The Ultimate Guide to GATE Exam Prep

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About GATE Exam

Initiated in 1983, GATE or Graduate Aptitude Test in Engineering is conducted once every year to assess a student's comprehensive mastery of numerous undergraduate engineering and scientific disciplines. 7-8 lakh students from different branches such as Civil Engineering, Mechanical Engineering, Electrical Engineering, Electronics & Communication

Engineering and Computer Science take this exam to test their calibre in their domain and pursue their preferred interests.

The cut-off for clearing GATE is usually low. However, to secure admission to premier institutes such as IITs, NITs and IISc Bangalore or to get into top PSUs, one must be in the top 0.5% of the candidates appearing

GATE Conducting Bodies

GATE is conducted in a cyclical pattern by the following institutes:

- **GATE 2025 : IIT Roorkee**
- **GATE 2024 : IISc Bangalore**
- **GATE 2023 : IIT Kanpur**
- **GATE 2022: IIT Kharagpur**
- **GATE 2021: IIT Bombay**
- **GATE 2020: IIT Delhi**
- **GATE 2019: IIT Madras**
- **GATE 2018: Guwahati**
- **GATE 2017: IIT Roorkee**
- **GATE 2016: IISc Bangalore**
- **GATE 2015: IIT Kanpur**
- **GATE 2014: Kharagpur**

and so on…

Opportunities After GATE

- **PSU Jobs**

- **M.Tech and higher Education from IITs, NITs and IISc**

- **Job Placements in Private Core Companies**

- **Post-Graduation from Abroad**

- **Junior Research Fellowship**

- **Teaching Jobs and many more**

Preparing for GATE, helps students to qualify for other marquee exams such as BARC, ISRO and other PSUs as well. This is because the syllabus and conceptual knowledge required for these exams are almost the same. The only difference is in the exam pattern.

Students can also prepare for ESE along with their GATE preparation, as the basic concepts remain unchanged for both exams. However, ESE requires some more subjects to be covered.

Venturing into PSUs

Getting a good score in GATE opens the door to many sought after PSUs, which offers great career prospects and salary packages.

PSUs base the selection of a candidate majorly on their GATE scores which take up to 70-80% weightage in the selection process. GATE scores are backed by the candidate's performance in further rounds such as Personal Interviews, Group Discussions etc. This being said, some PSUs conduct their own tests with a similar syllabus as that of GATE but the pattern may differ.

Thus, preparing for GATE helps you to excel in other PSU tests as well.

Important PSUs with Initial Salary Packages	
Organization	**Approx CTC**
Oil & Natural Gas Corporation Limited (ONGC)	16.5 Lac
Indian Oil Corporation Limited (IOCL)	16 Lac
National Thermal Power Corporation Limited (NTPC)	18 Lac
Coal India Limited (CIL)	8 Lac
Steel Authority of India (SAIL)	10 Lac
Bharat Petroleum Corporation Limited (BPCL)	16 Lac
Gas Authority of India Limited (GAIL)	16 Lac
Neyveli Lignite Corporation Limited(NLC)	10 Lac
Hindustan Petroleum Corporation Limited (HPCL)	16 Lac
Oil India Limited (OIL)	15 Lac
Power Grid Corporation of India Limited (PGCIL)	20 Lac
Hindustan Aeronautics Limited (HAL)	8 Lac
National Mineral Development Corporation Limited (NMDC)	10 Lac
National Aluminium Company Limited (NALCO)	16 Lac
Mazagon Docks Limited (MDL)	14 Lac

Private Jobs Post GATE

Private sector companies consider the GATE Score/Rank while looking for suitable candidates. Thus, it is important for students who are looking at a career in the private sector to have a good GATE Score/Rank. This is especially true in the case of Civil, Mechanical, Electrical and Electronics Engineering companies.

Post-Graduation

One of the most sought after paths post GATE is to seek admission to top IITs, IISc & top NITs for M.Tech (post-graduate program).

To get admission to IITs and IISc, one needs to apply separately for each IIT & appear for COAP (Common Offer Acceptance Portal) counselling sessions. Notably, some IITs also conduct interview rounds as a part of their admission process The selection criteria for top NITs and other Government funded Institutes include CCMT Counselling.

Top Colleges for Admission Through GATE

IISc Bangalore	IIT Guwahati	IIT BHUBANESWAR
IIT Madras	IIT Hyderabad	IIT PATNA
IIT Bombay	NIT TRICHY	IIT ROPAR
IIT Kharagpur	NIT WARANGAL	NIT CALICUT
IIT Delhi	NIT SURATHKAL	MNNIT ALLAHABAD
IIT Kanpur	IIT INDORE	
IIT Roorkee	ISM DHANBAD	

Admission to Foreign Universities via GATE:

GATE opens new vistas for students as many Foreign Universities consider it for admission.

Singapore:

Two of the premier universities in Singapore, Nanyang Technological University (NTU) and the National University of Singapore (NUS), accept GATE for admission to their post-graduate programs. According to global research surveys, they are highly ranked universities and are positioned among the top 20 universities in the world.

Germany:

Germany is well-known for opening access to a plethora of opportunities for growth and research in the field of Mechanical and Production engineering, thus making it a preferred location for students aiming to pursue Masters in these subjects.

Two of the most prominent universities of Germany accepting GATE are the Technical University of Germany and the RWTH ACHEN, among a few others.

Details of Universities				
S.No.	**University**	**Country**	**World Ranking**	**GATE score (req. ave. %)**
1	National University of Singapore (NUS)	Singapore	12	90
2	Nanyang Technological University (NTU)	Singapore	13	90
3	Technical University of Germany	Germany	60	90
4	RWTH ACHEN	Germany	145	-

Eligibility Criteria for GATE

Candidates who are currently in 3rd or higher year of any undergraduate degree program OR have already completed any government approved degree program in Engineering / Technology are eligible for appearing in the GATE exam.

Degree/Program	Qualifying Degree/Examination	Eligible Candidates
B.E/ B. Tech	Bachelor's degree in Engineering / Technology (4 years after 10+2 or 3 years after B.Sc. / Diploma in Engineering / Technology)	Currently in 3rd Year or higher or have already graduated
Int. M.E./ M.Tech. (Post-B.Sc.)	Post-B.Sc Integrated Master's degree programs in Engineering/ Technology (4-year program)	Studying In any year or have already graduated
Int. M.E./ M.Tech./M.Pharm or Dual Degree (after Diploma or 10+2)	Integrated Master's degree program or Dual Degree program in Engineering/Technology (5-year program)	Studying in the 3rd /4th/5th year or already completed

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GATE Papers and Codes

GATE PAPER	CODE
Aerospace Engineering	AE
Agricultural Engineering	AG
Architecture and Planning	AR
Bio-Medical Engineering	BM
Biotechnology	BT
Civil Engineering*	CE
Computer Science and Information Technology*	CS
Chemistry	CY
Electronics and Communication Engineering*	EC
Chemical Engineering	CH
Electrical Engineering*	EE
Environmental Science and Engineering	ES
Ecology and Evolution	EY
Geomatics Engineering	GE

GATE PAPER	CODE
Geology and Geophysics	GG
Instrumentation Engineering	IN
Mathematics	MA
Mechanical Engineering*	ME
Mining Engineering	MN
Metallurgical Engineering	MT
Naval Architecture and Marine Engineering	NM
Petroleum Engineering	PE
Physics	PH
Production and Industrial Engineering	PI
Statistics	ST
Textile Engineering and Fibre Science	TF
Engineering Sciences	XE
Humanities and Social Sciences	XH
Life Sciences	XL

* BYJU's Exam Prep caters to these papers only

GATE Exam Pattern

Particulars	Details
Examination Mode	Computer Based Test (CBT)
Duration	3 Hours
Sections	• General Aptitude (GA) • Technical Subjects
Type of Questions	(a) Multiple Choice Questions (MCQ) (b) Multiple Select Questions (MSQ) (c) Numerical Answer Type Ques. (NAT)
Number of Questions	10 (GA) + 55 (subject) = 65 Questions
Distribution of Marks in all Papers	General Aptitude: 15 Marks Engineering Mathematics: 13 Marks Subject Questions: 72 Marks Total: 100 Marks

Marking Scheme

The GATE Exam consists of MCQ, NAT, and recently introduced MSQ (Multiple Select) questions.

In Multiple Choice Questions, applicants will be provided with 4 options, of which only one is correct.

For an incorrect answer chosen in an MCQ, there will be negative marking. For 1 mark MCQ - 1/3 mark will be deducted if the answer is wrong whereas for 2 marks MCQ - 2/3 marks will be deducted for an incorrect answer.

For Numerical Type Questions, a numerical value should be entered as the answer using a mouse and virtual keyboard on the monitor. There is no negative marking for these questions.

Multiple Select Questions (MSQ), carry 1 or 2 marks each in all the papers and sections. These questions are objective, and each will have a choice of four answers, out of which

ONE or MORE than ONE choice(s) are correct. There is no negative marking for these questions.

GATE Score vs GATE Marks

For all multi-session papers, the following three parameters are calculated to obtain the result of each candidate:

■ Actual GATE Marks

■ Normalized GATE Marks

■ GATE Score

For all single session papers, the following two parameters are defined in the result of each candidate:

■ Actual GATE Marks

■ GATE Score

Actual GATE Marks

■ For MCQs, 1 mark is awarded for every correct answer and 1/3 mark is deducted for every incorrect answer.

■ There is no negative marking for numerical questions and MSQs.

■ GATE actual (raw) marks are awarded out of a total of 100 marks, for around 65 questions.

GATE Score

■ GATE score is calculated out of 1000.

■ It is computed based, on the marks (normalized) obtained by the candidate. This means the marks of the top 0.1% or top 10 of the candidates who appeared in the same paper including multi-session.

Cut-Offs with Qualifying Marks

Mechanical Engineering

GATE Qualifying Marks					
Year	Students Appeared	GEN	OBC/EWS	SC/ST/ PwD	Toppers Marks
2022	89567	28.1	25.2	18.7	90.05
2021	120594	33	29.7	22	93.22
2020	137826	34	30.6	22.6	86.88
2019	167376	34.1	30.7	22.7	94.75
2018	194496	34.7	31.2	23.1	96.83
2017	234727	32.7	29.4	21.8	94.85
2016	197789	29.6	26.6	19.7	94.66
2015	185758	32.7	29.4	21.8	98.33
2014	185578	28.86	25.97	19.24	88.84

Electrical Engineering

GATE Qualifying Marks					
Year	Students Appeared	GEN	OBC/EWS	SC/ST/ PwD	Toppers Marks
2022	69734	30.7	27.6	20.4	92.67
2021	87559	30.3	27.2	20.2	85.33
2020	93526	33.4	30	22.2	87.33
2019	112097	39.6	35.6	26.4	97.33
2018	121383	29.1	26.1	19.4	94
2017	125859	25.2	25.2	16.7	81.52
2016	146293	25.1	22.5	16.7	88.39
2015	125851	25	22.5	16.67	75.96
2014	141799	25	22.5	16.67	81.56

Electronics Engineering

GATE Qualifying Marks					
Year	Students Appeared	GEN	OBC/EWS	SC/ST/ PwD	Toppers Marks
2022	54292	25.0	22.5	16.6	78
2021	80629	25	22.5	16.6	82
2020	83418	28.8	25.9	19.2	82
2019	104782	26.7	24	17.8	89

GATE Qualifying Marks

Year	Students Appeared	GEN	OBC/EWS	SC/ST/PwD	Toppers Marks
2018	125870	25	22.5	16.6	80.67
2017	152318	25	22.5	16.6	83.83
2016	183152	25	22.5	16.6	86.27
2015	172714	25	22.5	16.67	85.02
2014	216367	25.56	23.01	17.04	89.86

Computer Science Engineering

GATE Qualifying Marks

Year	Students Appeared	GEN	OBC/EWS	SC/ST/PwD	Toppers Marks
2022	77257	25.0	22.5	16.6	81
2021	101922	26.1	23.4	17.4	87.81
2020	97481	28.5	25.6	19.0	91
2019	99932	29.5	26.6	19.7	88.67
2018	107893	25	22.5	16.6	83.3
2017	108495	25	22.5	16.6	86.38
2016	131803	25	22.5	16.6	85.95
2015	115425	25	22.5	16.67	85.85
2014	155190	25	22.25	16.67	83.39

Civil Engieering
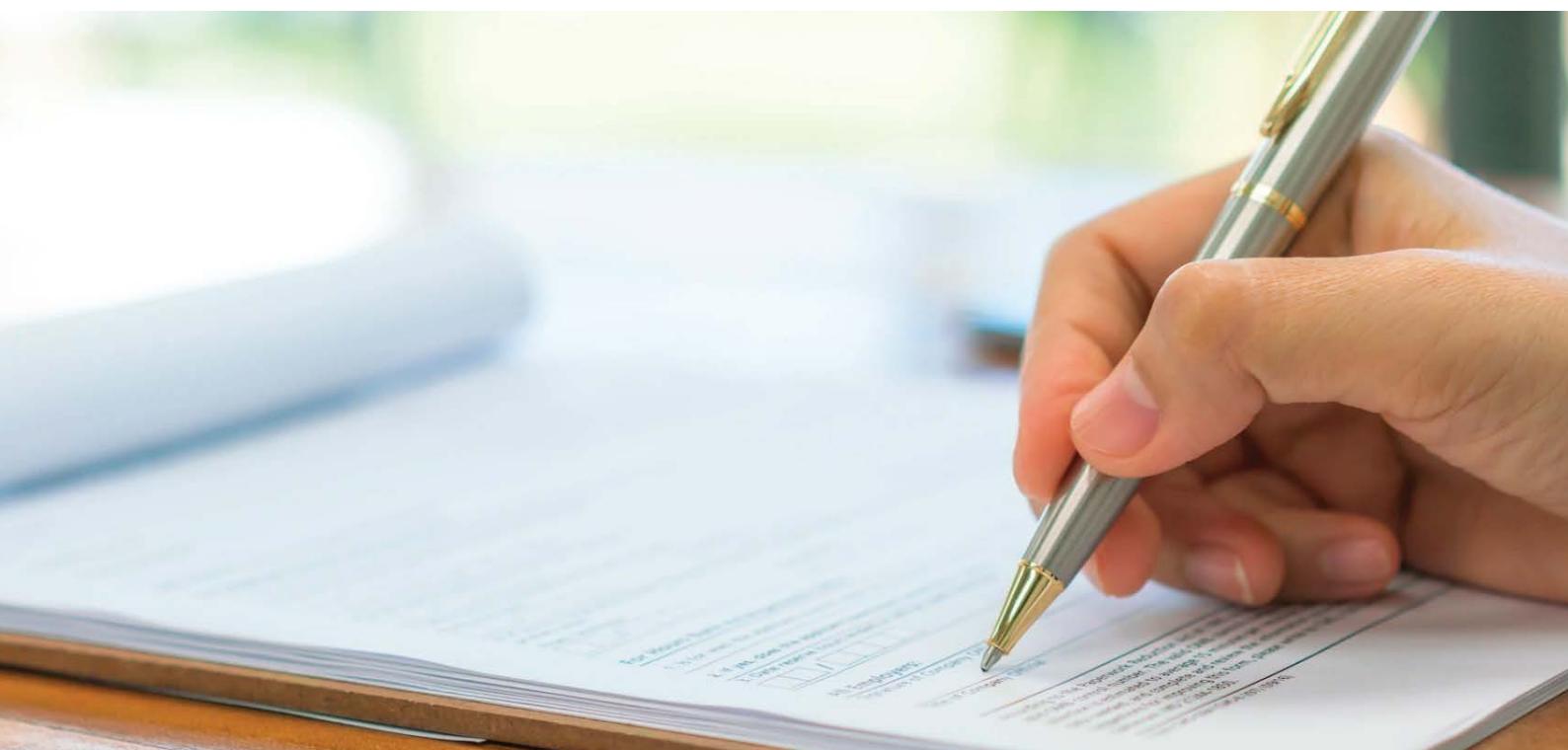
GATE Qualifying Marks					
Year	Students Appeared	GEN	OBC/EWS	SC/ST/PwD	Toppers Marks
2022	100043	30.4	27.3	20.2	97.36
2021	115270	29.2	26.2	19.4	95.56
2020	125974	32.9	29.6	21.9	90.77
2019	145064	28.2	25.4	18.8	87.7
2018	153078	26.9	24.2	17.9	91.29
2017	138140	28.7	25.8	19.1	92.94
2016	118147	25.0	22.5	16.6	87.86
2015	101429	25.0	22.5	16.67	91.04
2014	90872	26.57	23.91	17.71	86.26

ESE Exam Introduction

Indian Engineering Services remains the most sought-after career for engineering graduates in India. The Engineering Services Examination, commonly known as ESE, is held annually by UPSC to recruit engineers in four sectors, namely civil, mechanical, electrical, electronics and telecommunications for positions of management. The exam consists of a written test in two stages followed by an interview. ESE is considered one of the most difficult exams in India due to the low number of vacancies. Due to the highly competitive selection procedure, IES Officers are held in high esteem and status and are responsible for managing and executing activities in various technical and managerial areas.

These candidates after final selection are placed in various Ministries and Departments of Government of India such as Telecommunications, Border Roads, CPWD, CWC, CPES, NHAI, Naval Armament, IDSE , MES, Ordnance Factories, etc., however, the selected candidates can proceed to any cadre, organization, agency, department, ministry and PAUs of Government of India. All of these ultimately selected candidates are designated Class 1 Officers.

IES Exam Highlights

Exam Name	IES- Engineering Services Examination (ESE)
Conducting Authority	UPSC
Vacancies 2023	327
Level of Exam	National
Selection	Preliminary, Mains, Interview
Preliminary Exam	Objective Type
Mains Exam	Conventional
Exam Mode	Offline
Frequency	Annually
Qualification	Engineering Branch
Age Limit	21 to 30 years
Application Fee	Rs. 200

Reasons to Appear for ESE

- ■ **Great Opportunity to Serve the Nation**

- ■ **Secured Central Government Job**

- ■ **Pride Associated with the Post**

- ■ **Attractive salary**

- ■ **Wide scope for Application for Technical knowledge**

- ■ **Desirable Career Progression**

Eligibility Criteria

To be eligible for the IES exam, candidates must have attained the age of 21 years and not have attained the age of 30 years on January 1, 2023. Candidates should not be born earlier than 2nd January 1993 and not later than 1st January 2002. The conducting authority, UPSC, has mentioned the detailed IES eligibility criteria requirements categorized under various sections like nationality, age, educational qualification, etc. in their official notification. Every aspirant must comply with the IES ESE eligibility criteria to avoid disqualification.

To satisfy the IES eligibility, the candidate must fall into any one of the following categories.

- An Indian citizen

- Bhutan or Nepal Subject

- A refugee of Tibetan origin who migrated to India before 01 January 1962 to permanently settle in India

- A person of Indian origin came from Pakistan, Sri Lanka, Burma, or East African countries of Uganda, Zambia, Kenya, the United Republic of Tanzania, Zaire, Malawi, and Ethiopia, or from Vietnam to permanently settle in India.

Note: If you fall into last three categories mentioned above, you must have an eligibility certificate issued by the Government of India.

IES Educational Qualification

To satisfy the IES eligibility, the candidate must have the following educational qualification.

■ Must hold an engineering degree from a recognized institute or university.

■ A candidate holds a degree/diploma in Engineering from a foreign University and is recognized by the Government.

■ Cleared both Sections A and B of the IEI.

■ Cleared Graduate Membership Exam of the Institution of Electronics and Telecommunication Engineers (India).

■ Passed Associate Membership Examination of the Aeronautical Society of India.

■ Passed Graduate Membership Examination of the Institution of Electronics and Radio Engineers.
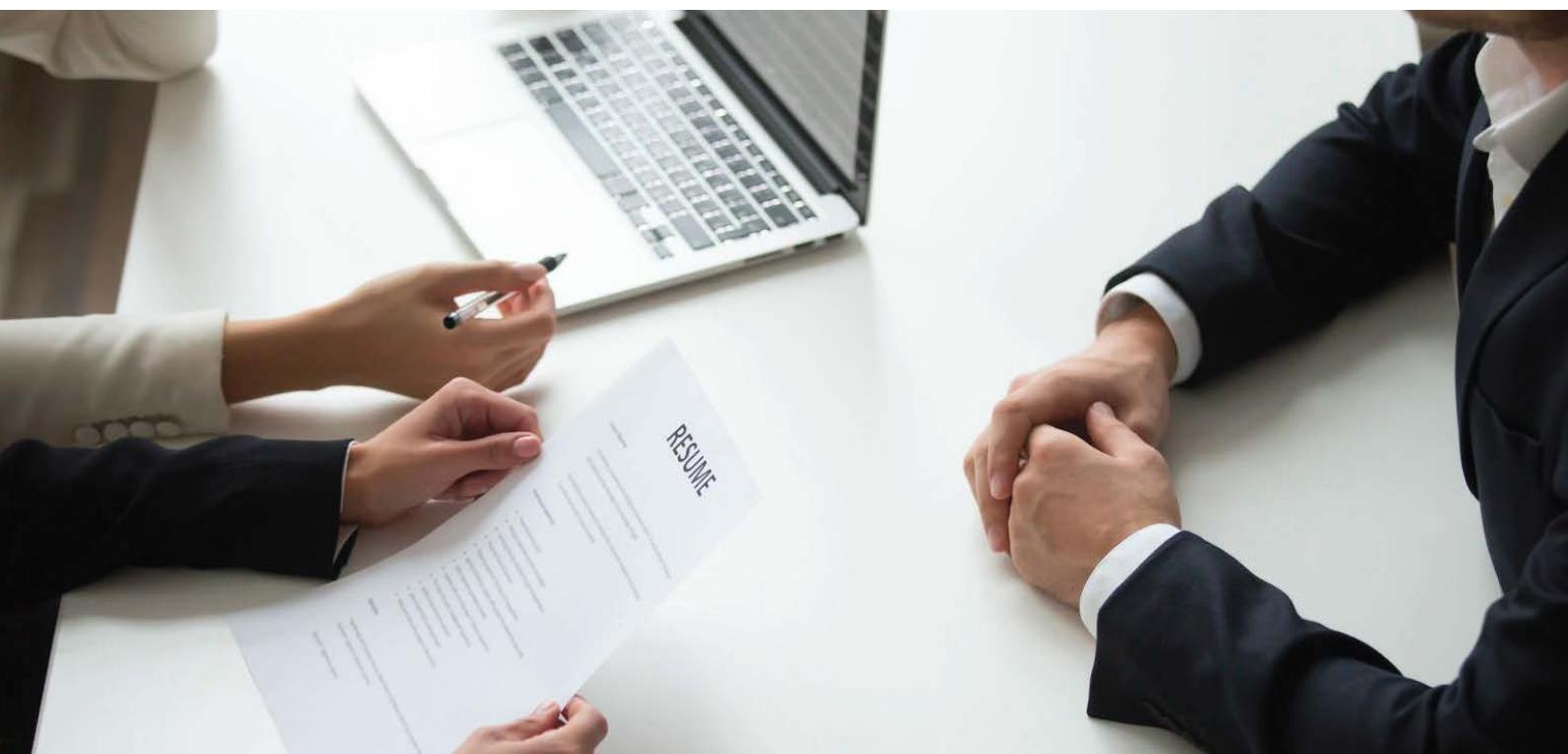
UPSC ESE Selection Process

The selection process for the UPSC ESE Civil Engineering, Electrical Engineering, Mechanical Engineering, and Electronics & Telecommunication Engineering is as follows:

- ■ **ESE Prelims Exam/ Stage I: Objective Paper**

- ■ **ESE Mains Exam/ Stage II: Conventional Paper**

- ■ **ESE Interview/ Personality Test**

You have to qualify for each stage to be eligible to move to the next stage of the selection process. Further, the final selection for each branch of the engineering discipline will be made based on the cutoff marks obtained in Stage I, Stage II, and Stage III.

Exam Pattern

The exam pattern for the IES exam is given below in detail for the Prelims and Mains exams for CE, EE, ME, and EC.

UPSC ESE Prelims Exam Pattern

The ESE Prelims exam is the first stage of the selection process. The ESE Prelims Exam has two papers as tabulated below.

- It has only objective questions in paper-I and paper-II.

- The total mark in the UPSC ESE exam is 500 marks.

- Paper I is common to all candidates, while paper II will have questions from the core engineering subject.

- The total duration of the ESE Prelims exam is 5 hours.

- ⅓ marks assigned to a question are deducted for an incorrect answer.

Paper	Marks	Duration
Paper-I: General Studies and Engineering Aptitude Paper	200 Marks	2 Hours
Paper-II: Core Engineering Branch	300 Marks	3 Hours
Total	**500 Marks**	

UPSC ESE Mains Exam Pattern

If candidates qualify for the ESE Prelims exam, they will be called to appear for the Mains exam.

- The Mains exam of the IES exam will also have 2 papers. However, both papers will be conventional in nature.

- Further, both the papers will have subjects based on the core engineering subject chosen by you while filling the application form, i.e. Civil Engineering, Electrical Engineering, Mechanical Engineering, and Electronics Telecommunication Engineering.

- The commission has the right to deduct up to 5% of the total marks if your handwriting is illegible.

Paper	Questions	Marks	Duration
Paper-I Core Engineering Subjects	6-8 Questions	200 Marks	3 Hours
Paper-II Core Engineering Subjects	6-8 Questions	300 Marks	3 Hours

Total Marks After Prelims and Mains Sums 1100 (500+600).

UPSC ESE Personality Test

STAGE -III	Marks
Personality Test	200
STAGE-I + STAGE-II + STAGE-III	1300

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Salary of ESE Officers

The IES officers are entitled to a handsome payment package as per the recent 7th CPC. The IES has divided cities into 3 classes and candidates will receive the salary according to the class of the city they are posted in. The IES Entry-level Pay Scale will depend upon the allotted locations. The three classes are listed below:

- Class A: Metropolis

- Class B: Metropolis + Other Big Cities

- Class C: Village + Small Cities

Rank/Level	Pay Scale	Grade Pay	Pay Scale
Junior level	₹ 15,600 – ₹ 39,100	₹ 5400	On Joining
Senior Scale	₹ 15,600 – ₹ 39,100	₹ 6600	5 – 6 years of joining
Junior Administrative Grade	₹ 15,600 – ₹ 39,100	₹ 7600	Minimum 10 years after joining
Selection grade scale (Chief Engineer L2 / Jt. G M)	₹ 37400 – ₹ 67000	₹ 8700	13 years or more after joining
Super time grade (Chief Engr. /Additional GM)	₹ 37400 – ₹ 67000	₹ 8700	20 years or more after joining
Cabinet Secretary Grade	₹ 90,000	N/A	Fixed

Allowance and Privileges

Indian Engineering Service Officers are among the top recipients of a good deal of privileges and allowances. Below is a list of allowances and privileges available for IES Officers apart from the basic pay :

- Residential Quarters (Type IV to Type VIII) OR HRA

- Official Vehicle

- Dearness Allowance

- CGHS Medical Facility

- Leave Travel Allowance/ Tour Allowance

- National Pension Scheme

- Gratuity

- Leave Encashment

- Mobile and Briefcase Allowance

- Newspaper and Mobile Bill Reimbursement

- Laptops

- Children Education Allowance

- Transport Allowance (approx. 8000 per month), etc.

ESE Posts Name: Branch-wise

Below is the list of all the ESE posts released for individual branches. Candidates who will successfully clear the IES exam will be appointed in the following profiles depending upon their performance in the examination.

Civil Engineering

■ Central Engineering Service

■ Central Engineering Service (Roads), Group-A (Civil Engineering Posts)

■ Survey of India Group 'A' Service.

■ AEE(Civil) in Border Road Engineering Service

■ Indian Defence Service of Engineers

■ AEE(QSC) in MES Surveyor Cadre

■ Central Water Engineering (Group 'A') Service

■ Indian Skill Development Service.

Mechanical Engineering

■ AEE in GSI Engineering Service Grade A

■ Indian Defence Service of Engineers

■ Indian Naval Armament Service (Mechanical Engineering Posts)

■ Assistant Naval Store Grade-I Officer (Mechanical Engineering Posts) in the Indian Navy

■ AEE(Electrical Mechanical) in Border Roads Engineering Service(Mechanical Engineering Posts)

■ Central Water Engineering (Group 'A') Service

■ Central Power Engineering Grade A Service (Mechanical Engineering Posts)

■ Indian Skill Development Service

■ Central Power Engineering Grade B Service (Mechanical Engineering Posts)

Electrical Engineering

- Central Mechanical and Electrical Engineering Service (Electrical Engineering Posts)

- Indian Defence Service of Engineers

- Assistant Naval Store Grade-I Officer (Electrical Engineering Posts)

- Central Power Engineering Grade A Service(Electrical Engineering Posts)

- Defence Aeronautical Quality Assurance Service/SSO-II (Electrical)

- Indian Skill Development Service

- Central Power Engineering Grade B Service (Electrical Engineering Posts)

Mechanical Engineering

- Grade A Indian Radio Regulatory Service

- Indian Telecommunication Service Grade A.

- Indian Naval Armament Service (Telecom and Electronics Engineering Posts)

- Asstt. Naval Store Officer Grade-I (Electronics and Telecom Engg. Posts) in Indian Navy.

- Central Power Engineering Service Grade A (Electronics Telecom Engineering Posts).

- Indian Skill Development Service

- Junior Telecom Officer Grade B

- Central Power Engineering Service Grade B (Electronics Telecom Engineering Posts)

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UPSC ESE Cut Off

UPSC ESE 2021 Cut-Off

Prelims					
Discipline	General	EWS	OBC	SC	ST
Civil Engineering (CE)	249	246	243	196	213
Mechanical Engineering (ME)	247	247	247	213	214
Electrical Engineering (EE)	235	225	235	199	230
Electronics & Telecommunication Engineering (ECE)	208	200	208	202	155

Mains					
Discipline	**General**	**EWS**	**OBC**	**SC**	**ST**
Civil Engineering (CE)	617	581	582	484	519
Mechanical Engineering (ME)	597	532	555	477	563
Electrical Engineering (EE)	567	534	522	484	508
Electronics & Telecommunication Engineering (ECE)	449	428	449	403	358

UPSC ESE 2020 Cut-Off

Prelims				
Discipline	**General**	**OBC**	**SC**	**ST**
Civil Engineering (CE)	238	238	202	227
Mechanical Engineering (ME)	262	250	214	202
Electrical Engineering (EE)	238	229	187	194
Electronics & Telecommunication Engineering (ECE)	245	245	205	202

Mains				
Discipline	General	OBC	SC	ST
Civil Engineering (CE)	651	576	486	575
Mechanical Engineering (ME)	624	577	545	506
Electrical Engineering (EE)	578	550	496	510
Electronics & Telecommunication Engineering (ECE)	516	491	451	442

UPSC ESE 2019 Cut-Off

Prelims				
Discipline	General	OBC	SC	ST
Civil Engineering (CE)	188	185	143	159
Mechanical Engineering (ME)	187	187	166	169
Electrical Engineering (EE)	221	211	191	172
Electronics & Telecommunication Engineering (ECE)	226	221	176	165

Mains				
Discipline	**General**	**OBC**	**SC**	**ST**
Civil Engineering (CE)	541	500	453	482
Mechanical Engineering (ME)	539	529	450	487
Electrical Engineering (EE)	547	481	466	417
Electronics & Telecommunication Engineering (ECE)	539	502	458	427

UPSC ESE 2018 Cut-Off

Prelims				
Discipline	**General**	**OBC**	**SC**	**ST**
Civil Engineering (CE)	207	194	169	188
Mechanical Engineering (ME)	256	255	220	223
Electrical Engineering (EE)	230	218	190	191
Electronics & Telecommunication Engineering (ECE)	213	206	173	155

Mains				
Discipline	**General**	**OBC**	**SC**	**ST**
Civil Engineering (CE)	546	502	467	513
Mechanical Engineering (ME)	611	611	542	564
Electrical Engineering (EE)	541	488	452	481
Electronics & Telecommunication Engineering (ECE)	504	476	405	403

Challenges Faced by Students

- **Lack of Study Material (Quality & Quantity)**

- **Lack of In-depth Knowledge of Syllabus**

- **Managing Job/College & Preparation**

- **No Channel For Doubt Resolution**

- **Unaware of Competition**

- **Time Management**

- **Strategy Management**

- **Lack of Guidance**

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Preparation Strategy for GATE & ESE Exam

There are different types of students who might be preparing for the GATE Exam:

- 1st Year Students
- 2nd Year Students
- 3rd Year Students
- 4th Year Students
- Drop-Out Students (Non-Working)
- Working Professionals

First-Year Students:

- Focus on Engg. Maths from 1st Semester
- Focus on making basic engineering stronger

Second Year Students:

Who Started Preparation From First Year

- Keep Revising and Practicing Engg Mathematics of 1st Year
- Know Weightage and Marks Distribution in GATE for 2nd yr subjects
- Make Formula Notes and

Revision Notes of 2nd-year subjects

- Solve maximun no. of Pratice Questions

Who Started Preparation in the Second Year

- Know weightage of 1st yr and 2nd-year subjects
- Start preparing for Engg Maths and Basic Engg of 1st year
- Make Formula Notes and Revision Notes of 2nd-year subjects
- Solve maximun no. of Pratice Questions

Third Year Students:

Who Started Preparation From First Year

- Keep Revising and Practicing Engg Mathematics of 1st Year
- Know Weightage and Marks Distribution in GATE for 2nd yr subjects
- Make Formula Notes and Revision Notes of 2nd-year subjects

Solve maximun no. of Pratice Questions

- Pratice Previous Years' Questions
- Attempt more and more Mock Tests

Who Started Preparation From Second Year

- Keep Revising and Practicing of 1st Year and 2nd Year Subjects
- Know Weightage and Marks Distribution in GATE for 3rd year subjects
- Make Formula Notes and Revision Notes of 3rd-year subjects
- Pratice Previous Years' Questions
- Attempt more and more Mock Tests

Who Started Preparation From Third Year

- Know weightage of all subjects
- A Parallel study is required
- Study and Practice 3rd-year subjects along with start preparation of 1st and 2nd-year subjects.
- All the syllabus should be completed by Dec end
- Pratice Previous Years' Questions

- Attempt more and more Mock Tests

Fourth Year Students:

Who Started Preparation in 1st, 2nd, 3rd Year:

- Revise from Notes which was made in the year 1st, 2nd and 3rd
- Solve maximun no. of Pratice Questions
- Pratice Previous Years' Questions
- Attempt more and more Mock Tests

Who Started Preparation in 4th Year:

- Know weightage of all subjects
- A parallel study is required
- Study and Practice 4th-year subjects along with start preparation of 1st and 2nd & 3rd-year subjects.
- All the syllabus should be completed by Dec end
- Pratice Previous Years' Questions
- Attempt more and more Mock Tests

Drop Out Strategy

1. **Know the Syllabus & Weightage of each subject**

2. **Select Good Books & Materials for GATE Preparation**

3. **Tips to remember and follow during preparation**

   - Understand the previous year questions pattern.

   - Practice previous year questions during preparation.

   - Try to understand the concepts, practice tests and revise regularly.

   - Most of the questions in GATE are Conceptual & Numerical, so you must try to improve your solving ability & time management to score a good rank.

4. **Plan your GATE Preparation**

   - A 7 to 8 months Preparation Plan will be a good idea to crack the GATE exam.

   - Create a daily or weekly preparation plan to give enough time to each subject.

   - Plan should include syllabus completion, revision, and practice tests.

   - Make a timetable and formulate your daily tasks. Once you have set daily, weekly and monthly targets, you will see better results for the same amount of effort.

5. **Follow the plan to Complete the Syllabus**

   - Start preparation with an easy subject and an important one. Mathematics and one basic technical subject is good to start preparation.

   - Read topic by topic to complete the entire GATE Syllabus.

   - Make a revision note for each topic that should cover all important definitions, formulas, differences, etc.

   - Practice topic wise previous GATE questions after understanding each topic.

   - Attempt the quizzes/tests for each topic and subject to know your performance.

- Clear all your doubts during your preparation.

- Identify the weak areas while practising quizzes/tests and try to revise and practise those topics.

6. **Revise everything you studied for GATE Preparation**

- Read the revision notes on a weekly basis to recall the concepts of prepared subjects.

7. **Practice the Mock Tests**

- Keep attempting online mock tests.

- Practice the mock tests to improve performance.

- Performance depends on how much time is devoted to answering each question and how many questions are answered correctly.

8. **Revise and Practice in the Last stage**

- Devote time to revision and practice.

- Practice more tests, identify the weaker topics in each test and revise them.

- Practice 2 to 5 tests every day and recall all concepts during your practice.

Preparation Strategy for ESE Mains

ESE Mains Preparation Tips & Revision Plan

1. Mock Test- Practice two ESE Mock tests and analyze your performance. If you are still uncertain about a few topics, note them down and skip questions on these in the exam. BYJU'S EXAM PREP offers free ESE sample question papers and online mock test practice

2. Short Notes- Candidates should create short notes while preparing for the ESE Mains exam. These short notes are helpful in last week's revision. All applicants need to do is, pick up these Study notes and revise concepts, formulae and assumptions. It also gives one clarity on the embraced topics.

3. Do not attempt any new topic in the last 15 days- In the last phase of Preparation, ESE Mains candidates must avoid picking up new topics. There
is a strict 'NO' as it creates needless confusion. Is it possible to understand the fundamentals of new topics quickly? Would it not add to the pressure? Instead, devote time to revision and be optimistic about whatever you've prepared so far.

4. Time Management- As per the ESE mains syllabus, Engineering Discipline Paper-1 carries 300 Marks for 3 hours, and Engineering Discipline Paper-2 carries a total of 300 Marks is held for 3 hours, so manage your time accordingly according to the time allotted for the exam.

ESE Answer Writing Techniques to Remember for exam

- Attempt all remaining test papers like you would give the actual ESE mains exam.

- Select the topics to be attempted at first glance over the entire paper.

- Marks will not be allotted for surface knowledge, so don't waste time on questions asked in ESE if you don't know properly & are unsure about concepts.

- Try to answer extensively, i.e., provide in-depth information from equations to essential points in each answer.

- Always use pointers while answering theoretical questions instead of writing lengthy passages.

- Try highlighting the equalizations or unknowns in your answer, presenting it easy for the invigilator to view.

- If possible, write a commentary or an inference at the end of the solution. It will surely fetch you excellent marks.

Points to Remember While Making Time Table for GATE

Understand the syllabus

Prior to building the timetable, aspirants must understand the GATE syllabus accurately; know about the subjects and all the important topics. Once this is known, a proper timetable can be drawn up.

Check your weaknesses and strengths

Candidates can comprehend their weaknesses and strengths during their preparation, so they should allocate more time to the weaker sections while making a timetable.

They should decide the priority of taking up weaker & stronger sections.
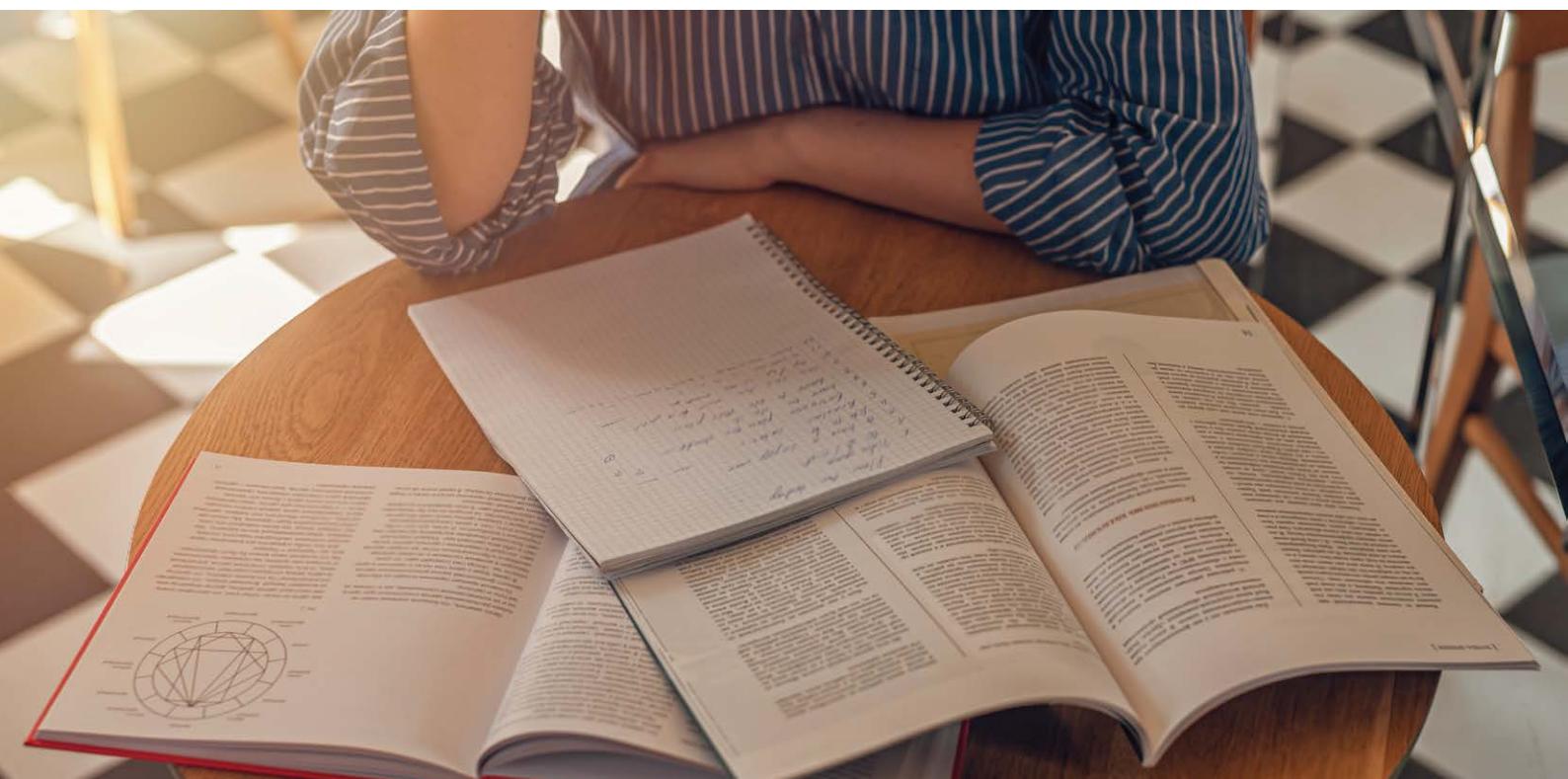
Proper time for revision

A candidate's GATE preparation timetable must have substantial time allocated for

revision. As the syllabus is vast, candidates must keep revising concurrently.

Be disciplined

Candidates must be disciplined in their preparation and follow their timetable religiously. There shouldn't be frequent long pauses in the timetable.

Important FAQs for GATE

Q. I am currently studying in 3rd year B.A./B.Com./B.Sc. Am I eligible to appear for the GATE Exam?

A. Yes, any undergraduate student currently in 3rd year or higher year of any government-approved program in Engineering / Technology / Architecture / Arts / Commerce / Science is eligible to appear for the GATE Exam.

Q. I am currently studying in 3rd year B.E., but through parallel entry in the 2nd year after finishing Diploma. Am I eligible to appear for the GATE Exam?

A. Yes, any undergraduate student currently in 3rd year or higher years of any government approved program in Engineering/ Technology/ Architecture/ Arts/ Commerce/ Science is eligible to appear for the GATE Exam.

Q. Is there any age limit to appear for the GATE Exam?

A. NO. There is NO age limit to appear for the GATE Exam.

Q. Are there any restrictions on the number of times one can appear for the GATE?

A. NO. One can appear for the GATE examination any number of times.

Q. Can I appear in any of the GATE Exam papers?

A. Although the candidate is free to choose any of the papers (up to two from the given combinations), the candidate should select the paper appropriate to the discipline of qualifying degree.

Q. Do I need to fill two forms to appear in two papers?

A. NO. The two papers option may be selected based on the given set of combinations in a SINGLE form only.

Q. Is there a relaxation in cut-off score and fee for the EWS (Economically weaker section) candidates?

A. The application fee for EWS candidates will be the same as that of General candidates, however, the qualifying mark is 90% as that of the General candidates.

Q. What will happen if I am not able to produce an EWS certificate at the time of admission/ counselling etc.?

A. If you are not having a valid EWS certificate at the time of admission/counselling, you will be considered as a General category candidate. However, GATE has nothing to do with subsequent admission or recruitment process.

Q. Do I have to upload my EWS certificate during the application process?

A. No

Q. After completing the ONLINE application process and generating a PDF file, will I be able to change my application data?

A. NO. After completing all the steps up to PDF application form generation in the ONLINE application process, you can only download the application form and CANNOT modify the data. Hence, you need to be very careful while entering the data.

Q. How many GATE papers can I apply for?

A. A candidate can apply for ONE or TWO papers (from the given set of combinations as per Table 4.3) of the 29 papers listed in the GATE INFORMATION BROCHURE or GATE website. The choice of the appropriate paper is the responsibility of the candidate. Some guidelines in this respect are suggested below:

The candidates are expected to appear in paper(s) [up to two as per the given set of combinations in Table 4.3] appropriate to the discipline of their qualifying degree.

The candidates are, however, free to choose any other paper according to their admission plan, keeping in mind the eligibility criteria of the institutions in which they wish to seek admission.

Q. If a paper is being held in more than one session, can I appear in any of the sessions of that particular paper?

A. NO. Each candidate will be assigned to ONLY ONE of the multiple sessions of a particular paper.

Q. After submission of application, am I permitted to change my GATE Examination Paper?

A. YES. ONLY after the last date for application submission, a request for the change of GATE Examination Paper will be entertained against additional payment

Q. After submission of application, am I permitted to change my Category?

A. YES. ONLY after the last date for application submission, category change request will be entertained against additional payment.

Q. Will I be provided with any white paper for rough work and calculations during the examination?

A. Only one scribble pad at any point of time will be provided to the candidate that can be used to do the rough work. To obtain a second scribble pad, the candidate MUST return the first scribble pad. The candidates have to return any scribble pad in their possession at the end of the examination. The virtual scientific calculator will be available on the computer screen.

Q. Can I use a physical calculator during the examination?

A. NO. During the online GATE examination, all candidates will be provided with a virtual scientific calculator which has to be used to answer the questions.

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Important FAQs for ESE

Q. Is the IES exam conducted every year?

A. Yes. Union Public Service Commission (UPSC) conducts the IES Exam as an entrance test in yearly basis to recruit the engineering aspirants in different sectors like Railways, Telecommunication, Public Works, Border Roads, CPWD, IDSE, CWC, CPES, NHAI, MES, Naval tArmaments, etc.

Q. How many attempts can a student give for the IES exam?

A. As per the guidelines of commission, there is no limit to attempt the IES exam. Candidates can participate in the UPSC ESE exam up to the maximum age limit prescribed by UPSC.

Q. Is IES a civil service exam?
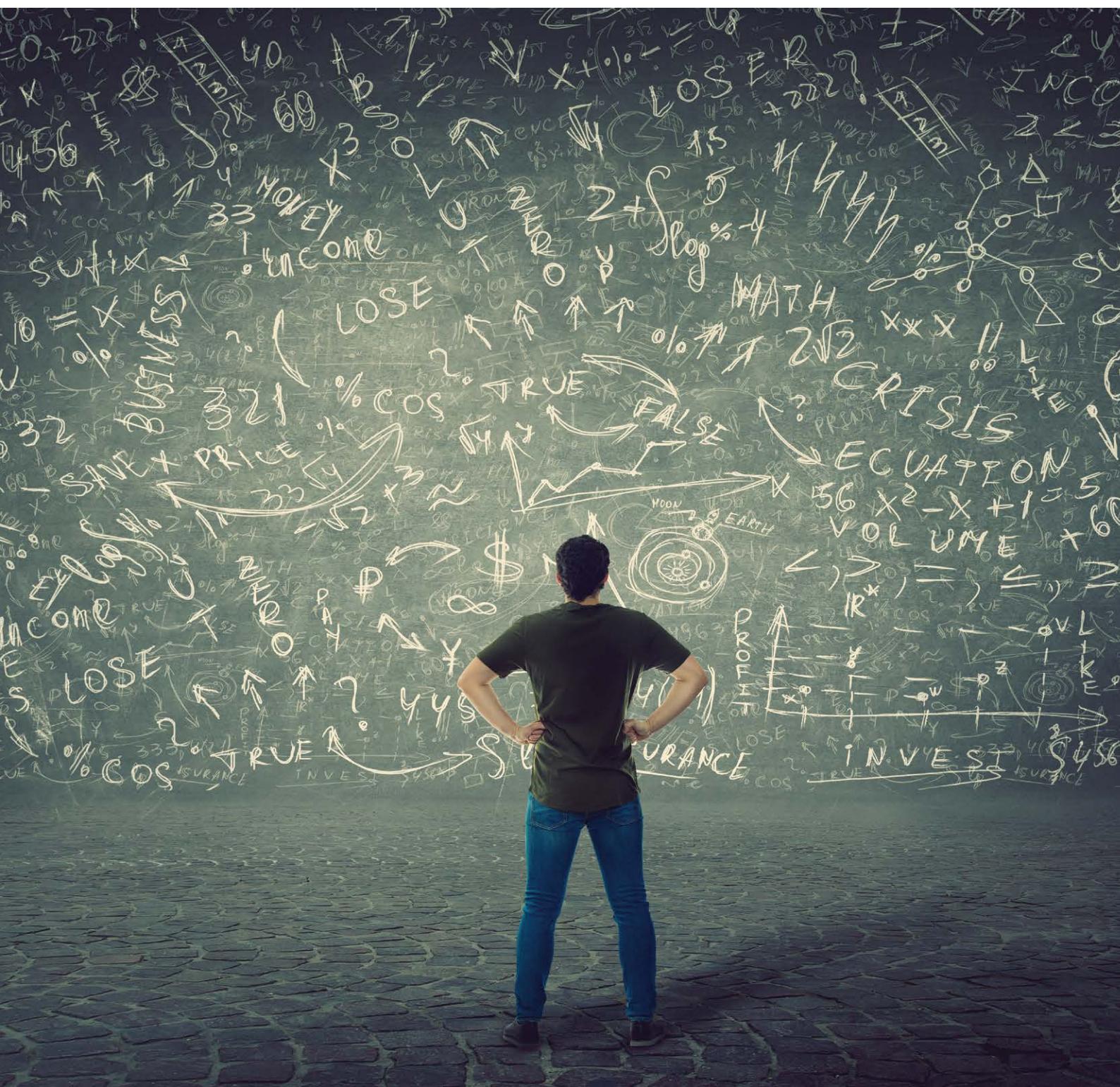
A. Yes, IES or ESE is a civil service exam that requires only the technical and engineering managerial roles in the various departments of the Government of India.

Q. What is the process of preparing the merit list for the UPSC ESE exam?

A. The merit list for the UPSC ESE Exam is prepared on the basis of the marks obtained by you in the Prelims, Mains and Interview.

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Important Formulas to Remember
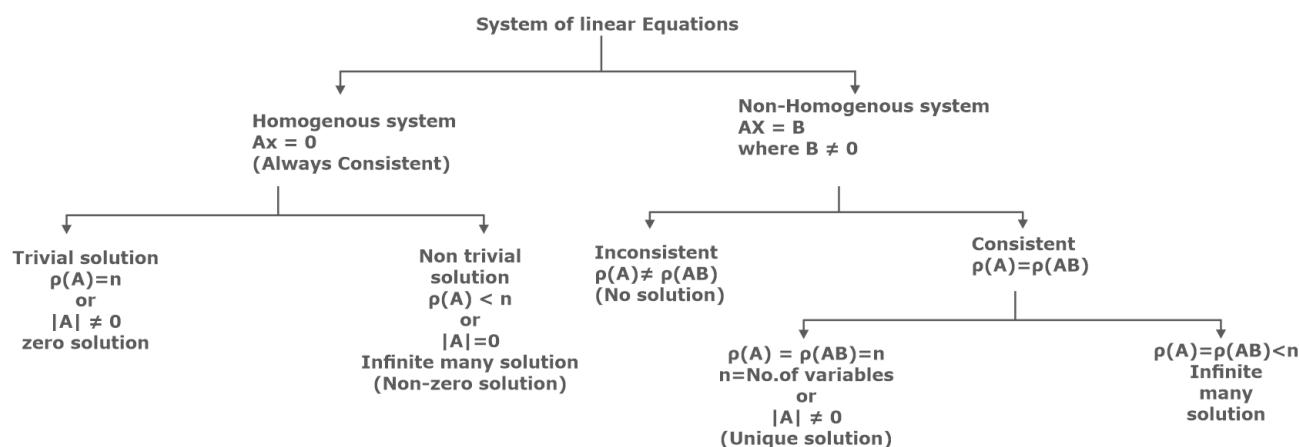
1. Rank of Matrix:

The rank of a matrix is defined as the order of highest non-zero minor of matrix A. It is denoted by the notation ρ(A). A matrix is said to be of rank r when:

(i) it has at least one non-zero minor of order r, and

(ii) every minor of order higher than r vanishes.

2. System of linear Equations:

3. Eigen Values and Eigen vectors:

3.1 Eigen Values:

Let A = $[a_{ij}]_{n \times n}$ be any n-rowed square matrix and λ is a scalar. Then the matrix $A - \lambda I$ is called characteristic matrix of A, where I is the unit matrix of order n.

Then, the determinant
$$|A - \lambda I| = \begin{bmatrix} a_{11-\lambda} & a_{12} & a_{1n} \\ a_{21} & a_{22-\lambda} & a_{2n} \\ \dots & \dots & \dots \\ a_{n1} & a_{n2} & a_{nn-\lambda} \end{bmatrix}$$

which is ordinary polynomial in λ of degree n is called "characteristic polynomial of A". The equation $|A - \lambda I| = 0$ is called "characteristic equation of A".

3.2 Eigen Vectors:

The corresponding non-zero solutions to X such that $AX = \lambda X$, for different eigen values are called as the eigen vectors of A.

4. Some important Expansion:

(i) $\sin\theta = \theta - \dfrac{\theta^3}{3!} + \dfrac{\theta^5}{5!} - \dfrac{\theta^7}{7!} + \ldots$
(ii) $\sinh\theta = \theta + \dfrac{\theta^3}{3!} + \dfrac{\theta^5}{5!} + \dfrac{\theta^7}{7!} + \ldots$

(iii) $\cos\theta = 1 - \dfrac{\theta^2}{2!} + \dfrac{\theta^4}{4!} - \dfrac{\theta^6}{6!} + \ldots$
(iv) $\cosh\theta = 1 + \dfrac{\theta^2}{2!} + \dfrac{\theta^4}{4!} + \dfrac{\theta^6}{6!} + \ldots$

(v) $\tan\theta = \theta + \dfrac{\theta^3}{3} + \dfrac{2}{15}\theta^5 + \ldots$
(vi) $\tan^{-1}x = x - \dfrac{x^3}{3} + \dfrac{x^5}{5} - \ldots$

(vii) $e^x = 1 + x + \dfrac{x^2}{2!} + \dfrac{x^3}{3!} + \dfrac{x^4}{4!} + \ldots$

(viii) $\log(1-x) = -\left(x + \dfrac{x^2}{2} + \dfrac{x^3}{3} + \dfrac{x^4}{4} + \ldots\right)$

(ix) $(1+x)^n = 1 + nx + \dfrac{n(n-1)}{2!}x^2 + \dfrac{n(n-1)(n-2)}{3!}x^3 + \ldots$

(x) $\log(1+x) = \left(x - \dfrac{x^2}{2} + \dfrac{x^3}{3} - \dfrac{x^4}{4} + \ldots\right)$

5. Standard Formulae of integration:

(i) $\int \sin(ax+b)\,dx = -\dfrac{1}{a}\cos(ax+b)$

(ii) $\int \cos(ax+b)\,dx = \dfrac{1}{a}\sin(ax+b)$

(iii) $\int \tan(ax+b)\,dx = \dfrac{1}{a}\log \sec(ax+b)$

(iv) $\int \cot(ax+b)\,dx = \dfrac{1}{a}\log \sin(ax+b)$

(v) $\int \sec^2(ax+b)\,dx = \dfrac{1}{a}\tan(ax+b)$

(vi) $\int \cosec^2(ax+b)\,dx = -\dfrac{1}{a}\cot(ax+b)$

(vii) $\int \sinh(ax+b)\,dx = \dfrac{1}{a}\cosh(ax+b)$

(viii) $\int \cosh(ax+b)\,dx = \dfrac{1}{a}\sinh(ax+b)$

(ix) $\int \tanh(ax+b)\,dx = \dfrac{1}{a}\log\cosh(ax+b)$

6. Bayes' Theorem

Suppose that E_1, E_2, E_3 .... E_m are the mutually exclusive events whose union is the sample space and E is an event

Then, as per the Bayes' theorem

$$P\left(E_n \mid E\right) = \dfrac{P(E_n) \times P\left(E/E_n\right)}{\displaystyle\sum_{i=1}^{n} P(E_i) \times P\left(E/E_i\right)}$$

7. Trapezoidal Rule of integration:

The integral $\int_a^b f(x)dx = \int_{x_0}^{x_n} ydx = \frac{h}{2}\left[(y_0 + y_n) + 2(y_1 + y_2 + \ldots\ldots\ldots y_{n-1})\right]$

8. Simpson's rule of Numerical integration (Simpson 1/3rd rule):

The integral

$\int_a^b f(x)dx = \int_{x_0}^{x_n} ydx = \frac{h}{3}\left[(y_0 + y_n) + 4(y_1 + y_3 + \ldots\ldots) + 2(y_2 + y_4 + \ldots\ldots)\right]$

9. Simpson's rule of Numerical integration (Simpson 3/8th rule):

Generally, the formula is

$\int_a^b f(x)dx = \int_{x_0}^{x_n} ydx = \frac{3h}{8}\left[(y_0 + y_n) + 3(y_1 + y_2 + y_4 + y_5\ldots\ldots) + 2(y_3 + y_6 + y_9\ldots\ldots)\right]$

10. Laplace Transform of Some Basic Function

S. No.	CT signal x(t)	Laplace Transform $$X(s) = \int_{-\infty}^{\infty} x(t)e^{-st}dt$$	ROC
1.	$\delta(t)$	1	Entire s-plane
2.	u(t)	$\frac{1}{s}$	$Re\{s\} > 0$
3.	u(t) − u(t −a)	$\frac{1}{s}(1 - e^{-as})$	$Re\{s\} > 0$
4.	e^{-at} u(t)	$\frac{1}{a+s}$	$Re\{s\} > -a$

S. No.	CT signal x(t)	Laplace Transform $$X(s) = \int_{-\infty}^{\infty} x(t)e^{-st}dt$$	ROC
5.	$t\, u(t)$	$\dfrac{1}{s^2}$	Re $\{s\} > 0$
6.	$t^{\,n}u(t)$	$\dfrac{n!}{s^n + 1}$	Re $\{s\} > 0$
7.	$te^{-at}\, u(t)$	$\dfrac{1}{(a + s)^2}$	Re $\{s\} > -\,a$
8.	$t^n e^{-at}\, u(t)$	$\dfrac{n!}{(a + s)^{n+1}}$	Re $\{s\} > -\,a$
9.	$\cos(\omega_0 t)u(t)$	$\dfrac{s}{\omega_0^2 + s^2}$	Re$\{s\} > a$
10.	$\sin(\omega_0 t)u(t)$	$\dfrac{\omega}{\omega_0^2 + s^2}$	Re $\{s\} > 0$
11.	$x(t) = \cos^2(\omega_0 t)u(t)$	$\dfrac{(2\omega_0^2 + s^2)}{s(4\omega_0^2 + s^2)}$	Re $\{s\} > 0$
12.	$x(t) = \sin^2(\omega_0 t)\, u(t)$	$\dfrac{2\omega_0^2}{s(4\omega_0^2 + s^2)}$	Re $\{s\} > 0$
13.	$x(t) = \exp(-at)\cos(\omega_0 t)\, u(t)$	$\dfrac{a + s}{(a + s)^2 + \omega_0^2}$	Re $\{s\} > -\,a$
14.	$x(t) = \exp(-at)\sin(\omega 0t)\, u(t)$	$\dfrac{\omega_0}{(a + s)^2 + \omega_0^2}$	Re $\{s\} > -\,a$

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