Electrical Engineering Syllabus for GATE 2015 Examinations:

Engineering Mathematics:

Linear Algebra: Matrix Algebra, System of Linear Equations, Eigen Values and Eigen Vectors

Calculus: mean value theorems, theorems of integral calculus, evaluation of definite and improper integrals, partial derivatives, maxima and minima, Multiple integrals, Fourier series. Vector identities directional derivatives , line surface and volume integrals, Stokes, Gauss and Green's theorems.

Differential Equations: first order equation (linear and Non linear) higher order linear differential equations with constant co-efficients, methods of variation of parameters, Cauchy's and Euler's equations, initial and boundary value problems, partial differential equation and variable separable method.

Complex Variables: analytic functions, Cauchy's integral theorem and integral formula, Taylor's and Laurent's series , residue theorem, solution integrals.

Probability and statistics: sampling theorems, conditional probability, mean, median, mode and standar deviation, random variables, discrete and continous distributions, Poisson, normal and binomial distributions, correlation and regression analysis.

Electrical Engineering:

Electrical Circuits and Fields: network graph, KCL, KVL, Node and Mesh Analysis, transient response of DC and AC networks, sinusoidal steady –state analysis, resonance, basic filter concepts, ideal current nad voltage sources. Thevenin's Norton's and superposition and maximum power transfer theorems, tow-port network, three phase circuits, Gauss Theorem, Electric field and potential due to point, line, plane and spherical charge, distributions, Ampere's and Biot –Savart's laws, inductance, dialectrics, capacitance.

Signals and systems: representation of continous and discrete – time signals, shifting and scaling operations, linear, time – invariant and causal systems, fourier series representations of continous periodic signals, sampling theorem, Fourier, Laplace and Z transforms.

Electrical Machines: single phase transformer – equivalent circuit, phasor diagram, Tests, Regulation and Efficiency, three phase transformers – energy conversion principles, DC machines – types, windings, generator characteristics, armature reaction and commutations, starting and speed control of motors, three phase induction motors- principles, types, performance characteristics, starting and speed control, single phase induction motors, synchronous machines-performance, regulation and parallel operation of generator, motor starting, characteristics and applications, servo and stepper motors.

Power systems: basic power generation concepts, transmission line models and performance, cable performance, insulation, corona and radio interference, distribution systems, per-unit quantities, bus impedance and admittance matrices, load flow, voltage control, Power factor correction, Economic operation, Symmetrical components, Fault analysis, principle of over- current, Differential and Distance protection, Solid state relays and Digital protection, Circuit breakers, system stability concepts, swing curves and equal area criterion, HDVC transmission and FACTS concepts.

Control systems: principles of feedback, transfer function, block diagrams, steady-state errors, Routh and Niquist Techniques, Bode plots, root loci, lag, lead and lead-lag compensation, state space model, state transition matrix, controllability and observability.

Electrical and electronic measurements: bridges and potentiometers, PPMC, moving iron, dynamometer and induction type instruments, measurement of voltage, current, power, energy and power factor, instrument transformers, digital voltmeters and multimeters, phase time and frequency measurement Q-meters, oscilloscopes, potentiometric recorders, error analysis.

Analog and digital electronics: characteristic of diodes, BJT, FET amplifiers – biasing, equivalent circuit and frequency response, oscillators and feeback amplifiers, operational amplifiers – characteristics and applications, simple active filters, VCOs and timer, combinational and sequential logic circuits,

multiplexer, Schmitt trigger, multi-vibrators, sample and hold circuits, A/D and D/A converters, 8-bit microprocessor basics, architecture, programming and interfacing.
Power Electronics and Drives: Semi conductor power diodes, transistor, thyristors, triacs, GTOs , MOSFETs and IGBTs – static characteristics and principles of operation, triggering circuits, phase control rectifiers, bridge convertes, – fully controlled and half controlled, principles of choppers and inverters, basis concepts of adjustable speed