Samrat Ashok Technological Institute (Engineering College) Vidisha, Madhya Pradesh
(An Autonomous Institute Affiliated to RGPV, Bhopal)
Syllabus for III and IV Semester B. Tech.

(Effective from 2018-2019 Admitted Batches)

Subject Code	Subject Name/ Title	L	T	P	Allotment of Marks			Total Marks	End Sem. Exam Time	Credits
					Mid Sem.	Assignment/ Quiz	End Sem.			
EI-1841	Managerial Economics	3	0	1	20	10	70	100	3hrs.	4

Introduction:
The purpose of this course is to provide students with a basic understanding of the Economic theories and analytical tools that can be used in decision making process. Identifying problems and formulating them into a managerial model, price determination in alternative market structure, demand theory and production and cost function.

Course Objectives:

1. To understand the basic principles of economics for an efficient decision making.
2. To gain knowledge of management principles in order to manage businesses and institutions efficiently.
3. To acquire the basics of entrepreneurship to establish industrial and economic activities.

Course Outcomes:

1. To understand the fundamentals of Economics in view of its nature, demand, Profit and Firm. Consumption, markets and business ownership aspects and how they are helpful in decision making process in order to sustain the economic activities.
2. To be aware of the significant role of an entrepreneur in the establishment, Development and achievement of organizational goals and objectives and also to learn importance of team work in demand forecasting and other functions of the organization.
3. To understand the fundamentals of management and business practices with respect to pricing and competition, cost analysis, business cycle and organization.

COURSE CONTENT

Unit-I

Introduction: Wealth, Welfare and Scarce Definitions of Economics; Micro and Macro Economics. Meaning of Managerial Economics and its scope in engineering perspective, Relationship with other areas in Economics, Basic economic principles – Opportunity cost, Incremental concept, Marginalize, Equi-marginal, Time perspective, Discounting principle, Objectives of Firms, Theories of profit, Measurement of profit.

Unit-II

Analysis of Demand: Meaning of Demand, Demand Analysis, Law of Demand, Determinates of Demand, Demand function, Indifference curve, Elasticity of Demand, Types of Elasticity, and Uses of concept of Elasticity of demand in managerial decision. Law of supply, Elasticity of supply, Consumer Behaviour theory. Utility Law of Diminishing Marginal Utility and its limitations.

P.T.O

Unit-III

Demand Forecasting and Entrepreneurship: Meaning, Significance, Methods of Forecasting, Forecasting of a new product, Production function, Production function with one/two variables, Laws of returns to scale, Law of Diminishing returns scale. Entrepreneurship: Entrepreneurial Functions, Entrepreneurial Development: Objectives, Training, Benefits; Phases of Installing a Project.

Unit-IV

Cost Analysis: Theory of cost, Accounting Cost Concepts, Analytical Cost Concepts, Short Run and Long Run Cost-output Relations, Break even analysis, Cost reduction and control. Meaning of Inflation, Types, Causes & Prevention methods, Business Cycles, Phases of business cycle.

Unit-V

Market Structure and Pricing Theory: Features and Types of different competitive situations, Price-Output determination in Perfect competition, Monopoly, Monopolistic competition and Oligopoly both the long run and short run sorbent features of price determination and Price discrimination. **Forms of Business Organizations**: Sole Proprietorship, Partnership, Joint Stock Company- Private limited and public limited companies, Public enterprises and their types.

Reference Books

1. **Managerial Economics**, Cauvery, U.K. Sudha Nayak
2. **Managerial Economics for Engineering**, Prof. D.N. Kakkar
3. **Managerial Economics** D.N. Dwivedi . Vikas Publishing House Pvt. Ltd.
4. **Principles of Economics** Robert H. Frank, Ben .S. Bernanke Tata McGraw Hill.
5. Mehta, P.L., **Managerial Economics Analysis, Problems**, Cases, Sultan Chand and Sons, New Delhi, 2001.
6. James L. Pappas and Engene F. Brigham, **Managerial Economics**, Pearson Education, New Delhi, 2006.
7. K.K. DEWETT, **Modern Economic Theory**, S. Chand and Company, New Delhi.-55.
8. S. C. Sharma and Banga T. R., **Industrial Organization & Engineering Economics,** Khanna Publications, Delhi -6.

4/6/19 04.06.19 4/6/19 04/06/2019

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE (DEGREE) VIDISHA (M.P)

ELECTRONICS & INSTRUMENTATION DEPARTMENT

Category of Course	Course Title	Course Code	Credits -4			Theory Paper
			L	T	P	
DC	Analog Circuit Design	EI-1842	3	-	2	Max.Marks-70 Min.Marks-22 Duration-3 Hrs.

Sub. Code	Subject Name & Title	Maximum Marks Allotted					Total Marks
		Theory Paper			Practical		
		End Sem.	Mid Sem. MST	Quiz/ Assignment	End Sem.	Lab Work/ Assignment	
EI-1842	Analog Circuit Design	70	20	10	30	20	150

Course Objectives	Study feedback techniques, oscillator's circuit & basic building blocks of linear integrated circuits; the linear and non-linear applications of operational amplifiers, special integrated circuits & active filters, IC 555 and signal generators circuits using op-amps.
Prerequisite Knowledge	Basic Electricals, Network analysis, Basic Electronics.
Course Description	This course is basically a study of the feedback techniques, oscillators, and linear integrated circuits. The course includes applications of linear integrated circuits in computation, measurements, instrumentation, and active filtering.
Course Outcomes	**CO-1** Able to understand & demonstrate the fundamentals of operational amplifiers & its application. **CO-2** Able to analyze different OP-Amp Circuits **CO-3** Able to design different applications of Op-Amp.

Syllabus

Unit-I

Introduction to Operational Amplifier and amplifier concepts, Op-Amp Characteristics. Op-Amp in open loop, inverting, non-inverting and differential mode, Practical Op-Amp, limitations, D.C errors, Slew rate, Frequency response, Noise effect, Frequency compensation.

Unit-II

Linear Op-Amp Circuits: Basic Op-Amp Circuits, V-I Converter with floating and grounded load, Current amplifier, Difference amplifier, Instrumentation amplifier,

Non-linear Op-Amp Circuits: Schmitt trigger and applications, Precision rectifiers, Analog switches, Peak detectors, S/H circuits. Comparator, logarithmic amplifiers, Analogue computation, Summer, Average, integrators, differentiators, scaling, multipliers.

04.06.19

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE (DEGREE) VIDISHA (M.P)

ELECTRONICS & INSTRUMENTATION DEPARTMENT

Category of Course	Course Title	Course Code	Credits - 4			Theory Paper
			L	T	P	
DC	Digital System Design	EI-1843	3	-	2	Max.Marks-70 Min Marks-22 Duration-3 Hrs.

Sub. Code	Subject Name & Title	Maximum Marks Allotted					Total Marks
		Theory Paper			Practical		
		End Sem.	Mid Sem. MST	Quiz/ Assignment	End Sem.	Lab Work/ Assignment	
EI-1843	Digital System Design	70	20	10	30	20	150

Course Objectives	1. Students should be able to study and appreciate the functioning of different digital components like logic gates, multiplexers, decoders , flip flops, counters etc. 2. To outline the formal procedures for the analysis and design of combinational circuits and sequential circuits 3. To introduce the concept of memories, programmable logic devices and digital ICs. 4. The students should be able to use this subject as the basis for other courses in the following semesters like Microprocessor, Micro controllers, Embedded Systems etc
Prerequisite Knowledge	Basic knowledge of direct current circuits, concept of voltage ,current , resistance, semiconductor diodes and transistors .
Course Description	This course provides a modern introduction to logic design and the basic building blocks used in digital systems, in particular digital computers. It starts with a discussion of combinational logic: logic gates, minimization techniques, arithmetic circuits, and modern logic devices such as field programmable logic gates. The second part of the course deals with sequential circuits: flip-flops, synthesis of sequential circuits, and case studies, including counters, registers, and random access memories. Different representations including truth table, logic gate, timing diagram, will be discussed.
Course Outcomes	**CO-1** The students will be able to represent numerical values in various number systems and perform number conversions between different number systems. **CO-2** The students will be able to design and debug complex combinational and sequential circuits based on an abstract functional specification. **CO-3** The students will be able to list the nomenclature and technology in the area of memory devices: ROM, RAM, PROM, PLD, FPGAs, etc. **CO-4** The students will be able to test and verify digital logic circuits.

04.06.19

Syllabus

Unit-I

Introduction Digital Systems; Binary coded decimal codes; Gray codes; Error detection and correction codes – parity check codes and Hamming code. Standard representation of logic functions - SOP and POS forms; Simplification of switching functions K-map and Quine McCluskey tabular methods

Unit-II

Combinatorial Logic Systems -;Synthesis of combinational logic circuits. Combinational Logic Modules and their applications Decoders, encoders, multiplexers, demultiplexers and their applications; Parity circuits and comparators; Arithmetic modules- adders, susbtractors and ALU; Design examples.

Unit-III

Sequential Logic systems: Definition of state machines, state machine as a sequential controller; Basic sequential circuits- latches and flip-flops: SR-latch, D-latch. D flip-flop, JK flip-flop, T flip-flop; Timing hazards and races; Analysis of state machines using D flip-flops and JK flip-flops; Design of state machines - state table, state assignment, transition/excitation table, excitation maps and equations, logic realization; Design examples Sequential logic modules and their applications ,Multi-bit latches and registers, counters, shift register, application examples, Concept of Finite state machine.

Unit-IV

Logic families: Introduction to different logic families, Operational characteristics of BJT in saturation and cut-off regions; Operational characteristics of MOSFET as switch; TTL inverter - circuit description and operation; CMOS inverter - circuit description and operation; Structure and operations of TTL and CMOS gates; Electrical characteristics of logic gates - logic levels and noise margins, fan-out, propagation delay, transition time, power consumption and power-delay product.

Unit-V

Introduction to D/A converters: Various types of Analog & Digital to Analog converters, Characteristics of ADC and DAC (resolution, quantization, significant bits, conversion/settling time) , V-F converters .Memory Read-only memory, read write memory-SRAM and DRAM Programmable Logic Devices: PLAs, PALs and their applications; Sequential PLDs and their applications; State-machine design with sequential PLDs; Introduction to field programmable gate arrays (FPGAs)

Text Books:

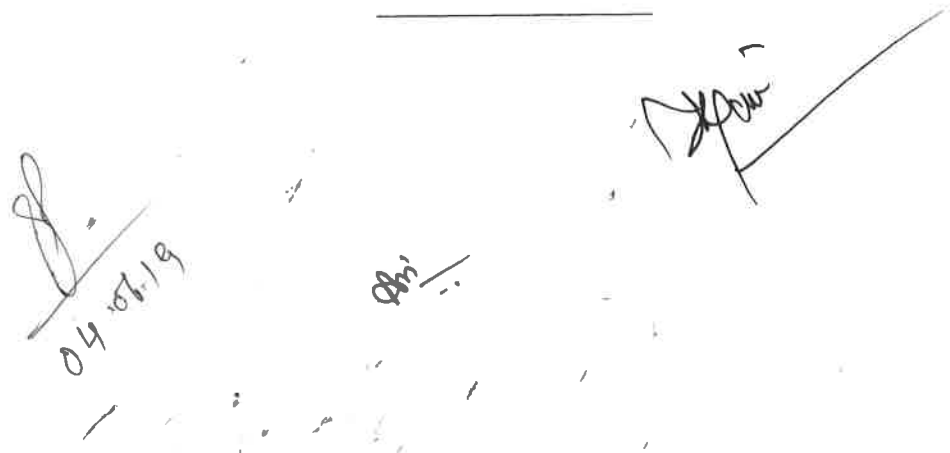
1. Fundamentals of Digital Circuits by Anand Kumar
2. R.J. Tocci, "Digital Systems principles &: Applications".
3. Z. Kohavi (TMH), "Switching & Automata Theory".
4. M. Mano (PHI), "Digital Logic & Computer Design".
5. M. Mano, "Digital Design".
6. H.V- Malmstadt & C.G. Euke (W.A. Benjamin IQC), "Digital Electronics for Scientists".

04-06-19

7. B-S- Sonde (New Age International),"Introduction to System Design using Integrated Circuits".
8. Millman & Taub (McGraw Hill). "Pulse, Digital & Switching Waveforms". .
9. Digital Fundamentals by B. Basavaraj

Reference books:

1. Digital Electronics- W.H. Gothman (PHI).
2. Practical Design of Digital Circuits- Ian Kampel
3. Digital Electronics: Principles And Integrated Circuit - Anil K. Maini
4. Analysis and Design of Digital Integrated Circuits- D.A. Hodges and H.G. Jackson



SAMRAT ASHOK TECHNOLOGICAL INSTITUTE (DEGREE) VIDISHA (M.P)

ELECTRONICS & INSTRUMENTATION DEPARTMENT

Category of Course	Course Title	Course Code	Credits - 4			Theory Paper
			L	T	P	
DC	Process Instrumentation-I	EI-1844	3	-	2	Max.Marks-70 Min.Marks-22 Duration-3 Hrs.

Sub. Code	Subject Name & Title	Maximum Marks Allotted					Total Marks
		Theory Paper			Practical		
		End Sem.	Mid Sem. MST	Quiz/ Assignment	End Sem.	Lab Work/ Assignment	
EI-1844	Process Instrumentation-I	70	20	10	30	20	150

Course Objectives	1. To impart students with the fundamental concepts, working principles and applications of various transducers for sensing physical parameters such as vibration, shock, sound, Force, torque, Displacement, Temperature, pressure, flow, temperature. 2. To enable the students to analyze and solve various problems on the sensors and develop suitable designs for practical applications. 3. To study the design of signal conditioning circuits using the sensors for different industrial applications. 4. To develop the student skill to access Manufacturer's data sheets to choose appropriate sensors and transducers for different applications and interpret the same.
Prerequisite Knowledge	Physics, Fundamentals of Instrumentation.
Course Description	This course introduces the concepts of modern sensors and actuators. The subject aims are to explain some of the most important physical principles applied in sensors and actuators & to highlight some of the most fundamental performance limitations which arise in these devices employing different physical principles.
Course Outcomes	**CO-1** Analyze and design signal conditioning circuits for various industrial applications using strain gauge, Industrial Weighing systems: strain gauge, load cells, belt conveyor weighing systems and weigh-feeders. **CO-2** Analyze and implement signal conditioning circuits using Torque & Displacement transducers. **CO-3** Understand safety sensors, devices and controls. **CO-4** Analyze and troubleshoot instrument problems and provide proper maintenance.

04.08.19

Syllabus

Unit-I

Sensing Elements: Resistive elements (potentiometer, strain guage, resistance thermometers), Capacitive elements (variable separation, area, dielectric), Inductive elements (variable inductance, potentiometer, variable reluctance, LVDT). Magnetic type (eddy current, magnetostrictive, magnetoresistive), Hall devices, Piezo electric element, Piezo resistive element. Thermal transducers: RTD, thermistors, radiation detectors (bolometer, pyroelectric type).

Unit-II

Industrial Weighing Systems: Various types of strain guage, load cells-column type, shear type and bending beam type, pressductor, application consideration of load cells, introduction to belt conveyor weighing systems and weigh-feeders.

Unit-III

Measurement of Velocity and Acceleration: Tacho-generators, tachometers, stroboscopes, encoders, non contact rpm measurement techniques, seismic accelerometers- piezoelectric, piezoresistive and capacitive types.

Unit-IV

Torque Measurement: Strain guages, feedback torque sensors, torsion bar dynamometer, etc. Shaft power: Dynamometer (servo control and absorption) instantaneous power measurement and alternator power measurement Introduction to vibration measurement and monitoring - Eddy current type, piezoelectric type, Seismic type. Jerk meter.

Unit-V

Proximity Sensors: Inductive, optical, magnetic, capacitive and ultrasonic. Pneumatic systems: Flapper-nozzle assembly, pneumatic relay, air filter regulator, pneumatic force balance systems. Introduction to electronic transmitters, Smart transmitters - features & advantages, HART protocol. Overview of sensor- actuator networks, field bus. Hardware /software sensor linearization techniques.

Textbooks/ Reference books:

1. Instrumental Methods of Analysis, Willard, Merritt, Dean, Settle, CBS Publishers & Distributors, New Delhi, 7th edition.
2. Handbook of Analytical Instruments, R. S. Khandpur, Tata McGraw–Hill Publications, 3rd edition
3. Instrumental Methods of Chemical Analysis, Galen W. Ewing, McGraw-Hill Book Company, 5th edition.
4. Introduction to Instrumental Analysis, Robert D.Braun, McGraw-Hill Book Company

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE (Deg)
VIDISHA (M.P)

ELECTRONICS & INSTRUMENTATION DEPARTMENT

Category of Course	Course Title	Course Code	Credits - 3			Theory Paper
			L	T	P	
DC	Electronic Instrumentations and Measurement	EI-1845	3	-	-	Max.Marks-70 Min.Marks-22 Duration-3 Hrs.

Sub. Code	Subject Name & Title	Maximum Marks Allotted					Total Marks
		Theory Paper			Practical		
		End Sem.	Mid Sem. MST	Quiz, Assignment	End Sem.	Lab Work/ Assignment	
EI-1845	Electronic Instrumentations & Measurement	70	20	10	-	-	100

Course Description	This course is a study of Instrumentation of various sensors, devices, and instruments used in Industry.
Prerequisite Knowledge	Basic of Electronics
Course Objectives	Upon completion of this course, the student will be able to: 1. Understand various Instrumentation techniques 2. Apply measurement principles to field applications 4 .Analyze and troubleshoot instrument problems and provide proper maintenance. 5. Understand Electronics Instruments
Course Outcomes	*The student will be able to* **CO-1** Underline Building Blocks of Electronic Instruments. **CO-2** Classify Electronic Ohmmeters. **CO-3** Apply Cathode Ray Oscilloscopes for Measurement. **CO-4** Categorize Digital Instruments. **CO-5** Use Sine wave generators, wave analyzer, Virtual Instrumentation.

Syllabus

Unit -I

Building blocks of Electronic Instruments: Voltage controlled oscillators, Phase Locked Loop, Charge Amplifier, Programmable Gain Amplifier, Current Mirror, Voltage to frequency and frequency to voltage converters.

Analogue Electronic Instruments: Introduction, Basic Emitter Follower Voltmeter, Voltmeters with IC Operational Amplifiers, True R.M.S Voltmeter, Peak Response Voltmeter.

Unit-II

Electronic Ohmmeters, Current measurement with Analogue Electronic Instruments – Current-to-voltage converter type, Electronic Ammeters, Chopper stabilized amplifiers for measurement of very low voltages and currents, Electronic Measurement of Power

Unit-III

Cathode ray oscilloscopes: Cathode Ray Tube, Deflection Amplifiers, Oscilloscope Time Base, Dual-Trace Oscilloscopes, Oscilloscope Controls, Oscilloscope Probes, Delayed time base oscilloscope, Digital Storage Oscilloscope.

Unit-IV

Digital instruments: Introduction, Basic Digital Displays – LEDs and LCD panels. Display Drivers and Latches, Digital Frequency Meter, Errors in frequency measurement – possible remedies, Time and Ratio measurement, Digital Voltmeters

Unit-V

Sine wave generator, sine wave synthesis, audio and function generator, RF signal generator, arbitrary waveform generator and its applications in instrumentation

Introduction to total harmonic distortion, wave analyzer and its applications, Spectrum Analyzer, Introduction to Virtual Instrumentation.

Text Books/ Reference books:

1. Electronic Measurement and Instrumentation-David Bell, Prientice Hall, 2nd edition.
2. Digital Instrumentation-A.J.Bowens, Mcgraw Hill, 1986
3. Instrumentation Devices & Systems-C.S.Rangna, G.R.Sharma, V.S.V.Mani, Tata Mcgraw Hill, 9th edition
4. Elements of Electronic Instrumentation & Control-J.J.Carr, Prientice Hall, 3rd edition.
5. Electronic Instrumentation & Measurement Techniques-W.Cooper, A.Helfric,PHI,3rd edition
6. Handbook of Electronic Instrumentation- Coombs

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE (DEGREE)
VIDISHA (M.P)

ELECTRONICS & INSTRUMENTATION DEPARTMENT

Category of Course	Course Title	Course Code	Credits - 1			Theory Paper
			L	T	P	
DLC	MATLAB Programming	EI-1846	-	-	2	--

Sub. Code	Subject Name & Title	Maximum Marks Allotted					Total Marks
		Theory Paper			Practical		
		End Sem.	Mid Sem. MST	Quiz, Assignment	End Sem.	Lab Work / Assignment	
EI-1846	MATLAB Programming	-	-	-	60	40	100

Course Objectives	The objective of this subject is to develop the programming and simulation skill for solving practical problems related with electronics and instrumentation engineering.
Prerequisite Knowledge	Matrix, Basic Programming concepts, flow charts
Course Description	This course is the study of various elements, instructions, functions available in the programming language. Know about their syntax, how to plot graphs, curve fitting, various control structures like arrays, loops, branch instruction, input-output, etc.
Course Outcomes	**CO-1**Ability to know about the syntax of the language used to solve engineering problems. **CO-2**Ability to understand the programming concept and simulation. **CO-3**Ability to write programs and simulate different engineering applications related with electronics and instrumentation concepts. **CO-4**Ability to use programming skill required for the development of Projects at higher semester.

Syllabus

1. MATLAB Windows.
2. Elementary Math built in Functions.
3. Arrays, Mathematical Operations with arrays.
4. Matrices, Matrix algebra with MATLAB .
5. Curve Plotting with MATLAB.
6. Control Structures –Conditional statements, loops, Branch control structure.
7. Input/Output Functions.
8. Script, Functions and Function files.
10. Cell Arrays, Structure Arrays.
11. Simulink and GUI Basics.

04-06-19

Textbooks/ Reference books:

1. MATLAB Programming for Engineers S.J.Chapman, Thomson Learning
2. MATLAB and its applications in Engineering, R.KBansal, A.K. Goel,M.K.Sharma
3. Programming in MATLAB, M.E. Herniter, Thomson Learning
4. MATLAB - An Introduction with Applications, Amos Gilat ,Wiley India.
5. Essential MATLAB for Engineers and Scientists, B.H.Hahn, D.T.Valentine, Elsevier.

04.06.19