembly language programming – Modular Programming – Linking and Relocation	**20ECE107 Microprocessors and Microcontrollers** **UNIT I: 8086 MICROPROCESSOR** Introduction to 8086 – 8086 Microprocessor architecture – Instruction set - Addressing modes- Assembler directives – Assembly language programming, Introduction to advanced processors. **UNIT II: INTERFACING WITH 8086** Memory interfacing- Parallel communication interface- Timer – Keyboard /display controller –	

UNIT II: 8086 INTERRUPTS: Stacks – Procedures – Macros – Interrupts and interrupt service routines – Byte and String Manipulation, Memory Interfacing, Co-processor, Introduction to advanced processors. **UNIT III: I/O INTERFACING WITH 8086:** I/O Interfacing: Parallel communication interface, D/A and A/D Interface – Timer – Keyboard /display controller – Interrupt controller – DMA controller – Programming and applications Case studies: LED display, Keyboard display interface **UNIT IV: 8051 MICROCONTROLLER:** Microcontroller: Architecture of 8051 – Special Function Registers(SFRs) – I/O Pins Ports and Circuits – Instruction set – Addressing modes – Assembly language programming **UNIT V: I/O INTERFACING WITH 8051:** Interfacing Microcontroller: Programming 8051 Timers – Serial Port Programming – Interrupts Programming - Stepper Motor and Waveform generation, Introduction to PIC Microcontroller	Interrupt controller – DMA controller- Assembly language programs related to the above interfacing **UNIT III: 8051 MICROCONTROLLER** Architecture of 8051 – Special Function Registers (SFRs) – Instruction set – Addressing modes – Assembly language programming involving I/O Ports – 8051 Timers – Serial Ports – Interrupts **UNIT IV: ARM MICROCONTROLLER** The RISC design philosophy- ARM Architecture fundamentals- ARM Instruction Set- Thumb Instruction set – ARM Assembly Language Programming – C programming – Optimizing ARM Assembly Code. **UNIT V: APPLICATION PROGRAMMING** Introduction to Proteus. 8051/ARM based Interfacing design and programming for applications such as: Key pad – LCD display - Seven segment display - Digital clock – Stepper motor control – ADC/DAC – Traffic light control – Use serial communication facility to send/receive messages – Use interrupt facility to monitor and service real-time events.	
18ECE204 Simulation and Control Systems Laboratory	**20ECE204 Simulation and Control Laboratory**	
18ECE203 Analog Circuits Lab	**20ECE205 Analog Circuits Laboratory**	
18ECE205 Microprocessor Lab	**20ECE206 Microprocessors and Microcontrollers Laboratory**	
Mandatory Course –II 18 CHE901 (Environmental Sciences) **UNIT I:** **MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES (6)** Definition, Scope and Importance – Need for Public Awareness. Renewable energy Resources: Solar energy - solar cells, wind energy, tidal energy. Non-renewable energy resources: LPG, water gas, producer gas. Overgrazing, effects of modern agriculture – fertilizer and pesticides. **UNIT II:** **ECOSYSTEMS (6)** Concept of an ecosystem. Structure – functions – Producers, Consumers and Decomposers – Ecological succession – Food chains, Food webs and Ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystems: Forest, Desert and Lake. **UNIT III:** **BIODIVERSITY AND ITS CONSERVATION (6)** Introduction, Definition: Value of biodiversity: consumptive use, productive use, social, ethical and aesthetic values. Biogeographical zones of India. Threats to biodiversity: habitat loss, poaching of wildlife, Endangered and Endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. **UNIT IV:** **ENVIRONMENTAL POLLUTION (6)** Definition, Cause, effects and control measures of pollution – Air, Water, Soil and Noise. Solid Waste Management: Effects and control measures of urban and industrial wastes.	**Mandatory Course – 1 20CHE901 (Environmental Sciences)** **UNIT I** **MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES** Definition, Scope and Importance – Need for Public Awareness. Renewable energy Resources: Solar energy - solar cells, wind energy, tidal energy. Non-renewable energy resources: LPG, water gas, producer gas. Overgrazing, effects of modern agriculture – fertilizer and pesticides. **UNIT II** **ECOSYSTEMS** Concept of an ecosystem. Structure – functions – Producers, Consumers and Decomposers – Ecological succession – Food chains, Food webs and Ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystems: Forest, Desert and Lake. **UNIT III** **BIODIVERSITY AND ITS CONSERVATION** Introduction, Definition: Value of biodiversity: consumptive use, productive use, social, ethical and aesthetic values. Biogeographical zones of India. Threats to biodiversity: habitat loss, poaching of wildlife, Endangered and Endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. **UNIT IV** **ENVIRONMENTAL POLLUTION** Definition, Cause, effects and control measures of pollution – Air, Water, Soil and Noise. Solid Waste Management: Effects and control measures of urban and industrial wastes.	

UNIT V **SOCIAL ISSUES AND THE ENVIRONMENT (6)** Urban problems related to Water conservation, rain water harvesting and watershed management; Climate changes: global warming, acid rain, ozone layer depletion, nuclear accidents. Case Studies: Population growth, variation among nations and population explosion.	UNIT V **SOCIAL ISSUES AND THE ENVIRONMENT** Urban problems related to Water conservation, rain water harvesting and watershed management; Climate changes: global warming, acid rain, ozone layer depletion, nuclear accidents. Case Studies: Population growth, variation among nations and population explosion.	
	20ECE5M02 Embedded System Design using ARM	
	20ECE601 Printed Circuit Board (PCB) DesigningLaboratory	
	20ECE602 Artificial Intelligence Laboratory	
	20ECE603 Object Oriented Programming using C++Laboratory	