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	Fundamental of Instrumentation	EI-1831	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-1831	Fundamental of Instrumentation	70	20	10	30	20	150

Course Objectives	The course aims at providing the fundamental concepts of the Instrumentation and Measurement, static and dynamic characteristics of instruments and their error analysis. It includes the measurement of passive electrical elements like R, L,C.
Prerequisite Knowledge	Basic Electrical Concepts, Mathematics (Matrices, Laplace Transform, Differential Equations and Complex Variables).
Course Description	This course explores the fundamental concepts of the Instrumentation and Measurement. It also enables the students to learn the principles of instruments for monitoring and measurement of electrical parameters.
Course Outcomes	Upon completion of the course, student will be able to **CO1**. Identify, conceptualize, demonstrate and apply the fundamentals of measurement science and measuring instruments **CO2** Analyze & Investigate the static and dynamic characteristics of the instruments and perform error analysis of the instruments.. **CO3** Design different AC & DC bridges for measurement of passive elements like Resistance, Capacitance and Inductance.

Syllabus

Unit - I

Basic concept of Instrumentation: Functional elements of an instrument, electrical equivalents of mechanical and other systems, classification of systems according to their mode of operation, input-output configurations, Performance characteristics: static characteristics, loading effects, dynamic characteristics, frequency response analysis, and response of a general form of instrument. Errors in measurement: definitions, signals and noise in measurement systems, uncertainty analysis.

Unit - II

Introduction to Electrical Measurements: Classification of analog instruments, Galvanometers – vibration, tangent and d' Arsonval type. Principle of operation, construction, sources of errors and compensations in PMMC, Moving iron, Dynamometer and Induction type instruments. Extension of ranges and calibration of ammeters & voltmeters.

Unit – III

04.06.19

Measurement of Resistance: Introduction, resistance and resistors, resistor types, color coding of resistor, Measurement of resistance(Low, Medium and High): voltmeter-ammeter method, ohmmeter, DC Bridges: Wheatstone bridge-design, arrangement of ratio arms, bridge sensitivity, errors in bridge circuits, Sensitivity and Calibration adjustments of Wheatstone bridge, Kelvin bridge, Various application of DC bridges, milli ohmmeter, mega ohmmeter.

Unit - IV

Measurement of Inductance:

Introduction, inductance and inductors, inductor structure, transformers and their types, impedance, Measurement of inductance using ac voltmeter, Maxwell's bridge, Various applications of Maxwell Bridges, Anderson Bridge, complex impedance measurement: vector impedance meter, Q measurement.

Unit – V

Measurement of Capacitance; Introduction, capacitance and capacitors, dielectrics, stray capacitance, capacitive reactance, capacitor types, color coding of capacitors, Capacitance Bridges: Hay's bridge, Schering bridge, Wein's Bridge, storage and dissipation factors measurement.

Textbooks/ Reference Books:

1. Cooper W.D., Helfrick A.D. "Modern Electronic Instrumentation & Measurement", Prentice Hall.
2. Sawhney A.K. "Electrical and Electronics Measurements & Instrumentation", Dhanpat Rai & sons.
3. Doeblin E.D., Measurement system, Tata Mc Graw Hill., 4th ed.
4. Kalsi, Electronic Instrumentation, Tata McGraw Hill

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	Network Analysis	EI -1832	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 - 1832	Network Analysis	70	20	10	30	20	150

Course Objectives	The objective of the course is to introduce the student to fundamentals of Network theory including its concepts, KVL, KCL, graph theory, network theorems initial and final conditions of components, transient ant steady state response, two-port network, network parameters, resonance. With this the students will have the knowledge of how to evaluate and analyze any complex network.
Course Outcomes	This course develop students abilities to **CO1.** Acquire and demonstrate the knowledge of circuit elements , different laws and theorems. **CO2.** Apply the fundamental concepts and mathematics in solving and analyzing different Electrical networks **CO3.** Apply mathematics in analyzing the networks in time and frequency domain. **CO4.** Apply mathematics in synthesizing the networks in time and frequency domain. **CO5.** Estimate the performance of a particular network.

Syllabus

Unit-I

Introduction to LLBP circuit elements R,L,C and their characteristics in terms of Linearity & time dependent nature, KCL and KVL analysis dual networks. Series & parallel Circuits, resonance, Tuned circuits. voltage & current sources, controlled sources.

Unit-II

Network topology, concept of Network graph, Tree, Tree branch & link, Incidence matrix, cut set and tie set matrices.

Network Theorems – Thevenin's & Norton's theorem, superposition, maximum power transfer and Millman's theorem.

Unit-III

04.06.19

Transient analysis Transients in RL, RC & RLC Circuits initial conditions, time constants. Network driven by constant driving sources & their solutions.
Steady state analysis - Concept of phasor & vector, impedance & admittance. Node & mesh analysis of RL, RC and RLC networks with sinusoidal and other driving sources.

Unit-IV

Frequency domain analysis – Laplace transform solution of Integro differential equations. Transform of Waveform – synthesized with step ramp, Gate and sinusoidal functions. Initial & final value theorem. Network Theorems in transform domain.
Concept of signal spectra, Fourier series co-efficient of a periodic waveform. Waveform symmetries. Trigonometric and Exponential form of Fourier series, steady state response to periodic signals.

Unit-V

Network function & Two port networks – concept of complex frequency, port. Network functions of one port & two ports, poles and zeros network of different kinds.
Two port parameters – Z, Y, chain parameters relationship between parameters. Interconnection of two ports. Terminated two port networks.

Text/References Books:

1. Hayt, Kemmerley and Durbin, "Engineering Circuit Analysis", TMH.
2. M.E. Van Valkenburg, "Network analysis", PHI.
3. Artice M Davis "Linear Circuit Analysis", PWS Pub. Co.
4. Van Valkenberg M.E., B.K. Kinarawala "Linear circuits", PHI.
5. David K. Cheng "Analysis of Linear Systems", Narosa Publishing House.
6. Bruce Carlson, "Circuits", Thomson Learning.

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	Electronic Devices and Circuits	EI -1833	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 - 1833	Electronic Devices and Circuits	70	20	10	30	20	150

Course Objectives	1. The course intends to provide an overview of the principles, operation and application of the analog building blocks like diodes, BJT, FET etc for performing various functions. 2. This course relies on elementary treatment and qualitative analysis and makes use of simple models and equation to illustrate the concepts involved. 3. To provide an overview of amplifiers. 4. Sufficient knowledge is provided so that students will be able to use this course as the basis for other advanced courses like Analog circuits and linear IC's, Power Electronics. 5. Continue to enhance oral and written communication skills specifically directed to the practice of electronics engineering.
Prerequisite Knowledge	Basic knowledge of e lectronic components and laws such as KCL, KVL, etc.
Course Description	This course presents the concept of several electronic devices, circuits and the design details in order to meet a given system specification. For each device; its analysis is firstly presented after a particular device physics overview, and then the design some circuit applications follow. The main focus of this course is not only to develop the student ability to analyze and design basic analog electronic circuits with passive components and/or the active elements like diode, transistors. Besides, some experiments are provided to help students to have a thorough grasp of the basic electronic circuit problem.
Course Outcome	**CO-1** Able to identify schematic symbols and understand the working principles of electronic devices. **CO-2** Able to analyze various electronic circuits. **CO-3** Able to design different electronic circuits.

04.06.19

Syllabus

Unit-I

Special Purpose Diodes:

Zener diode and applications Tunnel & Schottky diodes and applications, Optoelectronic devices, Varactor, PIN diode, light emitting diodes, Laser diodes, Clipping and Clamping circuits

Unit-II

Bipolar Junction Transistors (BJTs):

Physical structure and operation modes • Active region operation of transistor • D.C. analysis of transistor circuits • Transistor as an amplifier • Biasing the BJT: fixed bias, emitter feedback bias, collector feedback bias and voltage divider bias • Basic BJT amplifier configuration: common emitter, common base and common collector amplifiers • Transistor as a switch: cut-off and saturation modes • High frequency model of BJT amplifier

Unit-III

Field Effect Transistor (FET):

Junction Field-Effect Transistor (JFET) - Construction, Operation and Biasing • Depletion-type MOSFET • Enhancement-type MOSFET: structure and physical operation, current-voltage characteristics • D.C. operation of MOSFET circuits • MOSFET as an amplifier • Biasing in MOSFET amplifiers • Basic MOSFET amplifier configuration: common source, common gate and common drain types • High frequency model of MOSFET amplifier

Unit-IV

Multistage Amplifiers:

Multistage or Cascade amplifier: classification of multi-stage amplifier, coupling and frequency response of cascaded systems, effect of cascading on voltage gain, current gain, phase, input and output impedances and bandwidth of cascaded or multistage amplifiers. Types of coupling, cascade and cascade circuits, Miller theorem, Darlington pair, bootstrap circuit

Unit-V

Tuned Amplifiers:

Single tuned, double tuned and stagger tuned amplifiers characteristics and their frequency response. Power amplifier: • Class A large signal amplifiers, second-harmonic distortion • Transformer coupled audio power amplifier • Class B amplifier • Class AB operation push pull and Class C power amplifiers. Comparison of their efficiencies, types of distortion.

Text Books:

1. Integrated Electronics. - Millman Halkias
2. Electronic Devices & circuits – Boyelstad & Neshelsky – PHI
3. Electronic Devices & Circuits – David A.Bell – PHI
4. Principles of Electronic Devices – Malvino

Reference books:

1. Electronics Circuits And Systems- Owen Bishop
2. Intuitive Analog Circuit Design- Marc T. Thompson
3. Starting Electronics (Fourth Edition)-Keith Brindley

04.08.19

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	**Signals & Systems**	EI-1834	3	1	-	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-1834	Signals & Systems	70	20	10	-	-	100

Course Objectives	Signals and Systems is an introduction to analog and digital signal processing, a topic that forms an integral part of engineering systems in many diverse areas, including seismic data processing, communications, speech processing, image processing, defense electronics, consumer electronics, and consumer products. The study of signals and systems establishes a mathematical formalism for analyzing, modeling, and simulating electrical systems in the time, frequency, and *s*- or *z*-domains.
Prerequisite Knowledge	Basic Algebra, Trigonometry, Complex Arithmetic, Geometry, Overview of Signals, Laplace transform.
Course Description	The course presents the basic concepts for both continuous-time and discrete-time signals and systems. Signal and system representations and analysis are developed for both time and frequency domains. These representations are related through the Fourier transform and its generalizations, which are explored in detail. Sampling is discussed in detail. Fourier transform concepts are extended for the discrete domain. z- transform and its inverse are explored and its relation with the Laplace and Fourier transform is established.
Course Outcomes	After completion of the course students will be able to **CO-1** Interpret signals in time as well as in frequency domain and determine the response of LTI system. **CO-2** Analyze system properties based on impulse response and Fourier analysis and examine the stability of a feedback system. **CO-3** Demonstrate the process of sampling and hence conversion of signals from analog to discrete domain. **CO-4** Predict the applicability of various transforms and generate a relationship between them.

Syllabus

Unit-I

06-05-19

Signals and systems in everyday life, Classification of signals, The unit step, impulse and exponential signals, Sketching of signals, time scaling and time shifting, Classification of systems, System representation and properties of systems.

Unit-II

Impulse response of a system, convolution, Input-output behavior with various inputs, Cascade interconnections, Causality and stability of linear shift-invariant systems, Transmission of signals through a LTI system.

Unit-III

Fourier Series & Fourier Transform: Introduction to signal space and orthogonal bases of signals, Periodic and semi-periodic inputs to an LSI system, Frequency response and its relation to the impulse response, Fourier series representation, Fourier Transform and its properties

Unit-IV

DTFT & DFT: Sampling theorem and aliasing, Sampling of band pass signals, DTFT and its properties, DFT and its properties, Parseval's Theorem.

Unit-V

The z-Transform: z-transform definition, region of convergence, Properties of z-transform, Inverse z-transform using Contour integration - Residue Theorem, Inverse z-transform using Power Series expansion.

Inverse z-transform using Partial fraction expansion, Relationship between z-transform and Fourier transform, applications of z-transform

Text Books:

1. A.V. Oppenheim, A.S. Willsky and I.T. Young, "Signals and Systems", Prentice Hall, 1983.
2. B.P. Lathi, "Signal Processing and Linear Systems", Oxford University Press, 1998.
3. Digital Signal Processing, S Salivahanan, A Vallavaraj, C Gnanapriya, TMH, 2004.
4. Signals and Systems, S Sharma, 8e, Kataria, 2012.
5. Signals and Systems, B. Kumar, New Age International Publishers, 2011.
6. Signals and Systems, P. Ramesh Babu, A. Anandanatarajan, 4e, Scietech Publications.

Reference Books:

1. Signals and Systems, H P Hsu, Schaum's Outline Series, 2e, Mc Graw Hill, 2008.
2. Signals and Systems, Simon Haykin, Barry van Veen, John Wiley and Sons (Asia) Private Limited, 1998.
3. K. Huffman & R. Kunz, Linear Algebra, Prentice- Hall, 1971.
4. John .G.Proakis , "Digital Signal Processing Principles, Algorithms and Applications , Prentice Hall, New Delhi 2006.

e-Learning: MOOC, IIT Bombay, EE210x, Signals and Systems.

06.07.19

Category of Course	Course Title	Course Code	Credits - 4			Theory Paper
			L	T	P	
Departmental Core	Engineering Mathematics	BSC-1835	3	1	-	Max.Marks-70 Duration-3 Hrs.

Sub. Code	Subject Name & Title	Maximum Marks Allotted					Total Marks
		Theory Paper			Practical		
		End Sem.	Mid Sem.	Quiz, Assignment	End Sem.	Lab Work/ Assignment	
EI-1835	Engineering Mathematics III	70	20	10	-	-	100

Course Description	This course is a study of advanced topics in applied mathematics which will be very much useful to their further study of engineering. Students of all branches of engineering will be benefitted through this course. They will become self sufficient to model an engineering or physical science problem to find out the solution of that problem. Techniques of numerical method will be utmost helpful for them.
Prerequisite Knowledge	Basic knowledge of Mathematics: simultaneous Equations, Differentiation, Integration and Logarithms.
Course Objectives	It aims to equip the students to solve various advanced level of engineering problems as well as real world problems with the use of transformation and numerical techniques.
Course Outcomes	This course primarily contributes to applied mathematics program outcomes that develop students abilities to: 1. Students will learn the expansion of functions and various transformations. 2. It will help them to solve various physical science and engineering with the application of Laplace transform. 3. Interpolation will help them to find the solution of various types of problems like census problems, weather problems etc. 4. It is useful to solve various differentiation and integration problems using numerical techniques. 5. It will be very much useful to solve various boundary value problems.

	Syllabus
Unit-I	**Fourier Series and Fourier Transform :** Fourier Series, Change of Interval, Half Range Sine and Cosine Series, Fourier Transform, Fourier Sine Transform and Fourier Cosine Transform
Unit-II	**Laplace Transform:** Laplace Transform of Elementary Functions, Properties of Laplace Transform, Change of scale of properties, Second shifting theorem, Laplace Transform of derivatives, Inverse Laplace Transform and its properties, Convolutions theorem, Application of Laplace Transform to solve the ordinary differential equations.
Unit-III	**Interpolation :** Finite Differences, Factorial Notations by Newton's Forward Interpolation Formula, Newton's Backward Interpolation Formula, Gauss Forward Interpolation Formula, Gauss Backward Interpolation Formula, Bessel's Formula, Sterling Formula, Newton's Divided Difference Interpolation Formula, Lagrange's Interpolation Formula, Inverse Interpolation Formula.
Unit-IV	**Numerical Differentiation, Numerical Integration and Solution of Simultaneous Equations:** Methods of Numerical Differentiation, Numerical Integration, Quadrature Formula, Trapezoidal Rule, Simpson's One-third Rule, Simpson's Three-Eight Rule and Weddle's Rule. Solution of Simultaneous Algebraic Equations by Gauss elimination, Gauss Jordan, Crout's Methods, Jacobi's and Gauss-Siedel Iterative Method.
Unit-V	**Numerical Solution of Ordinary differential Equations :** Picard's Method, Taylor's Series Method, Euler's Method, Modified Euler's Method, Runge-Kuttta Method of Fourth Order

Text Books:

1 .Engineering Mathematics by B. V. Ramanna, Tata McGraw Hill
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers3. Advance Engineering Mathematics by E. Kreyszig
3 Advanced Engineering Mathematics by Kreyszig
4. Numerical Methods in Engineering and Science by B.S. Grewal, Khanna Publishers

25-5-19 25/5/19 25/5/19 25/5/19

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

(Effective from 2018-2019 Admitted Batches)

Subject Code	Subject Name/ Title	L	T	P	Allotment of Marks		Total Marks	Credits
					Internal Examination	External Examination		
EI-1836	**Language lab**	**0**	**0**	**2**	**20**	**30**	**50**	**1**

Introduction

The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English Language in everyday situations and contexts.

Course Objectives

- To make students recognize the sounds of English through Audio-Visual aids.
- To help students build their confidence and help them to overcome their inhibitions and self- consciousness while speaking in English. The focus would be on fluency.
- To familiarize the students with stress and intonation and enable them to speak English effectively.

Course Outcomes

- Students will be sensitized towards recognition of unique English sound patterns and their fluency in speech will be enhanced.
- The communicative activities in the laboratory will help the students become successful in the competitive world.
- Students will be able to express themselves fluently and accurately in social as well professional context.

UNIT-I

Developing Listening and speaking skills: Pronunciation: The Sounds of English (Phonetics), Stress, Intonation, and Rhythm. **Speaking Skills**: Conversational Skills, Role Plays, Debate and Just a minute session.

UNIT-II

Developing Employability Skills: Presentation skills: Definition, Key Elements, Body Language, Dos and Don'ts. **Interview Skills**: Definition, Types of Interviews, Required key skills, Non verbal communication during Interviews. Do's and Don'ts. **Group Discussions**: Definition, Skills tested in GD, Its Do's and Don'ts.

UNIT-III

Developing Soft Skills: Goal Setting and Time Management: Immediate, Short term, Long term, Smart Goals, Strategies to Achieve goals, Types of Time, Identifying Time Wasters, Time Management Skills, Stress Busters. **Leadership and Team Management:** Qualities of a Good Leader, Team Dynamics, Leadership Styles, Decision Making, Problem Solving.

P.T.O

DISTRIBUTION AND WEIGHTAGE OF MARKS

The practical examinations for the English Language Lab shall be conducted as per the University norms prescribed for the core Engineering practical sessions.

For the Language lab sessions, there shall be a continuous evaluation during the semester for 20 sessional marks and 30 semester-end Examination marks.

For the 20 sessional marks, 10 marks shall be awarded for day-to-day performance, 10 marks to be awarded by conducting Internal Lab Test(s).

Out of 30 semester- end (External) marks, 10 marks shall be awarded for written examination (dialogues, the sounds of English and stress) and 20 marks on the basis of viva-voce by an External Examiner.

Prescribed Textbook:

Speak Well. Board of Editors, Orient Black Swan Publishers, Hyderabad, India.

Reference Books:

1. Cambridge English Pronouncing Dictionary, Cambridge University Press, India, 2012. Rs 360/-
2. A Textbook of English Phonetics for Indian Students by T. Balasubramanian, Macmillan Publisher, 1981. Rs 186/-
3. English for Careers (ISBN: 9788131768846), Rs 150/-
4. Communication Skills and Soft Skills (ISBN: 9788131734537), Rs 160/-
5. Communicative English for Engineers and Professionals (ISBN: 9788131732045), Rs 190/-
6. Effective Communication and Soft Skills (ISBN: 9788131760345), Rs 245/-

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