



# ENGINEERS CAREER GROUP™

Leaders in IES & GATE Since 2009

## Syllabus for Scholarship Test

## Mechanical Engineering

### Engineering Mathematics and Aptitude

#### Linear Algebra

Matrix algebra, Systems of linear equations, Eigen values and eigenvectors

#### Differential equations

First order equation (linear and nonlinear), Higher order linear differential equations with constant coefficients, Method of variation of parameters, Cauchy's and Euler's equations, Initial and boundary value problems, Partial Differential Equations and variable separable method.

#### Probability and Statistics

Sampling theorems, Conditional probability, Mean, median, mode and standard deviation, Random variables, Discrete and continuous distributions, Poisson, Normal and Binomial distribution, Correlation and regression analysis.

#### Verbal Ability

English grammar, sentence completion, verbal analogies, word groups, instructions, critical reasoning and verbal deduction.

**Numerical Ability:** Numerical computation, numerical estimation, numerical reasoning and data interpretation.

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Head Office: S.C.O-80-81-82, 3<sup>rd</sup> and 4<sup>th</sup> floor, Sector-34/A, Chandigarh

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## Mechanical Engineering (ME)

### Strength of Materials

Stress and strain, stress-strain relationship and elastic constants, Mohr's circle for plane stress and plane strain, thin cylinders; shear force and bending moment diagrams; bending and shear stresses; deflection of beams; torsion of circular shafts; Euler's theory of columns; strain energy methods; thermal stresses.

### Theory of Machines

Displacement, velocity and acceleration analysis of plane mechanisms; dynamic analysis of slider-crank mechanism; gear trains; flywheels.

### Thermodynamics

Zeroth, First and Second laws of thermodynamics; thermodynamic system and processes; Carnot cycle. irreversibility and availability; behavior of ideal and real gases, properties of pure substances, calculation of work and heat in ideal processes; analysis of thermodynamic cycles related to energy conversion.

### Applications

Power Engineering: Steam Tables, Rankine, Brayton cycles with regeneration and reheat. I.C. Engines: air-standard Otto, Diesel cycles, Refrigeration cycle.

### Metal Casting

Design of patterns, moulds and cores; solidification and cooling; riser and gating design, design considerations.

### Forming

Design of patterns, moulds and cores: solidification and cooling; riser and gating design, design considerations.

### Joining

Physics of welding, brazing and soldering; adhesive bonding; design considerations in welding.

### Machining and Machine Tool Operations

Mechanics of machining, 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, principles of design of jigs and fixtures.

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## Contact Info

### Head office

S.C.O- 80-81-82, 3<sup>rd</sup> and 4<sup>th</sup> floor, Near passport office, Sector-34/A, Chandigarh

### Branch Office

S.C.O-89, Near NIT KUK, Sector-17, Kurukshetra

### Toll Free

1800-270-4242

### E-Mail

[engineersacregroup@live.in](mailto:engineersacregroup@live.in)

### Web

[www.engineerscareergroup.in](http://www.engineerscareergroup.in)

### Call/SMS

+91-9855224442

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