

REFERENCES:

1. Papoulis. A and Unnikrishnapillai. S., "Probability, Random Variables and Stochastic Processes ", Mc Graw Hill Education India , 4th Edition, New Delhi , 2010.
2. Walpole. R.E., Myers. R.H., Myers. S.L. and Ye. K., "Probability and Statistics for Engineers and Scientists", Pearson Education, Asia, 8th Edition, 2007.
3. Ross, S.M., "Introduction to Probability and Statistics for Engineers and Scientists", 3rd Edition, Elsevier, 2004.
4. Spiegel. M.R., Schiller. J. and Srinivasan. R.A., "Schaum's Outline of Theory and Problems of Probability and Statistics". Tata McGraw Hill Edition, 2004.

Evaluation Pattern:

Category of Course	Continuous Assessment	Mid – Semester Assessment	End Semester
Theory	40	20	40

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓	✓	✓	✓	✓						✓	✓
CO2	✓	✓	✓	✓	✓							
CO3	✓	✓	✓	✓	✓							
CO4	✓	✓	✓	✓	✓							
CO5	✓	✓	✓	✓	✓							
CO6	✓	✓	✓	✓	✓							

EE6351	BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING	L	T	P	EL	TOTAL CREDITS
		4	0	4	3	7
Prerequisites for the course: None						
OBJECTIVES : <ul style="list-style-type: none"> To learn the steady state DC and AC characteristics of electric circuits To understand the working of DC/AC motors, transformer and generators To understand the functionality of basic electronic circuits namely amplifiers, filters, data converters and oscillators To learn the design aspects of basic amplifier configurations and concepts of feedback techniques 						
MODULE I :		L	T	P		EL
		2	0	4		3
DC Electrical circuit - Fundamental laws– Steady State Solution of DC Circuits – Electrical measuring instruments.						

SUGGESTED ACTIVITIES :				
<ul style="list-style-type: none"> • Computer simulation of DC circuits problems and solution • EL- Solving of complex electrical networks using circuit theorems • Practical – Basic electrical circuit measurements and verification of circuit theorems 				
SUGGESTED EVALUATION METHODS:				
<ul style="list-style-type: none"> • Tutorial problems • Assignment problems • Quizzes 				
MODULE II :	L	T	P	EL
	4	0	4	3
Introduction to AC Circuits –Sinusoidal steady state analysis– Power and Power factor – Single Phase and Three Phase Balanced Circuits.				
SUGGESTED ACTIVITIES :				
<ul style="list-style-type: none"> • Computer simulation of AC circuits problems and solution • EL- Solving of other engineering problems as electrical circuit equivalents • Practical – Three phase power measurements 				
SUGGESTED EVALUATION METHODS:				
<ul style="list-style-type: none"> • Tutorial problems • Assignment problems • Quizzes 				
MODULE III :	L	T	P	EL
	4	0	4	3
Construction, Principle of Operation, Basic Equations and Applications of DC Generators, DC Motors				
SUGGESTED ACTIVITIES :				
<ul style="list-style-type: none"> • EL- Survey of commonly used DC machines and their applications • Practical – Load test on DC motor and generator 				
SUGGESTED EVALUATION METHODS:				
<ul style="list-style-type: none"> • Tutorial problems • Assignment problems • Quizzes 				
MODULE IV :	L	T	P	EL
	4	0	4	3
Operating principle of Transformers –Induction Motor – single phase and three phase operation, Stepper motor				
SUGGESTED ACTIVITIES :				
<ul style="list-style-type: none"> • Study of utility power grid and the use of transformers • EL- Survey of commonly used AC machines and their applications • Practical – Load test on transformer and Induction motor 				

SUGGESTED EVALUATION METHODS:				
<ul style="list-style-type: none"> Tutorial problems Assignment problems Quizzes 				
MODULE V :	L	T	P	EL
	4	0	4	3
Characteristics of PN Junction Diode, Half wave and Full wave Rectifiers, Zener Diode and its Characteristics – Voltage Regulation. Bipolar Junction Transistor – CB, CE, CC Configurations and Characteristics.				
SUGGESTED ACTIVITIES :				
<ul style="list-style-type: none"> Practical - V- I characteristics of PN Junction and Voltage regulator characteristic of Zener Diode, Demonstration - Half wave and Full wave Rectifiers 				
SUGGESTED EVALUATION METHODS:				
<ul style="list-style-type: none"> Tutorial problems Assignment problems Quizzes 				
MODULE VI:	L	T	P	EL
	4	0	4	3
Elementary Treatment of Small Signal Amplifier – Linear Amplifier, Biasing Requirement – Voltage Divider Biasing, Basic CE amplifier circuit - Small signal equivalent model - Small signal Voltage gain				
SUGGESTED ACTIVITIES :				
<ul style="list-style-type: none"> Practical – CE amplifier Voltage Divider Biasing and verification of operating point, Verification of small signal voltage gain 				
SUGGESTED EVALUATION METHODS:				
<ul style="list-style-type: none"> Tutorial problems Assignment problems Quizzes 				
MODULE VII:	L	T	P	EL
	4	0	4	3
Differential amplifier using BJT, Negative feedback amplifier – characteristics – topologies, Opamp - inverting amplifier - non inverting amplifier.				
SUGGESTED ACTIVITIES :				
<ul style="list-style-type: none"> Practical - Opamp characteristics: Verification of inverting amplifier gain Verification of non inverting amplifier gain 				

SUGGESTED EVALUATION METHODS:				
<ul style="list-style-type: none"> Tutorial problems Assignment problems Quizzes 				
MODULE VIII:	L	T	P	EL
	4	0	4	3
Opamp based circuit – Summer – Subtractor – Integrator – Differentiator, Opamp based Filters – Low pass, High pass, Band pass, Band reject.				
SUGGESTED ACTIVITIES :				
<ul style="list-style-type: none"> Practical -Verification of opamp based arithmetic circuit Verification of frequency response characteristics of opamp based First order lowpass filter,First order highpass filter 				
SUGGESTED EVALUATION METHODS:				
<ul style="list-style-type: none"> Tutorial problems Assignment problems Quizzes 				
MODULE IX:	L	T	P	EL
	4	0	4	3
Analog to Digital Converter – Flash ADC- Successive Approximation ADC, Digital to Analog Converter – Binary weighted DAC, Positive feedback – Ring oscillator.				
SUGGESTED ACTIVITIES :				
<ul style="list-style-type: none"> Presentation / Assignment on Performance metrics of ADC Ring oscillator circuit architecture 				
SUGGESTED EVALUATION METHODS:				
<ul style="list-style-type: none"> Tutorial problems Assignment problems Quizzes 				
MODULE X:	L	T	P	EL
	4	0	4	3
MOSFET – V-I characteristics, MOSFET small signal equivalent circuit, Common Source amplifier – Voltage gain – Frequency response characteristic.				
SUGGESTED ACTIVITIES :				
<ul style="list-style-type: none"> Spice simulation - MOSFET V-I characteristic 				
SUGGESTED EVALUATION METHODS:				
<ul style="list-style-type: none"> Assignment problems Quizzes 				

OUTCOMES:**Upon completion of the course, the students will be able to:**

- Compute steady state solution of DC and AC electric circuits
- Analyze the characteristics of motors and transformers
- Design and analyze amplifiers
- Characterize the frequency response of BJT based amplifiers
- Realize arithmetic circuits, basic filter configurations using opamp
- Point out the characteristics of data converters

TEXT BOOKS:

1. J Nagarath and Kothari DP, "Electrical Machines", Tata McGraw Hill, 2010.
2. Donald .A. Neamen, "Electronic Circuit Analysis and Design", 3rd Edition, Tata McGraw Hill, 2010.

REFERENCES:

1. P.C. Sen, "Principles of Electric Machines and Power Electronics", John Wiley & Sons, 2nd Edition, 2007.
2. Leonard S Bobrow, "Foundations of Electrical Engineering", Oxford University Press, 2013.
3. Mahmood Nahvi and Joseph A. Edminister, "Electric Circuits", Schaum's Outline Series, McGraw Hill, 2002.
4. Del Toro, "Electrical Engineering Fundamentals", Pearson Education, New Delhi, 2007
5. A.E. Fitzgerald, David E Higginbotham and Arvin Grabel, "Basic Electrical Engineering", McGraw Hill Education (India) Private Limited, 2009.
6. David A. Bell, "Electronic Devices and Circuits", Oxford Higher Education Press, 5th Edition, 2010.
7. Adel .S. Sedra, Kenneth C. Smith, "Micro Electronic Circuits", 7th Edition, Oxford University Press, 2014.
8. Coughlin and Driscoll, "Operational Amplifiers and Linear Integrated Circuits", Prentice Hall, 1989.

Evaluation Pattern:

Category of Course	Continuous Assessment	Mid – Semester Assessment	End Semester
Theory Integrated with Practical	15(T) + 25 (P)	20	40

CO - PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓	✓		✓					✓			
CO2	✓	✓	✓	✓	✓				✓			
CO3	✓	✓	✓	✓	✓				✓			
CO4	✓	✓	✓	✓	✓	✓			✓			
CO5	✓	✓		✓		✓	✓		✓	✓		✓