SYLLABUS

FOR

B.TECH. PROGRAMME

IN

ELECTRICAL ENGINEERING

INSTITUTE OF TECHNOLOGY

ZAKURA CAMPUS
UNIVERSITY OF KASHMIR
SRINAGAR J&K, 190006
As Per BOS Held In August 2017

COURSE STRUCTURE
B.Tech 3rd Semester ELE
University of Kashmir, Zakura Campus

Course Code	Course Title	Teaching Periods per week			Credits
		L	T	P	
MTH3117B	Engineering Mathematics – III	3	1	0	4
ELE3217B	Electrical Machines – I	3	1	0	4
ELE3317B	Network Analysis and Synthesis	3	1	0	4
ELE3417B	Signals & Systems	2	1	0	3
ELE3517B	Electrical Measurement & Measuring Instruments	3	1	0	4
ELE3617B	Thermal Engineering	2	1	0	3
ELE3517BL	Electrical Measurement & Measuring Instruments Lab	0	0	2	1
ELE3717BL	Basics of MATLAB Programming and Simulation Lab	0	0	4	2
Total		16	6	6	25

Applicable To Batch 2016 & Onwards

THIRD SEMESTER

COURSE CODE: MTH-3117B

ENGINEERING MATHEMATICS - III

Credits: 04

S. No	Topics	Number of Hours
1.	Laplace Transforms: Laplace transform, shifting theorem, Laplace Transforms of different functions, Heaviside's unit function. Dirac Delta function its Laplace Transforms. Heaviside's Expansion theorem.	12
2.	Inverse Laplace Transforms. Initial and Final value theorems, Convolution theorem and applications, use of Laplace Transforms in the solution of linear Differential equations.	7
3.	Fourier Transform: Fourier series, Harmonic analysis, Definition of Fourier transform. Fourier sine and cosine transform. Fourier integral formula, Applications to solutions of boundary value problems.	12
4.	Z- Transform: Definition, Linearity property, Z- transform of elementary functions, shifting theorems. Initial and Final value theorem. Convolution theorem.	12
5.	Inverse Z-transform	7
Total number of Hours		50

TextBooks:

S.No	Name of Book	Author	Publisher
1.	Laplace Transforms	Murray R. Speigal	McGraw Hill
2.	Advanced Engg. Mathematics	ErwinKreyzing	WileyEastern. Pub.
3.	The use of Integral Transform	Ian.N.Snedden	Tata McGraw Hill.
4.	Integral Transform	LoknathDebnath	New York, Press
5.	Higher engineering mathematics	H. K. Dass, RajnishVerma	S. Chand

COURSE CODE: ELE-3217B

ELECTRICAL MACHINES – I

Credits: 04

S. No	Topics	Number of Hours
1.	**Transformers:** Single Phase Transformers: Introduction, classification, construction, electromotive force (e. m. f.) equation, Equivalent circuit model, Phasor diagrams, Losses and efficiency, Voltage regulation	7
2.	Transformer tests (polarity test, open circuit test and short circuit test), All day efficiency, Frequency response, Parallel operation, Auto-transformers, Excitation phenomenon in transformers	7
3.	**Three Phase Transformers:** Construction, Connections, Open delta, Ratings, Phase Conversions	4
4.	**Special Purpose Transformers:** Impedance matching transformers, Isolation transformers, constant current and constant voltage Transformers, Instrument Transformers (Introduction)	4
5.	**Principles of Electromechanical Energy Conversion:** Energy conversion via electric and magnetic fields, Field energy and mechanical force, energy balance, co energy	4
6.	**D.C. Generator:** Construction, emf equation of D.C. generator, methods of excitation, losses condition for maximum efficiency, Commutation &armature reaction, interpoles and compensating winding, characteristics of D.C. generators	12
7.	**D.C. Motor:** Working principle, voltage equation, torque developed, operating characteristics of D.C. motor, starting ,3 point and 4 point starter, speed control methods, Swinburne's and break test, Application areas of D.C. Motors	12
Total number of Hours		50

TextBooks:

S.No	Name of Book	Author	Publisher
1.	Electric Machinery	Fitzgerald, Kingslay, Umans	Tata McGraw-Hill
2.	Electric Machinery Fundamentals	Chapman	McGraw-Hill Higher Education
3.	Electric Machines	Nagrath and Kothari	Tata McGraw-Hill
4.	Electric Machinery and Transformer	Guru, Hiziroglu	Oxford University press
5.	Electric Machinery	P.S.Bimbhra	Khanna Publishers
6.	Basic Electric Machines	Vincent Deltoro	Prentice Hall

COURSE CODE: ELE-3317B

NETWORK ANALYSIS & SYNTHESIS

Credits: 04

S. No	Topics	Number of Hours
1.	Basics circuit concepts: Charge and energy, capacitance, inductance and resistance parameters in the light of field and circuit concepts, approximate realization of a physical system as a circuit, Reference directions for currents and voltages, conventions for magnetically coupled circuits, Circuit topology	7
2.	First order differential equation: Differential equations as applied in solving networks, Application of initial conditions, evaluating initial conditions in networks	7
3.	Laplace Transformations: Solution of Network problems with Laplace transformation, Heaviside's expansion theorem	4
4.	Wave form analysis and synthesis: The unit step, ramp and impulse functions and their Laplace transforms, Initial and final value theorems, convolution integral, convolution as summation	5
5.	Network theorems and impedance functions: Complex frequency, transform impedance and transform circuits, series and parallel combinations of elements, Fosters reactance theorem and reciprocity theorem	6
6.	Network Functions- poles and zeros: Ports or terminal pairs, Network functions for one port and two port networks (ladder and general networks), Poles and Zeros of network functions, Restriction on pole and zero locations for driving point and transfer functions. Time domain behaviour from pole zero plot	7
7.	Two port parameters: Relationship of two port parameters, Admittance, impedance, transmission and hybrid parameters, Relationship between parameter sets, Parallel connection of two port Networks, Characteristics impedance of two port networks.	7
8.	Filters : Filter fundamentals – pass and stop band, filter classification, constant K & m derived filters, Behaviour of characteristic impedance over pass & stop bands, design of filters.	7
Total number of Hours		50

TextBooks:

S.No	Name of Book	Author	Publisher
1.	Network Analysis	Van Valkenberg	Prentice Hall of India
2.	Network Analysis and Synthesis	F. F. Kuo	John Wiley & Sons
3.	Network Analysis	G K Mithal	Khanna Publishers

COURSE CODE: ELE-3417B

SIGNALS & SYSTEMS

Credits: 03

S. No	Topics	Number of Hours
1.	**Introduction:** Continuous-Time and Discrete-Time Signals, Transformations of Independent Variable, Exponential and Sinusoidal Signals, Unit Impulse and Unit Step Functions, Continuous-Time and Discrete-Time Systems, Properties.	5
2.	**Discrete-Time & Continuous-Time LTI Systems:** Properties of Linear Time-Invariant Systems. Causal LTI Systems Described by Differential and Difference Equations. Singularity Functions.	5
3.	**Fourier Series Representation of Periodic Signals:** Response of LTI Systems to Complex Exponentials, Fourier Series Representation of Continuous-Time Periodic Signals, Convergence of the Fourier Series, Properties of Continuous-Time Fourier Series, Fourier Series Representation of Discrete-Time Periodic Signals, Properties of Discrete-Time Fourier Series, Fourier Series and LTI Systems, Filtering, Examples of Continuous-Time Filters Described by Differential Equations, Examples of Discrete-Time Filters Described by Difference Equations.	8
4.	**Discrete-Time Fourier Transform.**	3
5.	**Time- and Frequency Characterization of Signals and Systems:** The Magnitude-Phase Representation of the Fourier Transform, The Magnitude-Phase Representation of the Frequency Response of LTI Systems, Time-Domain Properties of Ideal Frequency-Selective Filters, Time- Domain and Frequency-Domain Aspects of Non-ideal Filters.	5
6.	**Sampling:** Representation of a Continuous-Time Signal by Its Samples: The Sampling Theorem, Reconstruction of a Signal from Its Samples Using Interpolation, The Effect of Under sampling: Aliasing, Discrete-Time Processing of Continuous-Time Signals, Sampling of Discrete-Time Signals.	5
7.	**The Laplace Transform:** Region of Convergence for Laplace Transforms, Analysis and Characterization of LTI Systems Using the Laplace Transform.	3
8.	**The Z-Transform:** Region of Convergence for the z-Transform, Analysis and Characterization of LTI Systems Using z-Transforms.	3
9.	Applications of signal and system theory: modulation for communication, filtering and so on.	2
Total number of Hours		39

TextBooks:

S.No	Name of Book	Author	Publisher
1.	Signals and Systems	A.V. Oppenheim, A.S. Willsky and I.T. Young	Prentice hall
2.	Signals and Systems - Continuous and Discrete	R.F. Ziemer, W.H. Tranter and D.R. Fannin	Prentice hall
3.	Signal Processing and Linear Systems	B.P. Lathi	Oxford university press

COURSE CODE: ELE-3517B

ELECTRICAL MEASUREMENT & MEASURING INSTRUMENTS

Credits: 04

S. No	Topics	Number of Hours
1.	Definition of basic terms used in measurements	02
2.	Electro-mechanical indicating instruments: Classification, effects utilized in measuring instruments, errors and their types, various forces in an electro-mechanical indicating instrument, various methods of damping,	04
3.	Galvanometers, Ammeters and Voltmeters (PMMC, Induction, Electrostatic and Dynamometer type), mathematical theory of the D'Arsonval galvanometer	10
4.	Measurement of Power, Energy and Power Factor: Power measurement in three phase a.c. circuits using single phase and 3-phase watt meter, measurement of reactive power (Single phase and 3-phase), Energy measurement using induction type meter	07
5.	Measurement of speed, frequency, and phase difference, Rotational speed measurements-stroboscopic methods, Frequency meters, Phase or power factor meters-Synchroscope	05
6.	Measurement of Resistance:Resistance classification, Measurement of Low resistance, Measurement of medium resistance, Measurement of high resistance, Meggar, Ohmmeter.	06
7.	Measurement of Inductance, Capacitance and Frequency using A.C. bridges.	07
8.	Potentiometers: D.C potentiometers, types & applications, A.C potentiometers, types & applications	04
9.	Magnetic measurements: Introduction, types, measurement of flux density and magnetizing force, Determination of magnetizing curve, hysteresis loop; measurement of Leakage, Magnetic testing with Alternating Current; bridge and potentiometric methods; magnetic shielding	04
10.	Introduction to virtual Instrumentation.	01
Total number of Hours		50

TextBooks:

S.No	Name of Book	Author	Publisher
1.	Electrical Measurements and Measuring Instruments	Golding, Widdis	Pitman
2.	Electrical Electronic Measurements	A.K.Sawhney.	DhanpatRai

COURSE CODE: ELE-3617B

THERMAL ENGINEERING

Credits: 03

S. No	Topics	Number of Hours
1.	THERMODYNAMICS: System and Surroundings, Zeroth Law, Temperature Scales, Equation of the state, First law, Steady flow, Isochoric, Isobaric, isothermal, adiabatic and polytrophic processes. Properties of steam, Second law, Entropy change, Reversible Irreversible processes, Carnot's Cycle, Rankine Cycle, Modified Rankine Cycle, and Flow through nozzle.	14
2.	STEAM TURBINE: Impulse turbine, velocity and pressure compounding , work output, Losses and efficiency, Reaction turbine, work output, losses and efficiency, degree of reaction, Modern steam power cycles, Regenerative and Reheat cycles, Governing of steam Turbines, Fields of Application.	10
3.	I.C. ENGINES: Otto, Diesel and Dual cycles, Magneto and battery ignition, detonation and pre-ignition, Octane Number, Draught, Diesel knock, Cetane Number, various I.C engines fuels, Carburation and Injection , Lubrication, Cooling, Governing of I.C Engines, Fields of Application.	08
4.	GAS TURBINES: Present status and future trends, Basic types and Cycles, Thermal refinements, jet propulsion, fields of Application.	07
Total number of Hours		39

TextBooks:

S.No	Name of Book	Author	Publisher
1.	Steam Turbine Performance and Economics	Bartlett	McGraw Hill
2.	Steam Turbine Theory and Practice	Kearton Pitman	CBS Publishers
3.	Theory and Design of steam and Gas turbine	Loe	McGraw Hill
4.	Gas Turbines Theory and Practice	Cohn and Rogers	Pearson
5.	Turbo machines	Yahya	McGraw Hill

COURSE CODE: ELE-3517BL

ELECTRICAL MEASUREMENT & MEASURING INSTRUMENTS LAB

Credits: 01

S. No.	Experiment
1.	Measurement of power in single phase and three phase circuits using single phase and three phase wattmeters.
2.	Energy Measurement using watt-hour meter as well as using wattmeter and stop watch.
3.	To study the constructional details of an electromechanical indicating instrument with the help of demonstration type of instrument
4.	Measurement of Inductance and capacitance using Bridge techniques (Anderson's Bridge, Wheat Stone's Bridge.)
5.	Measurement of Resistance by different methods (Loss of charge method, substitution Method, Kelvin's Double Bridge)
6.	To Study RC and LC models of a transmission line and observe the variation of voltage magnitude and phase along the line.
7.	Measurement of Electrical and Non Electrical quantities using virtual instrumentation. (Dasylab)

COURSE CODE: ELE-3717BL

BASICS OF MATLAB PROGRAMMING AND SIMULATION LAB

Credits: 02

S. No.	Experiment
1.	Introduction to MATLAB: basic concepts, language, programming and simulation
2.	Programs to study • Basic commands and programs • Loops, conditional statements etc. • Example of Fibonacci series • Solution of differential equations • Functions
3.	Plotting in MATLAB
4.	Use of MATLAB in electrical engineering as in • Transient and steady state analysis of A.C/D.C circuits. • Analysis of Electric Machines and Transformers. Using both programming and simulation knowledge.
5.	Use of MATLAB and SIMULINK Tool boxes.