

KURUKSHETRA UNIVERSITY, KURUKSHETRA

SCHEME OF EXMINATION FOR B.TECH DEGREE COURSE INSTRUMENTATION & CONTROL ENGINEERING THIRD SEMESTER EXAMINATION

COURSE NO.	COURSE TITLE	TEACHING SCHEDULE				SESSIONAL MARKS	EXAMINATION		TOTAL MARKS	DURATION OF EXAM
		L	T	P	TOTAL		THEORY	PRACTICAL		
MATH-201-E/ HUM-201E	MATHEMATICS –III / BASICS OF INDUSTRIAL SOCIOLOGY, ECONOMICS AND MANAGEMENT	3	1	-	4	50	100	-	150	3
IC-201-E	ANALOG ELECTRONICS	3	1	-	4	50	100	-	150	3
EE-203-E	NETWORK ANALYSIS AND SYNTHESIS	3	1	-	4	50	100	-	150	3
ELE-201-E	ELECTROMECHANICAL ENERGY CONVERSION	3	2	-	5		100	-	150	3
IC-203-E	MEASUREMENTS AND INSTRUMENTATION-I	3	1	-	4	50	100	-	150	3
IC-205-E	COMPUTER PROGRAMMING AND COMPUTATIONAL TECHNIQUES	3	1	-	4	50	100	-	150	3
IC-207-E	ANALOG ELECTRONIC LAB	-	-	3		25	-	25	50	3
IC-209-E	MEASUREMENTS AND INSTRUMENTS LAB-I	-	-	3		50	-	50	100	3
ELE-203-E	ELECTRICAL MACHINES LAB	-	-		2	25	-	25	50	3
IC-211-E	NETWORK THEORY LAB	-	-	2		25	-	25	50	3
TOTAL		18	8	9	35	425	600	125	1150	

BASICS OF INDUSTRIAL SOCIOLOGY, ECONOMICS AND MANAGEMENT

HUM – 201 E
L T P
3 1 -

Sessional	:	50	Marks
Theory	:	100	Marks
Total	:	150	Marks
Duration of Exam.	:	3 Hrs.	

UNIT-I

Meaning of social change, nature of social change, theories of social change. The direction of social change, the causes of social change, the process of social change. Factors of social change – the technological factors, the cultural factors, effects of technology on major social institutions, social need of status system, social relations in industry.

UNIT-II

Meaning of Industrial Economic, Production Function, its types, Least Cost Combination, Law of Variable Proportion, Laws of Return – Increasing, Constant & Diminishing.

Fixed & variable costs in short run & long run, opportunity costs, relation between AC & MC, U-shaped short run AC Curve.

Price & Output Determination under Monopoly in short run & long run. Price Discrimination, Price Determination under Discriminating Monopoly. Comparison between Monopoly & Perfect Competition.

UNIT-III

Meaning of Management, Characteristics of Management, Management Vs. Administration, Management – Art, Science & Profession, Fayol's Principles of Management.

Personnel Management – Meaning & Functions, Manpower – Process of Manpower Planning, Recruitment & Selection – Selection Procedure.

Training – Objectives & Types of Training, Various Methods of Training. Labour Legislation in India – Main provisions of Industrial disputes Act 1947;

UNIT – IV

Marketing Management – Definition & Meaning, Scope of Marketing Management, Marketing Research – Meaning, Objectives.

Purchasing Management – Meaning & Objectives, Purchase Procedure, Inventory Control Techniques.

Financial Management – Introduction, Objectives of Financial decisions, Sources of Finance.

Note : Eight questions are to be set taking two from each unit. The students are required to attempt five questions in all, taking at least one from each unit.

TEXT BOOKS :

1. “Modern Economic Theory” Dewett, K.K., S. Chand & Co.
2. “Economic Analysis” K.P. Sundharam & E.N. Sundharam (Sultan Chand & Sons).
3. “Micro Economic Theory” M.L. Jhingan (Konark Publishers Pvt. Ltd.).
4. “Principles of Economics” M.L. Seth (Lakshmi Narain Aggarwal Educational Publishers – Agra).
5. “An Introduction to Sociology”, D.R. Sachdeva & Vidya Bhusan.
6. “Society – An Introductory Analysis”, R.M. Maclver Charles H. Page.
7. “Principles and Practices of Management : R.S. Gupta; B.D. Sharma; N.S. Bhalla; Kalyani.

REFERENCE BOOKS

1. “Organization and Management : R.D. Aggarwal, Tata McGraw Hill.
2. Business Organization and Management : M.C. Shukla

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MATH-201 E**MATHEMATICS - III**

L	T	P
3	1	-

Theory	:	100	Marks
Sessional	:	50	Marks
Total	:	150	Marks
Duration of Exam	:	3 Hrs.	

UNIT - I

Fourier Series : Euler's Formulae, Conditions for Fourier expansions, Fourier expansion of functions having points of discontinuity, change of interval, Odd & even functions, Half-range series.

Fourier Transforms : Fourier integrals, Fourier transforms, Fourier cosine and sine transforms. Properties of Fourier transforms, Convolution theorem, Parseval's identity, Relation between Fourier and Laplace transforms, Fourier transforms of the derivatives of a function, Application to boundary value problems.

UNIT-II

Functions of a Complex Variables : Functions of a complex variable, Exponential function, Trigonometric, Hyperbolic and Logarithmic functions, limit and continuity of a function, Differentiability and analyticity.

Cauchy-Riemann equations, Necessary and sufficient conditions for a function to be analytic, Polar form of the Cauchy-Riemann equations, Harmonic functions, Application to flow problems, Conformal transformation, Standard transformations (Translation, Magnification & rotation, inversion & reflection, Bilinear).

UNIT-III

Probability Distributions : Probability, Baye's theorem, Discrete & Continuous probability distributions, Moment generating function, Probability generating function, Properties and applications of Binomial, Poisson and normal distributions.

UNIT-IV

Linear Programming : Linear programming problems formulation, Solution of Linear Programming Problem using Graphical method, Simplex Method, Dual-Simplex Method.

Text Book

1. Higher Engg. Mathematics : B.S. Grewal
2. Advanced Engg. Mathematics : E. Kreyzig

Reference Book

1. Complex variables and Applications : R.V. Churchill; Mc. Graw Hill
2. Engg. Mathematics Vol. II: S.S. Sastry; Prentice Hall of India.
3. Operation Research : H.A. Taha
4. Probability and statistics for Engineer : Johnson. PHI.

Note : Examiner will set eight question, taking two from each unit. Students will be required to attempt five questions taking at least one from each unit.

(IC-201-E) Analog Electronics

L	T	Total
3	1	4

Sessional	: 50 Marks	Marks
Exam.	: 100 Marks	Marks
Total	: 150 Marks	Marks
Duration of exam.	: 3 Hrs	

UNIT 1: Diodes

Semiconductor materials (intrinsic and extrinsic), P-N junction, Effect of temperature on P-N junction. Characteristics: Static and Dynamic resistance of diode. Zener diode, zener break down and Avalanche breakdown, LED and Photodiode.

Applications: Rectifiers, Filters and voltage Regulators, Elementary idea of dc Power supplies.

UNIT 2 : Bipolar Junction Transistor

Introduction, Construction, Operation of Transistors, Basic characteristics of transistor, amplifying action, C-B. C-E & C-C Configuration, dc biasing of transistor, Hybrid equivalent circuit of Transistor, General Description, construction and characteristics of FET, JFET, MOSFET, FET biasing Thermal stability: Transistor biasing and dissipation.

UNIT 3: Amplifiers

Transistor as an amplifier, Voltage amplifier, Power amplifier, Class A, B, AB, & C amplifiers, Tuned and un-tuned amplifiers, and feed back amplifiers, R-C Coupled & transformer coupled amplifiers, Power Amplifiers and Push Pull amplifiers- Low, Mid & high frequency response.

UNIT 4: Oscillators

Barkhausen criterion, UJT as relaxation oscillator, RC phase shift and Weinbridge oscillators, crystal oscillators.

TEXT BOOK :

- 1 Basic Electronics and Linear ckt, by N.N.Bhargava
- 2 Electronics Device and ckt .G.K.Mittal
- 3 Semi conductor device and circuits by B.P.Singh
- 4 Integrated Electronics: Millman & Halkias ; McGrawHill
- 4 Electronic circuit analysis and design (Second edition): D.A.Neamen; TMH

Reference Books:

1. Electronics Principles: Malvino ; McGrawHill
2. Electronics Circuits: Donald L. Schilling & Charles Belove ; McGrawHill
3. Electronics Devices & Circuits: Boylestad & Nashelsky ; Pearson.

Note : Eight questions are to be set taking two from each unit. The students are required to attempt five questions in all, taking at least one from each unit.

EE-203-E**NETWORK ANALYSIS & SYNTHESIS**

L T P
3 1 0

Sessional	:	50	Marks
EXAM	:	100	Marks
TOTAL	:	150	Marks
DURATION OF EXAM	:	3	HRS

UNIT I**TOPOLOGY :**

Principles of network topology , graph matrices, network analysis using graph theory.

TRANSIENT RESPONSE :

Transient Response of RC, RL, RLC Circuits to various excitation signals such as step, ramp, impulse and sinusoidal excitations using laplace transform.

UNIT 2**NETWORK FUNCTIONS :**

Terminal pairs or Ports, Network functions for one-port and two-port networks, poles and zeros of Network functions, Restrictions on pole and zero Locations for driving point functions and transfer functions, Time domain behavior from the pole-zero plot.

UNIT 3**CHARACTERISTICS AND PARAMETERS OF TWO PORT NETWORKS :**

Relationship of two-port variables, short-circuit Admittance parameters, open circuit impedance parameters, Transmission parameters, hybrid parameters, relationships between parameter sets, Inter-connection of two port networks.

UNIT 4**TYPES OF FILTERS AND THEIR CHARACTERISTICS :**

Filter fundamentals, high-pass, low-pass, band-pass, and band-reject Filters.

NETWORK SYNTHESIS :

Positive real functions, synthesis of one port and two port networks, elementary ideas of Active networks.

TEXT BOOKS:

1. Network Analysis & Synthesis : Umesh Sinha; Satya Prakash Pub.
2. Network Analysis & Synthesis : F.F.Kuo; John Wiley & Sons Inc.

REFERENCE BOOKS:

1. Introduction to modern Network Synthesis : Van Valkenburg; John Wiley
2. Network Analysis: Van Valkenburg; PHI
3. Basic circuit theory:Dasoer Kuh; McGraw Hill.
4. A Course in Electrical Circuit Analysis by Soni & Gupta; Dhanpat Rai Publication.
5. Circuit Analysis : G.K. Mithal; Khanna Publication.
6. Networks and Systems : D.Roy Choudhury; New Age International.

NOTE : Eight questions are to be set in total covering entire course selecting two questions from each unit. Each question will be of equal marks. Students will be required to attempt five questions in all, selecting at least one question from each unit.

ELE : 201 E ELECTROMECHANICAL ENERGY CONVERSION

L T P
3 2 -

Theory : 100
Sessional : 50
Total : 150
Duration of Exam : 3 Hrs.

UNIT – I

MAGNETIC CIRCUITS AND INDUCTION

Magnetic Circuits, Magnetic Materials and their properties, static and dynamic emfs and force on current carrying conductor, AC operation of Magnetic Circuits, Hysteresis and Eddy current losses, frictional & copper losses.

TRANSFORMERS :

Basic theory, construction, operation at no-load and full-load, equivalent circuit, phasor diagram, O.C. tests for parameters determination, efficiency and regulation, auto-transformer, introduction to three-phase transformer; Scott connection, parallel operation of transformer.

UNIT – II

PRINCIPLES OF ELECTROMECHANICAL ENERGY CONVERSIONS

Force and torque in magnetic field system, energy balance, energy and force in singly excited magnetic field system, concept of co-energy, forces and torques in system with permanent magnets, dynamic equation.

DC MACHINES

Basic theory of DC generator, brief idea of construction, emf equation, load characteristics, basic theory of DC motor, concept of back emf, torque and power equations, load characteristics, starting and speed control of DC motors, Types of DC generator & motors Armature reaction, commutation, characteristics of DC machines.

UNIT – III

INDUCTION MOTOR

Basic theory, construction, Phasor diagram, advantage of IM over other conventional machines Equivalent circuit, Torque equation, Load characteristics, starting speed control of induction motor, Introduction to single phase Induction motor double field revolving theory, types of single phase IM and its applications, open circuit & block rotor test.

UNIT-IV

SYNCHRONOUS MACHINES

Construction and basic theory of synchronous generator, emf equation, advantages of stationary armature, Regulation, Basic theory of synchronous motor, v-curves, starting of synchronous motor, comparison between synchronous & induction, open circuit & block rotor test of 3 phase and 1 phase motor.

Text Book :

1. Electrical Machines : P.S. Bimbhra; Khanna

Reference :

1. Electrical Machines : Nagarath and Kothari; TMH
2. Electrical Machines : Mukherjee and Chakravorti; Dhanpat Rai & Sons.
3. Electrical Technology (Vol-II) : B.L. Theraja; S. Chand.

NOTE : Eight questions are to be set in all by the examiner taking at least one question from each unit. Students will be required to attempt five questions in all.

Measurements and Instrumentation-I (IC-203-E)

L	T	Total
3	1	4

Sessional	:	50	Marks
Exam.	:	100	Marks
Total	:	150	Marks
Duration of exam.	:	3 Hours	

UNIT-1 Introduction

Block Diagram of measuring instruments, Characteristics of instruments, classification of instruments, classification of standards, error in measurement, relative, systematic, random error, parabolic errors.

Basic Instruments

Principle Construction, Features, Analysis & Performance of Moving Coil Instrument (Arsonval Galvanometer, ballistic Galvanometer, Vibration Galvanometer, Flux meter, Ratio meter & Meggar), (a) Moving Iron instruments (b) Electrodynamic Instruments (c) Electrostatic Instruments (d) Induction Instruments

UNIT –2 Measurement of Energy

Motor Meters, Braking, Friction, Energy Meters for AC circuits, Theory of Induction type Meters, Single phase Induction Type Watt-Hour Meters, Construction, Theory and operation, Two Element Energy meter, Average Demand Indicator.

UNIT -3 Measurement of R, L and C

Measurement of Resistance (low, medium and high), Inductance & Capacitance using Maxwell's, Hay's Anderson's, Campbell's, Desauty's & Schering's Bridge.

UNIT –4 Oscilloscope

Basic principles, Block diagram, Cathode ray tube, Vertical Amplifier, Horizontal Deflection system, Triggered sweep CRO, Delay line, Travelling Wave type CRT, Dual Trace Oscilloscope, Digital read out oscilloscope, Spot wheel & Gear Wheel method, Measurement of Capacitance & Inductance, Lissajous figure for Phase measurement, storage type CRO, Application of CRO.

Text Books

1. A.K. Sawhney Electrical and Electronics Measurement And Instrumentation
2. J.B. Gupta Electrical and Electronics Measurement And Instrumentation

Reference Books

1. Alan S. Morris Principles of Measurement & Instrumentation
2. A D Helfrick , W D Cooper Modern Electronics & Measurement Techniques

Note : Eight questions are to be set taking two from each unit. The students are required to attempt five questions in all, taking at least one from each unit.

**COMPUTER PROGRAMMING AND COMPUTATIONAL TECHNIQUES.
(IC-205-E)**

L	T	Total
3	1	4

Sessional	: 50 Marks
Exam.	: 100 Marks
Total	: 150 Marks
Duration of exam.	: 3 Hours

UNIT-1 Pointers

Introduction to pointers in C, pointer arithmetic, dynamic memory allocation, memory allocation for 1-D and 2-D array, Null Pointers, Concept of structure, declaring and defining structures, structures as User defined data types (VDTs), Arrays as structure to /form function , operations using pointers ,unions and bitfields.

UNIT-2 Files and Libraries

File I/O in C, FILE structure, opening and closing a file, formatted and unformatted I/O in C. Use of standard libraries in C for string date and time operation.

UNIT-3

Use of standard libraries in C for string date and time operation.

UNIT-4 Graphics Applications

Applications of Graphics—drawing lines, drawing and filling images, use of bar(), filling regular and non-regular shapes, introduction to animation.

Text Books

1. Yashavant Kanetkar Let Us C

Books for reference

Kerrigham & Rachie, *C programming* PHI
Herbert Schildt, Mchero. C Complete reference,
Programming with C b Byron, Gottfried, Scheum's outline series

Note : Eight questions are to be set taking two from each unit. The students are required to attempt five questions in all, taking at least one from each unit.

ANALOG ELECTRONICS
IC – 207-E)

L	T	Total
-	-	3

Sessional	:	25	Marks
Exam.	:	25	Marks
Total	:	50	Marks
Duration of exam.	:	3	Hours

LIST OF EXPERIMENTS :

1. To study of characteristics of photodiode & LED.
1. To study of characteristics of phototransistor.
2. To study of characteristics of VDR & LDR.
3. To study of characteristics of optocoupler.
4. To study of characteristics of Varactor diode.
5. To study Transformer coupled amplifier & determine its voltage gain.
6. To study RC coupled amplifier & determine its voltage gain, power gain & freq. response.
7. To study Hartley Oscillator.
8. To study the different types of negative feedback in two stage amplifier and to observe its effects upon the amplifier parameters.
9. To study biasing of transistor by following method :
 - i) Fixed bias.
 - ii) Voltage divider bias.

IC-209-E**MEASUREMENTS & INSTRUMENTS LAB-I**

L	T	P
0	0	3

Sessional	: 50	Marks
Exam	: 50	Marks
Total	: 100	Marks
Duration of Exam	: 3hrs	

LIST OF EXPERIMENTS :

1. To identify the meters from the given lot.
2. To convert & calibrate a D'Arsonnal type galvanometer into a voltmeter & an ammeter.
3. To calibrate an energy meter with the help of a standard wattmeter & a stop watch.
4. To measure power & p.f. by 3-ammeter method.
5. To measure power & p.f by 3-voltmeter method.
6. To measure power & p.f in 3-phase circuit by 2-wattmeter method.
7. To measure capacitance by De Sauty's bridge.
8. To measure inductance by maxwell's bridge.
9. To measure frequency by Wien's bridge.
10. To measure the power with the help of C.T & P.T.
11. To measure magnitude & phase angle of a voltage by rectangular type potentiometer.
12. To measure magnitude & phase angle of a voltage by polar type potentiometer.
13. To measure low resistance by Kelvin's double bridge.
14. To measure high resistance by loss of charge method.

Note: At least 7 experiments should be performed from above list. Remaining 3 experiments may either be performed from above list or designed & set by concerned institution as per scope of syllabus.

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ELE – 203E**ELECTRICAL MACHINES LAB**

L	T	P
0	0	2

Theory	:	25
Sessional	:	25
Total	:	50

Duration of Exam : 3 Hrs.

LIST OF EXPERIMENTS

1. To perform open and short circuit tests on 1-phase transformer and to calculate efficiency.
2. To perform Sumpner's back to back test on-phase transformer.
3. Parallel operation of two 1-phase transformers.
4. Study of construction of a DC machine.
5. To plot magnetizing of a DC SE Generator and find its critical resistance & critical speed.
6. Speed Control of a DC motor by armature control & field control methods.
7. Open circuit & Block test of 1-phase induction motor.
8. Light running & block rotor test of 3-phase I.M. with starting.
9. To plot V curve of a synchronous motor.
10. To study scott connection of transformer.
11. To study starting running & reversal of direction of 3-phase I.M.
12. To perform load test on a 3-phase I.M. D.C. generator set & to determine the efficiency of I.M.

NOTE : Ten experiments are to be performed, out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

IC-211-E NETWORK THEORY LAB

L T P
0 0 2

SESSIONAL	:	25	Marks
EXAM	:	25	Marks
TOTAL	:	50	Marks
DURATION OF EXAM	:	3 HRS	

LIST OF EXPERIMENTS :

1. Transient response of RC circuit.
2. Transient response of RL circuit.
3. To find the resonance frequency, Band width of RLC series circuit.
4. To calculate and verify "Z" parameters of a two port network.
5. To calculate and verify "Y" parameters of a two port network.
6. To determine equivalent parameter of parallel connections of two port network.
7. To plot the frequency response of low pass filter and determine half-power frequency.
8. To plot the frequency response of high pass filter and determine the half-power frequency.
9. To plot the frequency response of band-pass filter and determine the band-width.
10. To calculate and verify "ABCD" parameters of a two port network.
11. To synthesize a network of a given network function and verify its response.
12. Introduction of P-Spice

NOTE : Ten experiments are to be performed, out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.