B.Tech
II Year III Semester

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI
(AUTONOMOUS)
AK20-REGULATIONS

B. Tech II Year III Semester

Course Code	Course Title	L	T	P	Credits
20ABS9912	**TRANSFORM TECHNIQUES AND COMPLEX VARIABLES**	3	0	0	3

Course Objectives:

Upon completion of the course students will be able to

CO1: Find the differentiation and integration of complex functions used in engineering problems.

CO2: Apply the Laplace transform for solving differential equations (continuous systems).

CO3: Find the Fourier series of periodic signals.

CO4: Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms.

CO5: Develop Z transform techniques for discrete time systems.

UNIT I:

LAPLACE TRANSFORMS

Definition of Laplace transform, existence conditions, properties of Laplace transforms, inverse Laplace transforms, transforms of derivatives, transforms of integrals, multiplication by t^n, division by t, convolution theorem, periodic functions, unit step function, unit impulse function, applications to ordinary differential equations.(Without proofs).

UNIT II:

FOURIER SERIES

Dirichlet‟s conditions, Fourier series, conditions for a Fourier expansion, functions of any period, odd and even functions - half range series.

UNIT III:

FOURIER TRANSFORMS

Fourier integrals, Fourier cosine and sine integrals, Fourier transform, sine and cosine transform, properties, convolution theorem.

UNIT IV:

Z-TRANSFORMS

Definition of Z-transform, elementary properties, linearity property, damping rule, shifting un to the right and left, multiplication by n, initial value theorem, final value theorem, inverse Z-transform, convolution theorem, formation of difference equations, solution of difference equations using Z- transforms.

UNIT V:

COMPLEX VARIABLES

Differentiation, Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate. Complex integration, Cauchy theorem (without proof), Cauchy integral formula (without proof), Taylor’s series, zeros of analytic functions, singularities, Laurent’s series, residues, Cauchy residue theorem (without proof).

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 43/e, 2010.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9/e, John Wiley & Sons, 2006.

Reference Books:

1. Dr.T.K.V Iyengar, B.Krishna Gandhi, S. Ranganatham and M.V.S.S.N Prasad, Mathematics – II, S.Chand publications.
2. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9/e, Wiley India, 2009.
3. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
4. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7/e, Mc-Graw Hill, 2004.
5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, 2008.

CO No.	PO No. and Keyword	Competency Indicator	Performance Indicator
CO1	PO2: Analyze complex engineering problems	2.1	2.1.3
CO2	PO1:Apply the knowledge of mathematics	1.1	1.1.2
CO3	PO1: Apply the knowledge of mathematics	1.1	1.1.2
CO4	PO1: Apply the knowledge of mathematics	1.1	1.1.2
CO5	PO1: Apply the knowledge of mathematics	1.1	1.1.2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI
(AUTONOMOUS)
AK20-REGULATIONS

B. Tech II Year III Semester

Course Code	Course Title	L	T	P	Credits
20APC0401	ELECTRONIC DEVICES AND CIRCUITS	3	0	0	3

Course Outcomes:
Upon completion of the course students will be able to
CO1: Understand the operation of diodes and special electronic devices.
CO2: Know operation of different rectifiers without and filters.
CO3: Understand construction, operation of BJT, FET in different configurations
CO4: Know the need of biasing and design of DC biasing circuits.
CO5: Design of amplifiers with BJTs and FETs by using small signal model

UNIT I:
PN JUNCTION DIODE & SPECIAL DIODE CHARACTERISTICS
Review of semiconductor Physics: Intrinsic &Extrinsic Semiconductors and their Fermi Levels, Open circuited p-n junction, Biased p-n junction, Current components in PN junction Diode, Diode Equation, V-I characteristics of p-n junction diode, Temperature dependence on V-I characteristics, Diode resistance, Diode capacitance.
Special Electronic Devices: Construction, Operation, V-I Characteristics of Zener diode, Breakdown mechanisms, Zener diode applications, Varactor diode, Tunnel diode, SCR, UJT.

UNIT II:
RECTIFIERS & FILTERS
Rectifiers: Introduction to DC Power supply , Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, derivations of rectifier parameters , Rectifier circuits-Operation, Input and Output waveforms.
Filters: Capacitor filter, Inductor filter, L-section filter, π-section filter, Multiple L-section and Multiple π section filter, comparison of various filter circuits in terms of ripple factors.

UNIT III:
TRANSISTOR CHARACTERISTICS
BJT: Bi-polar Junction Transistor, Transistor current components, Transistor as an amplifier, Transistor equation, Transistor configurations, Input- Output Characteristics of Transistor in Common Base, Common Emitter and Common Collector configurations, Punch through-Reach through, Photo transistor, Typical transistor junction voltage values.
FET: BJT Versus FET, Junction Field Effect Transistor JFET Types, Construction, Operation, parameters, Drain and Transfer characteristics, MOSFET Types -Enhancement and Depletion Types-Construction, Operation, Characteristics.

UNIT IV:
TRANSISTOR BIASING & THERMAL STABILIZATION
Need for biasing, operating point, Load line analysis, BJT biasing-Methods, Basic stability Fixed bias, Collector to base bias, Self-bias, Stabilization against variations in V_{BE}, I_C, and β, stability factors, (S', S'', S'''), Bias compensation, Thermal runaway, Thermal stability.

UNIT V:
SMALL SIGNAL LOW FREQUENCY TRANSISTOR AMPLIFIER MODELS
BJT: Two port network, Transistor hybrid model, determination of h-parameters, generalized analysis of transistor amplifier model using h-parameters, analysis of CB, CE and CC amplifiers using exact analysis, approximate hybrid model, analysis of CB, CE and CC amplifiers using approximate hybrid model, Comparison of transistor amplifiers.
FET: Generalized analysis of small signal model, analysis of CG, CS and CD amplifiers, comparison of FET amplifiers.

Text Books:

1. David A. Bell, "Electronic Devices and Circuits", 5th Edition, Oxford University Press, 2015.
2. Thomas L. Floyd, "Electronic Devices", 9th Edition, Pearson Education, 2013
3. Robert L. Boylestad and Louis Nashelsky, "Electronic Devices & Circuit Theory", 11th Edition, Pearson Education, 2013.

Reference Books:

1. Donald Neamen, "Electronic Circuits: Analysis and Design", 3rd Edition, McGraw-Hill Education, 2011.
2. Muhammad Rashid, "Microelectronic Circuits: Analysis & Design", 2nd Edition, Cengage Learning, 2010.
3. S. Salivahanan, N. Suresh Kumar, "Electronic Devices and Circuits", 4th Edition, McGraw-Hill Education, 2017.

CO No.	PO No. and Keyword	Competency Indicator	Performance Indicator
CO1	PO 1: Engineering knowledge	1.3	1.3.1
	PO 2: Problem analysis	2.3	2.3.1
	PO 3: Design/Development of solutions	3.3	3.3.1
CO2	PO 1: Engineering knowledge	1.3	1.3.1
	PO 2: Problem analysis	2.3	2.3.1
	PO 3: Design/Development of solutions	3.3	3.3.1
CO3	PO 1: Engineering knowledge	1.3	1.3.1
	PO 2: Problem analysis	2.3	2.3.1
	PO 3: Design/Development of solutions	3.3	3.3.1
CO4	PO 1: Engineering knowledge	1.3	1.3.1
	PO 2: Problem analysis	2.3	2.3.1
	PO 3: Design/Development of solutions	3.3	3.3.1
CO5	PO 1: Engineering knowledge	1.3	1.3.1
	PO 2: Problem analysis	2.3	2.3.1
	PO 3: Design/Development of solutions	3.3	3.3.1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI
(AUTONOMOUS)
AK20-REGULATIONS

B. Tech II Year III Semester

Course Code	Course Title	L	T	P	Credits
20APC0402	SWITCHING THEORY AND LOGIC DESIGN	3	0	0	3

Course Outcomes:

Upon completion of the course students will be able to

CO1: To introduce basic postulates of Boolean algebra.

CO2: To introduce basic methods for simplifying Boolean expressions.

CO3: To illustrate the concepts and study the procedures for the analysis and design of combinational circuits.

CO4: To illustrate the concepts and study the procedures for the analysis and design of sequential circuits.

CO5: To introduce the concepts of programmable logic devices.

UNIT I:
NUMBER SYSTEM AND BOOLEAN ALGEBRA

Number System: Digital Systems, Binary Numbers, Number base conversions, complements of numbers, Signed binary numbers, Binary codes.

Boolean Algebra: Basic definition, Basic theorems and properties, Boolean Functions, Canonical & Standard forms, other logic operations & Logic gates.

UNIT II:
GATE LEVEL MINIMIZATION:

The map method, four variable & Five variable K-map, POS & SOP Simplification, don't care conditions, NAND & NOR Implementation, Other two-level Implementation, Ex-or Function.

Tabular Method- Simplification of Boolean function using tabulation Method.

UNIT III:
COMBINATIONAL LOGIC CIRCUITS

Combinational circuits, Analysis & Design procedure, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude comparator, Decoder, Encoders, Multiplexers.

UNIT IV:
SEQUENTIAL LOGIC CIRCUITS

Sequential Circuits: Latches, Flips-Flops - RS, JK, Master-Slave JK, D & T flip flops, Analysis of Clocked sequential circuits, State Reduction & Assignment, Design procedure, Registers & Counters – Registers, Shift Registers, Ripple Counters, Synchronous counters, asynchronous counters.

Asynchronous sequential circuits: Introduction, Analysis Procedure, Design Procedure, Reduction of State flow tables, Race-free State Assignment, Hazards.

UNIT V:
PROGRAMMABLE DEVICES:

Memory organization, classification of semiconductor memories, ROM, PROM, DROM, EPROM, EEPROM, RAM, expansion of memory, CCD, Flash memories, content addressable memory, programmable logic devices, PROM at PLD, programmable logic array (PLA) programmable array logic (PAL), field programmable gate array (FPGA).

Text Books:

1. M.Morris Mano & Michel D. Ciletti,"Digital Design", 5th Edition Pearson.
2. Zvi Kohavi and Nirah K.Jha, "Switching theory and Finite Automata Theory", 3rd Edition Cambridge.

Reference Books:

1. Subratha Goshal, “Digital Electronics”, Cambridge
2. Comer, “Digital & State Machine Design”, Third Indian edition, OXFORD

CO No.	PO No. and Keyword	Competency Indicator	Performance Indicator
CO1	PO 1: Engineering knowledge	1.3	1.3.1
	PO 2: Problem analysis	2.3	2.3.1
	PO 3: Design/Development of solutions	3.3	3.3.1
CO2	PO 1: Engineering knowledge	1.3	1.3.1
	PO 2: Problem analysis	2.3	2.3.1
	PO 3: Design/Development of solutions	3.3	3.3.1
CO3	PO 1: Engineering knowledge	1.3	1.3.1
	PO 2: Problem analysis	2.3	2.3.1
	PO 3: Design/Development of solutions	3.3	3.3.1
CO4	PO 1: Engineering knowledge	1.3	1.3.1
	PO 2: Problem analysis	2.3	2.3.1
	PO 3: Design/Development of solutions	3.3	3.3.1
CO5	PO 1: Engineering knowledge	1.3	1.3.1
	PO 2: Problem analysis	2.3	2.3.1
	PO 3: Design/Development of solutions	3.3	3.3.1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI
(AUTONOMOUS)
AK20-REGULATIONS

B. Tech II Year III Semester

Course Code	Course Title	L	T	P	Credits
20APC0403	SIGNALS AND SYSTEMS	3	0	0	3

Course Outcomes:

Upon completion of the course students will be able to

CO1: Understand mathematical description and representation of continuous time and discrete time signals.
CO2: Resolve signals in frequency domain using Fourier Series and Fourier Transforms
CO3: Apply sampling theorem to convert continuous-time signals to discrete-time signal
CO4: Understand the properties of systems, response of LTI systems and filters.
CO5: Able to analyze CT LTI systems and DTLTI systems busing Laplace and Z-Transforms

UNIT I: SIGNALS

Introduction: Definition of Signals, classification of signals: continuous time and discrete time signals, standard signals: impulse function, step function, ramp function complex exponential and sinusoidal signals, Signum, Sinc and Gaussian functions. Operations on signals and sequences. Analogy between vectors and signals, orthogonal signal space, Signal approximation using orthogonal functions, mean square error, Orthogonality of complex functions

UNIT II: FOURIER SERIES SERIES AND FOURIER TRANSFORMS

Fourier series: Representation of signals using Fourier Series, Trigonometric Fourier series (TFS) and complex exponential Fourier series (CEFS). Illustrative problems. Continuous Time Fourier Transform, definition, properties, Fourier Transforms of standard signals, complex Fourier spectrum, inverse Fourier Transform. Discrete Time Fourier Transform, definition, properties of Discrete Time Fourier Transform transforms of standard signals. Introduction to Hilbert Transform. Illustrative problems.

UNIT III: SAMPLING THEOREM

Definition of sampling, types: impulse and pulse sampling. Sampling theorem for band limited signals- Graphical and analytical proof, Nyquist criterion, Reconstruction of signal from its samples, effect of under sampling – Aliasing. Sampling theorem for Band pass signals. Illustrative problems.

UNIT IV: SYSTEMS

Definition of Systems, Classification of Systems, impulse response, response of a Linear Time Invariant system, Convolution and Correlation: time domain, frequency domain and Graphical representation. Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, signal bandwidth, system bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Poly-Wiener criterion for physical realization, relationship between bandwidth and rise time. Illustrative problems.

UNIT V: LAPLACE TRANSFORMS & Z TRANSFORMS

Laplace Transforms: Review of Laplace Transforms, concept of Region of Convergence (ROC) for Laplace Transforms, Inverse Laplace Transform, constraints on ROC for various classes of signals, properties of Laplace Transforms. Analysis of CT-LTI systems using Laplace Transforms: causality and stability.
Z-Transforms: Review of Z-Transforms, concept of Region of Convergence (ROC) for Z- Transforms, Inverse Z- Transform, constraints on ROC for various classes of signals, properties of Z-Transforms. Analysis of DT-LTI systems using Z- Transforms: causality and stability. Illustrative problems.

Text Books:

3. B.P. Lathi, Signals, Systems & Communications, BS Publications, 2003.
4. A.V. Obppenheim, A.S. Willsky and S.H. Nawab, Signals and Systems PHI, 2nd Edition. 2009

Reference Books:

6. Simon Haykin and Van Veen, Signals & Systems, Wiley, 2nd Edition.

7. John G. Proakis, Dimitris G. Manolakis, Digital Signal Processing, Principles, Algorithms,and Applications, 4 th Edition, PHI, 2007
8. BP Lathi, Principles of Linear Systems and Signals Oxford University Press, 2015.

CO No.	PO No. and Keyword	Competency Indicator	Performance Indicator
CO1	PO 1: Engineering knowledge	1.3	1.3.1
	PO 3: Design/Development of Solutions	3.3	3.3.1
			3.3.2
	PO 4: Conduct investigations of complex problems	4.3	4.3.1
			4.3.2
			4.3.3.
			4.3.4
	PO 5: Modern tool usage	5.2	5.2.1
			5.2.2
CO2	PO 1: Engineering knowledge	1.3	1.3.1
	PO 2: Problem analysis	2.4	2.4.1
			2.4.2
			2.4.3
	PO 5: Modern tool usage	5.2	5.2.1
			5.2.2
CO3	PO 5: Modern tool usage	5.2	5.2.1
			5.2.2
	PO 10: Communication	10.3	10.3.1
			10.3.2
CO4	PO 4: Conduct investigations of complex problems	4.2	4.2.1
			4.2.2
		4.3	4.3.1
			4.3.2
			4.3.3
			4.3.4
CO5	PO 3: Design/Development of solutions	3.3	3.3.1
			3.3.2
	PO 5: Modern tool usage	5.2	5.2.1
			5.2.2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI
(AUTONOMOUS)
AK20-REGULATIONS

B. Tech II Year III Semester

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20AHSMB01	MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS	3	0	0	3

Course Objective:

The objective of this course is to equip the student with the basic inputs of Managerial Economics and Economic Environment of business and to enrich analytical skills in helping them take sound financial decisions for achieving higher productivity.

Learning Outcome:

The thorough understanding of Managerial Economics and Analysis of Financial Statements facilitates the Technocrats – cum – Entrepreneurs to take-up decisions effectively and efficiently in the challenging Business Environment.

UNIT 1
INTRODUCTION TO MANAGERIAL ECONOMICS

Managerial Economics - Definition, nature and scope – contemporary importance of Managerial Economics - Demand Analysis: Determinants- Law of Demand - Elasticity of Demand. Significance – types – measurement of elasticity of demand - Demand forecasting- factors governing demand forecasting- methods of demand forecasting –Relationship of Managerial Economics with Financial Accounting and Management.

UNIT 2
THEORY OF PRODUCTION AND COST ANALYSIS

Production Function – Short-run and long- run production - Isoquants and Isocosts, MRTS, least cost combination of inputs - Cobb-Douglas production function - laws of returns - Internal and External economies of scale - **Cost Analysis**: Cost concepts - Break-Even Analysis (BEA) - Managerial significance and limitations of BEA - Determination of Break Even Point (Simple Problems)

UNIT 3
INTRODUCTION TO MARKETS AND NEW ECONOMIC ENVIRONMENT

Market structures: Types of Markets - Perfect and Imperfect Competition - Features, Oligopoly - Monopolistic competition. Price-Output determination - Pricing Methods and Strategies. Forms of Business Organization – Sole Proprietorship- Partnership – Joint Stock Companies – Public Sector Enterprises – New Economic Environment- Economic systems – Economic Liberalization – Privatization and Globalization

UNIT 4
CAPITAL AND CAPITAL BUDGETING

Concept of Capital - Over and Under capitalization – Remedial measures - Sources of Short term and Long term capital - Estimating Working Capital requirement – Capital budgeting – Features of Capital budgeting proposals – Methods and Evaluation of Capital budgeting – Pay Back Method – Accounting Rate of Return (ARR) – Net Present Value (NPV) – Internal Rate Return (IRR) Method (simple problems)

UNIT 5
INTRODUCTION TO FINANCIAL ACCOUNTING AND ANALYSIS

Financial Accounting – Concept - emerging need and importance - Double-Entry Book Keeping- Journal - Ledger – Trial Balance - Financial Statements - - Trading Account – Profit & Loss Account – Balance Sheet (with simple adjustments). Financial Analysis – Ratios – Techniques – Liquidity, Leverage, Profitability, and Activity Ratios (simple problems).

Text Books:

1. Aryasri: Managerial Economics and Financial Analysis, 4/e, TMH, 2009.
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.

Reference Books:

1. Premchand Babu, Madan Mohan: Financial Accounting and Analysis, Himalaya, 2009
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International,. 2009.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage, 2009.
4. H. L. Ahuja: Managerial Economics, S. Chand, 3/e, 2009

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI
(AUTONOMOUS)
AK20-REGULATIONS

B. Tech II Year III Semester

Course Code	Course Title	L	T	P	Credits
20APC0404	ELECTRONIC DEVICES AND CIRCUITS LABORATORY	0	0	3	1.5

Course Outcomes:
Upon completion of the course students will be able to
CO1: Test and operate diodes and special electronic devices.
CO2: Construct and operate rectifiers without and with filters.
CO3: Construct and operate BJT, FET in different configurations.
CO4: Design DC biasing circuits for Transistors.
CO5: Design amplifiers using BJTs and FETs.

LIST OF EXPERIMENTS:

1. PN Junction Diode Characteristics
2. Zener Diode Characteristics and Zener Diode as Voltage Regulator.
3. Rectifiers (With and Without Filter).
4. BJT Characteristics (CB Configuration).
5. BJT Characteristics (CE Configuration).
6. FET Characteristics (CS Configuration).
7. SCR Characteristics
8. Transistor Biasing
9. BJT-CE Amplifier
10. Emitter Follower-CC Amplifier
11. FET-CS Amplifier
12. UJT Characteristics

EQUIPMENT REQUIRED FOR LABORATORYORATORY

1. Regulated Power supplies
2. Analog/Digital Storage Oscilloscopes
3. Analog/Digital Function Generators
4. Digital Multimeters
5. Decade Résistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital)
8. Voltmeters (Analog or Digital)
9. Active & Passive Electronic Components
10. Bread Boards
11. Connecting Wires
12. CRO Probes etc.

CO No.	PO No. and Keyword	Competency Indicator	Performance Indicator
CO1	PO 1: Engineering knowledge	1.3	1.3.1
CO2	PO 2: Problem analysis	2.3	2.3.1
CO3	PO 2: Problem analysis	2.3	2.3.1
CO4	PO 3: Design/Development of solutions	3.3	3.3.1
CO5	PO 3: Design/Development of solutions	3.3	3.3.1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI
(AUTONOMOUS)
AK20-REGULATIONS

B. Tech II Year III Semester

Course Code	Course Title	L	T	P	Credits
20APC0405	SIGNALS AND SYSTEMS LABORATORY	0	0	3	1.5

Course Outcomes:

Upon completion of the course students will be able to

CO1: Understand basics of MATLABORATORY syntax, functions and programming.
CO2: Generate and characterize various signals and perform the basic operations
CO3: Design and analyze linear time-invariant (LTI) systems and compute its response
CO4: Analyze the spectral characteristics of signals using Fourier analysis.
CO5: Analyze the systems using Laplace transforms and Z-transforms.

LIST OF EXPERIMENTS

1. Write program to generate Standard Signals/Sequences: Periodic and Aperiodic, Unit Impulse, Unit Step, Square, Saw tooth, Triangular, Sinusoidal, Ramp, Sinc.
2. Perform operations on Signals and Sequences: Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power.
3. Write program to find the trigonometric & exponential Fourier series coefficients of a rectangular periodic signal. Reconstruct the signal by combining the Fourier series coefficients with appropriate weightings. Plot the discrete spectrum of the signal.
4. Write program to find Fourier transform of a given signal. Plot its amplitude and phase spectrum.
5. Write program to convolve two discrete time sequences. Plot all the sequences.
6. Write program to find autocorrelation and cross correlation of sequences.
7. Write program to verify Linearity and Time Invariance properties of a given Continuous/Discrete System.
8. Write program to generate discrete time sequence by sampling a continuous time signal. Show that with sampling rates less than Nyquist rate, aliasing occurs while reconstructing the signal.
9. Write program to find magnitude and phase response of first order low pass and high pass filter. Plot the responses in logarithmic scale.
10. Write program to find response of a low pass filter and high pass filter, when a speech signal is passed through these filters.
11. Write program for removal of noise by Autocorrelation / Cross correlation
12. Write a program for waveform Synthesis using Laplace Transform and to plot pole-zero diagram in S-plane / Z-plane of given signal/sequence

Note: All the experiments are to be simulated using MATLABORATORY or equivalent software

CO No.	PO No. and Keyword	Competency Indicator	Performance Indicator
CO1	PO 1: Engineering knowledge	1.3	1.3.1
	PO 3: Design/Development of Solutions	3.3	3.3.1
			3.3.2
	PO 4: Conduct investigations of complex problems	4.3	4.3.1
			4.3.2
			4.3.3.
			4.3.4
	PO 5: Modern tool usage	5.2	5.2.1
			5.2.2
CO2	PO 1: Engineering knowledge	1.3	1.3.1
	PO 2: Problem analysis	2.4	2.4.1
			2.4.2
			2.4.3
	PO 5: Modern tool usage	5.2	5.2.1
			5.2.2
CO3	PO 5: Modern tool usage	5.2	5.2.1
			5.2.2
	PO 10: Communication	10.3	10.3.1
			10.3.2
CO4	PO 4: Conduct investigations of complex problems	4.2	4.2.1
			4.2.2
		4.3	4.3.1
			4.3.2
			4.3.3
			4.3.4
CO5	PO 3: Design/Development of solutions	3.3	3.3.1
			3.3.2
	PO 5: Modern tool usage	5.2	5.2.1
			5.2.2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI
(AUTONOMOUS)
AK20-REGULATIONS

B. Tech II Year III Semester

Course Code	Course Title	L	T	P	Credits
20APC0406	SWITCHING THEORY AND LOGIC DESIGN LABORATORY	0	0	3	1.5

Course Outcomes:

Upon completion of the course students will be able to

CO1: Ability to verify all logic gates.
CO2: Ability to Design combinational circuits.
CO3: Ability to design flip flops.
CO4: Ability to design counters.
CO5: Ability to design sequence generator.

LIST OF EXPERIMENTS:

1. Verification of Basic Logic Gates
2. Realization of basic gates using Universal Gates
3. Half adder and Full Adder
4. Half Subtractor and Full Subtractor
5. Parallel Adder/Subtractor
6. Code Converters
7. Encoder/Decoder
8. Flip-Flops
9. Shift Registers
10. Counters
11. Johnson/Ring Counters
12. Sequence Generator

CO No.	PO No. and Keyword	Competency Indicator	Performance Indicator
CO1	PO 1: Engineering knowledge	1.3	1.3.1
	PO 2: Problem analysis	2.3	2.3.1
	PO 3: Design/Development of solutions	3.3	3.3.1
CO2	PO 1: Engineering knowledge	1.3	1.3.1
	PO 2: Problem analysis	2.3	2.3.1
	PO 3: Design/Development of solutions	3.3	3.3.1
CO3	PO 1: Engineering knowledge	1.3	1.3.1
	PO 2: Problem analysis	2.3	2.3.1
	PO 3: Design/Development of solutions	3.3	3.3.1
CO4	PO 1: Engineering knowledge	1.3	1.3.1
	PO 2: Problem analysis	2.3	2.3.1
	PO 3: Design/Development of solutions	3.3	3.3.1
CO5	PO 1: Engineering knowledge	1.3	1.3.1
	PO 2: Problem analysis	2.3	2.3.1
	PO 3: Design/Development of solutions	3.3	3.3.1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI
(AUTONOMOUS)
AK20-REGULATIONS

B. Tech II Year III Semester

Course Code	Course Title	L	T	P	Credits
Skill Oriented Course					
20ASC0401	ELECTRONIC CIRCUIT DESIGN	1	0	2	2

Course Outcomes:
Upon completion of the course students will be able to:
CO1: Identify basic Electronic Components
CO2: Understand Fundamentals of Circuit Design.
CO3: Construct different Power Supply circuits.
CO4: Analyze Printed Circuit Boards.
CO5: Design a Electronic circuit as a mini project.

List of Contents

1. IDENTIFICATION OF ELECTRONIC COMPONENTS:
Samples of Wire, Coaxial Cable, Capacitors, Diodes, Fuses, Integrated Circuits, Light Emitting Diodes (LED), Transistors, Resistors, Rectifiers, Zener Diodes, Solder, Transformers, Potentiometer, Photo Resistors.

2. FUNDAMENTALS OF CIRCUIT DESIGN:
Diode applications, Clipping and Clamping Circuits with Diodes, Rectifier Circuits, Transistors, Selection and analysis of Components, sensing devices and display devices.

3. POWER SUPPLY DESIGN:
Introduction to various types of power supplies. Estimation of power supply requirements and power loss in electronic products. Selection of appropriate power supplies for the given primary power sources (230VAC/Battery).

4. EVOLUTION AND CLASSIFICATION OF PRINTED CIRCUIT BOARDS:
Challenges in Modern PCB, Design and Manufacturing, PCB fabrication, PCB design considerations/ design rules for analog, digital and power applications.

5. MINI PROJECT:
Students should complete their Mini Project based on the above concepts.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI
(AUTONOMOUS)
AK20-REGULATIONS

B. Tech II Year III Semester

Course Code	Course Title	L	T	P	Credits
20AMC9901	BIOLOGY FOR ENGINEERS	2	0	0	0

Course Outcomes:

Upon completion of the course students will be able to

CO1: Explain about cells and their structure and function. Different types of cells and basics for classification of living Organisms.

CO2: Explain about biomolecules, their structure, function and their role in the living organisms. How biomolecules are useful in Industry.

CO3: Brief about human physiology.

CO4: Explain about genetic material, DNA, genes and RNA how they replicate, pass and preserve vital information in living Organisms.

CO5: Know about application of biological principles in different technologies for the production of medicines and pharmaceutical molecules through transgenic microbes, plants and animals.

UNIT I:
INTRODUCTION TO BASIC BIOLOGY

Evolution: Different patterns of evolution, Darwin's theory of evolution, Cell as Basic unit of life, cell theory, Cell shapes, Cell structure, Cell cycle. Chromosomes. Prokaryotic and eukaryotic Cell. Plant Cell, Animal Cell, Plant tissues and Animal tissues, Brief introduction to five kingdoms of classification, Tissue Engineering.

UNIT II:
INTRODUCTION TO BIOMOLECULES

Carbohydrates, lipids, proteins, Vitamins and minerals, Nucleic acids (DNA and RNA) and their types. Enzymes, Enzyme application in Industry. Large scale production of enzymes by Fermentation.

UNIT III:
HUMAN PHYSIOLOGY

Digestive system, Respiratory system, (aerobic and anaerobic Respiration). Respiratory organs, respiratory cycle, Central Nerves System and Excretory system.

UNIT IV:
INTRODUCTION TO MOLECULAR BIOLOGY AND RECOMBINANT DNA TECHNOLOGY

Prokaryotic gene and Eukaryotic gene structure. DNA replication, Transcription and Translation. DNA technology. Introduction to gene cloning.

UNIT V:
APPLICATION OF BIOLOGY

Brief introduction to industrial Production of Enzymes, Pharmaceutical and therapeutic Proteins, Vaccines and antibodies. Basics of biosensors, Properties and Classification of virus, Immune response to virus, Definitions-Pandemic, Epidemic and outbreak, pandemic alert system ranges, Prevention of pandemic disease and pandemic preparation.

Text Books:

5. P.K.Gupta, Cell and Molecular Biology, 5th Edition, Rastogi Publications.
6. U. Satyanarayana. Biotechnology, Books & Allied Ltd 2017.

Reference Books:

9. N. A. Campbell, J. B. Reece, L. Urry, M. L. Cain and S. A. Wasserman, "Biology: A Global Approach", Pearson Education Ltd, 2018.
10. T Johnson, Biology for Engineers, CRC press, 2011.
11. J.M. Walker and E.B. Gingold, Molecular Biology and Biotechnology 2nd ed.. Panima Publications. PP 434.
12. David Hames, Instant Notes in Biochemistry –2016.
13. Phil Tunner, A. Mctennan, A. Bates & M. White, Instant Notes – Molecular Biology – 2014.
14. Richard Dawkins, River Out of Eden: A Darwinian View of Life.

CO No.	PO No. and Keyword	Competency Indicator	Performance Indicator
CO: 1	PO 1: Apply the knowledge of basic science	1.2	1.2.1
CO: 2	PO 1: Apply the knowledge of basic science	1.2	1.2.1
CO: 3	PO 1: Apply the knowledge of basic science	1.2	1.2.1
CO: 4	PO 1: Apply the knowledge of basic science	1.2	1.2.1
CO: 5	PO 1: Apply the knowledge of basic science	1.2	1.2.1