

**DR. BABASAHEB AMBEDKAR
MARATHWADA UNIVERSITY,
AURANGABAD**



**Revised Syllabus of
Third Year**

B. Tech.

[Instrumentation & Control Engineering]

[Effective from 2009-10 & onwards]

Revised Syllabus

for

T. Y. B. Tech.

Instrumentation & Control Engineering

Syllabus for Third Year B. Tech Instrumentation and Control Engineering

Part:I

Sr. No.	Course Code	Subjects	Periods, hrs				Evaluation Schemes					Credits
			L	T	P	Total	TA	CT	ESE	PR	Grand Total	
1		Analytical Instrumentation	4	---	---	4	---	20	80	---	100	4
2		Digital Signal Processing	4	---	2	6	25	20	80	---	125	5
3		Modern Control Theory	4	---	2	6	25	20	80	25	150	5
4		Microprocessor Techniques	4	---	2	6	25	20	80	25	150	5
5		Linear Integrated Circuits	4	---	2	6	25	20	80	25	150	5
6		Unit Operations	2	---	---	2	---	10	40	---	50	2
7		Development of Skills-V	---	---	2	2	50	---	---	---	50	1
8		Workshop Technology	---	---	2	2	25	---	---	---	25	1
Total of Semester I			22	---	12	34	175	110	440	75	800	28

Part:II

Sr. No.	Course Code	Subjects	Periods, hrs				Evaluation Schemes					Credits
			L	T	P	Total	TA	CT	ESE	PR	Grand Total	
1		Data Communication and Computer Networks	4	---	---	4	---	20	80	---	100	4
2		Instrumentation System Design	4	---	2	6	25	20	80	---	125	5
3		Micro-Controllers and Applications	4	---	2	6	25	20	80	25	150	5
4		Process Control-I	4	---	2	6	25	20	80	25	150	5
5		Elective-I	4	---	2	6	25	20	80	25	150	5
6		Elective-II	2	---	---	2	---	10	40	---	50	2
7		Seminar	---	---	2	2	50	---	---	---	50	1
8		MatLab and Labview Practice	---	---	2	2	25	---	---	---	25	1
Total of Semester II			22	---	12	34	175	110	440	75	800	28
Total of Semester I and II			44	---	24	68	350	220	880	150	1600	56

Elective-I

- 1 Biomedical Instrumentation
- 2 Electronic Instrumentation

Periods

- L Lecture hours per week
 T Tutorial hours per week
 P Practical hours per week

Class Test Duration: 1 hour

Elective-II

- 1 Power Plant Instrumentation
- 2 Opto-Electronic Instrumentation

Evaluation Scheme:

- TA Teachers Assessment
 CT Class Test
 PR Practical
 ESE End Semester Examination

Analytical Instrumentation

Periods				Evaluation Scheme				Credit	
				Sessional Exam		ESE			Total
L	T	P	Total	TA	CT	TH	PR		
04	-----	-----	04	-----	20	80	-----	100	4

Objective:

<ul style="list-style-type: none"> ▪ To give the students a comprehension of Instrumentation used in Analytical and chemical field. ▪ To give the students knowledge about the most important issues in Analytical Instrumentation. ▪ To give the students a comprehension of the relation between Instrumentation and chemical plants/industries, etc. ▪ To make the students able to apply measurement and control in Analytical Instrumentation.

A: Theory:

Unit	Contents	Duration	Nature
01	<p>Introduction: Selection of instruments for application in industries, On line Instrumentation and laboratory techniques and brief review, difference between analytical and other instruments.</p> <p>PH measurement: Calorimetric and potentiometer PH meters, Construction, advantages, disadvantages, factors affecting measurement, applications.</p>	10 Hrs.	Analytical
02	<p>Electrical conductivity measurement: Definitions of electrical conductivity and molecular conductivity, methods of measurement, conductometric titrations, high-frequency methods, applications.</p> <p>Thermal conductivity gas analysis: bridge circuit, thermal conductivity cell.</p> <p>Chromatography: Introduction, definitions, classification, Solid, liquid and gas chromatography apparatus, details of different parts, applications, factors affecting separation.</p>	10 Hrs.	Analytical
03	<p>Absorption and Emission Spectroscopy: The nature of electromagnetic radiation, electromagnetic spectrum, atomic energy levels, vibration energy level, Raman effect, nuclear spin behavior, electron spin behavior, X-ray energy levels.</p> <p>Ultraviolet and Visible Spectrometry: Instrumentation radiation sources, detectors, readout module filters, Monochromator systems, monochromator performance, Grating.</p>	10 Hrs.	Analytical

04	Ultraviolet and Visible absorption Methods: Fundamental laws of photometry, spectrophotometer accuracy, photometric precision, Quantitative Methodology, Differential or Expanded Scale Spectroscopy, Difference Spectroscopy, Derivative spectroscopy, Photometric titrations, spectra of solids. Turbidity and Nephelometry, correlation of electronic absorption spectra with molecular structure.	10 Hrs.	Analytical
05	NMR and X-ray Spectroscopy: Nuclear Magnetic Resonance Spectroscopy-Basic principles, continuous wave NMR spectrometers, pulse Fourier transform NMR spectrometer, Spectra and molecular structure, Elucidation of proton NMR spectra. Quantitative analysis, X-ray spectroscopy-production of X-rays spectra. Instrumental methods, detectors, direct absorption fluorescence methods. X-ray diffraction.	10 Hrs.	Analytical
06	Mass Spectrometry: Components of mass spectrometers, resolution, Mass spectrometers, Interfacing Chromatography and Mass spectrometry, Quantitative analysis of mixtures, use of stable isotopes, leak detection correlation of mass spectra with molecular structure. Sampling techniques: Sampling systems for liquids and gases for analysis purpose, Automation of sampling, maintenance.	10 Hrs.	Analytical

SECTION:A :- Chapter 1,2,3

SECTION:B:- Chapter 4,5,6

B:- Suggested Text Books and References :			
Sr. No	Title	Author	Publication
01	Instrumental Methods of Analysis	Willard, Merrit and Dean	
02	Instrumental Methods of Chemical Analysis	Chatwal and Anand	
03	Instrumental Methods of Chemical Analysis	B. K. Sharma	
04	Instrumental Methods of Analysis	G. W. Wing	
05	Instrument Technology	Jones	Vol. I & II

Pattern of question Paper
Faculty of Engineering and Technology
Third Year (B. Tech) Instrumentation and Control Engineering (Revised Course)
Examination
November / December, May/June 200_
Analytical Instrumentation

Time: 3 Hrs

Max Marks: 80

‘Please check whether you have got the right question paper’

N.B:-

- i. All the questions are compulsory
- ii. Use separate answer book for each section
- iii.
- iv.

Section A

Question No. 1	16 Marks
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This question will consist of questions from the all chapters under **Section A** mentioned in the syllabus.

Question No.2 OR Question No.2	12 Marks
Question No.3 OR Question No.3	12 Marks

Note:

1. The topic may be intermingled in the questions
2. The questions will be memory based, application based and understanding oriented

Section B

Question No. 4	16 Marks
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This Question will consist of questions from the entire chapter under **Section B** mentioned in the syllabus.

Question No.5 OR Question No.5	12 Marks
Question No.6 OR Question No.6	12 Marks

Note:

1. The topic may be intermingled in the questions
2. The questions will be memory based, application based and understanding oriented

Digital Signal Processing

Periods				Evaluation Scheme				Credit	
				Sessional Exam		ESE			Total
L	T	P	Total	TA	CT	TH	PR		
04	-----	02	06	25	20	80	-----	125	5

Objective:

The contain aims to develop the knowledge of the students in the direction of the practical problem in the Digital Signals and Systems related applications.

A: Theory:

Unit	Contents	Duration	Nature
01	<p>Overview: Continuous time signal & discrete time signal, properties of the discrete signal, energy and power signal, response of LTI system using linear convolution, difference equation & response of system from difference equation, Z-transforms, ROC of Z-transform & its properties, system transfer function, impulse response of LTI system using Z-transform.</p>	10 Hrs.	Analytical
02	<p>Discrete time Fourier series: Properties, DFT & its properties, circular convolution, frequency response analysis of signal using DFT, linear filtering based on DFT, FFT algorithm, use of FFT for spectral estimation, filtering and correlation.</p>	10 Hrs.	Analytical
03	<p>Infinite Impulse Response Filter: Butterworth, Chebyshev approximation, Design of IIR filter: Impulse invariance method, bilinear transformation, and digital- to- digital transformation, Introduction to computer aided design of IIR filter, Realization methods for IIR filter.</p>	10 Hrs.	Analytical
04	<p>Finite Impulse Response Filter: FIR filter design using windows & frequency sampling method, design of optimal equi-ripple linear phase FIR filter, design of FIR differentiators and Hilbert transform, Introduction to computer aided design of linear phase FIR filter, basic structure of FIR system.</p>	10 Hrs.	Analytical
05	<p>Introduction to DSP hardware: TMS320C6XX processor, applications of TMS 320C6XX e.g. square wave generator, matrix multiplication, and Applications of DSP processor for biomedical, speech, radar & image processing.</p>	10 Hrs.	Analytical

06	Multirate DSP: The basic sample rate alteration time domain characterization, frequency domain characterization: Cascade equivalences, filters in sampling rate alteration systems, digital filter banks and their analysis and applications, multi level filter banks, estimation of spectra from finite-duration observation of signals, sampling rate conversion, decimation and interpolation, applications of Multirate signal processing over sampling A/D and D/A conversion, sigma-delta converters.	10 Hrs.	Analytical
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SECTION:A :- Chapter 1,2,3

SECTION:B :- Chapter 4,5,6

B:- Practical/ Drawings/ Design/ Workshop:

01	Shifting and folding of digital signal.
02	Linear convolution
03	Discrete Fourier transforms.
04	Fast Fourier transforms
05	Design and implement FIR filter using windowing method
06	Design and implement IIR filter using Chebyshev approximation
07	Design and implement IIR filter using Butterworth approximation
08	FIR filter implementation using TMS320C67XX
09	IIR filter implementation using TMS320C67XX
10	FFT implementation using TMS320C67XX
Experiments should be performed on the DSP Processor kit	

The assessment of term work shall be on the following criteria:

1. Continuous Assessment
2. Performing the experiments in the laboratory
3. Regular submission of practical report
4. Oral examination conducted internally on the practical work and assigned syllabus

C:- Suggested Text Books and References

Sr. No	Title	Author	Publication
01	Digital Signal Processing Principles, algorithms and applications	Proakis, Manolakis	PHI
02	Digital Signal Processing	Oppenheim, Schaffer	PHI
03	Digital Signal Processing, applications using C & TMS320CSX DSK	Rulph Chassaing	WILAY publication
04	Digital filter analysis & Design	A Antoniou j	McGraw Hill 1979
05	Digital Signal Processing Implementation using DSP microprocessors with examples from TMS320C54XX	Avtar Singh, S. Srinivasan	
06	TMS 320c67XX DSP Reference Set	Reference Set	Vol. 2, 1999

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Examination
November / December, May/June 200_
Digital Signal Processing

Time: 3 Hrs

Max Marks: 80

‘Please check whether you have got the right question paper’

N.B:-

- i. All the questions are compulsory
- ii. Use separate answer book for each section
- iii.
- iv.

Section A

Question No. 1	16 Marks
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This question will consist of questions from the all chapters under **Section A** mentioned in the syllabus.

Question No.2 OR Question No.2	12 Marks
Question No.3 OR Question No.3	12 Marks

Note:

1. The topic may be intermingled in the questions
2. The questions will be memory based, application based and understanding oriented

Section B

Question No. 4	16 Marks
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This Question will consist of questions from the entire chapter under **Section B** mentioned in the syllabus.

Question No.5 OR Question No.5	12 Marks
Question No.6 OR Question No.6	12 Marks

Note:

1. The topic may be intermingled in the questions
2. The questions will be memory based, application based and understanding oriented

Modern Control Theory

Periods				Evaluation Scheme				Credit	
				Sessional Exam		ESE			Total
L	T	P	Total	TA	CT	TH	PR		
04	-----	02	06	25	20	80	25	150	5

Objective:

<ul style="list-style-type: none"> ▪ To give the students a comprehension about the state space model. ▪ To give the students knowledge about the most important design issues in modern control theory. ▪ To give the students a comprehension of the relation between continuous and digital controller design. ▪ To make the students able to apply nonlinear system analysis ▪ To provide the knowledge about the design aspects to design state feedback controllers

A: Theory:

Unit	Contents	Duration	Nature
01	<p>Vector and matrix algebra: A review</p> <p>Vector and Matrix norm, Unitary, Orthogonal and Orthonormal Vectors, Linear dependent and independent vectors, Definitions of different types of matrices, Diagonalisation of a Matrix, Determinants and rank, Inverse of matrix, Eigen values, Eigen vectors, Pseudo inverse, Quadratic forms and definiteness of matrices.</p>	08 hrs.	Analytical
02	<p>State Space Analysis of Systems:</p> <p>Classical Vs Modern Control Theory, Concept of State, State Space and State Variables, State model for typical linear systems, construction of state model using differential equations, State Variable Diagram and Block Diagram Representation of State Models, State Space Model for Electrical Circuits, Mechanical Systems, Electro-Mechanical Systems—DC Motors, Solution of Time Invariant State Equation, State Transition Matrix from Cayleigh–Hamilton Theorem, Solution of Linear Time Varying State Equation.</p>	12 hrs.	Analytical
03	<p>Transformation in State Space Model:</p> <p>State Space Model from Transfer Functions, Decomposition methods, State Model for a Multi-Input Multi-Output System from Block Diagrams, Similarity transformation, Non-Uniqueness of State Space Model, Transfer Function from State Model, Different Canonical Models like Phase Variable Form or Controllable Canonical Model, Observable Canonical Model, Diagonal Canonical Model, Jordan Canonical Model, , State Variable Description of Discrete Time Systems,</p>	10 hrs.	Analytical

	Solution of Time Invariant Discrete Time State Equation.		
04	<p>Design of State Feedback Controllers and Observers:</p> <p>State and output Controllability of Systems, Criterion for Controllability for Continuous and Discrete Time Systems, Observability of Systems, Criterion for Observability of a System, Significance of Controllability and Observability, Transfer Function and Controllability/Observability, State Feedback Controller design using Pole Placement for Plants Represented in Phase Variable Form, Determination of Feedback Gain K Using Ackerman's Formula, Design of full state and Reduced Order Observers.</p>	10 hrs.	Analytical
05	<p>Discrete Time Control Systems:</p> <p>Basic Elements of a Discrete Data System, Examples of Discrete Data Systems, Sampling Theorem and Significance, Zero Order and First Order Hold and Data Reconstruction, Pulse Transfer Function, Different Block Diagram Realization for Pulse Transfer, Zero-Order Hold and G(s) in Cascade, Jury's Stability test, Digital controller algorithm and their realization.</p>	08 hrs.	Analytical
06	<p>Nonlinear Systems and Analysis Methods:</p> <p>Characteristics of Nonlinear Systems, Limit cycle, Jump Phenomenon, Classification of Nonlinearities, Common Physical Nonlinearities, Methods of Analysis- Linearization Techniques, Phase Plane Analysis, Describing Function Analysis, Classification of Singular Points, Basic Definition of Describing, Describing Function for Typical Nonlinearities (Ideal Relay, Relay with Dead Zone, Simple Dead Zone, Saturation or Limiter, Relay with Hysteresis and Dead Zone, Friction Controlled Backlash).</p>	12 hrs.	Analytical

SECTION:A :- Chapter 1,2,3

SECTION:B:- Chapter 4,5,6

B:- Practical/ Drawings/ Design/ Workshop:	
Experiment list (to be performed using simulation and writing algorithms)	
01	To perform different vector and matrix operations using MatLab tool, e.g. eigenvalues, eigenvectors, rank, pseudo-inverse, test for definiteness, etc.
02	To find the solution of linear equations using minimum norm method using pseudo-inverse method.
03	To derive the state space model of the inverted pendulum mounted on moving cart.
04	To derive state space model of spring mass system and series R-L-C circuit. To plot the response of these systems for step input
05	To validate that the output response of the state space model obtained using similarity transformation and output response of original state space model is unique.
06	To design a state feedback controller to stabilize the inverted pendulum mounted on

	moving cart using Pole Placement technique. (Take model from Experiment No. 3.)
07	To design a state feedback controller to stabilize the inverted pendulum mounted on moving cart using full order observer. (Take model from Experiment No. 3.)
08	To design a state feedback controller to stabilize the inverted pendulum mounted on moving cart using reduced order observer. (Take model from Experiment No. 3.)
09	To design a digital PID controller for given controller specification.
10	Reconstruction of digital data using zero and first order hold circuit
11	To obtain describing function of commonly encountered nonlinearities.
12	To construct phase trajectory using Isoclines method.

The assessment of term work shall be on the following criteria:

1. Continuous Assessment
2. Performing the experiments in the laboratory
3. Regular submission of practical report
4. Oral examination conducted internally on the practical work and assigned syllabus

The assessment of Practical Examination shall be on the following criteria:

1. Performing the assigned practical during examination
2. Record of experiment submitted by candidate
3. Viva- voce based on the syllabus

C:- Suggested Text Books and References

Sr. No	Title	Author	Publication
01	Automatic Control Systems	B. C. Kuo and FARID Golnaraghi (8 th Edition)	Wiley, 2003
02	Digital Control and state variable methods	M. Gopal (2 ND Edition)	Tata McGraw-Hill, 2005
03	Discrete-time Control Systems	Katsuhiko Ogata	Pearson, 2002
04	Modern Control Engineering	Dr. K. P. Mohandas	Sanguine Technical
05	Control systems Engineering	I.J. Nagrath and M.Gopal (3 rd Edition)	New age International Publishers, 2001
06	Modern Control Theory	U. A. Bakshi and M. V. Bakshi (1 st Edition)	Technical Publication, 2007

Pattern of question Paper
Faculty of Engineering and Technology
Third Year (B. Tech) Instrumentation and Control Engineering (Revised Course)
Examination
November / December, May/June 200_
Modern Control Theory

Time: 3 Hrs

Max Marks: 80

‘Please check whether you have got the right question paper’

N.B:-

- i. All the questions are compulsory
- ii. Use separate answer book for each section
- iii.
- iv.

Section A

Question No. 1	16 Marks
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This question will consist of questions from the all chapters under **Section A** mentioned in the syllabus.

Question No.2 OR Question No.2	12 Marks
Question No.3 OR Question No.3	12 Marks

Note:

1. The topic may be intermingled in the questions
2. The questions will be memory based, application based and understanding oriented

Section B

Question No. 4	16 Marks
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This Question will consist of questions from the entire chapter under **Section B** mentioned in the syllabus.

Question No.5 OR Question No.5	12 Marks
Question No.6 OR Question No.6	12 Marks

Note:

1. The topic may be intermingled in the questions
2. The questions will be memory based, application based and understanding oriented

Microprocessor Techniques

Periods				Evaluation Scheme				Credit	
				Sessional Exam		ESE			Total
L	T	P	Total	TA	CT	TH	PR		
04	-----	02	06	25	20	80	25	150	5

Objective:

<ul style="list-style-type: none"> ▪ To study the Intel 8085 and 8086 Microprocessors in detail ▪ To study its applications from instrumentation point of view

A: Theory:

Unit	Contents	Duration	Nature
01	Introduction to Microprocessor: Overview of Microprocessor structure and its operation, Microprocessor evolution and its types.	03 Hrs	Descriptive
02	Microprocessor 8085: Pin diagram, Architecture, Addressing Modes, Timing diagram, Instruction Set, Programming Techniques, Counters & time delays, stack & subroutines, Interrupt structure, Code conversion.	17 Hrs	Descriptive/ Logical
03	Microprocessor system peripheral and Interface: Different data transfer schemes, need of I/O Ports, memory mapping, memory mapped I/O & I/O mapped I/O.	06 Hrs	Descriptive
04	Microprocessor system peripheral and Interface: Introduction to 8155, 8255, 8253, 8251, 8279, 8355, Interfacing of LED'S, 7 Segment display, ADC/DAC, Stepper motor & keyboard with 8085	10 Hrs	Descriptive/ Logical
05	Microprocessor based data acquisition and control system: Temperature control system, Flow control system, etc.	04 Hrs	Descriptive/ Logical
06	Microprocessor 8086: Pin diagram, Architecture, Addressing Modes, Timing diagram, Instruction Set, Programming Techniques, Interrupt, Assembler Directives, Memory & I/O mapping	10 Hrs	Descriptive/ Logical
07	Multiprocessor Configuration: Minimum mode configuration, Maximum mode configuration, Introduction to NDP 8087, NDP data types, Introduction to IOP 8089, Coprocessor Configuration, Closely Coupled Configuration, Loosely coupled configuration.	10 Hrs	Descriptive/ Logical

SECTION:A :- Chapter 1,2,3,5

SECTION:B:- Chapter 4,6,7

B:- Practical/ Drawings/ Design/ Workshop:	
01	Study of 8085 Microprocessor
02	Write a program to add two 8- bit number using 8085
03	Write a program to add two 16- bit number using 8085
04	Write a program to subtract two 8- bit number using 8085
05	Write a program to subtract two 16- bit number using 8085
06	Write a program to multiply two 8- bit numbers by repetitive addition method using 8085
07	Write a program to multiply 16-bit number with 8-bit number using 8085
08	Write a program to add two 8- bit number using 8086
09	Write a program to add two 16- bit number using 8086
10	Write a program to subtract two 16- bit number using 8086
11	Write a program to copy 10 bytes of data from source to destination using 8086

The assessment of term work shall be on the following criteria:

1. Continuous Assessment
2. Performing the experiments in the laboratory
3. Regular submission of practical report
4. Oral examination conducted internally on the practical work and assigned syllabus

The assessment of Practical Examination shall be on the following criteria:

1. Performing the assigned practical during examination
2. Record of experiment submitted by candidate
3. Viva- voce based on the syllabus

C:- Suggested Text Books and References

Sr. no	Title	Author	Publication
01	Microprocessor, Architecture, Programming and application	Ramesh Gaonkar	
02	0000 to 8085	Shridhar Ghosh	PHI
03	Fundamentals of Microprocessors & Microcomputers	B.Ram	
04	Microprocessor	K.L.Short	
05	Advanced Microprocessors and Peripherals	Ray & Bhurchandi	TMH Publication
06	Microprocessors and Interfacing	D. Hall	TMH Publication
07	The Intel Microprocessors Architecture, Programming & Interfacing	Berry Bray C.R.Sarma	Pearson Publication
08	Microprocessor and Microcomputer based system Design	Mohammad Raffiquazaman	Universal Book Stall, New Delhi
09	The 8086/8088 Family – Design, Programming and Interfacing	Uffenbeck	PHI
10	Microcomputer System : The 8086/8088 Family Architecture, Programming & Design	Yu-Cheng Lue Glemma Gibson	PHI

D. Digital references:

Sr. No	Title		
01	Electrofriends.com		
02	www.yesnaraynan.blogspot.com		

Pattern of question Paper
Faculty of Engineering and Technology
Third Year (B. Tech) Instrumentation and Control Engineering (Revised Course)
Examination
November / December, May/June 200_
Microprocessor Techniques

Time: 3 Hrs

Max Marks: 80

‘Please check whether you have got the right question paper’

N.B:-

- i. All the questions are compulsory
- ii. Use separate answer book for each section
- iii.
- iv.

Section A

Question No. 1	16 Marks
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This question will consist of questions from the all chapters under **Section A** mentioned in the syllabus.

Question No.2 OR Question No.2	12 Marks
Question No.3 OR Question No.3	12 Marks

Note:

1. The topic may be intermingled in the questions
2. The questions will be memory based, application based and understanding oriented

Section B

Question No. 4	16 Marks
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This Question will consist of questions from the entire chapter under **Section B** mentioned in the syllabus.

Question No.5 OR Question No.5	12 Marks
Question No.6 OR Question No.6	12 Marks

Note:

1. The topic may be intermingled in the questions
2. The questions will be memory based, application based and understanding oriented

Linear Integrated Circuits

Periods				Evaluation Scheme				Credit	
				Sessional Exam		ESE			Total
L	T	P	Total	TA	CT	TH	PR		
04	-----	02	06	25	20	80	25	150	5

Objective:

The physical world is inherently analog, indicating analog circuitry is needed to condition physical signals from transducers and then process and control it for various applications.

A: Theory:

Unit	Contents	Duration	Nature
01	<p>Op- Amplifier Fundamentals:</p> <p>Basic building blocks of op-amplifier, differential configuration, types, DC and AC analysis, current sources, current mirrors, Active load, differential to single ended conversion, Dc level shifter, output stage. An overview of different types of op-amplifier, their peculiarities, application areas, general purpose and precision, instrumentation amplifier, isolation, power, comparators, fast settling time. Op-amplifier parameters: frequency response, offset nulling techniques, inverting and non inverting configuration.</p>	12 Hrs.	Theoretical and Analytical
02	<p>Linear Application of op-amplifier:</p> <p>Summing amplifier, difference amplifier, instrumentation amplifier, voltage to current converter with floating load and grounded load, current to voltage converter, integrator, differentiator & its application, comparator, limitation of op-amp as comparator, Schmitt trigger, comparator IC such as LM339, bandwidth and slew rate limitation, precision rectifiers and peak detector</p>	08 Hrs.	Theoretical and Analytical
03	<p>Non Linear Applications:</p> <p>Introduction to Log, Antilog amplifiers, Analog & trans conductance multipliers, Analog to Digital and digital to analog conversion techniques, sample and hold circuit, precision half wave & full wave rectifier, Phase lock loop IC 565 operating principle, locking capture range, applications of PLL : FM detector, FSK demodulator, Frequency synthesizer, AM detector.</p>	10 Hrs.	Theoretical and Analytical
04	<p>Signal Generator:</p> <p>Sine wave generators, triangular wave generators, SAW tooth generators,, Voltage to Frequency converter, frequency to voltage converter, function generator IC 8038, Multi vibrators</p>	06 Hrs.	Theoretical and Analytical

	IC 555 based astable & mono stable multi vibrators, monolithic waveform generators IC 566 function generators		
05	<p>Active Filters Design:</p> <p>Transfer Function, Op0-Amp based first order low pass active filters, standard second order low pass and high pass butter worth filters, KRC filters, multiple feedback filters, state variable and bi quad filters, band pass, band reject, all pass filters design and its sensitivity analysis, active filter performance considerations, switched capacitor filters(first and second order)</p>	08 Hrs.	Theoretical and Analytical
06	<p>Voltage Regulator:</p> <p>Performance specifications, voltage reference and its applications, linear regulators(positive, negative and dual tracking) design and its applications, switching regulators, monolithic regulators</p>	6 Hrs.	Theoretical and Analytical
07	<p>ICs in Instrumentation and Process Control:</p> <p>Temperature transducers and its applications, IC LM335/AD590/ LM301 A, OP97 E,IC AD 594/595 isolation amplifiers IC 284 J, commutating auto zero(CAZ) Op- amp, Operational Amplifiers in process control system, feed forward, ON/OFF control, proportional, proportional plus integral(PI) control, proportional plus derivative(PD) control, proportional plus derivative plus integral control(PID), servomechanism IC LM 2907 J</p>	10 Hrs.	Theoretical and Analytical

SECTION:A :- Chapter 1,2,3

SECTION:B:- Chapter 4,5,6,7

B:- Practical/ Drawings/ Design/ Workshop:	
Experiment list	
01	Op-Amp parameters
02	Op-amp applications: Inverting and Non Inverting amplifiers
03	Op- amp application: Integrator and Differentiator and its frequency response
04	Op-amp application: Comparator and Schmitt trigger
05	Design build and test Precision Rectifier (half wave and full wave)
06	Design, build and test Active filters and its frequency response
07	Design, build and test IC 555 as A-stable and Mono-stable multi vibrator
08	To measure and plot lock range, capture range and one application of IC 565 as Phase lock loop
09	Design ,build and test temperature transducer IC LM 335/ AD 590
10	Design, build and test typical velocity servo control system using LM 2907 J

<u>The assessment of term work shall be on the following criteria:</u>
<ol style="list-style-type: none"> 1. Continuous Assessment 2. Performing the experiments in the laboratory 3. Regular submission of practical report 4. Oral examination conducted internally on the practical work and assigned syllabus

<u>The assessment of Practical Examination shall be on the following criteria:</u>
<ol style="list-style-type: none"> 1. Performing the assigned practical during examination 2. Record of experiment submitted by candidate 3. Viva- voce based on the syllabus

C:- Suggested Text Books and References			
Sr. No	Title	Author	Publication
01	Integrated Circuits	K.R Botkar	Khanna Publication
02	Op Amps and Linear Integrated Circuits	R.A Gaikwad	PHI Publication
03	Design with operational Amplifiers and Analog Integrated circuits	Sergio Franco	Tata McGraw Hill
04	Operational Amplifiers	G.B Clayton	International Edition
05	Operational Amplifiers and Linear Integrated Circuits	Coughlin, Driscoll	PHI
06	Linear Integrated Circuits	D.Roy Choudhary, Shail Jain	New Age International

Pattern of question Paper
Faculty of Engineering and Technology
Third Year (B. Tech) Instrumentation and Control Engineering (Revised Course)
Examination
November / December, May/June 200_
Linear Integrated Circuits

Time: 3 Hrs

Max Marks: 80

‘Please check whether you have got the right question paper’

N.B:-

- i. All the questions are compulsory
- ii. Use separate answer book for each section
- iii.
- iv.

Section A

Question No. 1	16 Marks
----------------	----------

This question will consist of questions from the all chapters under **Section A** mentioned in the syllabus.

Question No.2 OR Question No.2	12 Marks
Question No.3 OR Question No.3	12 Marks

Note:

1. The topic may be intermingled in the questions
2. The questions will be memory based, application based and understanding oriented

Section B

Question No. 4	16 Marks
----------------	----------

This Question will consist of questions from the entire chapter under **Section B** mentioned in the syllabus.

Question No.5 OR Question No.5	12 Marks
Question No.6 OR Question No.6	12 Marks

Note:

1. The topic may be intermingled in the questions
2. The questions will be memory based, application based and understanding oriented

Unit Operations

Periods				Evaluation Scheme					Credit
				Sessional Exam		ESE		Total	
L	T	P	Total	TA	CT	TH	PR		
02	-----	-----	02	-----	10	40	-----	50	2

Objective:

<ul style="list-style-type: none"> ▪ To study different unit operations used in industry. ▪ To understand role of Instrumentation Engineer during such processes

A: Theory:

Unit	Contents	Duration	Nature
01	Introduction: Concepts of Unit Operation and Unit Processes, Material Balance and Energy Balance, Types of reactions, general idea of controlling operation	05 hrs.	Descriptive
02	Size Reduction: Different Crushers and Grinders, Working Principle.	03 hrs.	Descriptive
03	Crystallization: Principle and Operation and Equipment.	04 hrs.	Descriptive
04	Blowers and Industrial Compressors	03 hrs.	Descriptive
05	Drying and Evaporation: Liquid Characteristics, Types of Evaporators, Principle and Operation of Single and multiple effect Evaporators. Classification of Dryers, Principle and Operation	04 hrs.	Descriptive
06	Distillation: Equipment Setup, Flash Distillation, Batch Distillation, Continuous Distillation, Operational Features, Construction and Working Only.	05 hrs.	Descriptive
07	Leaching and Extraction: Principle, Working of Equipments.	03 hrs.	Descriptive
08	Humidification and Dehumidification: Equipment Setup, Principle of working.	03 hrs.	Descriptive

SECTION:A :- Chapter 1,2,3,4

SECTION:B:- Chapter 5, 6,7,8

B:- Suggested Text Books and References

Sr. No	Title	Author	Publication
01	Unit Operation of Chemical Engineering	McCabe W. L. Smith J. C., Peter Harriot	McGraw Hill Inc., 1993.
02	Chemical Reaction Engineering	Levenspel O.	Second Edition Wiley Eastern Pvt. Ltd.
03	Perry's Chemical Engineer's Handbook	Robert H. Perry and Don Green	Sixth Edition, International Student Edition
04	Instrumentation Engineers Handbook: Process Measurement	B. G. Liptak	Chilton Book Company
05	Instrumentation Engineers Handbook: Process Control	B. G. Liptak	Chilton Book Company

Pattern of question Paper
Faculty of Engineering and Technology
Third Year (B. Tech) Instrumentation and Control Engineering (Revised Course)
Examination
November / December, May/June 200_
Unit Operations

Time: 2 Hrs

Max Marks: 40

‘Please check whether you have got the right question paper’

N.B:-

- i. All the questions are compulsory
- ii. Use separate answer book for each section
- iii.
- iv.

Section A

Question No. 1	8 Marks
----------------	---------

This question will consist of questions from the all chapters under **Section A** mentioned in the syllabus.

Question No.2 OR Question No.2	6 Marks
Question No.3 OR Question No.3	6 Marks

Note:

1. The topic may be intermingled in the questions
2. The questions will be memory based, application based and understanding oriented

Section B

Question No. 4	8 Marks
----------------	---------

This Question will consist of questions from the entire chapter under **Section B** mentioned in the syllabus.

Question No.5 OR Question No.5	6 Marks
Question No.6 OR Question No.6	6 Marks

Note:

1. The topic may be intermingled in the questions
2. The questions will be memory based, application based and understanding oriented

Development of Skill - V

Periods				Evaluation Scheme				Credit	
				Sessional Exam		ESE			Total
L	T	P	Total	TA	CT	TH	PR		
-----	-----	02	02	50	-----	-----	-----	50	1

Objective

- Understanding the concept of quality and applications of quality tools
- Understanding the Entrepreneurship Skills
- Understanding the Technical writing skills

A: THEORY:

Unit	Contents	Duration	Nature
01	Quality: Definitions of Quality, Quality control, Quality Assurance, Dimensions of Quality circle details.	02 Hrs.	Theoretical
02	Problem Solving techniques-(Old & New tools) A. Old tools- i. Tally Sheet/Check Sheet ii. Pareto Diagram iii. Cause & Effect Diagram iv. Graphs/Histogram/Run Chart v. Stratification vi. Scatter Diagram vii. Control Chart	05Hrs.	Theoretical
	B) New Tools i. Affinity Diagram ii. Relation Diagram iii. Tree Diagram iv. Process Decision Program Chart v. Arrow diagram vi. Matrix Data Analysis Diagram	05Hrs.	Theoretical
	C) Helpful Techniques: i. Brainstorming ii Flow Chart: Definition purpose, procedure & examples of all the above said tools.	02Hrs.	Theoretical
03	Entrepreneurship: Definitions, need, significance, success stories of few exceptional entrepreneurs.	06 Hrs.	Theoretical
04	Marketing Management: Definitions of marketing, objectives, types of markets, marketing techniques.	06 Hrs.	Theoretical
05	Writing Skills: Writing of Technical /Project reports, Writing Technical Research papers	04Hrs.	Theoretical

B : Practical / Drawings / Design / Workshop

Term work shall consist of ten assignments as follows:

1. Three assignments on any three old QC tools.
2. Three assignments on any three new QC tools.
3. One assignment each on Entrepreneurship, Marketing Management, Writing Skills & Quality.

C. Suggested Text Books and References:

Sr. No.	Title	Author	Publication	Edition
1	Quality Planning and Analysis	Juran		
2	Handbook of Effective Technical Communications	Tyler G. Hicks, Carl M. Valorie, Sr	McGraw Hill Book Company	
3	Technical Writing Process and Product	Saron J. Gerson / M. Gerson	Prentice Hall	
4	Thesis and Assignment Writing	Anderson, Dustan, Poole	Wiley Eastern Limited.	

Workshop Technology

Periods				Evaluation Scheme					Credit
				Sessional Exam		ESE		Total	
L	T	P	Total	TA	CT	TH	PR		
-----	-----	02	02	25	-----	-----	-----	25	1

Objective:

The knowledge of the circuit design is important for Engineering Education. The student should be able implement small circuits which they have studied in curriculum. This will definitely help in building the confidence in the student what he has learnt theoretically. The dependent study of the state of the art topics in a broad area of his/her specialization.

Guidelines for students and faculty:

1. The Mini project topics under Workshop Technology practices may be chosen by the student with advice from the faculty members.
2. To design a prototype/ mini project at small level for the following applications-
 - a. Academic use like developing small circuits like Instrumentation.
 - b. Industrial applications like flow, level, pressure, temperature, signal conditioning circuits.
 - c. Medical applications, etc. and Control System, (ii) Experimental verification, or (iii) Design, fabrication, testing and calibration of an Instrumentation system. The students are required to submit the report based on project work done.
3. Use the Following Tools Pspice, Protus, and Orchids etc.
4. Each student is required to-
 - a. Submit a one page synopsis before the project talk for display on the notice board.
 - b. Give a 10 minutes presentation through OHP, PC, and Slide projector followed by a 10 minute discussion.
 - c. Submit a report on the mini project topic with a list of references and slides used
5. Min projects are to be scheduled in the weekly scheduled time-table during the semester and any change in schedule should be discouraged.
6. Award 25 Sessional marks based on the assessment done by internal guide during semester and the involvement of student in the work assigned related to the seminar topic and 5-10 page report on the same.

Data Communication and Computer Networks

Periods				Evaluation Scheme					Credit
				Sessional Exam		ESE		Total	
L	T	P	Total	TA	CT	TH	PR		
04	-----	-----	04	-----	20	80	-----	100	4

Objective:

<ul style="list-style-type: none"> ▪ To enhance the knowledge of students in the field of the computer communication in this globalizes age. ▪ To facilitate the techniques available in data communication. ▪ To give the students a comprehension of the relation between network hardware and software. ▪ To make the students able to learn current application of communication system at all fields. ▪ To provide the knowledge about the ISDN and communication standards.

A: Theory:

Unit	Contents	Duration	Nature
01	<p>Fundamentals of Data Communication:</p> <p>Communication model, Electrical interface, Transmission media wired and wireless, analog and digital communication, Transmission impairments, channel capacity, Signal to Noise ratio, Signal encoding techniques, ASK, FSK, PSK, FDM, TDM, CDM, EIA-232-D.</p>	10 hrs.	Descriptive
02	<p>Digital Data Communication Techniques:</p> <p>Synchronous, asynchronous transmission, Types of errors, Error detection and correction, Line configurations, Data layer design issues, data link control protocols, flow control, error control, HDLC, OSI/ISO model, TCP/IP model.</p>	10 hrs.	Descriptive
03	<p>Computer Networks:</p> <p>Network hardware hub, bridges, routers, repeaters, gateways, Network software, network design issues, network topology, LAN, MAN, WAN, high speed LAN, data communication networks, circuit and packet switching networks and their classifications, data routing.</p>	10 hrs.	Descriptive
04	<p>ISDN:</p> <p>Introduction to Integrated services digital network (ISDN), Integrated services digital network, architecture, user interface, services, types of ISDN, broadband ISDN.</p>	10 hrs.	Descriptive

05	ATM & Frame relay: X.25, frame relay, ATM, architecture, services, congestion control in data networks effect of congestion, congestion control, traffic management, congestion control in frame relay, ATM, packet- switching networks.	10 hrs.	Descriptive
06	Internet Applications: IEEE standards 802 for LAN and MAN, Internet application, internet protocol, electronic mail, web, DNS, HTTP, FTP, SMTP. Network security, cryptography.	10 hrs.	Descriptive

SECTION:A :- Chapter 1,2,3

SECTION:B:- Chapter 4,5,6

B:- Suggested Text Books and References			
Sr. No	Title	Author	Publication
01	Computer Network	Andrew S. Tannenbaum	PHI
02	Data & computer communication	William Stallin	PHI
03	Data Communications, Computer Networks & open system	Fred Halsall	PHI

Pattern of question Paper
Faculty of Engineering and Technology
Third Year (B. Tech) Instrumentation and Control Engineering (Revised Course)
Examination
November / December, May/June 200_
Data Communication and Computer Networks

Time: 3 Hrs

Max Marks: 80

‘Please check whether you have got the right question paper’

N.B:-

- i. All the questions are compulsory
- ii. Use separate answer book for each section
- iii.
- iv.

Section A

Question No. 1	16 Marks
----------------	----------

This question will consist of questions from the all chapters under **Section A** mentioned in the syllabus.

Question No.2 OR Question No.2	12 Marks
Question No.3 OR Question No.3	12 Marks

Note:

1. The topic may be intermingled in the questions
2. The questions will be memory based, application based and understanding oriented

Section B

Question No. 4	16 Marks
----------------	----------

This Question will consist of questions from the entire chapter under **Section B** mentioned in the syllabus.

Question No.5 OR Question No.5	12 Marks
Question No.6 OR Question No.6	12 Marks

Note:

1. The topic may be intermingled in the questions
2. The questions will be memory based, application based and understanding oriented

Instrumentation System Design

Periods				Evaluation Scheme				Credit	
				Sessional Exam		ESE			Total
L	T	P	Total	TA	CT	TH	PR		
04	-----	02	06	25	20	80	-----	125	5

Objective:

<ul style="list-style-type: none"> ▪ To give the students a comprehension Instrumentation System Design. ▪ To give the students knowledge about the design of Instruments according to International Standard. ▪ To give the students a comprehension of the aspects relating to the design of Instrumentation system with out most care. ▪ To make the students capable to apply knowledge gained to develop the smaller modules for demonstration purposes.

A: Theory:

Unit	Contents	Duration	Nature
01	Basic Concept of Instrumentation Design: Functional requirements & Specifications Environmental, industrial, military applications, NEMA, DIN, BSI, ANSI standards Enclosure Design Guidelines Index protection (IPXXX), cable design guidelines.	10 Hrs.	Analytical
02	Electronic design guideline: Noise in electronic circuits, Capacitive and inductive coupling and effect of shield, shielding to prevent magnetic radiation, co-axial and twisted pair cable, grounding, safety ground, signal ground, single and multi point ground, Hybrid ground, grounding of cables shields, ground loops and low frequency and high frequency analysis of common mode choke, guard shields.	12 Hrs.	Analytical
03	Protection Techniques: Shielding, near and far field, shielding effectiveness, absorption and relation loss, shielding with magnetic material, contact protection, glow and arc discharges, loads with high inrush current, Inductive and resistive load contact protection networks for inductive loads, intrinsic noise sources.	08 Hrs.	Analytical
04	Electrostatic Discharge: ESD, inductive charging human body model, ESD protection in equipment, software in ESD protection ,EMI, types of	10 Hrs.	Analytical

	noises, sensitive devices, input filters, clamping suppressors, Virtual instrumentation, Fault finding and troubleshooting techniques, causes and remedies of faults.		
05	Printed circuit board design guideline: Layout scheme, grid systems, PCB size, Design rules for digital circuits, and Design rules for analog circuits, single and multi-layer PCB, Automation in PCB design artwork, CAD package, Soldering techniques, and component assembly techniques, System Design Selection of sensors, signal conditioning, standard signals and noise considerations of typical systems.	14 Hrs.	Analytical
06	Reliability: Bath tube curve, Reliability for series parallel system, K-out of n system, MTTF, MTTR, MTBF, availability, Redundancy and stand by.	06 Hrs.	Analytical

SECTION:A :- Chapter 1,2,3

SECTION:B:- Chapter 4,5,6

B:- Practical/ Drawings/ Design/ Workshop:

	Minimum 10 Drawings and Report from the following a list should be completed during the course
01	Instrument Symbol
02	Equipment symbols
03	Transducer details dimensions, views and specifications, drawing.
04	Design of Transducer based on Reverse Engineering.
05	Case Study with design of Transducers module for Measurement

The assessment of term work shall be on the following criteria:

1. Continuous Assessment
2. Performing the experiments in the laboratory
3. Regular submission of practical report
4. Oral examination conducted internally on the practical work and assigned syllabus

C:- Suggested Text Books and References :

Sr. No	Title	Author	Publication
01	Applied Instrumentation Vol. –I-IV	Andrew Williams	
02	Principles of Industrial Instrumentation	D. Patranabis	THM Publications
03	Process /Industrial Instruments and Control Handbook	D. M. Considine	McGraw Hill Publications,4 th Edition
04	Measurement Systems	E. O. Doebelin	
05	Instrument Engineers' Handbook Vol. I & II	B. G. Liptak	Chilton Books Company,3 rd Edition
06	National Instruments Catalog		

Pattern of question Paper
Faculty of Engineering and Technology
Third Year (B. Tech) Instrumentation and Control Engineering (Revised Course)
Examination
November / December, May/June 200_
Instrumentation System Design

Time: 3 Hrs

Max Marks: 80

‘Please check whether you have got the right question paper’

N.B:-

- i. All the questions are compulsory
- ii. Use separate answer book for each section
- iii.
- iv.

Section A

Question No. 1	16 Marks
----------------	----------

This question will consist of questions from the all chapters under **Section A** mentioned in the syllabus.

Question No.2 OR Question No.2	12 Marks
Question No.3 OR Question No.3	12 Marks

Note:

1. The topic may be intermingled in the questions
2. The questions will be memory based, application based and understanding oriented

Section B

Question No. 4	16 Marks
----------------	----------

This Question will consist of questions from the entire chapter under **Section B** mentioned in the syllabus.

Question No.5 OR Question No.5	12 Marks
Question No.6 OR Question No.6	12 Marks

Note:

1. The topic may be intermingled in the questions
2. The questions will be memory based, application based and understanding oriented

Microcontrollers and Applications

Periods				Evaluation Scheme					Credit
				Sessional Exam		ESE		Total	
L	T	P	Total	TA	CT	TH	PR		
04	-----	02	06	25	20	80	25	150	5

Objective:

<ul style="list-style-type: none"> ▪ To give the students a comprehensive knowledge of micro-controller. ▪ To give the students knowledge about the application of microcontroller from hardware and software point of view. ▪ To make the students capable to apply knowledge gained to design a microcontroller based embedded for demonstration purposes.

A: Theory:

Unit	Contents	Duration	Nature
01	Introduction to microcontrollers: Comparison of microprocessor and microcontrollers 4-bit, 8-bit, and 16-bit microcontrollers, 89C51 and other 8-bit microcontroller chips, Embedded System overview, design challenges – Optimizing design matrix, selection of microcontroller, watchdog timer	04 Hrs.	Analytical
02	8051 Architecture: Pinout diagram, 8051 oscillator and clock, Program counter and Data Pointer, addressing modes, A and B, CPU registers, PSW, internal memory, stack and stack pointer, SFRS, Timer/Counter, I/P and O/P ports, serial communication.	12 Hrs.	Analytical
03	Assembly language programming for 8051 microcontroller: Addressing Modes, Instruction classification, instruction set, Writing assembly language programming based on instruction set, stack and subroutines. flash programming	08 Hrs.	Analytical
04	Interrupts of 8051: Serial data i/p and o/p, serial data transmission and communication counters and timers, timer modes, timer/counter programming	06 Hrs.	Analytical
05	8051 microcontroller interfacing with: 8255, Keyboard (4 by 4) and Display (LED, LCD), ADC 0808/09 and DAC 0808/09, stepper motor, converters	08 Hrs.	Analytical

06	Design of dedicated systems using 8051: For temperature indication, OR/AND control, Flow indication OR/AND control stepper motor control Embedded control systems, Smart transmitters	06 Hrs.	Analytical
07	Communication Interfaces: RS232, 422, 485, Ethernet, CAN, I2C, USB, IEEE802.11, Introduction to Bluetooth	06 Hrs.	Analytical
08	Microcontroller Application Development Tools: Development phases of a microcontroller- based system, software development cycle and applications, software development tools, Emulator and In circuit Emulator, Target Board, Device Programmer	10 Hrs.	Analytical

SECTION:A :- Chapter 1,2,3,4

SECTION:B:- Chapter 5,6,7,8

B:- Practical/ Drawings/ Design/ Workshop:

	Minimum 10 experiments from the following a list should be completed during the course using a Microcontroller 89C51
01	At least 4 software programs from the following list a) Block transfer b) Searching Sorting c) BCD binary Arithmetic d) Number system conversion etc.
02	Interfacing Keys and LED's with microcontroller.
03	Developing two programs using SPJ system simulator.
04	Interfacing ADC with microcontroller
05	Interfacing DAC with microcontroller.
06	Interfacing 7 segment display with microcontroller
07	Study of interrupts.
08	Interfacing of stepper motor with microcontroller

The assessment of term work shall be on the following criteria:

1. Continuous Assessment
2. Performing the experiments in the laboratory
3. Regular submission of practical report
4. Oral examination conducted internally on the practical work and assigned syllabus

The assessment of Practical Examination shall be on the following criteria:

1. Performing the assigned practical during examination
2. Record of experiment submitted by candidate
3. Viva- voce based on the syllabus

C:- Suggested Text Books and References :			
Sr. No	Title	Author	Publication
01	8051 Microcontroller Architecture, Programming and Application	K. J. Ayala 2 nd Edition.	Penram International
02	Programming and customizing the 8051 Microcontroller	Myke Predko	Tata McGraw-Hill New Delhi.
03	The 8051 Microcontroller And Embedded Systems	M. A. Mazidi & J. G. Mazidi & R. D. Mckinlay	Raj Kamal
04	8031 Microcontroller – Architecture, Programming and Hardware Design	N.G. Palan	Technova publishing House
05	Embedded System Design	Frank Vahid & Tony Givargus	
06	Microcontroller	Raj Kamal	Raj Kamal
07	Embedded Real Time Systems: Concepts, Design and Programming (Black Book)	Dr. K. V. K. K. Prasad	Dreamtech Press
08	Microcontrollers: Theory and Applications	Ajay Deshmukh	TMH Publication

Pattern of question Paper
Faculty of Engineering and Technology
Third Year (B. Tech) Instrumentation and Control Engineering (Revised Course)
Examination
November / December, May/June 200_
Microcontrollers and Applications

Time: 3 Hrs

Max Marks: 80

‘Please check whether you have got the right question paper’

N.B:-

- i. All the questions are compulsory
- ii. Use separate answer book for each section
- iii.
- iv.

Section A

Question No. 1	16 Marks
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This question will consist of questions from the all chapters under **Section A** mentioned in the syllabus.

Question No.2 OR Question No.2	12 Marks
Question No.3 OR Question No.3	12 Marks

Note:

- 1. The topic may be intermingled in the questions
- 2. The questions will be memory based, application based and understanding oriented

Section B

Question No. 4	16 Marks
----------------	----------

This Question will consist of questions from the entire chapter under **Section B** mentioned in the syllabus.

Question No.5 OR Question No.5	12 Marks
Question No.6 OR Question No.6	12 Marks

Note:

- 1. The topic may be intermingled in the questions
- 2. The questions will be memory based, application based and understanding oriented

Process Control – I

Periods				Evaluation Scheme					Credit
				Sessional Exam		ESE		Total	
L	T	P	Total	TA	CT	TH	PR		
04	-----	02	06	25	20	80	25	150	5

Objective:

<ul style="list-style-type: none"> ▪ To give the students a comprehension Instrumentation System Design. ▪ To give the students knowledge about the design of Instruments according to International Standard. ▪ To give the students a comprehension of the aspects relating to the design of Instrumentation system with out most care. ▪ To make the students capable to apply knowledge gained to develop the smaller modules for demonstration purposes.

A: Theory:

Unit	Contents	Duration	Nature
01	<p>Introduction of process control:</p> <p>Servo mechanism, control system evaluation, negative feedback, the difficult element - dead time the easy element – capacity combination of dead time and capacity, process-control drawing first order response second order response of sensor time response.</p>	06 Hrs.	Analytical
02	<p>Process characteristics:</p> <p>Process variables, Process degrees of freedom, Characteristics of physical systems, Elements of process dynamics, Liquid processes, Gas processes, Flow processes, Thermal processes, Dead time, Thermal element lag, Pressure element lag. Multi-capacity process, steady- state gain, testing the plant.</p>	08 Hrs.	Analytical
03	<p>Controller Design:</p> <p>Performance criteria, Proportional control, Integral control, Proportional integral control, Proportional derivative control, PID control action, Two position control, Single speed floating control, Two position floating controllers, Electronic, pneumatic and hydraulic Controllers designs, model based controllers.</p>	10 Hrs.	Analytical
04	<p>Transmitter Characteristics and designs:</p> <p>Smart transmitters for flow, pressure, temperature, E/P converter.</p>	06 Hrs.	Analytical

05	Control Valve design: Valves: Selection, Performance, sizing and characteristics (inherent and installed), Control valve design for specific applications like liquid, gas, slurries applications, control valve noises and their remedies, Testing of control valves.	08 Hrs.	Analytical
06	Process control networks: Fieldbus, Profibus, and different networks for process control	06 Hrs.	Analytical
07	Nonlinear control elements: Nonlinear elements in the closed loop, nonlinear phase shifting elements, variations of the on-off controllers, the dual mode concept, nonlinear PID controllers	06 Hrs.	Analytical
08	Intrinsic safety design: Hazardous locations and their classification, Intrinsically safe systems, installations, Barrier designs for Thermocouple, RTD, 4-20mA Transmitters, Distributed digital control systems, 80/20 rules for barrier designs, , Instrumentation in hazardous area, protection circuits using Shunt and Zener diode, Earthing considerations,	10 Hrs.	Analytical

SECTION:A :- Chapter 1,2,3,4

SECTION:B:- Chapter 5,6,7,8

B:- Practical/ Drawings/ Design/ Workshop:	
01	To study SMART transmitter
02	To design 4-mA current transmitter
03	To design a barrier circuit for low voltage
04	To determine characteristics of thermal system
05	To determine response of first and second order system
06	To study tuning of controllers
07	To study model based controller
08	To design a barrier circuit for thermocouple
09	To design an electronic PID controller
10	To study nonlinear elements in closed loop control system

The assessment of term work shall be on the following criteria:

1. Continuous Assessment
2. Performing the experiments in the laboratory
3. Regular submission of practical report
4. Oral examination conducted internally on the practical work and assigned syllabus

The assessment of Practical Examination shall be on the following criteria:

1. Performing the assigned practical during examination
2. Record of experiment submitted by candidate
3. Viva- voce based on the syllabus

C:- Suggested Text Books and References :

Sr. No	Title	Author	Publication
01	Applied Instrumentation Vol –I-IV	Andrew Williams	
02	Process control system	F. G. Shinsky	McGraw Hill Publications,3 rd Edition
03	Process /Industrial Instruments and Control Handbook	D. M. Considine	McGraw Hill Publications,4 th Edition
05	Instrument Engineers' Handbook Vol I & II	B.G.Liptak	Chilton Books Company,3 rd Edition
06	National Instruments Catalog		
07	Automatic Process Control	Eckman D. P,	Wiley Eastern, 1975.
08	Pneumatic System	Majumdar S.R	Tata McGraw, 1995
09	Process Control & Instrumentation Technology	Curtis D. Johnson	7 th Edition, Pearson Education, 2002
10	Electronic Instruments and Instrumentation Technology		

Pattern of question Paper
Faculty of Engineering and Technology
Third Year (B. Tech) Instrumentation and Control Engineering (Revised Course)
Examination
November / December, May/June 200_
Process Control – I

Time: 3 Hrs

Max Marks: 80

‘Please check whether you have got the right question paper’

N.B:-

- i. All the questions are compulsory
- ii. Use separate answer book for each section
- iii.
- iv.

Section A

Question No. 1	16 Marks
----------------	----------

This question will consist of questions from the all chapters under **Section A** mentioned in the syllabus.

Question No.2 OR Question No.2	12 Marks
Question No.3 OR Question No.3	12 Marks

Note:

- 1. The topic may be intermingled in the questions
- 2. The questions will be memory based, application based and understanding oriented

Section B

Question No. 4	16 Marks
----------------	----------

This Question will consist of questions from the entire chapter under **Section B** mentioned in the syllabus.

Question No.5 OR Question No.5	12 Marks
Question No.6 OR Question No.6	12 Marks

Note:

- 1. The topic may be intermingled in the questions
- 2. The questions will be memory based, application based and understanding oriented

Elective –I: Biomedical Instrumentation

Periods				Evaluation Scheme				Credit	
				Sessional Exam		ESE			Total
L	T	P	Total	TA	CT	TH	PR		
04	-----	02	06	25	20	80	25	150	5

Objective:

- To give the students the Knowledge about the Natural Engineering in the Physiological Systems of the Human Body.
- To give the students knowledge about the Measurement of Parameters of Human Systems based on engineering principles.
- To give the students a comprehension of the aspects relating to the design of Instrumentation system with out most care.
- To make the students capable to apply knowledge gained to develop the smaller modules for demonstration purposes.

A: Theory:

Unit	Contents	Duration	Nature
01	The Man-Instrument System: Components The origin of Bio-potential, Organization of Cell, Resting Potentials, Action Potential, Bioelectric Signal, Typical Waveform ,Electrodes, Electrode Based on Different Types, Material, Sizes, Applications	10 Hrs.	Analytical
02	Cardiovascular Systems: Heart And Cardiovascular Systems, Cardio Vascular Measurement, Electro cardiography, Measurement of Blood, Sphygmomanometer, Electro Sphygmomanometer, Measurements Of Blood Flow And Cardiac Output, Central Monitoring Systems, Bed Side Monitor (ICU), Pacemaker, Defibrillator	10 Hrs.	Analytical
03	Analyzers and measuring instrument: Auto Analyzer, Flame Photometer, PH/Blood Gas Analyzer, Pulse Oximeter, Hemodialysis, Blood Cell Counter, Study Of Essential Parameters Of Recorders Related To Biomedical Engineering, Non Fade C.R.O, Mediscope.	10 Hrs.	Analytical
04	Human Brain: Recording Of EEG Signal, EEG Amplifier, Analysis Of Diseases, Using EEG, Electromyography (EMG),Instrument for Surgery:-Principles of Surgical diathermy, Surgical Diathermy Machines, Safety aspects.	10 Hrs.	Analytical

05	<p>Modern Imaging System:-</p> <p>Principles of Imaging Systems, Diagnostic Ultrasound, Physics of Ultrasound, Medical Ultrasound, Basic pulse Echo Apparatus, A-Scan, M-Mode, B-Scan, Real-Time Ultrasonic Imaging, Biological Ultrasound ,Medical Thermography, Physics of Thermograph X-Ray:-Physics of X-Rays, Electromagnetic Radiation & Spectrum, Diagnostic X-Rays, Generation Of X-Rays, Block Diagram Of X-Ray Machine, Control Circuits Of X-Rays, Application CT Scanner:- Constructional Details, Image Reconstruction ,Introduction To NMR</p>	10 Hrs	Analytical
06	<p>Biomedical telemetry and Telemedicine:</p> <p>Introduction, Physiological Parameters adaptable, wireless Telemetry, Single channel ,Multi-channel, Multi-patient telemetry, Components of Bio-Telemetry system, Implantable telemetry, Transmission of Analog and Physiological signal over telephone, Telemedicine, Automated Biochemical Analysis</p>	10 Hrs	Analytical

SECTION:A :- Chapter 1,2,3

SECTION:B:- Chapter 4,5,6

B:- Practical/ Drawings/ Design/ Workshop:	
Minimum 10 Experiments based on Above Syllabus and as per the following list is to be completed as per the course.	
01	To study the various types of electrodes used in Biomedical applications
02	To study and record the BP Apparatus(Sphygmomanometer)
03	To study the Pacemaker.
04	To study the defibrillator.
05	To study the Autoanalyser.
06	To Study of Non fade CRO and Mediscope
07	Study of Haemodialysis Machine
08	To study the Electro-surgical Machine
09	To study the EEG Machine
10	To study the Ultrasound Machine
11	To study the X-rays Machine
12	To study the Biomedical Telemetry System.

The assessment of term work shall be on the following criteria:

1. Continuous Assessment
2. Performing the experiments in the laboratory
3. Regular submission of practical report
4. Oral examination conducted internally on the practical work and assigned syllabus

The assessment of Practical Examination shall be on the following criteria:

Performing the assigned practical during examination
Record of experiment submitted by candidate
Viva- voce based on the syllabus

C:- Suggested Text Books and References :

Sr. No	Title	Author	Publication
01	Handbook of Biomedical Instrumentation	Dr. R. S. Khandpur	Tata McGraw Hill Publications
02	Biomedical Instrumentation and Measurement	Lesille Cormwell, Peifier, Weibel	PHI Publications
03	Application and Design of Medical Instruments	John G Webster	
04	Biomedical Instrumentation	Dr. M Arumugam	Auraddha Publisher

Pattern of question Paper
Faculty of Engineering and Technology
Third Year (B. Tech) Instrumentation and Control Engineering (Revised Course)
Examination
November / December, May/June 200_
Elective –I: Biomedical Instrumentation

Time: 3 Hrs

Max Marks: 80

‘Please check whether you have got the right question paper’

N.B:-

- i. All the questions are compulsory
- ii. Use separate answer book for each section
- iii.
- iv.

Section A

Question No. 1	16 Marks
----------------	----------

This question will consist of questions from the all chapters under **Section A** mentioned in the syllabus.

Question No.2 OR Question No.2	12 Marks
Question No.3 OR Question No.3	12 Marks

Note:

- 1. The topic may be intermingled in the questions
- 2. The questions will be memory based, application based and understanding oriented

Section B

Question No. 4	16 Marks
----------------	----------

This Question will consist of questions from the entire chapter under **Section B** mentioned in the syllabus.

Question No.5 OR Question No.5	12 Marks
Question No.6 OR Question No.6	12 Marks

Note:

- 1. The topic may be intermingled in the questions
- 2. The questions will be memory based, application based and understanding oriented

Elective –I: Electronic Instrumentation

Periods				Evaluation Scheme					Credit
				Sessional Exam		ESE		Total	
L	T	P	Total	TA	CT	TH	PR		
04	-----	02	06	25	20	80	25	150	5

Objective:

- To give the students a comprehension about the measurements using electronic devices.
- To give the students knowledge about the design issues in electronic instrumentation.
- To make the students able to design electronic circuit for measurement

A: Theory:

Unit	Contents	Duration	Nature
01	Experimental data and errors: Measurement recording and reporting, graphical presentation of data, precision and accuracy, resolution and sensitivity, errors in measurement, statistical evaluation of measurement data and errors.	06 hrs.	Analytical
02	Electrical laboratory practice: Safety, grounds, circuit protection devices, cables, connectors, switches and relays, input impedance, output impedance and loading power transfer and impedance matching.	06 hrs.	Analytical
03	Analog DC and AC meters: Electromechanical meter movements, analog ac ammeters and voltmeters, analog multimeters, sampling and vector voltmeters, Voltmeter to Ohmmeter conversions.	06 hrs.	Analytical
04	Digital electronic meters: Counting and encoding, display devices, digital voltmeters, digital multimeters.	05 hrs.	Analytical
05	D.C and A.C bridges and applications: Whetstone Bridge, Kelvin bridge, Schering and Maxwell bridge, Wein bridge, Q meter.	07 hrs.	Analytical
06	The oscilloscope: Oscilloscope subsystems, display (cathode-ray tube), vertical deflection subsystem, dual–trace feature, horizontal deflection sub system, oscilloscope probes, oscilloscope controls, special	10 hrs.	Analytical

	purpose oscilloscope.		
07	Recorders and potentiometer: Potentiometer, recorder, machine-interpretable recorders.	04 hrs	Analytical
08	Time and frequency measurements: Time measurement, frequency measurement.	04 hrs	Analytical
09	Interference signals and their elimination or reduction: Capacitive interference, inductive interference, input shielding, electromagnetic interference and shielding, input guarding to reduce ground-loop interference, internal noise.	06 hrs	Analytical
10	Signal analyzers: Distortion measurements, wave analysis, spectrum analyzer, logic analyzer, sound level meter.	06 hrs	Analytical

SECTION:A :- Chapter 1,2,3,4,5

SECTION:B:- Chapter 6,7,8,9,10

B:- Practical/ Drawings/ Design/ Workshop:	
Experiment list: (Minimum 10 experiments to be performed)	
01	Measurement of resistance (high, medium, low)
02	Measurement of inductance.
03	Measurement of capacitance.
04	Phase and frequency measurement on CRO using Lissajous pattern
05	Study of digital voltmeter, digital multimeter.
06	Study of recorders
07	Digital measurement of phase and frequency.
08	Study of AC and DC meters.
09	Conversion of voltmeter to Ohmmeter
10	Study of spectrum and logic analyzer
11	Case Study of electronic instrument
12	Sound level meter

The assessment of term work shall be on the following criteria:

1. Continuous Assessment
2. Performing the experiments in the laboratory
3. Regular submission of practical report
4. Oral examination conducted internally on the practical work and assigned syllabus

The assessment of Practical Examination shall be on the following criteria:

1. Performing the assigned practical during examination
2. Record of experiment submitted by candidate
3. Viva- voce based on the syllabus

C:- Suggested Text Books and References			
Sr. No	Title	Author	Publication
01	Student reference manual	Stanley wolf, Richard I. M. Smith	Prentice Hall of India
02	Modern electronic instrumentation and measurement techniques	Helfric A, D and Cooper W. D	Prentice Hall of India.
03	A course in electrical and electronic measurements and instrumentation	A. K. Shawney	Dhanpat Rai and Sons, New Delhi
04	Electronic measurements	Kantrowitz, Kousourou, and zucker	Prentice Hall, New Jersey
05	Electronic instrumentation	H. S. Kalsi	Tata McGraw- Hill, New Delhi

Pattern of question Paper
Faculty of Engineering and Technology
Third Year (B. Tech) Instrumentation and Control Engineering (Revised Course)
Examination
November / December, May/June 200_
Elective –I: Electronic Instrumentation

Time: 3 Hrs

Max Marks: 80

‘Please check whether you have got the right question paper’

N.B:-

- i. All the questions are compulsory
- ii. Use separate answer book for each section
- iii.
- iv.

Section A

Question No. 1	16 Marks
----------------	----------

This question will consist of questions from the all chapters under **Section A** mentioned in the syllabus.

Question No.2 OR Question No.2	12 Marks
Question No.3 OR Question No.3	12 Marks

Note:

1. The topic may be intermingled in the questions
2. The questions will be memory based, application based and understanding oriented

Section B

Question No. 4	16 Marks
----------------	----------

This Question will consist of questions from the entire chapter under **Section B** mentioned in the syllabus.

Question No.5 OR Question No.5	12 Marks
Question No.6 OR Question No.6	12 Marks

Note:

1. The topic may be intermingled in the questions
2. The questions will be memory based, application based and understanding oriented

Elective –II: Power Plant Instrumentation

Periods				Evaluation Scheme					Credit
				Sessional Exam		ESE		Total	
L	T	P	Total	TA	CT	TH	PR		
02	-----	-----	02	-----	10	40	-----	50	2

Objective:

- To introduce the students with a special application of Instrumentation in power industries.
- To get details about the control issues within such industries.
- To make the students able to correlate instrumentation and its role in such industry.

A: Theory:

Unit	Contents	Duration	Nature
01	Introduction to Power Plant: Significance of Instrumentation in Power Plant, Indian energy scenario, only principles and working of Hydroelectric, Nuclear, Gas Turbine Plants, Salient features of power plants in India. Safety aspects	05 hrs.	Descriptive
02	Gas turbine power plant: Comparison of different types of gas turbine power plant analysis of closed cycle and open cycle constant pressure gas turbine plants, components of gas turbine plant, advantages of gas turbine power plant over Diesel and Thermal power plant	05 hrs.	Descriptive
03	Combined Operation of Different power plants: Introduction, advantages of combined working, Load Division between plants, storage type Hydro-electric power plant in combination with steam plant, coordination of Hydro-electric and gas Turbine station, coordination of hydro-electric and nuclear station.	05 hrs.	Descriptive
04	Instrumentation and Control: Importance of Measurement and Instrumentation in power plant, measurement of water purity, Gas analysis, O ₂ and CO ₂ Measurements, measurement of moisture in carbon dioxide circuit, nuclear measurements, Control for Boiler, Condenser, Steam Heaters, Pumps, Compressors, Generator Cooling System, Control in nuclear plant.	06 hrs.	Descriptive
05	Turbine Monitoring and Control: Turbine-Supervisory System for monitoring of Mechanical	05 hrs.	Descriptive

	Parameters-Speed, Vibration, eccentricity Axial shift, Shell Temperature Monitoring, Lube Oil Temperature Control, Turbine Trip Condition.		
06	Auxiliaries in Power Plants: Soot Blowers, Electrostatic Precipitator, Oil Automation System, Water Treatment Plant, Cooling Towers, ID,FD fans, Economisers, Air Preheaters, Superheaters	04 hrs.	Descriptive

SECTION:A :- Chapter 1,2,3

SECTION:B:- Chapter 4,5,6

B:- Suggested Text Books and References			
Sr. No	Title	Author	Publication
01	Instrumentation Engineers Handbook: Process Measurement	B. G. Liptak	Chilton Book Company
02	Instrumentation Engineers Handbook: Process Control	B. G. Liptak	Chilton Book Company
03	A Course in Power Plant Engineering	Arora and Domkundwar	Dhanpat Rai and Sons, New Delhi
04	Power Plant Engineering	Keswani H. B	Standard Book House Delhi
05	Industrial instrumentation servicing hand book	Carrok	

Pattern of Question Paper
Faculty of Engineering and Technology
Third Year (B. Tech) Instrumentation and Control Engineering (Revised Course)
Examination

November / December, May/June 200_

E-II: Power Plant Instrumentation

Time: 2 Hrs

Max Marks: 40

‘Please check whether you have got the right question paper’

N.B:-

- i. All the questions are compulsory
- ii. Use separate answer book for each section
- iii.....
- iv.....

Section A

Question No. 1	8 Marks
----------------	---------

This Question will consist of questions from the entire chapter under section A mentioned in the syllabus.

Question No.2 OR Question No.2	6 Marks
Question No.3 OR Question No.3	6 Marks

Note:

1. The topic may be intermingled in the questions
2. The questions will be memory based, application based and understanding type

Section B

Question No. 4	8 Marks
----------------	---------

This Question will consist of questions from the entire chapter under section A mentioned in the syllabus.

Question No.5 OR Question No.5	6 Marks
Question No.6 OR Question No.6	6 Marks

Note:

1. The topic may be intermingled in the questions
2. The questions will be memory based, application based and understanding type

Elective –II: Opto-Electronic Instrumentation

Periods				Evaluation Scheme					Credit
				Sessional Exam		ESE		Total	
L	T	P	Total	TA	CT	TH	PR		
02	-----	-----	02	-----	10	40	-----	50	2

Objective:

- To study different Opto-electronic instruments.
- To make the students able to correlate instrumentation and opto-electronics.

A: Theory:

Unit	Contents	Duration	Nature
01	Photo-devices: Photoconductive devices like photodiodes, photo-transistors, photo Darlington pair , photo FET, photo multiplier tube, Opto-isolators, IMPATT, TRAPATT, B ARITT,GUNN diode and their characteristics,	05 hrs.	Descriptive
02	Laser fundamentals: Stimulated absorption and emission, Einstein's equations, Classification of LASERS, Solid, liquid, Gas and Semiconductor lasers and their respective energy level diagrams, LED and their characteristics	05 hrs.	Descriptive
03	Laser Instrumentation: Laser principle and measurement techniques, Study of atmospheric effects and pollutants, Industrial applications of Lasers, Lasers in Bio-Medical application.	05 hrs.	Descriptive
04	Optical Fiber Fundamentals: Introduction to optical Fibers, Fundamentals of transmission theory, Fiber fabrication and fiber drawing, Fiber splicing, connectors and jointing techniques, Electro-optic, Mechano-optic and Mechano-optic modulation	06 hrs.	Descriptive
05	Optical Fiber Sensors: Multimode passive & active fiber sensors, phase modulated sensors.	04 hrs.	Descriptive
06	Fiber-Optic Instrumentation: Classification and principle of fiber optic sensors, Measurement of current, Voltage, Pressure, Temperature, Displacement, Acceleration and Fluid level	05 hrs.	Descriptive

SECTION:A :- Chapter 1,2,3

SECTION:B:- Chapter 4,5,6

B:- Suggested Text Books and References

Sr. No	Title	Author	Publication
01	A Text Book of Optics	Subramanyam & Brijlal	S.Chand & Company
02	Opto-Electronics -An Introduction	J.Wilson & J.F.B.Hawkes	PHI, 3rd Edition, New Delhi, 1998
03	Optical Fibers and Fiber Optic Communication Systems	Sukhbir Kumar Sarkar	S.Chand & Company, 2nd Edition, 1997
04	Industrial Lasers and Their Applications	John E.Harry	McGraw Hill 1974

Pattern of question Paper
Faculty of Engineering and Technology
Third Year (B. Tech) Instrumentation and Control Engineering (Revised Course)
Examination
November / December, May/June 200_
Elective –II: Opto-Electronic Instrumentation

Time: 2 Hrs

Max Marks: 40

‘Please check whether you have got the right question paper’

N.B:-

- i. All the questions are compulsory
- ii. Use separate answer book for each section
- iii.....
- iv.....

Section A

Question No. 1	8 Marks
----------------	---------

This Question will consist of questions from the entire chapter under section A mentioned in the syllabus.

Question No.2 OR Question No.2	6 Marks
Question No.3 OR Question No.3	6 Marks

Note:

1. The topic may be intermingled in the questions
2. The questions will be memory based, application based and understanding type

Section B

Question No. 4	8 Marks
----------------	---------

This Question will consist of questions from the entire chapter under section A mentioned in the syllabus.

Question No.5 OR Question No.5	6 Marks
Question No.6 OR Question No.6	6 Marks

Note:

1. The topic may be intermingled in the questions
2. The questions will be memory based, application based and understanding type

Seminar

Periods				Evaluation Scheme				Credit
				Sessional Exam		ESE		
L	T	P	Total	TA	CT	TH	PR	1
-----	-----	02	02	50	-----	-----	-----	

Objective:

1. To create awareness amongst pre final year students for latest technological Aspects.
2. To improve presentation and communication skills.
3. To inculcate qualities of team work and team spirit.
4. To motivate for research work in the respective areas.
5. To have common platform where interaction between various groups of students will take place on the various advanced and emerging topics of technology.
6. To improve skills related to search on the internet.
7. To realize importance of basic technological aspects.

Guidelines for students and faculty:

1. Seminar topics may be chosen by the students with advice from the guide/Industry persons, which shall be finalized by guide and approved by concerned head of the department. Students are to be exposed to the following aspects of the seminar presentation.
 - a) Literature Survey / Review
 - b) Organization of the material
 - c) Preparing for presentation
 - d) Technical writing
2. Each student is required to-
 - Submit one page synopsis before the seminar talk for display on the notice board and
 - Give a 20 minutes presentation through OHP, PC, and Slide projector followed by a 10 minute question answer session.
3. For award of Sessional marks:
 - a) 25 marks - based on the assessment done by internal guide during semester and the involvement of student in the work assigned related to the seminar topic

- b) Remaining 25 marks based on the examination at final presentation. Student is to be examined on the basis of an oral and written presentation by at least two examiners, one of them shall be guide and other as an external examiner appointed by the principal of the institute.

Seminar Report format

The Seminar Report shall be typed on A-4 size white bond paper.

Typing shall be with spacing of 1.5 using one side of the paper.

Margins:-

Left 37.5 mm

Right, top and bottom 25 mm.

Binding: -

Hard with golden embossing on the front cover of brown colour

Front cover of hard bound report:-

It should be identical to first title page.

Default font size TNR-12

1. Format for title page (First Page) (Centre justified)

Report of Seminar (TNR-14, Bold)
in

{Title}(TNR-18, Bold)
by

{Name of student}(TNR-16, Bold)
(Roll No:)

Submitted in partial fulfillment of the requirement for
Degree of Bachelor of Technology (Branch Name) (TNR-14, Bold)

of

Dr. Babasaheb Ambedkar Marathwada University,
Aurangabad. (TNR-14, Bold)

Department of _____ Engineering, (TNR-14, Bold)
Maharashtra Institute of Technology, (TNR-16, Bold)
Aurangabad. (TNR-14, Bold)

200 - 200

2. Format for Certification page (Second page)

CERTIFICATE (TNR-16, Bold)

This is to certify that the Seminar Report

Submitted by

(Name of Student) (TNR-14, Bold)
(Roll No: __)

Is completed as per the requirement of the Dr. Babasaheb Ambedkar Marathwada
University, Aurangabad in partial fulfillment of
Degree of Bachelor of Technology (Branch Name) (TNR-14, Bold)

For the academic Year 20__ - 20__

(Name) Guide	(Name) Head of Department	(Name) Principal (TNR -12, Bold)
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The third page will be certificate issued by the industry regarding the completion of Seminar if applicable.

The fourth page would be for acknowledgement, which would be followed by index page (Fifth page).

Sketches should be drawn on separate sheet (minimum A4 size) and be inserted at proper places. The sketches should be drawn in black ink and be numbered.

Tables should preferably type in the text only.

The mathematical symbol should be typed or neatly written so as to match darkness of the text.

The last item on the index should be references.

Page number must appear on the right hand top corner of each page starting after index page.

The contents of the seminar can be decided by the internal guide / department and student.

Minimum number of copies = 5 Copies (Central Library + Department + Internal Guide + External Examiner + Student). The copy of External Examiner will be submitted by the student after completion of Seminar.

SAMPLE COPY

Report of Seminar

in

Automation in Sugar Plant using PLC System

by

Mr. Sayyad Ajij D.

(Exam Seat No:)

Submitted in partial fulfillment of the requirement for
Degree of Bachelor of Technology (Instrumentation and Control),

of

**Dr. Babasaheb Ambedkar Marathwada University,
Aurangabad.**



**Department of Instrumentation and Control Engineering,
Maharashtra Institute of Technology,
Aurangabad.**

200 - 200

SAMPLE COPY

CERTIFICATE

This is to certify that the Seminar Report

Submitted by

Mr. Kanhe Ram K.

(Exam Seat No:)

Is completed as per the requirement of the Dr. Babasaheb Ambedkar Marathwada

University, Aurangabad in partial fulfillment of

Degree of Bachelor of Technology

(Instrumentation and Control Engineering)

For the academic Year 200 – 200

(Name)
Guide

(Name)
Head of Department

(Name)
Principal

General Attributes

- Chapter heading -All Capital—TNR 14 Font (Bold)
- Heading –All Capital- TNR 12 Font (Bold)
- Subheading–Title case- TNR12 Font (Bold)
- Text – TNR11 Font
- Title of the Report should not be more than two lines
- Page numbers are at right hand corner at ½ inch from right and top side.
- Page number should be allotted only from Chapter no. 1 onwards.

References

Last chapter of the report is references including the addresses of websites.

MatLab and Labview Practice

Periods				Evaluation Scheme				Credit	
				Sessional Exam		ESE			Total
L	T	P	Total	TA	CT	TH	PR		
-----	-----	02	02	25	-----	-----	-----	25	1

Term Work:

Minimum 10 Experiments should be conducted during the course and record for the same shall be submitted. Term work will be based on the various Practical form the areas of control system, DSP and Instrumentation using base MatLab, tools boxes such as control system, Signal Processing, nonlinear Controls etc programming related to the tools boxes and programming for basic Arithmetic, logical operations, Loops and programme based using above tools boxes.

Programming Related to control systems:-

1. Programme for the basic inputs like Step, Ramp, Impulse, Exponential,- Cos, Sin
2. Program to determine TF and state Models.
3. Program to determine stability using root locus, bode plots, Nyquist plots.
4. Program on Transients Response.

<p><u>The assessment of term work shall be on the following criteria:</u></p> <ol style="list-style-type: none"> 1. Continuous Assessment 2. Performing the experiments in the laboratory 3. Regular submission of practical report 4. Oral examination conducted internally on the practical work and assigned syllabus
