

UPSC – Engineering Service Examination

Preliminary Examination

The Preliminary stage consists of two papers:

Paper I: General Studies and Engineering Aptitude (200 Marks, 2 Hours)

This paper is common to all engineering disciplines and includes the following topics:

1. **Current Issues of National and International Importance:**
 - Related to social, economic, and industrial development.
2. **Engineering Aptitude:**
 - Logical reasoning and analytical ability.
3. **Engineering Mathematics:**
 - Basic numerical analysis, linear algebra, calculus, probability, and statistics.
4. **Basics of Energy and Environment:**
 - Conservation, environmental pollution, sustainable development.
5. **Project Management:**
 - Basics of project planning, scheduling, and monitoring.
6. **Material Science and Engineering:**
 - Properties and applications of engineering materials.
7. **Ethics and Values in Engineering:**
 - Professional ethics and values in engineering.
8. **Information and Communication Technology (ICT):**
 - Basics of networking, software engineering, cybersecurity.
9. **Standards and Quality Practices:**
 - Quality control, quality assurance, and standards.
10. **Basics of Engineering Economics and Industrial Management:**
 - Costing, financial management, supply chain management.
11. **Design, Drawing, and Safety:**
 - Basics of engineering design, safety standards.

Paper II: Discipline-Specific (300 Marks, 3 Hours)

This paper focuses on the core engineering discipline chosen by the candidate. Below are the key topics for each discipline:

1. Civil Engineering

1. **Building Materials:** Properties of concrete, steel, bricks, etc.
 2. **Structural Engineering:** Mechanics, analysis, design of structures.
 3. **Geotechnical Engineering:** Soil mechanics, foundation engineering.
 4. **Water Resources Engineering:** Hydrology, irrigation, and flood control.
 5. **Environmental Engineering:** Water supply, waste management.
 6. **Transportation Engineering:** Highway design, traffic engineering.
 7. **Surveying:** GPS, remote sensing, levelling.
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2. Mechanical Engineering

1. **Thermodynamics:** Heat transfer, IC engines, refrigeration, and air conditioning.
 2. **Fluid Mechanics:** Hydraulic machinery, fluid dynamics.
 3. **Engineering Mechanics:** Statics, dynamics, vibrations.
 4. **Production Engineering:** Metal cutting, casting, welding.
 5. **Machine Design:** Design of mechanical elements.
 6. **Material Science:** Properties and manufacturing processes.
 7. **Mechatronics and Robotics:** Basics of automation.
 8. **Renewable Energy:** Solar, wind, and other non-conventional sources.
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3. Electrical Engineering

1. **Circuits and Fields:** Basics of electrical circuits, electromagnetic fields.
 2. **Electrical Machines:** Transformers, motors, generators.
 3. **Power Systems:** Generation, transmission, distribution.
 4. **Control Systems:** Stability, controllers, system analysis.
 5. **Measurements and Instrumentation:** Transducers, sensors, data acquisition.
 6. **Power Electronics:** Converters, inverters, drives.
 7. **Analog and Digital Electronics:** Operational amplifiers, logic circuits.
 8. **Renewable Energy:** Smart grids, renewable energy sources.
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4. Electronics and Telecommunication Engineering

1. **Networks:** Circuit theory, signal processing.
 2. **Control Systems:** System modeling, stability.
 3. **Electronic Devices:** Diodes, transistors, microprocessors.
 4. **Analog and Digital Circuits:** Amplifiers, filters, A/D conversion.
 5. **Communication Systems:** Modulation, satellite, optical fiber.
 6. **Microwave Engineering:** Waveguides, antennas, radar.
 7. **Computer Engineering:** Operating systems, databases, microcontrollers.
 8. **Signals and Systems:** Fourier, Laplace transforms.
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Main Examination

The Main stage tests advanced knowledge in the discipline-specific syllabus through **two conventional (descriptive) papers**:

- **Paper I:** Discipline-Specific Topics (300 Marks)
- **Paper II:** Discipline-Specific Topics (300 Marks)

The syllabus for these papers is a deeper extension of the topics covered in the Preliminary stage for the chosen engineering discipline.

Personality Test (Interview)

- Focuses on the candidate's technical knowledge, problem-solving abilities, leadership, and decision-making skills.
- Awareness of the latest technologies, government projects, and policies is also tested.