

ADIKAVI NANNAYA UNIVERSITY, RAJAMAHENDRVARAM
B.TECH ELECTRONICS AND INSTRUMENTATION ENGINEERING
III YEAR I SEMESTER COURSE STRUCTURE
(From the admitted batch of 2016 – 2017 under CBCS Scheme)

Sub Code	Subject	Hrs/week		Max Marks		Total Marks	Credits
		Theory	Lab	Internal	External		
BTEIE501	LINEAR DIGITAL AND INTEGRATED CIRCUITS	4	--	25	75	100	4
BTEIE502	MICROPROCESSOR AND INTERFACING	4	--	25	75	100	4
BTEIE503	INDUSTRIAL INSTRUMENTATION - 1	4	--	25	75	100	4
BTEIE504	MANAGEMENT SCIENCE	4	--	25	75	100	4
BTEIE505	ELECTRICAL TECHNOLOGY	4	--	25	75	100	4
BTEIE506	PROCESS CONTROL INSTRUMENTATION	4	--	25	75	100	4
BTEIE507	ELECTRICAL TECHNOLOGY LAB	--	3	50	50	100	2
BTEIE508	PROCESS CONTROL INSTRUMENTATION LAB	--	3	50	50	100	2
BTEIE509	MOOCS	-	-	50	-	50	-
TOTAL		24	6	300	550	850	28

BTEIE501: LINEAR DIGITAL AND INTEGRATED CIRCUITS

Theory : 4 Hrs/week
Int Marks : 25

Credits : 4
Ext Marks : 75

UNIT-I

INTEGRATED CIRCUITS: Classification, chip size and circuit complexity.

OPERATION AMPLIFIER: Basic information of Op-amp, ideal and practical Op-amp, Op-amp characteristics, 741 op-amp and its features, modes of operation-inverting, noninverting, differential mode.

OP-AMP APPLICATIONS : Basic application of Op-amp, instrumentation amplifier, AC amplifier, V to I and I to V converters, Precision rectifiers, log and antilog amplifiers, sample & hold circuits, multipliers and dividers, Differentiators and Integrators, Comparators, Schmitt trigger, Multivibrator, Triangular wave generator

UNIT-II

ACTIVE FILTERS, OSCILLATORS AND REGULATORS: Introduction-Low pass and High pass filters- Design of first and second order Butterworth low pass and high pass filters Band pass, Band reject and all pass filters- Oscillator types and principle of operation – RC, Wien bridge oscillators triangular, saw-tooth, square wave and VCO - Introduction to voltage regulators, features of 723, Three Terminal IC regulators- DC to DC Converter- Switching Regulators-UPS-SMPS.

UNIT-III

TIMERS & PHASE LOCKED LOOPS: Introduction to 555 timer, functional diagram, monostable and astable operations and applications, Schmitt Trigger. PLL - introduction, block schematic, principles and description of individual blocks of 565-PLL applications, Analog and digital phase detectors

D-A AND A- D CONVERTERS: Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, Different types of ADCs - parallel comparator type ADC, counter type ADC, successive approximation ADC, dual slope ADC and Sigma delta ADC. DAC and ADC specifications. DAC 0800 and ADC 0804 pin diagram and applications

UNIT-IV

LOGIC FAMILIES: Classification of Integrated circuits, comparison of TTL and CMOS logic families, standard TTL NAND Gate- Analysis and characteristics, TTL open collector O/Ps, Tristate TTL, MOS and CMOS open drain and tristate outputs, CMOS transmission gate, IC Interfacing- TTL driving CMOS and CMOS driving TTL

TEXT BOOKS:

1. Linear Integrated Circuits –D. Roy Chowdhury, New Age International (p) Ltd, 2ndEd, 2008.
2. Digital Fundamentals – Floyd and Jain, Pearson Education, 8th Edition, 2005.

REFERENCE BOOKS:

1. Operational Amplifiers and Linear Integrated Circuits – R.F. Coughlin and Fredrick F. Driscoll, PHI, 1977.
2. Operational Amplifiers and Linear Integrated Circuits:4/e William D Stanley PEI 2009.
3. Op-Amps and Linear ICs – Ramakanth A. Gayakwad, PHI, 1987
4. Modern Digital Electronics RP Jain 4/e TMH 2010.

BTEIE502: MICROPROCESSOR AND INTERFACING

Theory : 4 Hrs/week
Int. Marks : 25

Credits : 4
Ext Marks : 75

UNIT - I

INTRODUCTION TO 8085: Generic-8-bit microprocessor and its architecture-8085 functional block diagram-Architecture-functions of different sections-Memory mapping – Memory interfacing-Instruction format-addressing modes-instruction set of 8085 CPU instruction cycle timing diagram-different machine cycles-fetch and execute operations estimation of execution time.

UNIT - II

INTRODUCTION TO 8086: Register organization of 8086, Architecture, signal description of 8086, physical memory organization, general bus operation, I/O addressing capability, special processor activities, Minimum mode, maximum mode of 8086 system and timings, machine language instruction formats, addressing mode of 8086, instruction set of 8086, assembler directives and operators.

UNIT - III

PROGRAMMING WITH 8086 MICROPROCESSOR: Machine level programs, programming with an assembler, Assembly language programs, Introduction to stack, stack structure of 8086/8088, interrupts and interrupt service routines. Interrupt cycle of 8086, non-mask able interrupt and mask able interrupts, interrupt programming.

UNIT -IV

INTERFACING WITH 8086/88: Semiconductor memory interfacing, dynamic RAM interfacing, interfacing i/o ports, PIO 8255 modes of operation of 8255, interfacing to D/A and A/D converters, stepper motor interfacing, control of high power devices using 8255. Programmable interrupt controller 8259A, the keyboard /display controller 8279, programmable communication interface 8251 USART, DMA Controller 8257.

TEXT BOOKS:

1. Ramesh S Gaonkar, “Microprocessor Architecture, Programming and application with 8085”, 4th Edition, Penram International Publishing, New Delhi, 2000.
2. Ray A.K, Bhurchandi K.M, —Advanced Microprocessor and Peripherals, TMH, 2nd Edition, 2012.

REFERENCES:

1. Douglas V. Hall, —Microprocessors and Interfacing Programming and Hardware, TMGH, 2nd Edition, 1994
2. John Uffenbeck, “The 80x86 Family, Design, Programming and Interfacing”, Third Edition, Pearson Education, 2002.

BTEIE503: INDUSTRIAL INSTRUMENTATION - I

Theory : 4 Hrs/week

Credits : 4

Int Marks : 25

Ext Marks : 75

UNIT – I

Introduction to Process Variable and Measuring Devices

Definitions of Process variable, Unit conversions and physical constants, Terristial constants a Properties water.Fluid mechanics: Pressure Hydraulic power system, Pneumatic power system, pascals principle and hydro static pressure

Speed: Measurement of speed, moving iron and moving coil Type, AC and DC Tacho generator, Stroboscope. Velocity sensor, Torque sensor

Manometers, Buoyancy Principle Reynolds number, Bernoulli's equation, venturi tube. Nature of flow

Torque: Measurement of torque, Inductive principle and Digital methods.

UNIT – II

Pressure Measurement

Types of Pressure, Pressure measurement using Mano meters, Errors in manometer, Electrical Pressure sensor: strain gauge, Differential capacitance sensor, Elastic type pressure measurement: Bourdon gauge, bellows, diaphragms, capacitance sensor

Measurement of Vacuum Pressure: McLeod gauge, Thermal conductivity gauge, Thermocouple type conductivity gauge. Ionization gauges: Hot and cold cathode.

Differential Pressure Transmitters: Flapper nozzle. Measurement of flapper movement. Application consideration: Selection, installation and calibration.

UNIT – III

Flow Measurement

Variable head: orifice plate, Pitot tube, Variable area: Rotameter, velocity based flowmeter: Turbine flow meters, Magnetic flow meters, Ultrasonic flowmeters.

Inertia-based (true mass) flowmeters. Coriolis flow meters, thermal based mass flowmeters, Hot wire Anemometer. Open channel flow measurement: weir-rectangular, v-notch, trapezoidal,Application consideration, selection, installation, and calibration.

UNIT – IV

Measurement of Level, Humidity & Various Process applications

Methods of Level Measurement: Direct Measurement-Mechanical type float, Magnetic float, indirect measurement: Hydrostatic pressure, air purge system. Electrical type: Capacitive type level sensor. Echo- Ultrasonic level measurement.

Measurement of Humidity: Humidity terms, Dry & wet bulb Psychrometers, Dew point hygrometer.

Application Consideration: Selection, installation and calibration of level Measurement, Application of various Process parameters used in Paper industry, mine, and nuclear industry.

TEXT BOOKS

1. Measurement Systems – Applications and Design – by Doebelin E.O., 4/e, MGH International
2. Principles of Industrial Instrumentation – Patranabis D. TMH. End edition 1997

REFERENCES

1. Process Instruments and Control Handbook – by Considine D.M., 4/e, MGH, 1993.
2. Mechanical and Industrial Measurements – by Jain R.K., Khanna Publishers, 1986.
3. Instrument Technology, vol. I – by Jones E.B., Butterworths, 1981.

BTEIE504: MANAGEMENT SCIENCE

Theory : 4 Hrs/week
Int Marks : 25

Credits : 4
Ext Marks : 75

UNIT -I

Introduction to Management and Organizational Concepts of Management and organization-nature, importance and Functions of Management, Systems Approach to Management – Taylor’s Scientific Management Theory — Fayal’s Principles of Management — Maslow’s theory of Hierarchy of Human Needs — Douglas McGregor’s Theory X and Theory V — Hertzberg Two Factor Theory of Motivation – Leadership Styles, Social responsibilities of Management. Designing Organizational Structures: Basic concepts related to Organization –Departmentation and Decentralization.

UNIT-II

Human Resources Management (HRM): Concepts of HRM, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Wage and Salary Administration, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating — Capability Maturity Mode’ (CMM) Levels — Performance Management System.

Strategic Management and Contemporary Strategic Issues: Mission, Goals, Objectives, Policy, Strategy, Programmers, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Bench Marking and Balanced Score Card as Contemporary Business Strategies.

UNIT -III

Operations Management: Principles and Types of Plant Layout Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement — Business Process Reengineering (BPR) -Objectives of inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and, JIT System,

UNIT -IV

Project Management Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), identifying critical path, Probability of Completing the project within given time. Marketing Management - Supply Chain Management, Functions of Marketing, Marketing Mix, and marketing Strategies based on Product Life Cycle, Channels of distribution.

TEXT BOOKS

1. Stoner, Freeman, Gilbert, Management, 6th Ed, Pearson Education, New Delhi, 2004
2. P. Vijaya Kumar, N. Appa Rao and Ashima B. Chhalill, Cengage Learning India Pvt Ltd. 2012.
3. Kotler Philip and Keller Kevin Lane: Marketing Management, Pearson, 2012.
4. Koontz and Wehrich: Essentials of Management, McGraw Hill, 2012.

REFERENCES

1. Thomas N.Duening and John M.Ivancevich Management—Principles and Guidelines, Biztantra, 2012.
2. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2012.
3. Samuel C.Certo: Modern Management, 2012.

BTEIE505: ELECTRICAL TECHNOLOGY

Theory : 4 Hrs/week

Credits : 4

Int Marks : 25

Ext Marks : 75

UNIT I

TRANSIENT ANALYSIS

Transient Response of RL, RC and RLC Circuits for DC excitations, Initial Conditions, Solution using Differential Equations approach and Laplace Transform Method

UNIT II

Two Port Networks

Impedance Parameters, Admittance Parameters, Hybrid Parameters, Transmission (ABCD) Parameters, Conversion of one Parameter to another, Conditions for Reciprocity and Symmetry, Interconnection of Two Port networks in Series, Parallel and Cascaded configurations, Image Parameters, Illustrative problems.

UNIT III

DC Machines

DC Generators: Principles of Operation of DC Generator, construction, EMF equation, Types of Generators, Magnetization, Internal and external Characteristics of DC Generators.

DC Motors: DC Motors, Types of Dc Motors, Characteristics of Dc Motors, Losses and Efficiency, Swinburne's Test, Speed Control of Dc Shunt Motor- Flux and Armature Voltage control methods.

UNIT IV

Transformers and AC Machines

Transformers and Their Performance: Principle of Operation of Single Phase transformer, Types, Constructional Features, Phasor Diagram on No Load and Load, Equivalent Circuit, Losses, Efficiency and Regulation of Transformer, OC and SC Tests, Predetermination of Efficiency and Regulation, Simple Problems.

AC Machines - Three Phase Induction Motor: Principle of operation of three phase induction motors- Slip ring and Squirrel cage motors –Slip - Torque characteristics.

Alternators: Principle of operation –Types - EMF Equation- Predetermination of regulation by Synchronous Impedance Method- OC and SC tests

TEXT BOOKS:

1. Network analysis and Synthesis- C L Wadhwa, New Age International Publishers
2. Circuit Theory by Chakrabarti, Dhanpat Rai and Co
3. Principles of Electrical Engineering- A.Sudhakar, Shyammohan S.Palli, TMH Publications
4. Introduction to Electrical Engineering – M.S.Naidu and S. Kamakshaiah, TMH Publications

REFERENCES:

1. N C Jagan C Lakhminaraya, —Network Analysis, BS Publications 2nd Edition, 2011
2. B.L. Thereja and Thereja “A text book of Electrical Technology”-Vol-I, S.Chand&Co.Ltd.,
3. P S Bimbra, —Electrical Machines, Khanna Publishers, New Delhi,2004

BTEIE506: PROCESS CONTROL INSTRUMENTATION

Theory : 4 Hrs/week

Credits : 4

Int Marks : 25

Ext Marks : 75

UNIT-I

PROCESS CHARACTERISTICS: Terms and Objectives, Incentives for process Control – design aspects of a Process Control System- Classification of variables. Process Equation, Process variables, Degrees of freedom. Characteristics of liquid system, gas system, thermal system. Mathematical modelling of processes. Self - regulating-Servo and Regulatory, Interacting and Non-Interacting process – Inverse response

UNIT-II

PROCESS CONTROL ELEMENTS: Signal conversion - I/P, P/I Converters, Pneumatic and Electric actuators, Valve Positioner-Control Valve – Characteristics of Control Valves-Types of control valves- Control valve sizing- cavitation and flashing. Dynamics of batch and Continuous process

UNIT-III

CONTROLLER: - Basic control actions – Discontinuous control mode, Continuous control mode- Proportional, Single speed floating, Integral and Derivative– Composite control modes – P+I, P+D and P+I+D control modes. Response of controller for different types of test inputs – Integral windup – Auto manual transfer. Selection of control mode for different processes – Typical control schemes for level flow, pressure and temperature

CONTROLLER TUNING: – Zeigler and Nichols open and closed loop methods, Performance indices –Based on evaluation criteria – ISE, IAE, ITAE

.UNIT-IV

VARIOUS CONTROL SYSTEMS: Feed Forward Control, Cascade control,Ratio control, Override control, Split range control, Selective control,Adaptive control, and Inferential control.

TEXT BOOKS:

1. Chemical process control-by George Stephanopoulos, Pearson Education,2005
2. Process control instrumentation Technology Curtis. D. Johnson, Pearson education, 2004.

REFERENCES:

1. Process Control, Third Edition – Liptak B.G., Chilton Book Company, Pennsylvania, 1995
2. Automatic Process Control – by Eckman D.P. , Wiley Eastern Ltd., New Delhi, 1993
3. Process control – by Pollard A., Heinemann Educational Books, London, 1971.
4. Process System Analysis and Control – Coughanowr, McGraw Hill, Singapore, 1991
5. Process Control – by Patranabis, TMH, 1991

BTEIE507: ELECTRICAL TECHNOLOGY LAB

Lab : 3 Hrs/week
Int Marks : 50

Credits : 2
Ext Marks : 50

LIST OF EXPERIMENTS

PART- A

1. Verification of KVL and KCL.
2. Series and Parallel Resonance – Timing, Resonant frequency, Bandwidth and Qfactor determination for RLC network.
3. Time response of first order RC/RL network for periodic non-sinusoidal inputs timeconstant and steady state error determination.
4. Two port network parameters –Z and Y-parameters
5. Two port network parameters – ABCD and h-parameters
6. Verification of Superposition and Reciprocity theorems.
7. Verification of maximum power transfer theorem. Verification on DC and ACExcitation with Resistive and Reactive loads
8. Experimental determination of Thevenin's and Norton's equivalent circuits andverification by Direct test.

PART- B

1. Magnetization characteristics of D.C Shunt generator, Determination of critical fieldresistance.
2. Swinburne's Test on Dc shunt machine. (Predetermination of efficiency of a given Dc Shunt machine working as motor and generator)
3. Brake test on DC shunt motor. Determination of Performance Characteristics
4. OC and SC tests on Single-phase transformer (Predetermination of Efficiency and Regulation at given power factors and determination of equivalent circuit)
5. Load Test on single Phase Transformer.
6. Speed Control of DC shunt Motor – flux and armature voltage control methods.

Note: Minimum 12 Experiments should be conducted.

BTEIE508: PROCESS CONTROL INSTRUMENTATION LAB

Lab : 3 Hrs/week

Credits : 2

Int Marks : 50

Ext Marks : 50

LIST OF EXPERIMENTS

1. Realization of control actions: Electronic controllers.
2. Flow level control unit.
3. Temperature level control unit.
4. Servo and regulator operation.
5. Realization of control actions: Pneumatic controllers. Hydraulic controllers.
6. Process tuning – Process reaction curve method.
7. Process tuning – continuous and damped oscillation method.
8. Operation of flow loop in plant.
9. Input convertor – Pneumatic actuator.
10. Input convertor – Hydraulic actuator.
11. Control valve characteristics (Different types).
12. Feed forward control systems
13. Multi loop control systems – Ratio Control.
14. Multi loop control systems – Cascade Control.
15. Interacting and non interacting system
16. pH Control System

Note: Minimum 12 experiments should be conducted