DeenbandhuChhotu Ram University of Science & Technology, Murthal (Sonepat)
B.Tech. 2nd YEAR ELECTRICAL ENGINEERING (SEMESTER – III)
Choice Based Credit System Scheme Of Studies & Examinations w.e.f. 2019-20

Sl. No.	Course Code	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total	Credits	Duration of Exam.
			L	T	P		Theory	Practical			
1	EE201C	Electrical Circuit Analysis	3	1	0	25	75	0	100	4	3
2	EE203C	Semiconductor Devices and Circuits	3	1	0	25	75	0	100	4	3
3	EE281C	Semiconductor Devices and Circuits Laboratory	0	0	2	25	0	75	100	1	3
4	EE205C	Electrical Machines-I	3	1	0	25	75	0	100	4	3
5	EE283C	Electrical Machine-I Laboratory	0	0	2	25	0	75	100	1	3
6	EE207C	Measurements and Instrumentation	3	1	0	25	75		100	4	3
7	EE285C	Measurements and Instrumentation Laboratory	0	0	2	25	0	75	100	1	3
8	ME201C	Engineering Mechanics (Common with ME, Auto and EEE)	3	1	0	25	75	0	100	4	3
9	MC203C Or MC201C	Constitution of India (Gr. A) EnvironmentalStudies (Gr. B)	3	0	0	25	75	0	100	0	3
Total			18	05	06	225	450	225	900	23	27

L= Lecture, T = Tutorial, P = Practical,&MC = Mandatory Course (Audit)

1. All the branches are to be divided into groups 'A' and 'B' as per the suitability of the institute/college, so that there is an equitable distribution of teaching load in odd and even semesters.
2. For DCRUST Murthal: GROUP A: BME, BT, CSE, ECE. GROUP B: CE, CHE, EE, ME.
3. The students will be allowed to use non-programmable scientific calculator in the examination. However, Sharing/exchange of calculator is prohibited in the examination.
4. Electronics gadgets including Cellular phones are not allowed in the examination.
5. For student admitted in B. Tech. 1st Semester (C-Scheme) in 2019 and all trailing students, Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

Department	Electrical Engineering						
Program Name	Bachelor of Technology in Electrical Engineering						
Program Level	UG						
Course Code	**EE 201C**						
Category	**Programme Core**						
Course Title	**ELECTRICAL CIRCUIT ANALYSIS**						
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Duration of Examination**		
	3	0	0	3	3 hours		
Evaluation System	**Sessional**				**End Term Examination**	**Grand Total**	
	As per Ordinance				**Total**		
					25	75	100
Prerequisites (if any)							

Detailed Contents

S. No.	Contents
Unit - I	**Network Theorems** TOPIC NO 1 Superposition theorem TOPIC NO 2 Thevenin theorem. TOPIC NO 3 Norton theorem, TOPIC NO 4 Maximum power transfer theorem. TOPIC NO 5 Reciprocity theorem, TOPIC NO 6 Compensation theorem TOPIC NO 7 Analysis with dependent current and voltage sources. TOPIC NO 8 Node and Mesh Analysis TOPIC NO 9 Concepts of duality and dual networks
Unit – II	**Sinusoidal steady state analysis** TOPIC NO 10 Phasor Analysis, TOPIC NO 11 Solution of first and second order differential equations for Series and parallel R-L TOPIC NO 12 R-C, R-L-C circuits TOPIC NO 13 Initial and final conditions in network elements TOPIC NO 14 Forced and free response TOPIC NO 15 Time constants TOPIC NO 16 Steady state and transient state response to dc and sinusoidal ac TOPIC NO 17 Three-phase circuits TOPIC NO 18 Mutually-coupled circuits, TOPIC NO 19 Dot Convention in coupled circuits & Ideal Transformer.
Unit – III	**Electrical Circuit Analysis Using Laplace Transforms** TOPIC NO 20 Review of Laplace Transform TOPIC NO 21 Analysis of electrical circuits using Laplace Transform for standard inputs. TOPIC NO 22 Convolution integral TOPIC NO 23 Inverse Laplace transform TOPIC NO 24 Transformed network with initial conditions TOPIC NO 25 Transfer function representation TOPIC NO 26 Poles and Zeros. TOPIC NO 27 Frequency response (magnitude and phase plots) TOPIC NO 28 Series and parallel resonances

Unit - IV	**Two Port Network and Network Functions** TOPIC NO 29 Two Port Networks TOPIC NO 30 Terminal pairs TOPIC NO 31 Relationship of two port variables TOPIC NO 32 Impedance parameters TOPIC NO 33 Admittance parameters, TOPIC NO 34 Transmission & inverse transmission parameters and hybrid& inverse hybrid parameters TOPIC NO 35 Interconnections of two port networks.

Text / References:

1. M. E. Van Valkenburg, "Network Analysis", Prentice Hall, 2006.
2. D. Roy Choudhury, "Networks and Systems", New Age International Publications, 1998.
3. W. H. Hayt and J. E. Kemmerly, "Engineering Circuit Analysis", McGraw Hill Education,2013.
4.C. K. Alexander and M. N. O. Sadiku, "Electric Circuits", McGraw Hill Education, 2004.
5. K. V. V. Murthy and M. S. Kamath, "Basic Circuit Analysis", Jaico Publishers, 1999.

Note:

1. **In Semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attend only five questions selecting atleast one question from each unit.**
2. **The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.**

Department	Electrical Engineering

Program Name	Bachelor of Technology in Electrical Engineering					
Program Level	UG					
Course Code	EE203C					
Category	**Programme Core**					
Course Title	**SEMICONDUCTOR DEVICES AND CIRCUITS**					
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Duration of Examination**	
	3	0	0	3	3 hours	
Evaluation System	**Sessional**				**End Term Examination**	**Grand Total**
	As per Ordinance			**Total**		
				25	75	100

Prerequisites (if any)
Detailed Contents

S. No.	Contents
Unit-1	**Diode circuits** TOPIC NO 1 P-N junction diode TOPIC NO 2 I-V characteristics of a diode TOPIC NO 3 Performance analysis of half-wave and full-wave rectifiers, TOPIC NO 4 Zenerdiodes TOPIC NO 5 Clamping TOPIC NO 6 Clipping and regulator circuits **BJT circuits** TOPIC NO 7 Structure and VI characteristics of a BJT TOPIC NO 8 Biasing circuits, TOPIC NO 9 BJT as a switch TOPIC NO 10 BJT as an amplifier: TOPIC NO 11 Small-signal model. TOPIC NO 12 Common-emitter TOPIC NO 13 Common-base and common-collector amplifiers TOPIC NO 14 Small signal equivalent circuits TOPIC NO 15 High-frequency equivalent circuits.
Unit – II	**JFET &MOSFET circuits** TOPIC NO 16 JFET &MOSFET structure and I-V characteristics TOPIC NO 17 Biasing circuits. TOPIC NO 18 MOSFET as a switch. TOPIC NO 19 MOSFET as an amplifier TOPIC NO 20 Small-signal model and common-source TOPIC NO 21 Common-gate and common-drain amplifiers; TOPIC NO 22 Small signal equivalent circuits - gain TOPIC NO 23 Input and output impedances TOPIC NO 24 Trans-conductance TOPIC NO 25 High frequency equivalent circuit.

Unit – III	**Power and operational amplifiers** TOPIC NO 26 Power amplifier TOPIC NO 27 Non-idealities in an op-amp (Output offset voltage) TOPIC NO 28 Input bias current TOPIC NO 29 Input offset current TOPIC NO 30 Slew rate TOPIC NO 31 CMRR TOPIC NO 32 Gain bandwidth product TOPIC NO 33 Differential amplifier.
Unit - IV	**Application of op-amp:** **Linear applications of op-amp** TOPIC NO 34 Idealized analysis of op-amp circuits TOPIC NO 35 Inverting and non-inverting amplifier, TOPIC NO 36 Instrumentation amplifier, TOPIC NO 37 Differentiator TOPIC NO 38 Integrator TOPIC NO 39 Active filter TOPIC NO 40 Oscillators, (Wein bridge and phase shift). **Nonlinear applications of op-amp** TOPIC NO 41 Comparator TOPIC NO 42 Zero Crossing Detector, TOPIC NO 43 Schmitt trigger ckt, TOPIC NO 44 Square-wave and triangular-wave generators TOPIC NO 45 Peak detector

Text/References:

1. **A. S. Sedra and K. C. Smith, "Microelectronic Circuits", New York, Oxford University Press, 1998.**
2. **J. V. Wait, L. P. Huelsman and G. A. Korn, "Introduction to Operational Amplifier theory and applications", McGraw Hill U. S., 1992.**
3. **J. Millman and A. Grabel, "Microelectronics", McGraw Hill Education, 1988.**
4. **P. Horowitz and W. Hill, "The Art of Electronics", Cambridge University Press, 1989.**
5. **P.R. Gray, R.G. Meyer and S. Lewis, "Analysis and Design of Analog Integrated Circuits", John Wiley & Sons, 2001.**

Note:

1. **In Semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attend only five questions selecting at least one question from each unit.**
2. **The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.**

For student admitted in B. Tech. 1st Semester (C-Scheme) in 2019 and all trailing students, Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms

Department	Electrical Engineering						
Program Name	Bachelor of Technology in Electrical Engineering						
Program Level	UG						
Course Code	**EE205C**						
Category	**Programme Core**						
Course Title	**ELECTRICAL MACHINES-I**						
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Duration of Examination**		
	3	0	0	3	3 hours		
Evaluation System	**Sessional**				**End Term Examination**	**Grand Total**	
	As per Ordinance			**Total**			
				25	75	100	
Prerequisites (if any)							
Detailed Contents							
S. No.	**Contents**						

Unit – I

Magnetic fields and magnetic circuits

TOPIC NO 1 Review of magnetic circuits - MMF
TOPIC NO 2 Flux, reluctance, inductance
TOPIC NO 3 Review of Ampere Law and Biot-Savart Law
TOPIC NO 4 Visualization of magnetic fields produced by a bar magnet and a current carrying coil
TOPIC NO 5 Through air gap and through a combination of iron and air
TOPIC NO 6 Influence of highly permeable materials on the magnetic flux lines
TOPIC NO 7 B-H curve of magnetic materials
TOPIC NO 8 Flux-linkage vs current characteristic of magnetic circuits
TOPIC NO 9 Linear and nonlinear magnetic circuits
TOPIC NO 10 Energy stored in the magnetic circuit
TOPIC NO 11 Force as a partial derivative of stored energy with respect to position of a moving element
TOPIC NO 12 Torque as a partial derivative of stored energy with respect to angular position of a rotating element
TOPIC NO 13 Examples - galvanometer coil, relay contact, lifting magnet, rotating element with Eccentricity or saliency

Unit – II

DC Machines

TOPIC NO 14 Basic construction of a DC machine
TOPIC NO 15 Magnetic structure - stator yoke, stator poles
TOPIC NO 16 Pole-faces or shoes, air gap and armature core
TOPIC NO 17 Visualization of magnetic field produced by the field winding excitation with armature winding open
TOPIC NO 18 Air gap flux density distribution, flux per pole, induced EMF in an armature coil
TOPIC NO19 Armature winding and commutation - Elementary armature coil and commutator
TOPIC NO 20 Lap and wave windings, construction of commutator, linear commutation
TOPIC NO 21 Derivation of back EMF equation, armature MMF wave
TOPIC NO 22 Derivation of torque equation, armature reaction
TOPIC NO 23 Air gap flux density distribution with armature reaction effect and mitigation
TOPIC NO 24 Types of field excitations - separately excited, shunt and series
TOPIC NO 25 Open circuit characteristic of separately excited DC generator
TOPIC NO 26 Back EMF with armature reaction, voltage build-up in a shunt generator
TOPIC NO 27 Critical field resistance and critical speed, V-I characteristics and torque-speed characteristics of separately excited
TOPIC NO 28 Shunt and series motors

Unit – III

DC machine

TOPIC NO 29 Starting braking and speed control of DC motors.
TOPIC NO 30 Losses, load testing and back-to-back testing of DC machines transformers
TOPIC NO 31 Principle, construction and operation of single-phase transformers,
TOPIC NO 32 Equivalent circuit, phasor diagram,
TOPIC NO 33 Voltage regulation
TOPIC NO 34 Losses and efficiency Testing of single phase and three phase transformer - open circuit and short circuit tests,
TOPIC NO 35 Polarity test, back-to-back test,
TOPIC NO 36 Separation of hysteresis and eddy current losses.

Unit - IV

Transformers

TOPIC NO 37 Autotransformers - construction, principle
TOPIC NO 38 Applications and comparison with two winding transformer
TOPIC NO 39 Magnetizing current, effect of nonlinear B-H curve of magnetic core
TOPIC NO 40 Material, harmonics in magnetization current
TOPIC NO 41 Phase conversion - Scott connection
TOPIC NO 42 Three-phase to six-phase conversion
TOPIC NO 43 Tap-changing transformers - No-load and on-load tap-changing of transformers, Three-winding transformers
TOPIC NO 44 Cooling of transformers, Three-phase transformer- construction
TOPIC NO 45 Types of connection and their comparative features
TOPIC NO 46 Parallel operation of single-phase and three-phase transformers

Text / References

1.A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 2013.
2. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers, 2004.
3. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
4. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
5. I. J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.

Note:

1. In Semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attend only five questions selecting atleast one question from each unit.
2. The use of scientific calculator will be allowed in the examination. However, programmable calculator and cellular phone will not be allowed.

For student admitted in B. Tech. 1st Semester (C-Scheme) in 2019 and all trailing students, Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

Subject: SEMICONDUCTOR DEVICES AND CIRCUITS LABORATORY
Subject Code: EE281C

L	T	P	Credits	Class-work Marks	: 25
0	0	2	1	Exam Marks	: 75
				Total Marks	:100
				Duration of Examination	3 Hrs

COURSE OUTCOMES:

Through this course, the students:

1. Acquire a basic knowledge in solid state electronics including diodes, MOSFET, BJT, and operational amplifier.
2. Develop the ability to analyze and design analog electronic circuits using discrete components.
3. Observe the amplitude and frequency responses of common amplification circuits.
4. Design, construct, and take measurement of various analog circuits to compare experimental results in the laboratory with theoretical analysis.

LIST OF EXPERIMENTS:

1 To calculate efficiency of half wave and full wave rectifiers
2 Design power supply filter.
3 To drawn the characteristic of diode as a clipper and clamper.
4 To Realizezener diode as a voltage regulator.
5 To design CE amplifier for voltage, current and Power gains input, output impedances.
6 To use CC amplifier as a buffer.
7 To plot frequency response of RC coupled amplifier.
8 To designconstant current source by using transister CE configuration .
9 To plot characteristics of FET.
10 To Design FET common source amplifier.
11 Design of FET common drain amplifier.
12 Graphical determination of small signal hybrid parameter of bipolar junction transistor.
13 To Study and design of a DC voltage doubler.
14 To perform at least three out of above experiments on NI Elvis board.

Note:-
1 Total ten experiments are to be performed in the semester.
2 At least seven experiments should be performed from the above list. Remaining three experiments should be performed as designed and set by the concerned institution as per the scope of the syllabus.

Subject: ELECTRICAL MACHINES-I LAB
Subject Code: EE283C

L	T	P	Credits		
0	0	2	1	Class-work Marks	: 25
				Exam Marks	: 75
				Total Marks	:100
				Duration of Examination	3 Hrs

Course Outcomes:
At the end of the course, students will demonstrate the ability to:

1. Understand the basic operation of Electrical machines
2. To Analyse various tests on Electrical machines
3. To Design some test circuits for Electrical Machines
4. To understand and analyse design parameters of transformers

LIST OF EXPERIMENT

1. To perform load test on DC shunt motor and determine performance characteristics
2. To perform load test on DC shunt generator.
3. To determine efficiency of DC shunt Machine by Hopkinson's test.
4. To study speed control of DC shunt motor by field control and armature control method.
5. To study Ward Leonard method of speed control of D.C. motor.
6. To find turns ratio & polarity of a 1-phase transformer.
7. To perform open & short circuit tests on a 1-phase transformer, and determine transformer parameter and Efficiency at different loads.
8. To separate the hysteresis and eddy current losses of a Transformer.
9. To perform Sumpner's back to back test on 1-phase transformers.
10. To perform Parallel operation of two 1-phase transformers.
11. To perform Parallel operation of two 3-phase transformers.
12. To convert three phase to two-phase By Scott-connection

NOTE:

1. The students will be required to perform at least 8 experiments/exercises from the above list and any other experiments designed on the basis course.
2. The students will be allowed to use non-programmable scientific calculator. However, sharing/ex-change of calculator are prohibited in the examinations.
3. Electronic gadgets including cellular phones are not allowed in the examination.

Department	Electrical Engineering						
Program Name	Bachelor of Technology in Electrical Engineering						
Program Level	UG						
Course Code	**EE207C**						
Category	**Programme Core**						
Course Title	**MEASUREMENTS AND INSTRUMENTATION**						
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Duration of Examination**		
	3	0	0	3	3 hours		
Evaluation System	**Sessional**				**End Term Examination**	**Grand Total**	
	As per Ordinance			**Total**			
				25	75	**100**	
Prerequisites (if any)							
Detailed Contents							
S. No.	**Contents**						

Unit - I

Fundamental Concepts Relating to Measurements

TOPIC NO 1 True Value,
TOPIC NO 2 Static Characteristics of Instruments (Accuracy, Precision, Resolution, Threshold, Sensitivity, Drift, Hysteresis & Dead-band, Dead Time);
TOPIC NO 3 Classification of Instruments (Absolute & Secondary Instruments; Indicating, Recording & Integrating instruments);,
TOPIC NO 4 Generalized Instrument (Block diagram, description of blocks);
TOPIC NO 5 Three forces in Electromechanical indicating instruments;
TOPIC NO 6 Comparison of damping methods & their suitability

Quality Improvement:

TOPIC NO 7 Errors in Measurements (Gross, Systematic, Random);
TOPIC NO 8 Basic statistical analysis applied to measurements
TOPIC NO 9 Standard deviation,
TOPIC NO 10 Six-sigma estimation,
TOPIC NO 11 C_p, C_{pk}, process capability indices.

Unit – II

MEASURING INSTRUMENTS FOR VOLTAGE & CURRENT:

TOPIC NO 12 Construction
TOPIC NO 13 Operating Principle
TOPIC NO 14 Torque equation ,
TOPIC NO 15 Shape of scale ,
TOPIC NO 16 Use as Ammeter or as Voltmeter (Extension of Range)
TOPIC NO 17 Use on AC/DC or both
TOPIC NO 18 Advantages & disadvantages,
TOPIC NO 19 Errors (Both on AC/DC) of PMMC types
TOPIC NO 20 Electrodynamics Type

TOPIC NO 21Moving iron type (attraction, repulsion & combined types), & Induction type instruments
TOPIC NO 22 Instrument Transformers (C.T. & P.T.)

Unit – III

WATTMETERS & ENEGRY METERS:

TOPIC NO 23 Construction ,
TOPIC NO 24 Operating principle
TOPIC NO 25 Torque equation
TOPIC NO 26 Shape of scale
TOPIC NO 27 Errors
TOPIC NO 28 Advantages & Disadvantages of Electro dynamic & Induction type Watt meters;
TOPIC NO 29 Single phase induction type Energy meter
TOPIC NO 30 Compensation & creep in energy meter.

POWER FACTOR & FREQUENCY METERS

TOPIC NO 31 Construction
TOPIC NO 32 Operation
TOPIC NO 33 Principle
TOPIC NO 34 Torque equation
TOPIC NO 35 Advantages & disadvantages of Single phase power factor meters (Electro dynamic& Moving Iron types)
TOPIC NO 36 Frequency meters (Electrical Resonance Type: Ferro dynamic & Electro dynamic types

Unit – IV

MEASUREMENT OF RESISTANCES (MEDIUM, LOW & HIGH):

TOPIC NO 37 Voltmeter-ammeter method & Substitution Method for medium range resistance measurement;
TOPIC NO 38 Limitations of Wheatstone bridge;
TOPIC NO 39 Four-terminal resistance
TOPIC NO 40 Kelvin's double bridge method for low resistance measurement –
TOPIC NO 41 Difficulties in high resistance measurements;
TOPIC NO 42 Measurement of high resistance by direct deflection & loss of charge methods .
TOPIC NO 43 Meggar.

MEASUREMENT OF INDUCTANCE (L) & CAPACITANCE (C) & FREQUENCY BY A.C. BRIDGES:

TOPIC NO 44 General balance equation,
TOPIC NO 45 Circuit diagram
TOPIC NO 46 Phasor diagram
TOPIC NO 48 applications of Maxwell's inductance-capacitance
TOPIC NO 49 DeSauty Bridge
TOPIC NO 50 Hays Bridge
TOPIC NO 52 Schering Bridge
TOPIC NO 53 Wein's bridge,Anderson Bridge

TEXT BOOK:

A text Book of Measurements & Instrumentation (With Experiments) by J.S. Saini, Pub. New Age Publishers, N. Delhi.

REFERENCE BOOKS:

1. A Course in Elect. & Electronic Measurements & Instrumentation by A. K. Sawhney; Khanna Pub.
2. Electrical Measurements by E.W. Golding & F.C. Widdis; Pub.: Reem Publications
3. Electronic & Elect. Measurement & Instrumentation by J.B. Gupta; Pub.: Kataria& Sons.
4. Electronic Instrumentation & Measurement Technique, W.D. Cooper & A.D. Helfrick; Pub.: Prentice Hall
5. Measuring Systems by Ernest O. Doebelin & Dhanesh N. Manik; Pub.: McGraw Hill.

Note:

1. In Semester Examinations, the examiner will set two questions from each unit (total 8 questions in all) covering the entire syllabus. The students will be required to attend only five questions selecting at least one question from each unit.

Subject : MEASUREMENTS AND INSTRUMENTATION LABORATORY
Subject Code: EE285C

COURSE OUTCOMES:

At the end of this Laboratory course, the students will be able to have hands on experience of:

1. Various measuring instruments;
2. Understanding statistical data analysis & errors in instruments;
3. Measurement of power and power factor using different techniques;
4. Measurement of parameters & variables with the help of D.C. & A.C. bridges;

Storage & retrieval of waveforms/ data to & from DSO and computations there from

LIST OF EXPERIMENTS

1. To measure the resistances of a batch of resistors (same-value by specifications) and estimate their statistical parameters (mean & standard deviation).
2. To measure inductance (L) by Maxwell's bridge and by an LCR meter.
3. To measure capacitance (C) by De-Sauty's bridge and by an LCR meter.
4. To measure frequency (f) by Wien's bridge.
5. To measure resistance of a four-terminal Low Resistance using Kelvin's double bridge.
6. To measure High resistance and Insulation resistance using Megger.
7. To use DSO for storage and retrieval of steady state periodic waveforms produced by a function generator. Consider selection of trigger source and trigger level, selection of time scale and voltage scale. Also alter bandwidth of measurement and sampling rate & record observations.
8. To Store & Retrieve one cycle of data of a periodic waveform from a DSO and use the values of data to compute RMS values using C or MATLAB program.
9. To use DSO to capture transients like step response of R-L-C circuit.
10. To effect current measurement using Shunt, C.T., and Hall sensor.
11. To measure power with the help of Wattmeter, C.T. & P.T.
12. To measure, using 2-wattmeter method, the (a) power in a balanced & an unbalanced 3-phase load (b) p.f. in a balanced 3-phase load.
13. To measure power & p.f. by 3-ammeter method.
14. To measure power & p.f. by 3-voltmeter method.
15. To measure high resistance by loss of charge method.

NOTE:

The students are required to perform 10 experiments, with at least 8 experiments from the above list and further two experiments either from the above list or from any other experiments designed on the basis of the corresponding theory course.

Subject: ENGINEERING MECHANICS
Subject Code: ME 201C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	1	-	4	25	75	3 hours	100

UNIT- I Review Of Basic Force Systems:

Topic No1 Dimensions and units of mechanics,
Topic No2 Idealization of mechanics,
Topic No3 Laws of mechanics,
Topic No4 Vector algebra review,
Topic No5 Moment of a force about a point and axis
Topic No6 The couple and couple moment,
Topic No7 Addition and subtraction of couples,
Topic No8 Moment of a couple about a line
Topic No9 Translation of a force to a parallel position,
Topic No10 Resultant of a force system, equivalent force,
Topic No11 Friction – static and dynamic, Problems.
Topic No12 Equilibrium: Introduction, free body diagram,
Topic No13 Control volumes, general equations of equilibrium,
Topic No14 Two point equivalent loading, static in-determinancy,
Topic No15 Simple truss,
Topic No16 Method of joints,
Topic No17 Method of sections, Problems.

UNIT-II Properties of Surfaces, Moments And Products Of Inertia:

Topic No 18 First moment of an area and the centroid,
Topic No19 Formal definition of inertia quantities,
Topic No20 Relation between mass-inertia terms and area-inertia terms,
Topic No21 Translation of coordinate axes, transportation properties of the inertia terms,
Topic No22 A brief introduction to tensors,
Topic No 23 The inertia of ellipsoid and principal moments of inertia, Problems.

UNIT-III Kinematics Of Particles And Rigid Bodies:

Topic No24 Velocity and acceleration in path and cylindrical coordinates,
Topic No25 Motion of a particle relative to a pair of translating axes,
Topic No26 Inertial and non-inertial frame of reference,
Topic No27 Cand coriolis acceleration,
Topic No28 Definition and motion of a rigid body in the plane,
Topic No29 Translation and rotation in the plane,
Topic No30 Chasles theorem,
Topic No31 Kinematics in a coordinate system rotating and translating in the plane,
Topic No32 Angular momentum about a point of a rigid body in planar motion;
Topic No33 Euler's laws of motion. Problems.

UNIT-IV Particle Dynamics, Energy & Momentum Methods:

Topic No34 Newton's law for rectangular coordinates & cylindrical coordinates,
Topic No35 Newton's law for path variables,
Topic No36 Work energy equations, work energy equations for a systems of particles,
Topic No37 Linear and angular momentum equations for a systems of particles,
Topic No38 Conservation of angular momentum, Problems.

TEXT BOOK:

1. Engineering Mechanics- Statics and Dynamics by R. C. Hibler, Pearson
2. Engineering Mechanics - Statics & Dynamics by I.H. Shames, PHI, New Delhi.
3. Engineering Mechanics – Timoschenko.

REFERENCE BOOKS:

1. Statics & Dynamics by J.L. Meriam, JohnWiley & Sons (P) Ltd. New York.
   Statics & Dynamics by Beer & Johnson, MGH, New Delhi

Subject: Constitution of India
Subject Code: MC203C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	-	-	3	25	75	3 hours	100

Unit 1 Philosophy of Indian Constitution:

Topic No 1 Ideological Basis and Salient Features of Indian Constitution,
Topic No 2 Fundamental Rights & Duties of the Citizens**,**
Topic No 3 Directive Principles of State Policy

Unit 2 Nature and Dynamics of Indian Federalism:

Topic No 4 Federalism: Theory and Practice in India,
Topic No 5 Federal Features of the Indian Constitution**,**Legislative,
Topic No 6 Administrative and Financial Relations between the Union and the States.

Unit 3 Union and State Legislature :

Topic No 7 Parliament: Composition, Functions and Working of the Parliamentary system
Topic No 8 State Legislature:
Topic No 9 Composition and Functions of Vidhan Sabha/ Vidhan Parishad

Unit 4 Centre and State: Executive and Judiciary:

Topic No 10 President,
Topic No 11 Prime Minister and Council of Ministers **,**
Topic No 12 Governor,
Topic No 13 Chief Minister and Council of Ministers**,**Judiciary:
Topic No 14 Supreme Court;
Topic No 15 High Court

Text Books:

1. Austin G., *The Indian Constitution: Corner Stone of a Nation*, New Delhi: Oxford University Press, 196
2. Basu D.D., *An Introduction to the Constitution of India*, New Delhi: Prentice Hall, 1994
3. Kothari R., *Politics in India*, New Delhi: Orient Language, 1970
4. Siwach J.R., *Dynamics of Indian Government and Politics*, New Delhi: Sterling Publishers, 1985
5. Bhambhri C.P., *The Indian State--Fifty Years*, New Delhi: Shipra, 1997
6. Ghai U.R., *Indian Political System*, Jalandhar: New Academic Publishing Company, 2010

Course Outcomes: Upon successful completion of this course,students will be able:

1. To understand basic features of the constitution and rights and duties of Indian citizens
2. To understand the basic structure of Centre and State Government
3. To get acquainted with the nature of parliamentary form of Government

To have knowledge of the executive and judiciary powers in Indian democratic set-up

Scheme of End Semester Examinations (Major Test):

1. The duration of examinations will be three hours.
2. Nine questions of 15 marks each will be set out of which the students will have to attempt five questions in all.
3. First question of 15 marks will be compulsory. It will cover all the four units of the syllabus. The nature of the questions in each unit will depend upon the nature of content therein. The questions may have sub-parts with marks assigned against each.
4. Question No 02 to 09 of 15 marks each will be set from the four units of the syllabus --- two from each unit.
5. In addition to first compulsory question the students will have to attempt four more questions, selecting one from each unit.

Subject: Environmental Studies
Subject Code: MC201C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	-	-	3	25	75	3 hours	100

UNIT – I Environmental Studies and Environmental Pollution

Topic No 1 The Multidisciplinary Nature of Environmental Studies,
Topic No 2 Introduction to Environment:
Topic No 3 Definition, Scope, and importance of environmental studies;
Topic No 4 need for public awareness.
Topic No 5 Environmental Pollution: Definition, Cause and effects
Topic No 6 Air pollution,
Topic No7 Waterpollution
Topic No8 Soil pollution,
Topic No 9 Marine pollution,
Topic No10 Noise pollution,
Topic No 11 Role of an individual in prevention of pollution,
Topic No 12 Pollution case studies

UNIT – II Natural Resources:

Topic No13 Water resources: over-utilization, floods, drought, dams-benefits and problems;
Topic No14 Mineral resources: Use and exploitation, environmental effects;
Topic No15 Food resources: changes caused by modern agriculture, fertilizer-pesticide problems, water logging,
Topic No16 Energy resources: Growing energy needs, renewable and non renewable energy sources;
Topic No17 Land resources: Land as a resource, land degradation, man induced landslides,
Topic No18 soil erosion and desertification.

UNIT – III Ecosystems and Biodiversity

Topic No 19 Concept of an ecosystem,
Topic No 20 Structure and function,
Topic No 21 Energy flow,
Topic No 22 Ecological succession,
Topic No 23 Ecological pyramids.
Topic No24 Concept of Biodiversity, definition and types,
Topic No25 Hot-spots of biodiversity; threats to biodiversity,
Topic No26 Endangered and endemic species of India, Conservation of biodiversity.

UNIT - IV Social Issues and Environment

Topic No 27 Water conservation,
Topic No 28 Rain water harvesting,
Topic No 29 Environmental ethics: Issues and possible solutions.
Topic No 30 Climate change, global warming,
Topic No 31 Acid rain,
Topic No 32 Ozone layer depletion,
Topic No 33 Public awareness.

Topic No34 Population growth, variation among nations,
Topic No35 Family Welfare Programmed.
Topic No 36 Human Population and the Environment
Topic No 37 Population growth,
Topic No 38 Population explosion,
Topic No39 Women and Child Welfare.

Field Work –

1. Visit to a local area to document environmental assets—river/forest/grassland/hill/ mountain.
2. Visit to a local polluted site—Urban/Rural/Industrial/Agricultural.
3. Study of common plants, insects, birds.
4. Study of simple ecosystems—pond, river, hill slopes, etc

REFERNCE BOOKS:

1. A Textbook of Environmental Studies by Asthana D.K. and Asthana Meera
2. Fundamental Concepts in Environmental Studies by Mishra D.D.
3. Environmental Studies by S.C Sharma M.P Poonia
4. Textbook of Environmental Studies for Undergraduate by Erach Bharucha
   Environmental Studies: Third Edition by R. Rajagopalan

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