Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonepat) B.Tech.
2nd YEAR ELECTRICAL ENGINEERING(SEMESTER – IV)
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	EE202C	Logic and Sequential Circuits	3	1	0	25	75		100	4	3
2	EE280C	Logic and Sequential Circuits Laboratory	0	0	2	25	0	75	100	1	3
3	EE204C	Electrical Machines – II	3	1	0	25	75	0	100	4	3
4	EE282C	Electrical Machines- II Laboratory	0	0	2	25	0	75	100	1	3
5	EE206C	Power Systems – I	3	0	0	25	75		100	3	3
6	EE284C	Power Systems Laboratory – I	0	0	2	25	0	75	100	1	3
7	EE208C	Signals and Systems	3	0	0	25	75	0	100	3	3
8	MATH203C	Mathematics – III (Probability and Statistics) (common with EEE)	3	1	0	25	75	0	100	4	3
9	BT221C	Biology for Engineers (common with CHE and EEE)	3	0	0	25	75	0	100	3	3
10	MC201C MC203C	Environmental Studies (Gr. A) Constitution of India (Gr. B)	3	0	0	25	75	0	100	0	3
Total			**21**	**03**	**06**	**250**	**525**	**225**	**1000**	**24**	**30**

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. At the end of 4th semester, each student has to undergo Professional Training (Level - 2) of at least 4 weeks from the industry / institute /research lab / training centre, etc. during summer vacation & its evaluation shall be carried out in 5th Semester.
6. 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	**EE202C**					
Category	**Programme Core**					
Course Title	**LOGIC AND SEQUENTIAL 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 - I	**Fundamentals of Digital Systems and logic families** TOPIC NO 1 Digital Signals TOPIC NO 2 Digital Circuits, Logic Symbols and Truth Tables TOPIC NO 3 AND, OR, NOT, NAND, NOR and Exclusive-OR Operations TOPIC NO 4 Universal Gates, Boolean Algebra TOPIC NO 5 Examples of IC Gates TOPIC NO 6 Bases-2, 8, 10 and 16 Number Systems (Binary, Signed Binary TOPIC NO 7 Octal Hexadecimal Number),Conversion from one Base to other Base, Binary Arithmetic TOPIC NO 8 Addition, Subtraction, One's and Two's Complements Arithmetic TOPIC NO 9 Other Binary Codes, Error Detecting and Correcting Codes TOPIC NO 10 Digital Logic Families, TTL, Schottky TTL and CMOS Logic TOPIC NO 11 Interfacing CMOS and TTL, Tri-State Logic.
Unit – II	**Combinational Digital Circuits**: TOPIC NO 12 Standard Representation for Logic Functions, Fundamental Sum of TOPIC NO 13 Products and Product of Sum Expressions TOPIC NO 14 K-Map Representation, Simplification of Logic Functions Using K-Map TOPIC NO 15 Minimization of Logical Functions. Don't care Conditions TOPIC NO 16 Common Combinational Logic Circuits, Multiplexer TOPIC NO 17 De-Multiplexer /Decoders, Half Adders, Full Adders, Subtractors TOPIC NO 18 Binary Coded Decimal Arithmetic, Carry Look Ahead Adder, Serial Adder TOPIC NO 19 Digital Comparator, Even and Odd Parity, Parity Checker/Generator TOPIC NO 20 Code Converters, Priority Encoders TOPIC NO 21 Decoders/Drivers for Display Devices TOPIC NO 22 Q-M Method of Function Realization
Unit – III	**Sequential Circuits and Systems:** TOPIC NO 23 Binary Storage Element, A 1-bit Memory TOPIC NO 24 Circuit Properties of Bi-Stable Latch TOPIC NO 25 Basics of Flip-flop, Flip-Flop Operationand its types, SR and Clocked SR flip flop TOPIC NO 26 J- K,T and D-types Flip-Flops, Applications of Flip-Flops, Introduction to TOPIC NO 27 Registers, Shift Registers, Applications of Shift Registers, Serial to Parallel Converter TOPIC NO 28 Parallel to Serial Converter, General form of a Sequential Circuit, TOPIC NO 29 And synchronous Circuits TOPIC NO 30 Sequence Generator, Ripple (Asynchronous) Counters TOPIC NO 31 Synchronous Counter.

Unit - IV	**A/D and D/A Converters**: TOPIC NO 32 Digital to Analog Converters TOPIC NO 33 Weighted Resistor/Converter, R-2R Ladder TOPIC NO 34 D/A Converter, Specifications for D/A Converters TOPIC NO 35 Examples of D/A Converter lCs TOPIC NO 36 Sample and Hold Circuit, Analog to Digital Converters TOPIC NO 37 Quantization and Encoding, Parallel Comparator A/D Converter TOPIC NO 38 Successive Approximation A/D Converter TOPIC NO 39 Counting A/D Converter, Dual Slope A/D Converter TOPIC NO 40 A/D Converter using Voltage to Frequency and Voltage to Time TOPIC NO 41 Conversion, Specifications of A/D Converters TOPIC NO 42 Example of A/D Converter ICs. Memory Organization and Operation TOPIC NO 43 Expanding Memory Size, Classification and Characteristics of Memories TOPIC NO 44 Sequential Memory, Read Only Memory (ROM) TOPIC NO 45 Read and Write Memory(RAM) TOPIC NO 46 Used **TEXT/REFERENCES**: 1. R. P. Jain, "Modern Digital Electronics", McGraw Hill Education, 2009. 2. M. M. Mano, "Digital logic and Computer design", Pearson Education India, 2016. 3. A. Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016. **COURSE OUTCOMES:** After going through this course, the students shall be able to: 1. Understand working of logic families and logic gates. 2. Design and implement Combinational andSequential logic circuits. 3. Understand the process of Analog to Digital conversion and Digital to Analog conversion. **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. Memory Chips
Department	**Electrical Engineering**

Program Name	**Bachelor of Technology in Electrical Engineering**						
Program Level	**UG**						
Course Code	**EE280C**						
Category	**Programme Core**						
Course Title	**LOGIC AND SEQUENTIAL CIRCUITS LAB**						
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)							
LIST OF EXPERIMENTS							

1. To realize and verify truth tables of TTL gates –AND, OR, NOT, NAND, NOR, EX-OR,EX-NOR.
2. To realize the universal property of NAND gate.
3. To realize the universal property of NOR gate.
4. Design & realize a given function using K-maps and verify its performance.
5. To verify the operation of Multiplexer & De-multiplexer.
6. To verify the operation of Comparators.
7. To perform Half adder and Full adder.
8. To perform Half Substractor and Full Substractor.
9. To verify the truth table of S-R, J-K, T & D Type flip flop.
10. To verify the operation of bi-directional shift register.
11. To verify the operations of analog to digital and digital to analog converter.
12. To design & verify the operation of 3 bits' synchronous counter.
13. To design & verify the operation of synchronous UP/DOWN decade counter using JK flip flop & derive a seven segment display using the same.
14. To design & verify the operation of asynchronous UP/DOWN decade counter using JK flip flop & derive a seven segment display using the same.
15. Design a 4- bit shift register, verify its operation and verify the operation of a ring counter and a Johnson counter.
16. To implement the experiment 1 on NI ELVIS Board.
17. To implement Boolean expression on NI ELVIS Board.

Department	**Electrical Engineering**						
Program Name	**Bachelor of Technology in Electrical Engineering**						
Program Level	**UG**						
Course Code	**EE204C**						
Category	**Programme Core**						
Course Title	**ELECTRICAL MACHINES – II**						
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)							

Unit-I	**Fundamentals of AC machine windings** TOPIC NO 1 Physical arrangement of windings in stator and cylindrical rotor TOPIC NO 1 Slots for windings TOPIC NO 2 Single-turn coil - active portion and overhang TOPIC NO 3 Full-pitch coils TOPIC NO 4 Concentrated winding, TOPIC NO 5 Distributed winding TOPIC NO 6 Winding axis TOPIC NO 7 3D visualization of the above winding types TOPIC NO 8 Air-gap MMF distribution with fixed current through winding-concentrated and distributed TOPIC NO 9 Sinusoidally distributed winding TOPIC NO 10 winding distribution factor Pulsating and revolving magnetic fields TOPIC NO 11 Constant magnetic field TOPIC NO 12 Pulsating magnetic field - alternating current in windings with spatial displacement, TOPIC NO 13 Magnetic field produced by a single winding - fixed current and alternating current Pulsating fields produced by spatially displaced windings TOPIC NO 14 Windings spatially shifted by 90 degrees, TOPIC NO 15 Addition of pulsating magnetic fields TOPIC NO 16 Three windings spatially shifted by 120 degrees (carrying three- phase balanced currents), TOPIC NO 17 Revolving magnetic field.
Unit – II	**Induction Machines** : TOPIC NO 18 Construction TOPIC NO 19 Types (squirrel cage and slip-ring), TOPIC NO 20 Torque Slip Characteristics TOPIC NO 21 Starting and Maximum Torque TOPIC NO 22 Equivalent circuit TOPIC NO 23 Phasor Diagram TOPIC NO 24 Losses and Efficiency TOPIC NO 25 Effect of parameter variation on torque speed characteristics (variation of rotor and stator resistances, stator voltage, frequency) TOPIC NO 26 Methods of starting TOPIC NO 27 Braking and speed control for induction motors.

Unit – III	**Induction Generators :** TOPIC NO 28 Generator operation. TOPIC NO 29 Types-Self-excitation TOPIC NO 30 Doubly-Fed Induction Machines and their applications **Single-phase induction motors** TOPIC NO 31 Constructional features TOPIC NO 32 Double revolving field theory TOPIC NO 33 Equivalent circuit TOPIC NO 34 Determination of parameters. TOPIC NO 35 Split-phase starting methods and applications
Unit - IV	**Synchronous machines** TOPIC NO 36 Constructional features TOPIC NO 37 Cylindrical rotor synchronous machine - generated EMF TOPIC NO 38 Equivalent circuit and phasor diagram

1. The students will be required to perform the 8 experiments/exercises from the above list and any other experiment 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.

Subject: ELECTRICAL MACHINES – II LAB
Subject Code: EE282C

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

LIST OF EXPERIMENTS:

1. To perform starting and reversing the direction of rotation of 1-Phase and 3-Phase induction motor.
2. To perform the open circuit test and block rotor test on 3 phase induction motor and determine equivalent circuit parameters.
3. To conduct the load test to determine the performance characteristics of the I.M.
4. To compute the torque v/s speed characteristics of 3-phase induction motor for various stator voltages .
5. To perform speed control of induction motor by using rotor resistance control.
6. To perform speed control of 3-Phase induction motor by using V/f control method.
7. To perform the open circuit test and block rotor test on single-phase induction motor and determine equivalent circuit parameters.
8. To draw Voltage Vs load Characteristics of 3 phase synchronous generator, and draw input vs. Output power.
9. To perform O.C. test onsynchronous generator. And determine the full load regulation of a three phase synchronous generator by synchronous impedance method.
10. To plot V- Curve of synchronous motor.
11. To study the parallel operation of synchronous generators.

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	**EE206C**					
Category	**Programme Core**					
Course Title	**POWER SYSTEM -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	**Fundamentals of AC machine windings** TOPIC NO 1 Evolution of Power Systems and Present-Day Scenario TOPIC NO 2 Structure of a power system: Bulk Power Grids and Micro-grids. TOPIC NO 3 Transmission and Distribution Systems: Line diagrams TOPIC NO 4 Transmission and distribution voltage levels and topologies (meshed and radial systems). TOPIC NO 5 Feeder TOPIC NO 6 Service mains Substations TOPIC NO 7 Mechanical design of Transmission TOPIC NO 8 Synchronous Grids and Asynchronous (DC) interconnections TOPIC NO 9 Comparison of ac and dc transmission
Unit – II	**POWER SYSTEM ANALYSIS** TOPIC NO 10 Overhead Transmission Lines and Cables TOPIC NO 11 Electrical and Magnetic Fields around conductors TOPIC NO 12 Corona TOPIC NO 13 Parameters of lines and cables TOPIC NO 14 Capacitance and Inductance calculations for simple configurations TOPIC NO 15 Short, medium and long lines TOPIC NO 16 Power Transfer TOPIC NO 17 Voltage profile and Reactive Power TOPIC NO 18 Characteristics of transmission lines. TOPIC NO 19 Surge Impedance Loading TOPIC NO 20 Generation of Over-voltages TOPIC NO 21 Lightning and Switching Surges. TOPIC NO 22 Protection against Over voltages TOPIC NO 23 Insulation Coordination TOPIC NO 24 Propagation of Surges TOPIC NO 25 Voltages produced by traveling surges TOPIC NO 26 Bewley Diagrams
Unit – III	**POWER SYSTEM COMPONENTS** TOPIC NO 27 Insulators TOPIC NO 28 Application of Phase-shifts. And Distribution transformers, TOPIC NO 29 Tap-Changing transformers. TOPIC NO 30 Synchronous Machines: TOPIC NO 31 Steady-state performance characteristics. TOPIC NO 32 Real and Reactive Power Capability Curve of generators.

	TOPIC NO 33 Typical waveform under balanced terminal short circuit conditions –steady state, transient and sub-transient equivalent circuits TOPIC NO 34 Loads: TOPIC NO 35 Types, TOPIC NO 36 Voltage and Frequency Dependence of Loads. TOPIC NO 37 Per-unit System and per-unit calculations

Unit - IV	**FAULT ANALYSIS AND PROTECTION SYSTEMS** TOPIC NO 38 Method of Symmetrical Components (positive, negative and zero sequences). TOPIC NO 39 Balanced and Unbalanced Faults. TOPIC NO 40 Representation of generators, TOPIC NO 41 Lines and transformers in sequence networks. TOPIC NO 42 Computation of Fault Currents. TOPIC NO 43 Neutral Grounding. TOPIC NO 44 Switchgear: Types of Circuit Breakers. TOPIC NO 45 Attributes of Protection schemes, TOPIC NO 46 Back-up Protection. TOPIC NO 47 Protection schemes (Over-current, directional, distance protection, differential protection), TOPIC NO 48 Power line carrier communication and their application.

TEXT BOOKS:

1. J. Grainger and W. D. Stevenson, "Power System Analysis", McGraw Hill Education, 1994.
2. O. I. Elgerd, "Electric Energy Systems Theory", McGraw Hill Education, 1995.
3. S K Gupta, "Power System Analysis", Umesh Publication 2009
4. B. M. Weedy, B. J. Cory, N. Jenkins, J. Ekanayake and G. Strbac, "Electric Power Systems", Wiley, 2012.

REFERENCE BOOKS:

5. A.R. Bergen and V. Vittal, "Power System Analysis", Pearson Education Inc., 1999.
6. Advanced Power System Analysis & Dynamics by L P Singh: Wiley Eastern LTD New Delhi
7. Elements of Power System Analysis by W D Stevenson: MGH Publication New Delhi
8. Power Generation, operation and control by Alen J. Wood by Wiley.

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 reform

Subject : POAWE SYSTEM -I LAB

Subject Code: EE284C

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

Experiment No. 1: (i) Study over current relay
(ii) Draw the current-time characteristics of an over current relay for TMS=1 & 0.5 and PSM=1.25 & 1.
Experiment No. 2: (i) Study percentage bias differential relay.
(ii) Plot the characteristics of a percentage bias differential relay for 20%, 30% and 40% biasing
Experiment No. 3: To draw the operating characteristics of IDMT over current relay.
Experiment No. 4: To draw the operating characteristics of IDMT under Voltage relay.
Experiment No. 5: To draw the operating characteristics of IDMT over Voltage relay.
Experiment No. 6: To draw the operating characteristics of Differential current relay.
Experiment No. 7: To draw the operating characteristics of negative sequence relay.
Experiment No. 8: To obtain A B C D parameter of a transmission line (model).
Experiment No. 9: To study Ferranti Effect on transmission line model.
Experiment No. 10: To visit study and draw the layout of 33KV substation.
Experiment No. 11: To visit study and draw the layout of 110/220 KV substation
Experiment No. 12: To study and designing of Earthing /Grounding.
Experiment No. 13: Study the burden effect on the performance of CT and measure ratio error.
Experiment No. 14: Study filtration and Treatment of transformer oil.
Experiment No. 15: Determine dielectric strength of transformer oil.

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 up by the department as per the scope of the syllabus

Department	**Electrical Engineering**						
Program Name	**Bachelor of Technology in Electrical Engineering**						
Program Level	**UG**						
Course Code	**EE208C**						
Category	**Programme Core**						
Course Title	**SIGNAL AND SYSTEMS**						
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	**Introduction to Signals and Systems** TOPIC NO 1 Introduction TOPIC NO 2 Signals and systems, TOPIC NO 3 Signal properties: periodicity TOPIC NO 4 Absolute integrability TOPIC NO 5 Determinism and stochastic character. TOPIC NO 6 Some special signals of importance: the unit step, TOPIC NO 7 The unit impulse, TOPIC NO 8 The sinusoid, TOPIC NO 9 The complex exponential, TOPIC NO 10 Some special time-limited signals; continuous and discrete time signals, TOPIC NO 11 Continuous and discrete amplitude signals. TOPIC NO 12 System properties: linearity: additivity and homogeneity, TOPIC NO 13 Shift-invariance, TOPIC NO 14 Causality, TOPIC NO 15 Stability, TOPIC NO 16 Realizability. TOPIC NO 17 Examples							
Unit – II	**Behavior of continuous and discrete-time LTIsystems** TOPIC NO 18 Impulse response and step response, TOPIC NO 19 Convolution TOPIC NO 20 Input-output behavior with a periodic convergent inputs, TOPIC NO 21 Cascade interconnections. TOPIC NO 22 Characterization of causality and stability of LTI systems. TOPIC NO 23 System representation through differential equations and difference Equations. TOPIC NO 24 State-space Representation of systems, TOPIC NO 25 State-Space Analysis, TOPIC NO 26 Multi-input, TOPIC NO 27 Multi-output representation. TOPIC NO 28 State Transition Matrix and its Role. TOPIC NO 29 Periodic inputs to an LTI system, TOPIC NO 30 The notion of a frequency response and its relation to the impulse response							

UNIT – III:Fourier, Laplace and z- Transforms:

TOPIC NO 31 Fourier series representation of periodic signals, Waveform Symmetries,
TOPIC NO 32 Calculation of Fourier Coefficients. Fourier Transform, convolution/multiplication and their effect in the frequency domain,
TOPIC NO 33 Magnitude and phase response, Fourier domain duality.
TOPIC NO 34 The Discrete-Time Fourier Transform (DTFT) and the Discrete Fourier Transform (DFT).
TOPIC NO 35 Parseval's Theorem. Review of the Laplace Transform for continuous time signals and systems,
TOPIC NO 36 System functions, poles and zeros of system functions and signals,
TOPIC NO 37 Laplace domain analysis, solution to differential equations and system behavior.
TOPIC NO 38 The z-Transform for discrete time signals and systems, system functions,
TOPIC NO 39 Poles and zeros of systems and sequences, z-domain analysis.

UNIT – IV:Sampling and Reconstruction:
TOPIC NO 40 The Sampling Theorem and its implications.
TOPIC NO 41 Spectra of sampled signals. Reconstruction: ideal interpolator, zero-order hold, first-order hold.
TOPIC NO 42 Aliasing and its effects.Relation between continuous and discrete time systems.
TOPIC NO 43 Introduction to the applications of signal and system theory:
TOPIC NO 44 Modulation for communication, filtering, feedback control systems.

REFERENCES:

1. A. V. Oppenheim, A. S. Willsky and S. H. Nawab, "Signals and systems", Prentice Hall India, 1997.
2. J. G. Proakis and D. G. Manolakis, "Digital Signal Processing: Principles, Algorithms, and Applications", Pearson, 2006.
3. H. P. Hsu, "Signals and systems", Schaum's series, McGraw Hill Education, 2010.
4. S. Haykin and B. V. Veen, "Signals and Systems", John Wiley and Sons, 2007.
5. A. V. Oppenheim and R. W. Schafer, "Discrete-Time Signal Processing", Prentice Hall, 2009.
6. M. J. Robert "Fundamentals of Signals and Systems", McGraw Hill Education, 2007.
7. B. P. Lathi, "Linear Systems and Signals", Oxford University Press, 2009.

COURSE OUTCOMES:
After going through this course, the students shall be able to:

1. Understand the concepts of continuous time and discrete time systems.
2. Analyse systems in complex frequency domain.
3. Understand sampling theorem and its implications.

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	**MATH203C**						
Category	**(Probability and Statistics)**						
Course Title	**MATHEMATICS-III**						
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Duration of Examination**		
	3	**10**	**0**	**4**	**3 hours**		
Evaluation System	**Sessional**					**End Term Examination**	**Grand Total**
	As per Ordinance				**Total**		
					25	**75**	**100**
Prerequisites (if any)							
Detailed Contents							

Note:

1. The paper setter will set two questions (with/without parts) from each units, & a ninth compulsory question comprising of 6 to 10 sub-parts, covering the entire syllabus. The examinee will attempt 5 questions in all, along with the compulsory question (with all it sub-parts), selecting one question from each unit.
2. The use of programmable devices such as programmable calculators, etc. is not allowed during the exam.

UNIT-I

Topic No.1 Measures of Central tendency:
Topic No. 2 Skewness and Kurtosis- Probability distributions:
Topic No. 3, Poisson and Normal - evaluation of statistical parameter for these three distributions,
Topic No. 4 Correlation and regression —
Topic No. 5 Rank correlation.

UNIT-II

Topic No. 6 Curve fitting by the method of least squares-
Topic No. 7 Fitting of straight lines, second degree parabolas and more general curves.
Topic No. 8 Test of significance: Large sample test for single proportion,
Topic No. 9 Difference of proportions, single mean, difference of means, and difference of standard deviations.
Topic No. 10 Test for single mean, difference of means and correlation coefficients,
Topic No.11 Test for ratio of variances - Chi-square test for goodness of fit and independence of attributes.

UNIT-III

Topic No. 12 Probability spaces, conditional probability,
Topic No. 13 Independence; Discrete random variables,
Topic No. 14 Independent random variables, the multinomial distribution,
Topic No. 15 Poisson approximation to the binomial distribution infinite sequences of Bernoulli trials,
Topic No. 16 Sums of independent random variables;
Topic No. 17 Expectation of Discrete Random Variables, Moments, Variance of a sum,
Topic No. 18 Correlation coefficient, Chebyshev's Inequality.

UNIT-IV

Topic No. 19 Continuous random variables and their properties,
Topic No. 20 Distribution functions and densities, normal,
Topic No. 21 Exponential and gamma densities.
Topic No. 22 Bivariate distributions and their properties, distribution of sums and quotients,
Topic No. 23 Conditional densities, Bayes' rule.

Suggested Text/ReferenceBooks:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. S.S. Sastry, Engineering Mathematics, PHI, Vol. I & II.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
4. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003 (Reprint).
5. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.
6. W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968.
7. Veerarajan T., Engineering Mathematics (for semester III), Tata McGraw-Hill, New Delhi, 2010.

Course outcomes:

1. The students will be able to apply the concept of central tendencies, moment , skewness and kurtosis in designing the structure and nature of the curve.
2. The students will apply principle of least squares and chi-square test in defining the fitness of goods and shape of curves
3. The students can apply the probability spaces & conditional probability concept and properties in practical problems.
4. The students will be able to use the functioning of continuous random variable, distribution functions and densities in various field works.

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.

Department	**Electrical Engineering**						
Program Name	**Bachelor of Technology in Electrical Engineering**						
Program Level	**UG**						
Course Code	**3T221C:**						
Category	**Choice Based Credit System (effective from Session 2019-20)**						
Course Title	**BIOLOGY FOR ENGINEERS**						
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Duration of Examination**		
	3	**1**	**0**	**4**	**3 hours**		
Evaluation System	**Sessional**					**End Term Examination**	**Grand Total**
	As per Ordinance				**Total**		
					25	**75**	**100**
Prerequisites (if any)							
Detailed Contents							

Course Objectives:

1. To learn about the significance of biology as an important scientific discipline for engineers.
2. To get a basic knowledge of classification and organization of living organisms.
3. To learn about the various bio molecules, and to understand their role in biological metabolism.
   To understand the fundamentals of nature & structure of genetic material, and the flow of genetic information in biological systems

UNIT-I

Topic No. 1 Introduction: Significance of biology; why study biology ;
Topic No. 2 Biological observation in history that led to the discovery of some major engineering basics(Brownian motion & origin of thermodynamics);
Topic No. 3 Fundamental similarities and difference between science and engineering-
Topic No. 4 Human as the best machines, comparison between eye camera, flying of a bird and aircraft etc.
Topic No. 5 Classification: classification based on
Topic No. 6 (a) Cellularity- unicellular or a multicellular (b) Ultrastructure-prokaryotes or eukaryotes
Topic No. 7(c) Energy and carbon utilization- autotrophs and lithotrophs (d) Ammonia excretion –aminotelic, uricotelic
Topic No. 8(e) Habit- aquatic or terrestrial ; Molecular Taxonomy three major kingdoms of life.
Topic No. 9 Single-celled organism-Microorganism and Microbiology:
Topic No. 10 Concept of single called organism , species and strains;
Topic No. 11 Identification and classification of microorganism ;
Topic No. 12 Ecological aspects of single celled organism; Microscopy.

UNIT-II

Topic No. 13 Bio molecules: Molecules of the life –
Topic No. 14 Monomeric unit and polymeric structure –sugar , starch and cellulose ,
Topic No. 15 Amino acid and proteins; Nucleotides and DNA/RNA;Two carbon unit and lipids.
Topic No. 16 Proteins and Enzymes: proteins structure and function ; Hierarchy in protein structure –
Topic No. 17 Primary , secondary , tertiary and quaternary structure;
Topic No. 18 Proteins as enzymes, transporters , receptors and structural elements;
Topic No. 19 Enzymes classification and mechanism of action ;
Topic No. 20 Enzymes catalysed reaction ; Enzyme kinetic and kinetic parameters;RNA catalysis

UNIT –III

Topic No. 21 Genetics: Genetics is to biology what Newtons law are to physics; model laws of genetics;
Topic No. 22 Concept of allele, recessiveness and dominance, segregation and independent assortment;
Topic No. 23 Genetic material passes from parent to offspring ;
Topic No. 24 Epistasis; Mapping of phenotype yto genes, gene/linkage mapping ;

Topic No. 25 Single gene disorder in human ; meiosis and mitosis.
Topic No. 26 Genes, Chromosomes and information transfer:
Topic No. 27 DNA as genetic material ;
Topic No. 28 Hierarchy of DNA structure single stranded to double stranded to nucleosomes to chromosomes;
Topic No. 29 Moleculear basis of information transfer concept of genetic code ;
Topic No. 30 Universality and degeneracy of genetic code.

UNIT-IV

Topic No. 31 Metabolism: Similarities between fundamental principles of energy transaction in physical and biological world;
Topic No. 32 Thermodynamics as applied to biological system;
Topic No. 33 Exothermic and endothermic versus endergonic and exergonic reaction;
Topic No. 34 Concept of $K_{eq}$and its relation to standard free energy ; Spontaneity; APT as an energy currency;
Topic No. 35 Glycolysis and Krebs cycle (breakdown of glucose to CO_2 to H_2O);
Topic No. 36 Photosynthesis (synthesis of glucose from CO_2 toH_2O);
Topic No. 37 Energy Yielding and energy consuming reaction; Concept of energy change.

TEXT BOOK:

1. Biology : a Gopal approach Campbell , N.A Reece, J.B Urry ,Lisa; Cain M.L Wasserman , S.A Minorsky,P.VJackson, R.B Person Education ltd
2. Outline of Biochemistry , conn E.E Stumpf, P.K Burening ,G; Doi, R.H;John Wiley and sons

REFERENCE BOOK:

1. Principles of Biochemistry(V Edition) by Nelson, D.L; and Cox, M.M.W.H Freeman and company.
2. Molecular Genetics (second Edition) stent G.S; Calender , R.W.H Freeman Company Distributed by satishkumarjain for CBS Publisher.
3. Microbiology , Prescott, L.M.J.P; Harley and CA Klein 1995, 2nd edition W.M.C Brown Publisher.

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: 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
7.

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 Water pollution
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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