



# Engineering Nerds Program

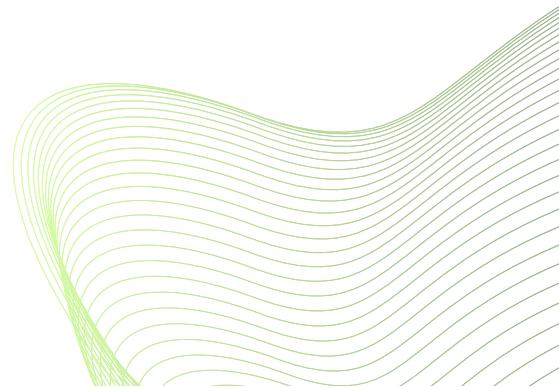


By Geeks Of Gurukul



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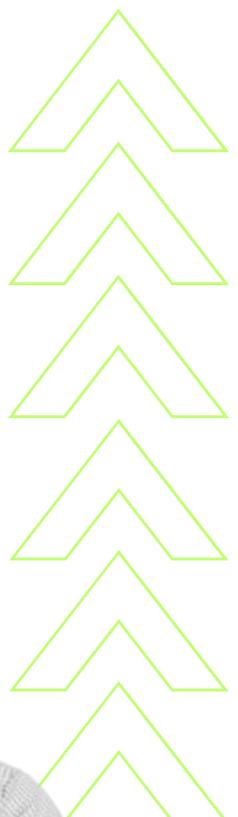


# About Us

Geeks of Gurukul is a leading skill building school where we upskill and provide the opportunity to work directly with industry experts on latest projects. We offer programs in both IT and Non-IT domains providing equal opportunity to everyone.

## Our Mission

- Our commitment is to make education accessible and affordable to all.
- To democratize the higher education in true sense.
- To assist individuals in developing fulfilling jobs.



# Courses We Offer

## A. School Champ Programs

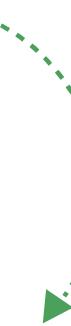
1. Basic Coding Champions
2. Advance Coding Champions

## B. Coding Bees Program

1. Full Stack Data Analytics
2. Full Stack Web Development

## C. Engineering Nerd Program

1. Mechanical Engineering
2. Electrical Engineering



# Engineering Nerds Curriculum



## Electrical Engineering Curriculum



### Block A - Week 1 - Week 25

**1. Electric circuits Network elements:** ideal voltage and current sources, dependent sources, R, L, C, M elements; Network solution methods: KCL, KVL, Node, and Mesh analysis; Network Theorems: Thevenin's, Norton's, Superposition and Maximum Power Transfer theorem; Transient response of dc and ac networks, sinusoidal steady-state analysis, resonance, two-port networks, balanced three-phase circuits, star-delta transformation, complex power and power factor in ac circuits.

**2. Electromagnetic Fields:** Coulomb's Law, Electric Field Intensity, Electric Flux Density, Gauss's Law, Divergence, Electric field and potential due to point, line, plane, and spherical charge distributions, Effect of the dielectric medium, Capacitance of simple configurations, Biot-Savart's law, Ampere's law, Curl, Faraday's law, Lorentz force, Inductance, Magnetomotive force, Reluctance, Magnetic circuits, Self and Mutual inductance of simple configurations.

**3. Signals and Systems** Representation of continuous and discrete time signals, shifting and scaling properties, linear time-invariant and causal systems, Fourier series representation of continuous and discrete time periodic signals, sampling theorem, Applications of Fourier Transform for continuous and discrete time signals, Laplace Transform and Z transform. R.M.S. value, average value calculation for any general periodic waveform.

**4. Electrical Machines** Single phase transformer: equivalent circuit, phasor diagram, open circuit and short circuit tests, regulation and efficiency; Three-phase transformers: connections, vector groups, parallel operation; Auto-transformer, Electromechanical energy conversion principles; DC machines: separately excited, series and shunt, motoring and generating mode of operation and their characteristics, speed control of dc motors; Three-phase induction machines: principle of operation, types, performance, torque-speed characteristics, no-load and blocked-rotor tests, equivalent circuit, starting and speed control; Operating principle of single-phase induction motors; Synchronous machines: cylindrical and salient pole machines, performance and characteristics, regulation and parallel operation of generators, starting of synchronous motors; Types of losses and efficiency calculations of electric machines.

**5. Power Systems** Basic concepts of electrical power generation, ac and dc transmission concepts, Models and performance of transmission lines and cables, Economic Load Dispatch (with and without considering transmission losses), Series and shunt compensation, Electric field distribution and insulators, Distribution systems, Per-unit quantities, Bus admittance matrix, Gauss- Seidel and Newton-Raphson load flow methods, Voltage and Frequency control, Power factor correction, Symmetrical components, Symmetrical and unsymmetrical fault analysis, Principles of over-current, differential, directional and distance protection; Circuit breakers, System stability concepts, Equal area criterion.

**6. Control Systems** Mathematical modeling and representation of systems, Feedback principle, transfer function, Block diagrams and Signal flow graphs, Transient and Steady-state analysis of linear time invariant systems, Stability analysis using Routh-Hurwitz and Nyquist criteria, Bode plots, Root loci, Lag, Lead and Lead Lag compensators; P, PI and PID controllers; State space model, Solution of state equations of LTI systems.

**7. Electrical and Electronic Measurements** Bridges and Potentiometers, Measurement of voltage, current, power, energy and power factor; Instrument transformers, Digital voltmeters and multimeters, Phase, Time and Frequency measurement; Oscilloscopes, Error analysis.

**8. Analog and Digital Electronics** Simple diode circuits: clipping, clamping, rectifiers; Amplifiers: biasing, equivalent circuit and frequency response; oscillators and feedback amplifiers; operational amplifiers: characteristics and applications; single stage active filters, Active Filters: Sallen Key, Butterwooth, VCOs and timers, combinatorial and sequential logic circuits, multiplexers, demultiplexers, Schmitt triggers, sample and hold circuits, A/D and D/A converters.

**9. Power Electronics** Static V-I characteristics and firing/gating circuits for Thyristor, MOSFET, IGBT; DC to DC conversion: Buck, Boost and Buck-Boost Converters; Single and three-phase configuration of uncontrolled rectifiers; Voltage and Current commutated Thyristor based converters; Bidirectional ac to dc voltage source converters; Magnitude and Phase of line current harmonics for uncontrolled and thyristor based converters; Power factor and Distortion Factor of ac to dc converters; Single- phase and three-phase voltage and current source inverters, sinusoidal pulse width modulation.

## **Block B - Week 31 - Week 40**

Practical of all the above topics

## **Block C - Week 41 - Week 45**

1. Mathematical & Logical Aptitude
2. Case-Study
3. Industry-based Projects
4. Soft Skill Training
5. Resume Building & LinkedIn Building
6. Mock - HR Interviews & Technical Interviews
7. Revision

# Engineering Nerds Curriculum



## Mechanical Engineering Curriculum



### Block A - Week 1 - Week 25

**1. Applied Mechanics and Design** Engineering Mechanics: Free-body diagrams and equilibrium; friction and its applications including rolling friction, belt-pulley, brakes, clutches, screw jack, wedge, vehicles, etc.; trusses and frames; virtual work; kinematics and dynamics of rigid bodies in plane motion; impulse and momentum (linear and angular) and energy formulations; Lagrange's equation.

Mechanics of Materials: Stress and strain, elastic constants, Poisson's ratio; Mohr's circle for plane stress and plane strain; thin cylinders; shear force and bending moment diagrams; bending and shear stresses; concept of shear centre; deflection of beams; torsion of circular shafts; Euler's theory of columns; energy methods; thermal stresses; strain gauges and rosettes; testing of materials with universal testing machine; testing of hardness and impact strength.

Theory of Machines: Displacement, velocity and acceleration analysis of plane mechanisms; dynamic analysis of linkages; cams; gears and gear trains; flywheels and governors; balancing of reciprocating and rotating masses; gyroscope.

Vibrations: Free and forced vibration of single degree of freedom systems, effect of damping; vibration isolation; resonance; critical speeds of shafts.

Machine Design: Design for static and dynamic loading; failure theories; fatigue strength and the SN diagram; principles of the design of machine elements such as bolted, riveted and welded joints; shafts, gears, rolling and sliding contact bearings, brakes and clutches, springs.

## 2. Fluid Mechanics and Thermal Sciences

**Fluid Mechanics:** Fluid properties; fluid statics, forces on submerged bodies, stability of floating bodies; control-volume analysis of mass, momentum and energy; fluid acceleration; differential equations of continuity and momentum; Bernoulli's equation; dimensional analysis; viscous flow of incompressible fluids, boundary layer, elementary turbulent flow, flow through pipes, head losses in pipes, bends and fittings; basics of compressible fluid flow.

**Heat-Transfer:** Modes of heat transfer; one dimensional heat conduction, resistance concept and electrical analogy, heat transfer through fins; unsteady heat conduction, lumped parameter system, Heisler's charts; thermal boundary layer, dimensionless parameters in free and forced convective heat transfer, heat transfer correlations for flow over flat plates and through pipes, effect of turbulence; heat exchanger performance, LMTD and NTU methods; radiative heat transfer, StefanBoltzmann law, Wien's displacement law, black and grey surfaces, view factors, radiation network analysis

**Thermodynamics:** Thermodynamic systems and processes; properties of pure substances, behavior of ideal and real gases; zeroth and first laws of thermodynamics, calculation of work and heat in various processes; second law of thermodynamics; thermodynamic property charts and tables, availability and irreversibility; thermodynamic relations.

**Applications:** Power Engineering: Air and gas compressors; vapour and gas power cycles, concepts of regeneration and reheat. I.C. Engines: Air-standard Otto, Diesel and dual cycles.

Refrigeration and air-conditioning: Vapour and gas refrigeration and heat pump cycles; properties of moist air, psychrometric chart, basic psychrometric processes.

**Turbomachinery:** Impulse and reaction principles, velocity diagrams, Pelton-wheel, Francis and Kaplan turbines; steam and gas turbines.

### 3. Materials, Manufacturing and Industrial Engineering Engineering

**Materials:** Structure and properties of engineering materials, phase diagrams, heat treatment, stress-strain diagrams for engineering materials. **Casting, Forming and Joining Processes:** Different types of castings, design of patterns, moulds and cores; solidification and cooling; riser and gating design. Plastic deformation and yield criteria; fundamentals of hot and cold working processes; load estimation for bulk (forging, rolling, extrusion, drawing) and sheet (shearing, deep drawing, bending) metal forming processes; principles of powder metallurgy. Principles of welding, brazing, soldering and adhesive bonding.

**4. Machining and Machine Tool Operations:** Mechanics of machining; basic machine tools; single and multi-point cutting tools, tool geometry and materials, tool life and wear; economics of machining; principles of non-traditional machining processes; principles of work holding, jigs and fixtures; abrasive machining processes; NC/CNC machines and CNC programming.

**5. Metrology and Inspection:** Limits, fits and tolerances; linear and angular measurements; comparators; interferometry; form and finish measurement; alignment and testing methods; tolerance analysis in manufacturing and assembly; concepts of coordinate-measuring machine (CMM).

**Computer Integrated Manufacturing:** Basic concepts of CAD/CAM and their integration tools; additive manufacturing.

**Production Planning and Control:** Forecasting models, aggregate production planning, scheduling, materials requirement planning; lean manufacturing.

**Inventory Control:** Deterministic models; safety stock inventory control systems.

**Operations Research:** Linear programming, simplex method, transportation, assignment, network flow models, simple queuing models, PERT and CPM.

## Block B - Week 31 - Week 40

1. Practicals of Applied Mechanics and Design
2. Practicals of Fluid Mechanics and Thermal Sciences
3. Practicals of Materials, Manufacturing and Industrial Engineering
4. Practicals of Machining and Machine Tool Operations
5. Practicals of Metrology and Inspection
6. Practicals of Computer Integrated Manufacturing
7. Practicals of Production Planning and Control
8. Practicals of Inventory Control & Operations Research

## Block C - Week 41 - Week 45

1. Mathematical & Logical Aptitude
2. Case-Study
3. Industry based Projects
4. Soft Skill Training
5. Resume Building & LinkedIn Building
6. Mock - HR Interviews & Technical Interviews
7. Revision



# Course Details



Time commitment  
**2 hours every day**



Flexible Hours  
**Mon to Sat**



Course Language  
**Eng + Hindi**



**Learn**  
Every Thing From Scratch



**100+ Live Projects**



**100+ Assignments**



Eligibility  
**All Degrees & Branches**



**Live Mock Interviews**

# Skills And Tools

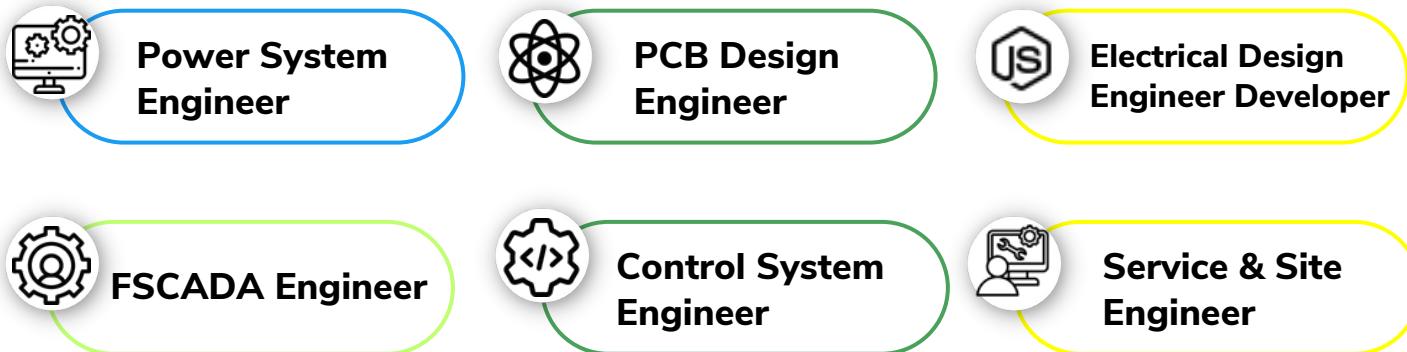


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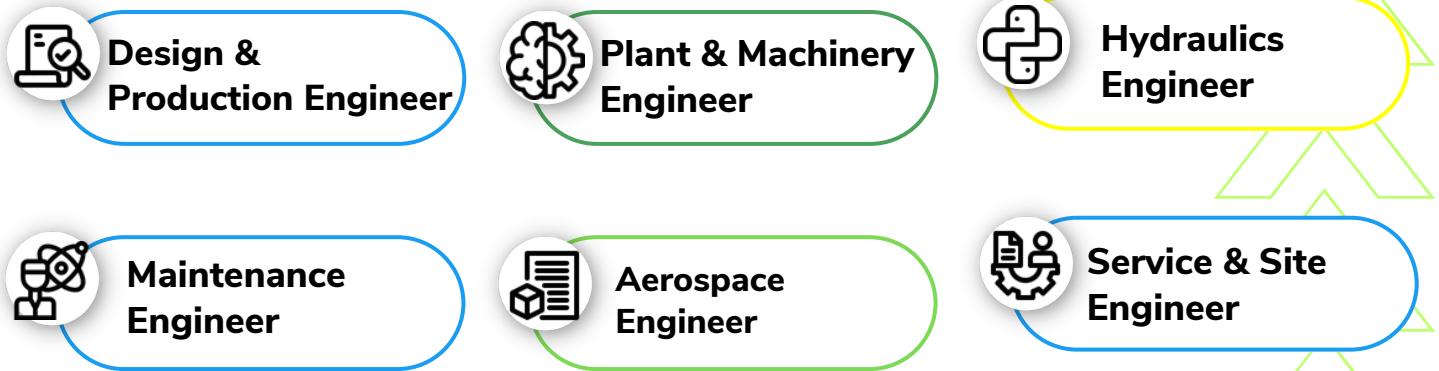


**AUTODESK®**

# Career Opportunities After Electrical Engineering



# Career Opportunities After Mechanical Engineering



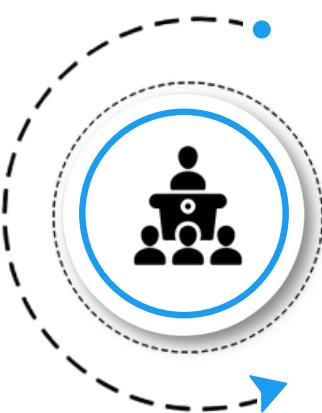
# Admission



Registration



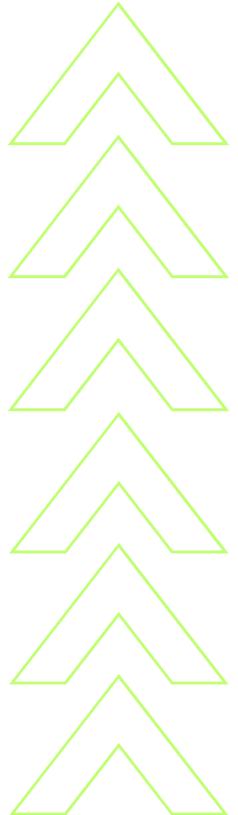
Documentation



Join Class



Start Learning



# Placement Support

## Resume Building

You can get assistance from the professionals at Resume Building to write a resume that will get you interviews and suitable jobs.

## Mock Interviews

We help you get ready for the pressure of a face-to-face interview. We can assist you whether you're a seasoned professional, a recent graduate, or a student!

## Personalised Guidance

Get individualised advice from our placement team so you can set yourself up for success.

## Referral With Our Hiring Partners

Start giving interviews with our international hiring partners who are seeking candidates exactly like you and forging connections with them.



# Hiring Partners



**SIEMENS**



**ABB**

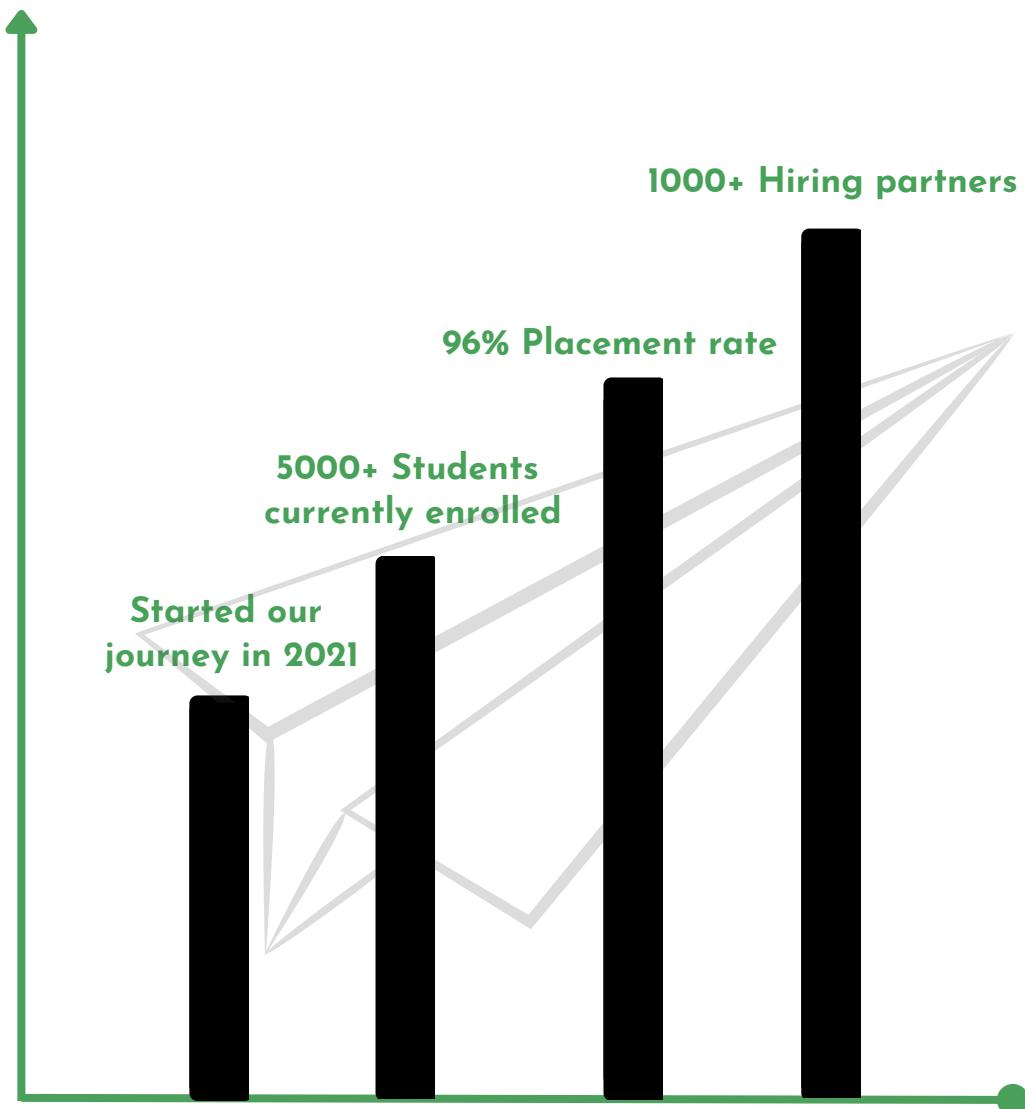


**AMERICAN EXPRESS**



Enriching Lives

# Our Journey So Far



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