

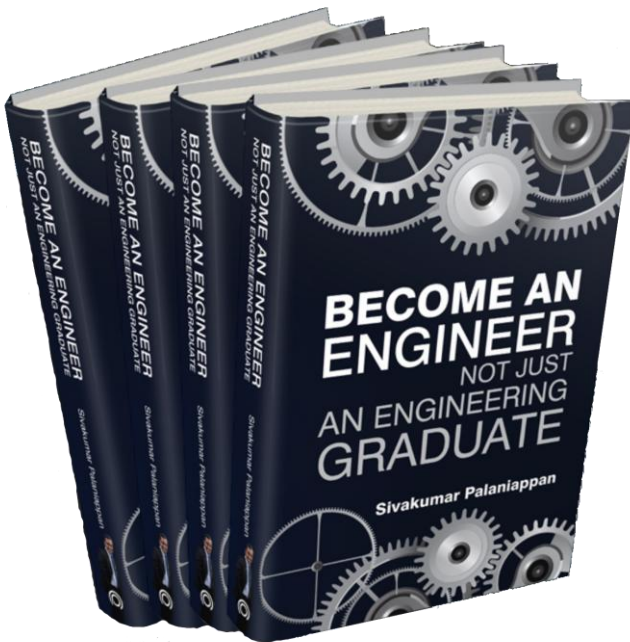


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BECOME AN ENGINEER

NOT JUST AN ENGINEERING GRADUATE

A Comprehensive guide to every
Engineering Aspirant



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BECOME AN ENGINEER

NOT JUST AN ENGINEERING GRADUATE

A Comprehensive guide to every
Engineering Aspirant

Sivakumar Palaniappan



notionpress.com

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Become An Engineer Not Just An Engineering Graduate

TESTIMONIALS

“The book ‘Become an Engineer’ is very well written and will be of great value to engineering students and recent graduates. The author, Sivakumar Palaniappan, has drawn from his significant experience to give very simple, but powerful and practical messages. I particularly liked the “student tales” to which readers can easily relate. The workbook feature is also very effective. I wish the book a lot of success. It will definitely make a difference in the lives of those who read it.”

Dr.Krishna Vedula

Professor and Dean Emeritus
University of Massachusetts Lowell
Executive Director (IUCEE)
Indo US Collaboration for Engineering Education

A timely guide for young students who are aspiring to enter the engineering profession. “Do I really want to be an engineer?”, “Which engineering discipline should I choose?”, “How do I prepare myself for an engineering career?” If these questions have ever crossed your mind – then this book written in conversational style could guide you to find an answer.

Dr.G Venkatesh,

CTO, Sasken Communication Technologies Ltd
ADI Chair Professor, IIT Madras

A big failure of public policy has resulted in heedless expansion of poor quality engineering education in the last 5 years. Now lakhs of students face unemployment and underemployment. If you want to bootstrap yourself out of this mess this is the book for you.

Mr. Sharad Sharma

ISPIRT Foundation

A Think Tank for the Indian software product industry

I remember in the childhood days one was allowed to dream of becoming either Engineer or Doctor, without understanding what it means to be one. Siva gives a fantastic view into what would entail to be a real engineer and not have only an engineering degree.

As NASSCOM Engineering council chairman, one of the dimensions we are dealing with is clearly “competency” of our engineers. If you dig deep, the ability to apply knowledge, experimentation, and having the required eco-system to relate to are some of the fundamental challenges of today’s context in India. Siva has looked at, how can engineers relate and solve some of these challenges to be a “good engineer”. This is apt timing by Siva; I wish him a grand success.

Mr. Vijay Ratnaparkhe

President and Managing Director, Robert Bosch

Engineering and Business Solutions Limited

Chairman, NASSCOM Engineering Council 2013-15

In the age of globalization, we in India have a tremendous opportunity to leverage our youth to build a strong economy that is much needed for building the nation. The quality of education has been quite sub-standard and this will be a challenge unless it is addressed right away. The reasons are many. Siva has done a phenomenal job touching every single aspect that contributes to this and has given excellent solutions and guidance. A must read for everyone aspiring for an engineering degree, or currently in college and also for those who have graduated. My heartfelt congratulations to Siva's efforts in a time that this is much needed.

Mr. Anand Purushothaman

Chief Executive Officer, Payoda Technologies

Hundreds of thousands of young Indians enroll in engineering colleges every year. Siva Palaniappan's book provides a much-needed guide to these students as to how they can make their engineering education much more than a passport to a job. With the job environment changing fast, this book is right in time. I hope prospective engineering students and their families will read this book carefully before deciding on whether to apply to engineering schools."

Dr. Rishikesh T. Krishnan

Director

Indian Institute of Management, Indore

Foreword

Dr.Mylswamy Annadurai

Outstanding Scientist /
Programme Director, IRS-SSS
ISRO Satellite Centre
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Bangalore 560 017

3rd December 2013

Sub : Become an Engineer, Not Just an Engineering Graduate.

The manuscript of the book titled “Become an Engineer, Not just an Engineering Graduate”, a comprehensive guide to every engineering aspirant by Mr.Sivakumar Palaniappan came to my reading at the peak of Mangalyan activities. Mostly I read it during the travelling time between by residence to the Spacecraft Control Centre.

The book is need of the hour as Tamilnadu alone produces graduates who are more in number than that of USA. But if one considers the whole of India, then we produce much more engineering graduates. What about Quality Engineers?

This gap of engineering graduates Vs engineers need to be filled in. This guide tries to identify the action plan at the individual level.

I strongly recommend such reading, as most of the ideas are in sync with me.

If the guide comes in local languages, its impact will be more felt.

Best wishes,

Dr.M.Annadurai

Preface

Engineering today is extremely useful only as a form of employment for engineering graduates

Technical education in India has scaled over few years with thousands of engineering colleges mushrooming across the country, producing million graduates annually. There are many small villages in India without a primary school, but has a private engineering college close by. With increasing number of engineering colleges, key focus is on quantity not on quality of engineering graduates. Lack of focus on quality of technical education is clearly reflecting in the employability ratio of young graduates coming out of these colleges.

Raising serious concerns about employability of engineering graduates, a recent study in India states, “30% of the country’s fresh engineers cannot solve simple mathematical problems”. Their ineptitude is not just limited to mathematics, but also in basic engineering concepts, basic physics, analytical thinking and English comprehension.

It’s alarming, as more than one-third engineers do not possess basic skills needed in their day to day life for doing simple transactions. They have feeble understanding of basic concepts such as decimals, ratios, fractions, powers and aptitude to apply these concepts to real world problems. The study also reveals that only 18% of technical graduates in the country are

employable, but after weeks or months of training by companies those hire them. This means that, 82% of engineering graduates are not readily employable. Lack of sound basics, analytical abilities and engineering principles are fundamental reasons for this poor employability rate.

This is not the problem seen only in India but also across the world. World Economic Forum put it rightly well when it stated earlier that, “We are entering a new era of unparalleled talent scarcity, which will put a brake on economic growth around the world, and fundamentally change the way we approach workforce challenges.”

Unfortunately our education system has responded to increasing demand for quality engineers by just increasing the production of engineering graduates. There is also huge demand for getting admission into engineering colleges, as majority of students are choosing to study engineering due to various social factors. In general, society in most parts of India sees only professional courses like engineering and medicine as respectable stream of education. As children are forced to become a doctor or an engineer, the ones who don't really have interest and aptitude for engineering ends up in engineering courses. This inorganic demand and supply has lead to mere increase in number of engineering colleges that eventually shifted the focus to quantity instead of quality of engineering education.

Most of our technical institutions are merely functioning as assembly lines whose main job are bulk manufacturing engineering graduates, but not involved in the process of making real and passionate engineers,

who could take on the technological problems that the world is facing today and challenges to come in future.

Let's look into the typical example of a final year electronics engineering student Ramesh, who was looking for campus placement. His wish was to work in an MNC in the domain of embedded systems. He appeared for number of placements in his college but could not clear any of them. The reasons are manifold; first he was not able to clear most of the entry level written tests conducted by companies. In one of the tests, he even failed to write a program that counts all even numbers from 1 to 100. When he cleared written tests, he was stuck in technical interviews. In one of the interviews, he was not able to answer "why semiconductor materials are commonly used to make electronic devices?" In one another interview he failed to conceptually explain the difference between RAM and ROM. In another interview he was unsuccessful in drawing a simple JK flip flop.

There were few unusual occasions when Ramesh managed to clear technical interviews, but unfortunately he was caught in HR rounds of interviews. When a HR manager asked him "tell me about you", he had nothing to say after few seconds. He did not pursued any useful hobbies, he was not keenly into sports, he did not had any significant academic achievements and all the above he was not confident about himself. He had nothing much to say about himself.

This is not a concern of just one Ramesh, but there are thousands of engineering graduates in their final year of engineering looking for placements, wanting jobs but without basic skills necessary for employment.

There are electrical engineers who do not understand and cannot explain Ohm's law, who don't know how to change fuse filament in mains box. There are computer science engineers who do not know how to draw a flow chart, who don't know how to install operating system in a computer. There are mechanical engineers who don't know Newton's laws of motion, who don't understand Bernoulli's principle. Same is the case in every other stream of engineering.

Unfortunately the Software and Information Technology bubble burst had swayed away many young students from concentrating in core physics and engineering domains. Need of the hour is not just engineering graduates, but exuberant engineers who have courage to confidently take on the technological challenges of today and tomorrow.

This book **“Become an Engineer, Not just an Engineering Graduate”** is written with the aim of encouraging engineering graduates to be passionate engineers, help them enhance their employability potential and enable them to sculpt their career as an engineer.

This book is a culmination of all my research, study and analysis on engineering education, engineering graduates and employment scenario based on inputs from students, faculty members, placement officers, CEOs, hiring managers, line managers, technical experts, parents, and society at large.

This is your book and you own it. **Read the ways you want, write as much as you like, mark notes all over the book, draw underlines, but take action every day.**

Ultimately, if you transform into an **Exuberant Engineer**, purpose of this book and the very purpose of you learning engineering will be accomplished.

Sivakumar Palaniappan

Acknowledgements

Every book has its own life story. The very thought of this book started when I first met a young engineering student who worked as security officer in an apartment complex. It was heart breaking to see the emotional trauma that this young graduate was going through doing a security officer job. When I shared this incident with my friends, I got astonished with many similar stories of engineering graduates who settled in routine jobs. I started believing that I must do something to help these kids as they deserve better in return for all their efforts. I started to write.

My first thanks goes to all students, their parents, faculty friends, placement officers and hiring managers with whose inputs and experiences this book became an enriching reality. Without your stories, this book would not be possible. I thank you all for your honesty and openness during various formal/informal interactions, counseling sessions and workshops.

I am grateful to all my gurus, mentors and teachers who greatly inspired me in my life with all their knowledge and experiences.

I am deeply indebted to my dear friend Himanshu Sheth who influenced me into the world of writing by persuading me to start my blog www.anbusivam way back in 2007.

I thank all my friends who have read the draft versions of this book, gave their critical feedback and insights to improvise this. My special thanks to friends

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Saro Velrajan, Tapan Pattnayak, Dr.N.Sankaran and Sujith Kumar who offered to review the contents in depth and provided critical inputs.

Thanks to my friends and colleagues for their continuous support and encouragements that pulled me along to complete this work.

My gratitude to Notion Press team and special appreciations to the project manager of this book, Surekha for her time, creativity and support in bringing this book as what it is. While thanking them, I must also extend my gratitude to my good friend, psychologist, educationist and author Aarti C Rajaratnam who brought me to Notion Press.

I thank all my dear friends from one of the world's wonderful movement, Toastmasters International. In specific, thanks to all friends from Coimbatore Toastmasters Club who always encouraged me to freely experiment with my thinking, writing and speaking skills.

Furthermore, I am greatly indebted to my dear parents who strongly believed in the power of education and gave me quality education in spite of all the tough odds they faced in their life. Their love for me is evident in their unconditional kindness and support. I would not be who I am or what I am without their love, affection and all their sacrifices for me and my kind sister Suganthi.

Last but not least, thanks to my loving wife Sangeetha and our sweetheart Akhil for allowing me to spend all the time in writing this book. I have been blessed to have them in my life. Thanks for their understanding and continuous support in this endeavor. I have no words to fully express my appreciation to Sangeetha for

all her support in all my crazy career decisions, with the strong belief in me that I am in the process of crafting my own career.

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CHAPTER 1

Why This Book is for You?

“There is no friend as loyal as a book”

- Ernest Hemingway

Engineering is everywhere. Starting from morning alarm till end of the day, engineering improves the ways we communicate, travel, work, live and entertain ourselves. Take a quick look around where ever you are, you will find everything around you was designed, developed and created with engineering. Think about the world around you: airplanes, automobiles, electricity, cell phones, medications, even a bottle of water – everything around you has been designed by an engineer. Virtually everything – the building you’re in, vehicle you travel, movie you watch was engineering’s creation.

This book is certainly for you if you say “Yes” to any one of the following questions.

- a) Are you a high school student aspiring for engineering?
- b) Are you an engineering graduate?
- c) Have you just graduated from an engineering college?
- d) Are you a parent planning to guide your child?
- e) Are you a teacher in a high school?
- f) Are you a professor in a college?

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- g) Are you a seasoned engineer by profession?
- h) Are you a career counselor?
- i) Do you use any of the engineering creations in your daily life?

Chances of you saying “No” to all the above questions are sky high. **So, this book is certainly for you.**

With engineering being the most conventional and highly sought after professional course, having better understanding of the whole concept of engineering and engineer would be of great benefit for individuals. The very purpose of this book arises mainly due to lack of understanding of engineering and lack of focus on quality of engineering education today.

Here are three encounters that triggered my thoughts and conscience to write a book of this kind.

Engineering Graduate working as Security Officer

I was terribly dazed to come across an engineering graduate working as a Security Officer in a private firm. When I spoke to him at length, I understood that he is from a rural family, his father worked as an office assistant in a local village administration office and his mother worked in farm fields. He was fascinated with the fad for engineering degree, thanks to his good scores in 12th; he got into Computer Science engineering in a very remote engineering college. He had taken an educational loan of Rs.4.0 Lakhs.

He studied his entire school education in local medium and had great difficulties in coping up with the engineering curriculum. He never understood what was taught in classes but managed to clear all the papers by rote learning and got his degree in Computer Science

engineering. He appeared for numerous placements in campus and off campus interviews, but all in vain. He tried for more than 10 months and nothing worked. His parents had invested every penny they earned in the last few years for his education and they don't really understand why he was not getting a job. They were hoping that he will get a job soon and will finally support them.

His parents were much worried; neighbors and relatives started asking about what he is doing and educational loan's installment dues had come for payment. With no other choice, at last he landed in a Security firm through someone and took up a job as security officer in an apartment complex. Being a first graduate in his family, he had no one to guide him, no one to help him in his studies or placements, no one tell him what to do. He was feeling terrible upset with low morale for not being able to get an appropriate job for his education.

Engineering Graduate working in Back Office

I was astounded when I came across an engineering graduate working in the back office of a leading real estate company. I had been to the office to meet my friend who is a structural engineering consultant there. While discussing with my friend about this engineering graduate, I understood that this young boy has joined recently through a referral from an influencing person in the society. His boss could not say no and placed him in back office to do some documentation work.

Next time when I went there, I couldn't stop from talking to this young man. He is from an economically well to do family, father is doing a small business and

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mother is working as a school assistant. Both are reasonably educated, but still he was not guided properly on his education and career. He was admitted into a good city based engineering college in management quota; he got his electrical engineering degree but was not able to get any job either in campus placements or outside the college.

He wanted to sustain his living by himself, He went to Bangalore for 6 months and then Chennai for 4 months in search of a job but nothing worked out. At last with his father's efforts they got a recommendation letter from a big wig to get this back office job. He feels humiliated doing the work of a 10th standard. He lost his self respect and esteem; his confidence levels were hitting the bottom. He said, "Sir, I am the first graduate in our family and no one was there to give me proper guidance or inputs on my education, career choices etc". He would have taken better decisions if at all there was someone who could have given him suggestions or at least some pointers in life.

Engineering Graduate working as Pizza Delivery Person

Third incident is about a person, whom I met on a Sunday afternoon, when I ordered Pizzas for lunch. It was a rainy day, I was alone at home and was not in a mood to go out or cook something for lunch. I dialed up Domino's Pizza nearby, placed order for a medium Pizza and a drink. As I was so hungry, I started waiting at the door for the delivery person to come home. As I was waiting, the drizzling turned into heavy down pour. After about 45 minutes someone called me and said, "Sir, I am calling from Dominos. I am extremely sorry, stuck in traffic jam. I'll be there in 5 minutes".

After another 20 minutes someone knocked the door. When I opened, I found this young, skinny boy standing with Pizza box. He was fully drenched and shivering in the rain. I offered him to come inside, but he politely refused. I paid the bill; he returned the change and started walking back to his scooter.

Suddenly he turned back and asked, “Sir, are you working as a HR manager?” I was surprised and replied, “Yes, but how do you know that?” He said, “I had attended one of your guest lecturers when I was studying in an engineering college”.

I understood from him that he was in his 2nd year engineering in a private college where I addressed their students in one of their technical events. He said, “Sir, I realized that I was going nowhere in the engineering college. At the end of 2nd year, I thought of dropping out of college as it was waste of time, money and my efforts. I walked out of my degree and joined Dominos three months ago. I am getting a decent salary now”. I asked him, “But what happen to your education?” for which a simple smile was his answer.

He had to leave as he was already getting late, he should report back for the next delivery on time. I was deeply concerned after seeing the state of an engineering graduate working as a Pizza delivery person.

These three young engineering graduates made me realize the pressing need to inspire and guide our young children to take up engineering not just for the sake of getting a degree or a job, but with **real passion towards engineering**. I am not demeaning these jobs; I sincerely believe every job has its own respect and dignity. But, my only question is, why one should spend so much of time, money and efforts to get an engineering degree

and then end up in these jobs that any 10th grader could do.

Unfortunately these are not only the stories of three young graduates, but there are thousands of students pursuing engineering without even knowing why they are doing so. According to a survey conducted by one of the leading IIT's student body, it was found that about 75 percent of the students are not interested in spending any time on the academic excellence. Sadly, the reason for this is students who come into the IITs don't arrive because their hearts beat for Engineering and Sciences. The reason why they come in and do their best is because there is peer pressure, parental pressure and above all societal expectations.

Survey and study published by the Associated Chambers of Commerce and Industry of India (ASSOCHAM) says, "Passion in science and technology should ideally be the reason for a student to seek admission in IITs. However, we have come to find that a lot of students generally don't have a single concrete aim or reason for entering the IITs and there is a clear mismatch of ideals at entry point. When in school, students tend to be confused as they are not sure why they aspire to get into IITs in the first place. Their decision to prepare for JEE is mostly driven due to parental pressure or herd mentality,"

Coaching for admission to the IITs and other engineering colleges has acquired the status of a big industry in India. According to the Associated Chambers of Commerce and Industry, the size of industry is more than Rs 10,000 Crores. ASSOCHAM's conclusion is based on the assumption that 6.0 lakh students attend these classes every year and the average cost for each student is Rs 1.7 lakh.

But, unfortunately I don't see any systematic guidance or eco system to help students understand on why and how to approach engineering education and career building. This made me write a short article on the state of engineering education and engineering graduates in my blog.

Thanks to my family, friends and colleagues. It's because of their encouragement, what I started as a short article, blossomed into this wonderful book "**Become an Engineer, Not just an Engineering Graduate**".

This book is not just on placements or job, but written with the larger perspective of engineering as passionate career for life. Clean water, health care and energy are among the greatest challenges facing society today, and engineering can make significant and lasting contributions that will help address these problems and improve quality of life. We need real engineers to solve these problems, not mediocre engineering graduates just with a degree in hand. We need engineers and scientists who can understand the ground reality, with grass roots exposure, clarity of basic engineering concepts and ability to put all these together and think in a collective perspective to find technical solutions to all the haunting social problems.

This book will serve as a comprehensive guide to every engineering aspirant and will be a companion, guide and mentor in transformation of engineering graduates into real engineers.

Do engineering not just as a degree, but as a passionate career for life.

CHAPTER 2

Why Should I Choose Engineering Degree?

“Engineering is the conscious application of science to the problems of economic production”

- H. P. Gillette

Student tale

On a hot summer afternoon, I was travelling to Bangalore in Coimbatore-Bangalore intercity express. Half way through, a Father-Son duo joined me in the journey and they were discussing on which group to choose in 11th and 12th class. I understood that the son had just completed his 10th standard and is going to 11th standard and their conversation was revolving around which subjects to choose in 11th class, which degree course, job, career, etc. Father said, “Look, you should take PCM (Physics, Chemistry and Mathematics), because you will be able to choose Engineering, I think only that will give you to a stable career with a handsome salary”. He continued, “Do you know...? Even your aunt’s second brother-in-law’s daughter had taken PCM, did her electronics engineering later and now she is in US”. Son replied, “Dad, she is in US because, she got married to a guy who is working there and she is doing nothing related to her engineering degree. She is a homemaker” for which there was no reply from the Father. Instead he said, “Do you remember, the other day our family astrologer looked into

*your horoscope and pledged that you will do well only if you choose an occupation linked to engineering". In course of the journey I got to talk to the Son and his underlying question was "I am not bad in Physics, Chemistry and Mathematics, I am not sure what to choose, but I also don't know **Why should I choose engineering degree?** I don't want to take up something just because my dad is asking me to do so. But I am sure my dad will force me into engineering".*

I told him, "You should choose engineering degree only if you have early signs of liking for STEM in your high school". What is STEM? It is Science, Technology, Engineering and Mathematics. It is proven that regardless of what they do, STEM graduates command higher respect and better remuneration than their non-STEM counterparts. Rationale being, getting a STEM degree is not that simple and cushy as getting a degree in arts. It involves learning many subjects, laboratory classes, projects work etc than arts graduates.

Getting an engineering degree is not a child's play; it is hard work which involves sincerity and commitment. Engineering graduates are expected to be highly intelligent and determined, who will be able to apply intelligence and determination to their work. Engineering has been the traditional professional course that opens many doors to numerous career opportunities. Throughout an engineer's career the engineer may become multi-disciplined, having worked in several technical and non-technical areas.

More than doctor, lawyer or a teacher for whom the scope of work is very well defined within a boundary; for an engineer the scope of work has no frontiers. Almost every aspect of our existence is filled with contributions from engineers. Starting from water we drink, food we

eat, vehicles we drive, computers we work, gadgets we use, technologies we rely on, appliances we operate, medical services and medicine we consume, power and fuel we guzzle and many more. The list is endless.

10 Reasons Why Engineering is a Great Career?

1. Engineers do everything based on truth

Engineers do everything based on scientific truth and reality. Engineers know how to convert scientific knowledge into technology and then technology into successful innovations that are made available for practical use. Engineers bring the complex scientific concepts into practically usable products and solutions for the common man. There are lots of very interesting things in the world that would look like magic on the surface, but only an engineer can understand what's really going on inside. Engineers accept the limitations, and focus on what is practical and what is possible.

In your science, mathematics and engineering study, you're given facts, answers, knowledge and truth based on scientific principles, evidence and proven experiments.

2. Engineers solve problems of society

The irresistible urge to solve problems around, find new ways and solutions, is what makes us human. The breed called engineers are passionate human beings who don't see problems, but they only see the opportunities in them to create new and better things to live. Engineering is all about using math and science to design new things or to solve practical problems. Engineers confidently take on ecological problems and challenges to provide technological solutions. Some of the important social problems like electrification, safe aviation, green

automobiles, internet and mobile communication, health advancements are all the problems solved by engineers for betterment of this society. Engineering is all about extending the horizons of thinking by solving social problems using technology.

Engineering is most exciting, dynamic, *significant* part of human life. In spite of all advancements, there are numerous social problems that need efficient solutions and only engineering community can solve with innovations from their science and technology. Engineers makes things happen. Engineering offers a world of excitement, challenges and interesting career opportunities. Engineering converts science and technology into successful innovation, providing the conditions for civilized living.

3. Engineers do creative and intelligent work

Engineering is a creative enterprise, one that requires intense imagination. Engineers are creators of new products and services who get to work with most interesting people. Engineers get the opportunity to interface with very creative, intelligent and talented people from around the world. Engineers build today's thoughts into tomorrow's reality. Engineering is a great outlet for imagination and a perfect field for independent thinkers. Engineers see the problems more as challenges and opportunities than as difficulties. What they appear to be doing is solving problems, but in fact they are busy creating solutions, an altogether more imaginative activity.

Greatest inventors of the past were creative, intelligent thinkers who imagined solutions. Leonardo da Vinci one of the Quintessential Engineer effectively combined his scientific intellect with his artistic

creativity to become the world's incredibly innovative thinker and creator. Engineers simply think differently than many other professionals. As an engineer you will be called upon to answer difficult technical problems that involve creative solutions that require innovation and invention. Engineers are modern day inventors.

For example, the idea of using gyroscope, a device for measuring or maintaining orientation in mobile phones is an excellent creativity. Accelerometers in mobile phones are used to detect the orientation of phone. Gyroscope, or gyro for short, adds an additional dimension to information supplied by the accelerometer by tracking rotation or twist. Thus, engineers are always exercising their grey cells to ensure that they create the best of products.

4. Engineers make changes for the world

Engineers learn the tools and techniques to work with other people to make things better. Engineers create new thinks and make changes for betterment of the world. Engineers build new products, come up with solutions no one else has thought of and make a mark on the world. Changing the world doesn't mean that the planet as whole, changing the work perhaps is changing the subset of the world that highly impacts human beings. Engineering has a long tradition, with the work of engineers including the pyramids, many temples and historical buildings, roads and water supply systems, the steam engine and ships.

Engineers generally don't "do" science. Science is about discovering the natural. Engineering is creating the artificial and change this world for better living.

5. Engineers work everywhere

Engineers work everywhere. Engineers work in manufacturing plants, assembly lines, design bureaus, research laboratories, business offices, testing fields etc. Engineers work in space shuttles, war fields, skyscrapers, even work in traffic signals programming traffic control systems. The work of engineers can be seen everywhere - in health, in our cities, in the country, in food supply and distribution, in medicine and in aerospace.

Engineers design and build everything from sports stadiums to roller coasters. They clean miniscule bacteria out of our drinking water. They even develop systems that get clothes and groceries onto store shelves. There's always some engineering in everything we come across.

6. Engineers never get bored

Engineers use their imagination and analytical skills to invent, design and build things that matter. Engineering career is exciting, by dreaming up creative and practical solutions engineers never gets bored in what they do. Engineers would never get bored of work since there is always something new, something exciting. There are always new challenges and unsolved problems that are present and thus it is never boring.

Creative problem solving will take you into uncharted territory, and the ideas of innovation will expose you to different ways of thinking. Be prepared to be fascinated and to have your talents stretched in ways you never expected. It's challenging as well as exciting to be an engineer.

7. Engineers make a difference

Engineers make a difference in the world. They make hearing aids, braille books, pacemakers, life saving

medical devices, automated robots, safe and reliable transportation systems, effective communication systems, information revolutions and connectivity and many more. From the first flying machine of the Wright Brothers to the i-Phone, engineering is something that aims at improving the way of living.

By dreaming up creative and practical solutions, engineers are constantly making difference in the world. Engineers take math and science from paper and the lab to invent, design, and build things that matter the most for the mankind. From the traditional craftsman, to the more modern inventors, engineers have been the driving force behind making life better for those around them.

8. Engineers are in demand

Engineers are in demand; real engineers are in great demand. Highly qualified engineers are the back bone of new inventions, technologies and business growth. World needs more and more skilled engineers to build better roads, good hospitals, excellent educational institutions, efficient power plants, automated robots, new products to make our enhance our living.

Trained engineering graduates have skills which are attractive not only to engineering companies, but to other businesses with their recognized numeracy and organizational skills. Engineers are rewarded with high salaries because of the great demand for qualified, skilled professionals in these fields. But please note that the demand is only for engineers, not for just engineering graduates.

9. Engineers earn more money

Engineers not only earn lots of respect, but they're also highly paid. Even the starting salary for an entry-level

engineer is impressive than any other graduates. As the employability variance of engineering graduates is increasing, the salary level of highly skilled engineers is also increasing. More skilled you are more salary you could demand.

Engineers are rewarded with high salaries because of the great demand for qualified, skilled professionals in these fields. As an engineer if one can acquire niche knowledge, skills and abilities she can greatly demand good pay packages.

Obviously, being an engineer is paying off more than most other jobs. Getting an engineering degree provides high initial salary as well as long term income than any other degree. Multiple sources report that careers in engineering pay well above the national average, and become increasingly lucrative as experience builds over time. As you move from pure technical engineering to engineering management, your salary advances quickly. That's the reason many engineers looking for professional advancement in engineering management positions that furthers their career growth rapidly.

If you are an engineer with concrete knowledge and experience on technology, getting a master degree in engineering management will provide lots of earning possibilities.

10. Engineers enjoy numerous career choices

We are all aware of Neil Armstrong, Alfred Hitchcock, and Rowan Atkinson - one an astronaut, one a filmmaker and one a world class comedian. They may be of extremely diverse fields but the common link between them is that they all hold a degree in engineering. Engineering is a field which is diverse and has a lot of career options.

Engineers enjoy numerous career choices in technological and also in managerial and administrative functions. Being skilled at physics, math, and logical thinking engineers are obviously found to be successful in whatever career they choose. As an engineering graduate you could become a design engineer, product engineers, process engineer, reliability engineer and many more.

You could also build your career in various industry streams like defense, aerospace, automobile, automation, telecommunication, mobile technology, semiconductors, instrumentation, computers, marine, manufacturing, engineering services, power utilities, consumer goods etc.

Engineers makes things happen. Engineering offers a world of excitement, challenges and interesting career opportunities. Engineering converts science and technology into successful innovation, providing the conditions for civilized living.

Engineers have no shortage of career options, as their skills and abilities are used to positively impact businesses in every industry, these graduates are in extremely high demand. Engineering is a great choice that opens up many paths for the future. Remember that Software and IT are not the only engineering domains.

“Engineers are in great demand, but not just Engineering Graduates”

Yes, as an engineer you will have all the above possibilities and privileges, but not just in a flash. Becoming an engineer is pretty intensive, especially if you want to become a real engineer. All the above opportunities will embrace you only if you are a real engineer, not just one among the other million engineering graduates.

Answer the following questions to know, if Engineering is appropriate for you.

Sl.No	Question	Yes or No
1	Do you enjoy knowing how things work?	
2	Do you think of new or better ways of doing things?	
3	Do you like to break and reassemble toys, simple equipments etc?	
4	Do you like Physics and Mathematics?	
5	Do you love solve problems?	
6	Do you like to express your ideas to others?	
7	Do you have the ability to focus for long hours?	
8	Do you make decisions based on data, facts and information?	
9	Do you have acumen for attention to details?	
10	Do you have the ability to work individually and also as a team?	

(Please note: This is not an extensive psychometric test)

If you've answered **"Yes"** to most of the above questions, your potential for success in engineering is very high. If you've said **"No"** to more than half of the above questions engineering degree might not be a good choice for you. It's time for you to think about alternate choices of education appropriately.

"Engineering is the professional art of applying science to the optimum conversion of natural resources to the benefit of man."