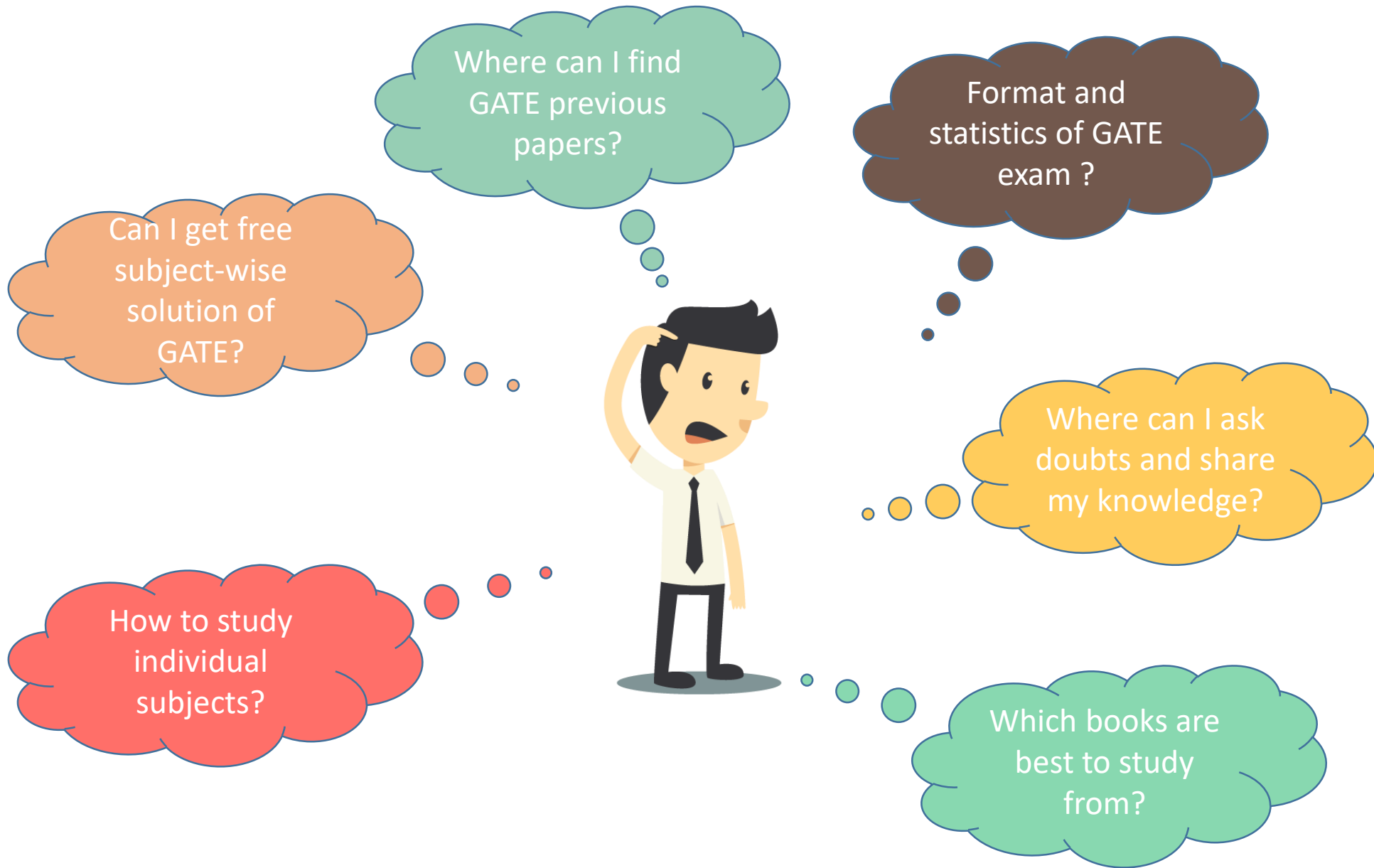




GATE Mechanical Resource

Amit Singh Rathore
Mtech IIT Bombay
www.ExamHill.com



Can I get free subject-wise solution of GATE?

Where can I find GATE previous papers?

Format and statistics of GATE exam ?

Where can I ask doubts and share my knowledge?

How to study individual subjects?

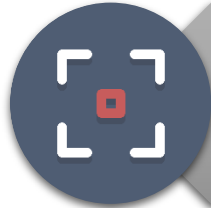
Which books are best to study from?

If above thoughts haunt you, this presentation is for you.

How to use this Presentation?



This presentation is **quick and simple** resource for **GATE Mechanical** exam preparation



The focus is to have all **useful links** at one place, most of the images and texts in this presentation are **clickable**.



In case you have doubts or suggestion write us at
“help@examhill.com”

This presentation will be continuously updated based on your feedback

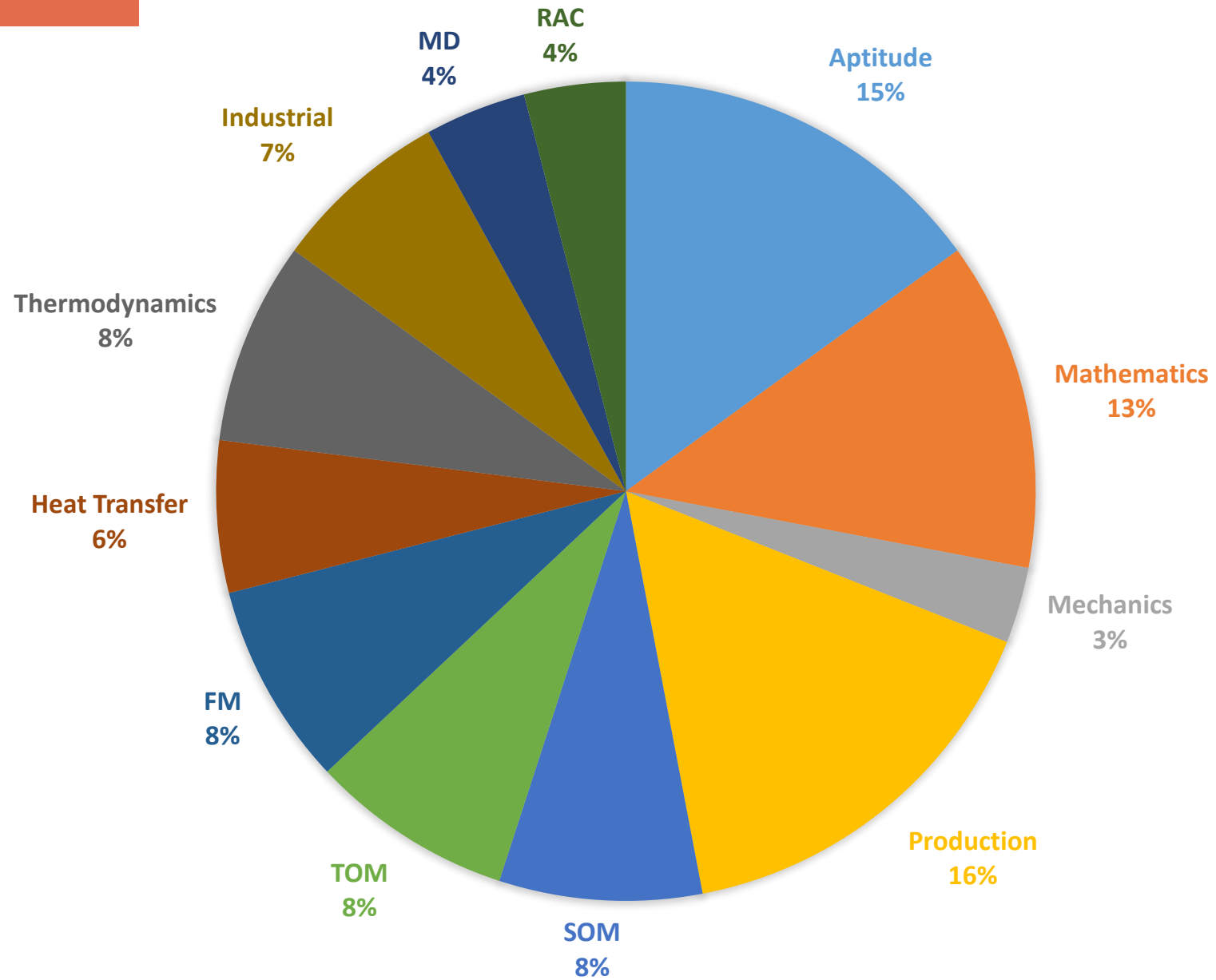
GATE Format

Exam	General Aptitude	Technical	Negative
GATE	5 question - 1 marks each	25 question - 1 marks each	one-third (0.33)
	5 question - 2 marks each	30 question – 2 marks each	one-third (0.667)
Total	15 marks	85 marks	Grand Total = 100 marks

Year	Organizing Institute
2019	IIT Madras
2018	IIT Guwahati
2017	IIT Roorkee
2016	IISc Bangalore
2015	IIT Kanpur
2014	IIT Kharagpur
2013	IIT Bombay
2012	IIT Delhi

Year	Organizing Institute
2011	IIT Madras
2010	IIT Guwahati
2009	IIT Roorkee
2008	IISc Bangalore
2007	IIT Kanpur
2006	IIT Kharagpur
2005	IIT Bombay
2004	IIT Delhi

GATE Average Marks



GATE Year-wise Papers

Year	Question Paper	Answer Key
2018	Set 1	Set 1
	Set 2	Set 2
2017	Set 1	Set 1
	Set 2	Set 2
2016	Set 1	Set 1
	Set 2	Set 2
	Set 3	Set 3
2015	Set 1	Set 1
	Set 2	Set 2
	Set 3	Set 3
2014	Set 1	Set 1
	Set 2	Set 2

Year	Question Paper	Answer Key
2014	Set 3	Set 3
	Set 4	Set 4
2013	Set 1	Set 1
2012	Set 1	Set 1
2011	Set 1	-
2010	Set 1	-
2009	Set 1	-
2008	Set 1	-
2007	Set 1	-
2006	Set 1	-
2005	Set 1	-

Note: Detailed solution of all the above paper is available at www.ExamHill.com

Subject	Detailed Solution
General Aptitude	Click here
Mechanics	Click here
Mathematics	Click here
Theory of Machines	Click here
Mechanics of Material	Click here
Machine Design	Click here
Fluid Mechanism	Click here
Heat Transfer	Click here
Thermodynamics	Click here
Refrigeration and Air-Conditioning	Click here
Production Engineering	Click here
Industrial Engineering	Click here

GATE 2018 Analysis

Rank	Marks	Score
1	96.83	1000
410	80.65	836
587	78.97	818
1212	74.92	775
1312	74.42	770
2362	70.46	728
2936	68.52	707
3179	67.85	700
3552	66.84	690
4431	64.81	668
6805	59.76	615
16,436	46.28	472

GATE 2017 Analysis

Rank	Marks	Score
3	94.52	989
8	92.28	965
82	85.92	900
434	79.31	831
835	75.57	797
1147	73.85	775
1221	73.19	768
1886	70.12	736
2929	66.67	701
4335	62.87	662
6632	57.69	608
10,070	51.51	544

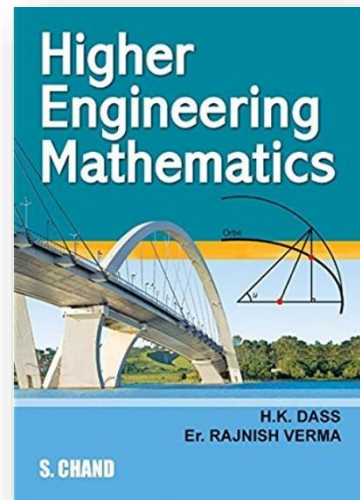
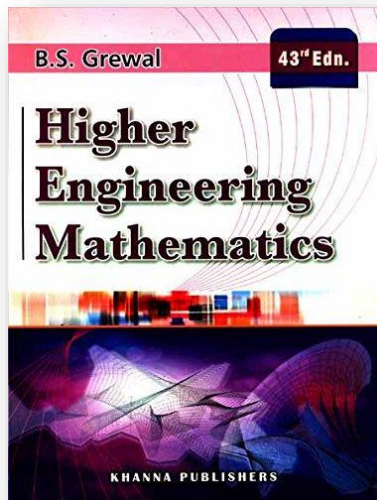


How to study:

Engineering Mathematics has got an average weightage of 13 marks, so you are always sure that it's very important and there is not much fluctuation in its weightage. Mathematics is simple and mostly consists of parts that students study in 1st and 2nd semester. It is easy and scoring; not much effort has to be applied, questions asked in GATE are simple and straight forward except one or two. Coaching notes are very good for preparing maths as they put in a variety of questions in notes. And previous years' question practice is obviously important, you will understand the trend which repeats again and again.



Books:



Notes:





Syllabus:

Linear Algebra: Matrix algebra, systems of linear equations, eigenvalues and eigen vectors.

Calculus: Functions of single variable, limit, continuity and differentiability, mean value theorems, indeterminate forms; evaluation of definite and improper integrals; double and triple integrals; partial derivatives, total derivative, Taylor series (in one and two variables), maxima and minima, Fourier series; gradient, divergence and curl, vector identities, directional derivatives, line, surface and volume integrals, applications of Gauss, Stokes and Green's theorems.

Differential equations: First order; solution equations (linear and nonlinear); higher order linear differential equations with constant coefficients; Euler-Cauchy equation; initial and boundary value problems; Laplace transforms; solution of heat, wave and Laplace's equations.

Complex variables: Analytic functions; Cauchy-Riemann equations; Cauchy's integral theorem and integral formula; Taylor and Laurent series.

Probability and Statistics: Definitions of probability, sampling theorems, conditional probability; mean, median, mode and standard deviation; random variables, binomial, Poisson and normal distributions.

Numerical Methods: Numerical solutions of linear and non-linear algebraic equations; integration by trapezoidal and Simpson's rules; single and multi-step methods for differential equations.



How to study:

Engineering mechanics has no fixed weightage as it fluctuates a lot from as high as 11 marks to 0 marks. The syllabus is mostly class 12th physics. The questions asked are also of school level so not much in-depth knowledge is required. Practice previous year questions and read the basic concept used in the questions from any standard book or internet. This subject should not be given priority and can be understood even 1 month before exam without any hustle.

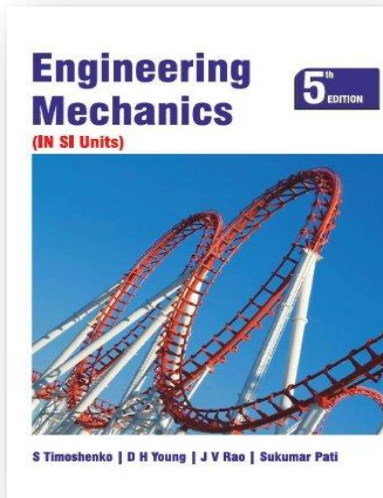


Syllabus:

Free-body diagrams and equilibrium; trusses and frames; virtual work; kinematics and dynamics of particles and of rigid bodies in plane motion; impulse and momentum (linear and angular) and energy formulations, collisions.



Books:



Notes:



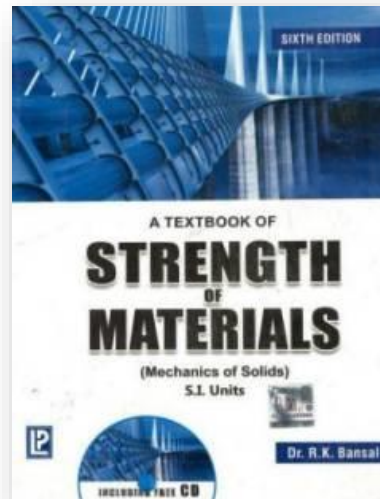
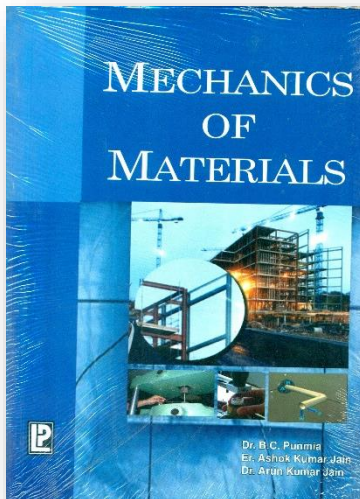


How to study:

Strength of material is a very important subject you can not get good marks in GATE or any other exam without this subject. Initially reading from notes you may not understand much. So a combination of notes and a book is essential. At the same time keep on solving previous year GATE and ESE questions, so that you practice what you read most of the time we understand the concept in wrong way and only realize while solving questions. So it will be a mixture of these initially and later on you will automatically converge to particular topics from each material. In my case later on I made book as my sole refuge and would write every important point on the space available at top and bottom of page. Although coaching going students would prefer there own class notes.



Books:



Notes:





Syllabus:

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; 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.

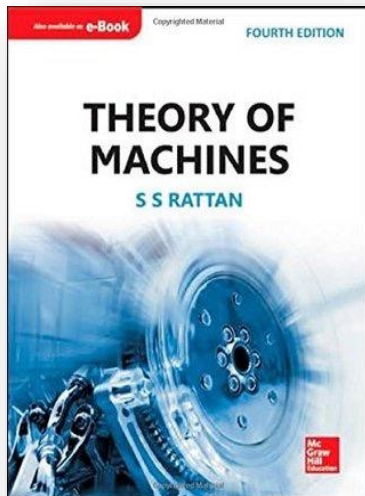


How to study:

This is one subject which has so many formulas to learn by heart. From 2015 governors and gyroscope were two new topics added. Although very basic question like just put the value and get answer type were asked in GATE 2015. So overall its easy subject and doing variety of objective problems is very essential. Theoretical part is less and more of numerical subject. You can study from notes or book, and I have seen that notes go exactly like Theory of Machine book By SS Rattan. There are few tricks that you may not find in book, you will come to know when you do objectives. Vibration syllabus is also covered in Rattan, so there is no need to buy separate book although I have seen students buying books like Grover for vibration, hence it depends on person to person.



Books:



Notes:





Syllabus:

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.

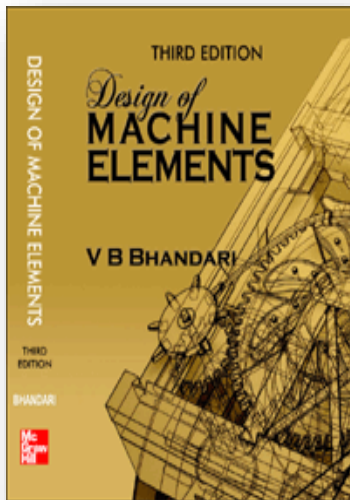


How to study:

Machine design has a very small syllabus and also its basic no extra brain has to be applied on it. During preparation everyone score good marks in machine design just 2-3 readings you will understand everything. By solving last year papers you will get more understanding of concepts. Also there are mostly formulas in machine design which should be there on your tips to solve objective as deriving them may take a lot of time like minimum number of teeth, bearing formulae, sommerfield number, spring stiffness etc. Notes are same as in book so I don't think there is any difference between them, its not that there is something written in notes and that is hidden somewhere in book its not like production where what you find in notes you may not find in a particular book easily.



Books:



Notes:





Syllabus:

Machine Design : Design for static and dynamic loading; failure theories; fatigue strength and the S-N 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.

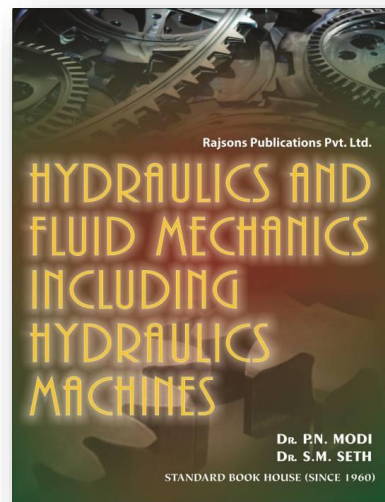
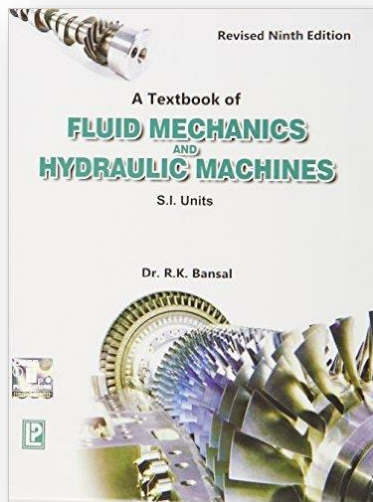


How to study:

When students go for interview in BARC, ISRO or other PSUs or IITs, majority of students will say “Sir, my favorite subject is Fluid mechanics” . Yes, its true because its simple and if you study it you will surely understand it. One thing that people tend to forget is they keep on reading the theoretical part of FM and think they have completed it but when they give test series or solve last year papers, FM is one subject in which you will perform poorly even when you think that you know and have understood FM. So its very essential that along with every topic you keep on seeing GATE question so that you get an idea what all things to study and which topics are very important.



Books:



Notes:





Syllabus:

Fluid Mechanics: Fluid properties; fluid statics, manometry, buoyancy, 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.

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



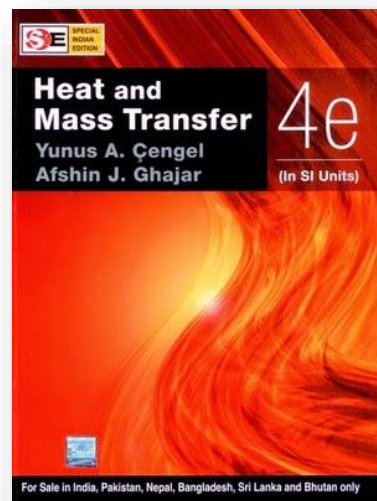
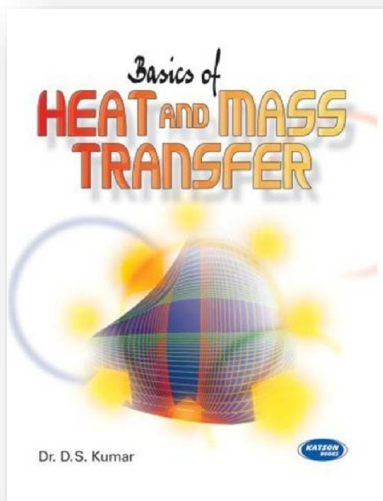
How to study:

Well, first of all I must say that its the easiest subject, after going through it once you will understand most of the concepts of Heat transfer. Conduction, heat exchanger and radiation almost everyone knows well, mostly problem faced is with convection which seems totally new, complex and not easy to understand. But after doing all previous GATE question and ESE question majority of students will get it right and you too are one of them. Therefore I highly recommend to do previous years solved paper when you don't understand a thing. A very important note here for those who are preparing on their own is NPTEL video on Heat transfer by Prof. SP Shukatme he is a faculty here at IIT Bombay. Prof. Shukatme has taught conduction, heat exchanger and radiation part very nicely (i mean it) his way of teaching is superb, [click here](#) for his videos on YouTube. Please do not forget to make notes while seeing his videos, so that you don't have to watch them again. The convection part however is taken by Prof Gaitonde who too is a great teacher but he teaches beyond the scope of what is required for GATE or other competitive exams. So for convection part notes, book and previous papers will only help.



Syllabus:

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, Stefan-Boltzmann law, Wien's displacement law, black and grey surfaces, view factors, radiation network analysis.



Notes:



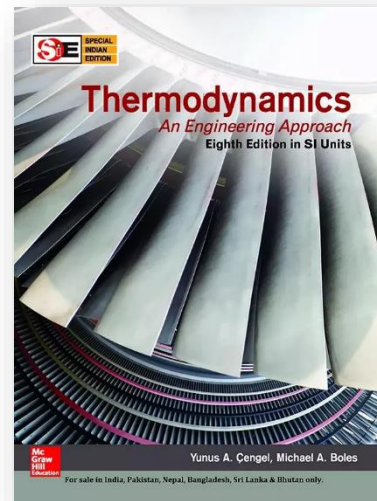
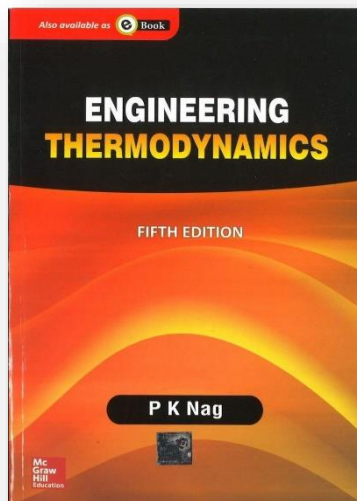


How to study:

This is one of the subjects which students just pass during their semester exams and have no idea about its concept. This subject is easy when you have read it 5 times thoroughly, yes you need to study it again and again to understand its basics. Book by PK Nag is the most followed one, so doing solved questions at the end of a chapter will really help in grabbing the concepts although only basic questions in the solved exercises need to be done. And obviously previous years' questions will help a lot. I would recommend NPTEL videos when you want to understand a particular topic, videos by Prof SK Som from IIT Kgp are great you can [click here](#) to see on YouTube. His video on gas and vapour cycles are highly recommended.



Books:



Notes:





Syllabus:

Thermodynamics: Thermodynamic systems and processes; properties of pure substances, behaviour 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.

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.



How to study:

This subject is interesting as well as easy. The syllabus is small, so in a week you can easily go from zero level to GATE level. It has some basic definitions, formulae and numerical based on that. It should be done in the end after all the main subjects are complete. Before 1 or 2 month of exam it should be studied, as it does not require many revisions.

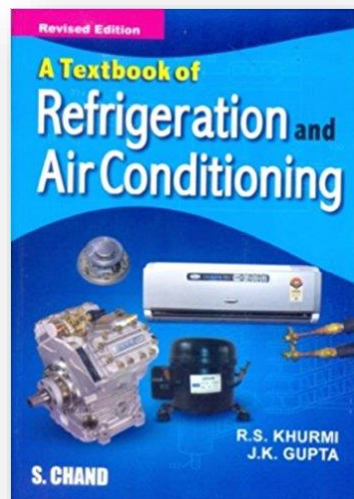
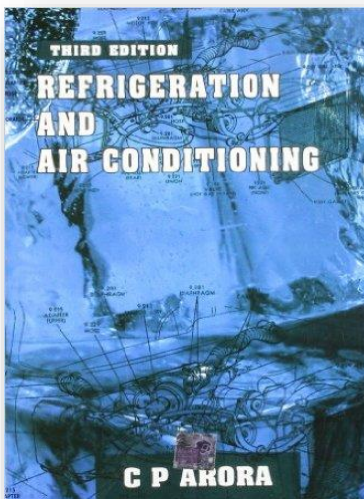


Syllabus:

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



Books:



Notes:





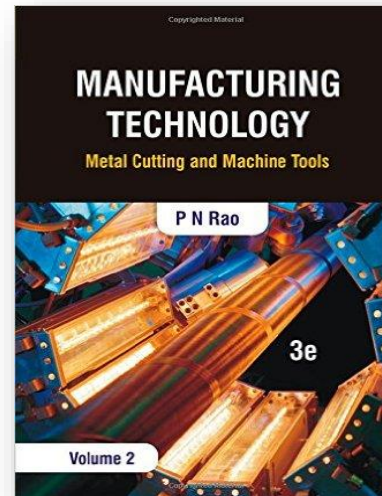
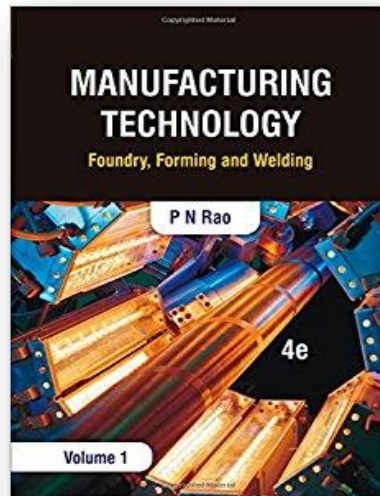
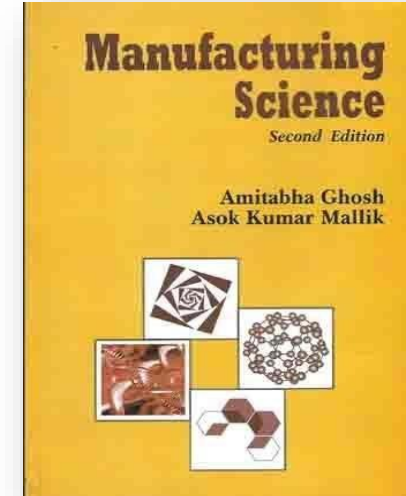
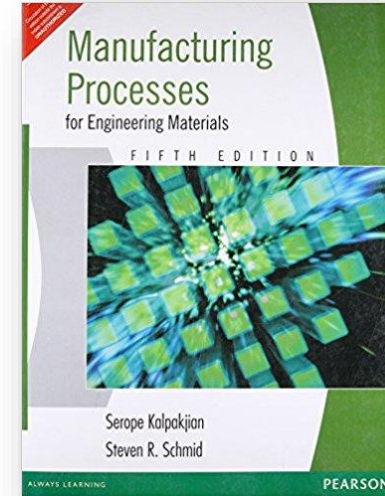
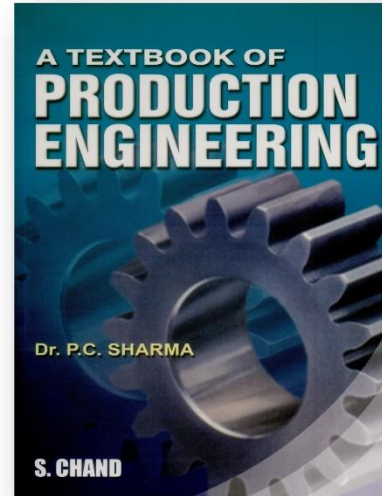
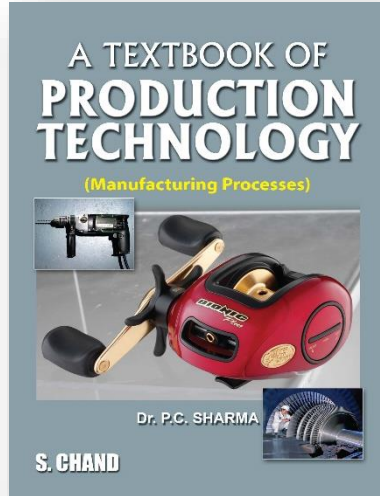
How to study:

This is the most important subject and you need to study this whole heartedly. One of the biggest misconception is that it is theory subject but I must reveal you the truth that it is a numerical subject, you talk about casting, machining or metrology all have numerical. For those who are starting I must advice that leave theory part just focus on numerical. Once you get little experience just see theory of those question which have come in objective problems of GATE or ESE, that's all no more theory. **NOTES are the best**, content in books are scattered and it would take lot time to sort it out. Although machining, metrology and casting are very well given in PC Sharma book, you may refer to them you wont regret. There are other good books like PN Rao, Kalpakjian and Amitabh Gosh, it is not possible to read all these books so choose the books which you have already studied in semester or the books your friends are studying. Now talking about Engineering materials, well from this subject at max 1-2 question will be asked so I recommend to study only the basics like unit cell, miller indices and defects, these things we have been studying from our school days. Don't put extra effort in material science and you can gladly leave this subject if you have limited time.

Production



Books:



Notes:





Syllabus:

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.

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, design of jigs and fixtures.

Metrology and Inspection: Limits, fits and tolerances; linear and angular measurements; comparators; gauge design; interferometry; form and finish measurement; alignment and testing methods; tolerance analysis in manufacturing and assembly.

Computer Integrated Manufacturing: Basic concepts of CAD/CAM and their integration tools.

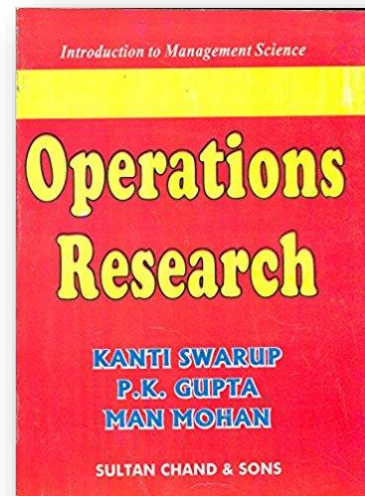
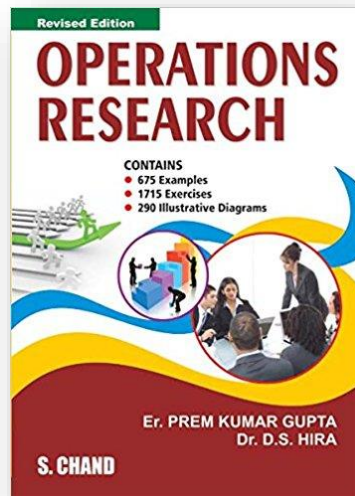


How to study:

I would describe Industrial engineering syllabus as aptitude questions and management theory. Most of the time you don't need to put your brain into work just put the values follow a procedure and its done. Many formulas and definitions to be remembered with 3-4 readings it will fit in your brain and little revision will revive all of industrial engineering from your memory. Those in final year generally have problem with this as in 7-8th semester you do these subjects so you may not have already done these topics at college before GATE exam but reading on your own and solving previous year objective will suffice.



Books:



Notes:





Syllabus:

Production Planning and Control: Forecasting models, aggregate production planning, scheduling, materials requirement planning.

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.

Ideal Time Table





Ideal time table for GATE, which I had come to follow at last, after a lot of changes and experiences. That passion of studying 12-17 hours is not at all possible even if you follow it for 2 days you will get so much exhausted that next 2 days you will take rest and will arise a repulsive force with books. So always remember in life that be practical in your life, be it a interview, time table, friends, family etc everyone has limits and don't try to cross them it will be destructive only.



Study time for GATE - 8 hours (you can cut it to 6 hours also doesn't matter much)

But did you

- loose any fun time - “nope” ,
- hectic - “nope” ,
- did you enjoy - “yep”
- did you have time to talk to family- “yep”



1. Go through the previous year question papers so that you can get an idea of the type of questions to prepare. It will help you decide, to focus on the theoretical part or numerical part.
2. Evaluate yourself , how much you need to work on yourself. You are weak in some topics or strong.
3. Prepare a timeline to complete your topics. So that you complete your syllabus in time.
4. Once one subject gets completed it has to be revised frequently (once in a month or so), so that formulae can be remembered on the long run.
5. Prepare short notes for any topic and it should only contain formulae's and imp points.
6. Read each and every topic , prepare all subjects.
7. Take help of nptel carefully, it consumes your time too so decide intelligently.
8. Read standard book for concepts and solve different numerical.
9. Give tests as much as you can. But it should be given to improve. Not to compare to others.
10. Don't procrastinate , be consistent in your efforts.

Don'ts



1. Do not study at a place where you sleep, eat and do all other chores. You'll sleep more than you study.
2. When practicing previous years, be patient. Do not just read a question and see its answer. Let your mind work even if it takes some time initially. This will build up your problem solving ability.
3. Do not blindly follow others for the strategy. Be your own critic. Make your own strategy.
4. Use your study time, only for preparing relevant topics in syllabus and not for preparing the whole book.
5. Do not get disheartened if preparation is not going well, maintain your equilibrium.
6. Don't eat unhealthy food, take care of your health.
7. Don't use offline calculator during practice but use online calculator.
8. Do not study more than 2 subjects simultaneously.
9. Do not overload yourself with too many hours of study time.
10. Do not attend any family function, interview etc 1 month before exam.

Thank You !

Thank you for reading through the presentation

We sincerely hope that you like it and would help you to prepare for GATE exam

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- The team is dedicated in providing 100% error free solutions
- We take into consideration every comment posted by the students