



# ACTION PLAN

10th – 12th Grade

**Student Name**

**23/03/2022**



## **Anuradha Kishore**

Senior Counsellor

**Hello Arshita,**

It was a pleasure meeting you on 22 November 2021. With a preference for and an interest in varied career possibilities, it is best to keep the options open. You can also join coaching classes to strengthen your foundation. I also suggest that you research schools in your state look at the combination of subjects of your choice.

# **BEST FIT CAREER FOR YOU**

(Based on assessment and counselling process, these are your career preferences)

## **ARCHITECTURE**

### **How To Have A Career In Urban Planning**

An individual who uses the land to build large communities, physical facilities and influence population growth in towns, cities, metropolitan areas, and counties is known as Urban Planners. They inspect and administrate various land policies made by the government, review lands, investigate potential sites, and request changes where required.

There are a few variations in this profession. Some of those are- Town planner, Park planner, Regional Planner, City planner, Transportation planner. Seeing these variations, one can assume a planner only focuses on a particular area at a time.

A professional in this field will find the best use of the proposed land and its resources to build a sustainable environment.

## About the Urban Planner

Urban Planners use land resources to build residential or commercial or recreational places. There are a few planners who take on community-wide projects. Most Urban Planners focus on small areas. Planners need to keep things like economic, social, or environmental issues in their minds.

At the beginning of a project, planners work with government officials, residents of the area to find the issues and set a project's goal. Planners use various techniques to complete the project. Geographic Information System or GIS is such a device.

This tool helps to analyze and manipulate geographical data. Planners use this by integrating data with an electronic map. They also use different software, financial sheet, a visualization tool, and database programs.

## Eligibility to Become an Urban Planner

There are some eligibility criteria one has to fulfill if he/she wants to be an Urban Planner.

- Candidates must have a Masters's degree in Urban or Regional Planning approved by the Regional Planning Board.
- A candidate with a Master's degree in [Geography](#) or Urban Design can also be an Urban Planner.
- Environmental, Civil, and Transportation engineering graduates can also appear for jobs in this field.

## How to Become Urban Planner

- The candidate should have a pure science stream in his/her 12th class. Mathematics is a compulsory subject in the higher studies for Urban Planning.
- After completing the 12th standard candidates should attend the 2nd and 3rd paper of JEE main paper for B.Arch and B.Planning.
- The suitable course is B. Planning. If one cannot secure a seat in B. Planning, they can opt for B.Arch.
- If you pass the B.Planning graduation exam, you are qualified for the job of Urban Planning.
- Consider doing your Masters in Urban or Regional Planning after your bachelor's. A master's degree will surely get you more job opportunities.
- You can now apply for an Urban Planner Job in different openings.

## Top Urban Planning Institute In India

- Indian Institute of Technology, Kharagpur, West Bengal.
- School of Planning & Architecture, New Delhi.
- School of Architecture & Planning, Anna University, Chennai.
- Centre for Environmental Planning and Technology (CEPT), Ahmedabad
- Institute of Development Studies, University of Mysore, Mysore.
- Pune Institute of Engineering & Technology, Pune.
- Indian Institute of Technology, Roorkee.
- Bengal Engineering College, Shibpur University, Kolkata (West Bengal).
- Visvesvaraya National Institute of Technology, Nagpur, Maharashtra (Deemed University).
- College of Engineering, Thiruvananthapuram (Kerala).

## Urban Planning Entrance Exam

Students interested in taking Urban Planning in their bachelor's degree course can appear for the 2nd and 3rd papers of the JEE Main Exam.

And for the Master's program in Urban or Regional Planning, candidates can appear for the exam like GATE, CEET, OJEE, TANCET, CUCET. Though who are applying for an M.Planning degree have to appear in the TS PGECET exam.

## Career Opportunities as A Urban Planner

In the next ten years, the Urban and Regional Planner demand is hoped to grow over 11 percent. The way we are progressing, more housing, parks, and other communities are expected to grow.

As long as this demand remains intact, the need for Urban Planer will never go down. Within Towns and cities, issues like population growth, lack of resources, environmental degradation, lack of space for transportation need to be solved.

Urban Planners solve these issues by taking on live projects. As existing communities will need new and advanced infrastructure, planners will also come into the picture.

## Employment Sector/Industry for Urban Planner

There are various industries Urban Planners can work in. Some of those are-

- Municipal Corporations.
- Engineering Industries.
- Agricultural Services.
- Construction Agencies and companies.
- Management firms.
- IT Companies.
- Scientific Research Institute.

Some of the Leading Companies are-

- Tata Consulting Engineers.
- ICRA Management Consulting Private Limited.
- Townland Consultants Private Limited.
- CRISIL Risk and Infrastructure Solutions Limited.

## Jobs In Urban Planning

- Urban Planner
- Regional Planner: Regional Planner uses land resources for better growth opportunities over a large area.
- Surveyor: Surveys different areas of proposed land and reports the data to his/her superior.
- Economic Development Planner: Assists in the economic development of a large group or a community.
- Resource Planner: Plans to optimize remaining resources for the best result of a project.

## Salary of An Urban Planner

The salary in this profession varies from role to role. But on average, an entry-level planner is expected to earn between 20,000RS to 30,000RS. An experienced planner is likely to make between 55,000RS to 80,000RS.

The senior-level salary ranges from 1,00,000RS to 1,10,000 RS. In the USA one is expected to earn between \$70,000 to \$95,000.

## Study Material to Become an Urban Planner

- Building and Dwelling: Ethics for the City by Richard Sennett
- Sustainable Nation: Urban Design Patterns for the Future by Douglas Farr
- Walkable City Rules: 101 Steps to Making Better Places by Jeff Speck
- Redevelopment and Race: Planning a Finer City in Postwar Detroit by June Manning Thomas

## Pros & Cons of Becoming an Urban Planner

### Pros

- Good growth in government jobs.
- Good exposure in live projects. One gets to work to improve the lives of Urban People.
- One gets to work on Major projects.

### Cons

- One has to stay in the field all the time.
- Stressful expectations of the clients.
- Long working time.

## How To Have A Career In Architecture

Architecture is the study of designing physical structures such as buildings, artificial constructions, bridges, etc. An architect has to have the idea and the method of execution for the planning. They also need to monitor the actual construction sites. Hence, architects need to be equipped with first-hand knowledge about their field.

They may get tasks involving a few, or all phases of development of the construction. It is an exciting and creative field with loads of opportunities if you select the proper path. The career option is rewarding, and there is always a new seat for a future aspirant.

## About the Architect

An architect may have a wide range of responsibilities according to their specialization and their skill set. Some architects may be involved in various tasks, such as designing, engineering, managing, supervising, etc.

- If you want to be involved in the design, you should have the skills to create a scientifically-backed layout of the target construction.
- If you have leadership qualities, you could hold managerial and administrative responsibilities. You can become the overall in charge of the construction site and oversee legal, power, communication, and estimation problems.

## Eligibility to become an Architect

You can pursue Architecture at UG, PG, and Ph.D. levels.

- **For UG Level:** Students need to get into the B. Arch Degree course from a CoA-recognized institute. B. Arch. or Bachelor of Architecture is five years. Aspirants must have a 10+2 Science stream (including physics, chemistry, and mathematics) with a minimum of 50% aggregate marks to apply.

Students with a 10+3 year Diploma in any stream can apply for B. Arch. Program as well.

- **For PG level:** Students require a minimum of 50% aggregate to be eligible to enroll in the PG course, which has two years.
- **For Ph.D. level:** Candidates must pass the M. Arch degree with a minimum of 55% aggregate (50% for SC/ST/OBC) to enroll for the 3-6 years course.

## How to Become an Architect

If you wish to build an Architectural career, you will need to pass the architectural college admission entrance exam. After passing, you will be admitted based on your merit if you secure a seat at the reputed institute for the B. Arch. Course, you will then dedicate five years for the B. Arch. Degree.

- All must pass the main exam at the end of each academic year. On the course completion, you will receive the B. Arch. Degree.
- The next step is registering with the CoA. You can register yourself to become a full-fledged, professional architect in India.
- Another process to become a professional architect is by clearing the IIA (Indian Institute of Architects) Associate examination.
- Candidates with Diploma in Civil Engineering, [Interior Designing](#), or Architectural Assistantship must clear all the IIA exams after registration to get the IIA associate title equivalent to the B. Arch. Degree.

There are several disputes between the CoA and the IIA. Hence, it is best if you complete the B. Arch. Degree.

## Top Architecture Institutes in India

India has many top-rated colleges and universities for Architecture courses such as

- Indian Institute of Technology (IIT) Kharagpur
- IIT Roorkee
- National Institute of Technology (NIT) Calicut
- CEPT University (Ahemdabad)
- IEST Shibpur
- Jamia Millia Islamia (JMI) Delhi

## Architecture Entrance Exams

You can pass the entrance exams such as NATA, or JEE, and other institute-wise entrance exams to secure a seat in the B. Arch. Course.

There are separate entrance exams that differ from institute to institute for M. Arch. Degree course.



## Career Opportunities in Architecture

Architects integrate technology with effective planning to strategically design houses, factories, office buildings, etc.

It is best to do an internship with a firm after completing graduation to gain practical experience.

They can then work with construction companies or governmental organizations as Managers, Landscape Architect, Contractor, etc.

Architects can also build their independent firms and do consultations for others.

## Employment Sector/Industry for Architect

Most jobs are available in governmental organizations such as the Public Works Department, Archaeological Department, National Building Organization, Ministry of Defence, National Building Construction Corporation Ltd.

The state departments, housing boards, architectural firms, consultancy companies, local bodies also recruit architects.

## Jobs in Architect

Some popular job profiles for candidates are-

- Architectural Designer
- Architectural Engineer
- Interior Designer
- Building Contractor
- Project Assistant Manager
- Manager
- Draftsman
- Technical Assistant
- Architectural Historian
- Architectural Journalist

## Salary of Architect

Graduates from the top 10 colleges in India can secure a salary of Rs 5- 10 LPA. Graduates from other colleges can secure around Rs 1- 5 LPA.

## Study Material to Become Architect

Students need to clear the NATA exam to secure a seat for a B. Arch degree. Some of the best books for NATA are:

- A Visual Dictionary of Architecture- F.D.K. Ching
- NATA Guide to Bachelor of Architecture Entrance Examination
- A Complete Self Study Guide for B.Arch- PK Mishra
- B. Arch Entrance Examination Guide by Surendra Kavimandan.

There are several other books available in the market. Students can also opt for online study materials and PDFs over books, but the latter is more effective.

## Pros & Cons of Becoming an Architect

### Pros

- Opportunity for independent growth
- International exposure
- Creative atmosphere
- Job security
- Gradually increasing salary

### Cons

- Low initial income
- Long work hours
- Constant corrections in designs according to the client's requirements

# BEST FIT CAREER FOR YOU

(Based on assessment and counselling process, these are your career preferences)

## ELECTRICAL & ELECTRONICS ENGINEERING

### How To Have A Career In Electrical And Electronics Engineering

Electrical engineers generally work with enormous scope electrical frameworks which incorporate engine control and force transmission. They work on an assorted scope of advancements through their profession, from planning family unit apparatuses, electrical force stations, wiring, and building and satellite interchanges.

There are different job opportunities for people with bachelor's degrees in [Electronics engineering](#) in gadgets designing that incorporates radio recurrence plan and portable interchanges, electronic control frameworks, media communications, electronic item configuration, control and force hardware buyer gadgets, signal handling, military and aeronautical gadgets.

### About The Electrical And Electronics Engineering

An electrical engineer plans and grows new electrical frameworks, test hardware and discovers answers for electrical issues and gadgets. For the most part, electrical engineers work with huge electrical frameworks that incorporate engine control and force transmission. They work on an assorted scope of innovations through their profession, from planning family machines, electrical force stations, wiring, and building and satellite correspondences. Electronics engineering is one sort of engineering which is developing quickly and has gigantic profession choices. It is a type of engineering related to electronic circuits, gadgets and the gear and frameworks that utilisation them. Electronic designing is huge to the point that incorporates an assortment more explicit electronic designing fields that incorporate advanced hardware, simple gadgets, purchaser gadgets, implanted frameworks and force gadgets.

## Eligibility To Become An Electrical or Electronics Engineer

The eligibility criteria for aspirants wanting to pursue their career with electrical or electronics engineering is given below:

- A candidate must pass the 12th class from a recognised board or equivalent examination with at least 50% marks. However, the passing marks for different categories vary from college to college.
- Ought to have a legitimate score in the engineering entrance exams, for example, JEE Mains, JEE Advanced, BITSAT, VITEEE, CET, et cetera
- Not many institutes additionally follow an age limitation for admission to engineering courses.
- Diploma holders should clear class 10 with half-full imprints in material science, math and science (PCM) stream.

## How To Become An Electrical Or An Electronics Engineer

To start your profession as an electrical engineer, you should acquire in any event a Bachelor's Degree in Electrical Engineering, or EE, from a foundation that is certified by the Accreditation Board for Engineering and Technology, or ABET. Some electrical engineering projects are offered through a different school of designing and expect understudies to apply for entrance, notwithstanding the school or college.

Classes like math, software engineering, material science, fundamental designing and insights are common prerequisites for this field. Also, programs centre around the plan of advanced frameworks, differential conditions and electrical circuit hypothesis, in addition to other things. Then you have to seat for entrance exams.

A candidate needs to have some skills to become an engineer, namely, problem-solving, critical thinking, organisational, communication, circuit knowledge, programming, creative thinking, etc.

## **Top Electrical And Electronics Engineering Institute In India**

- Indian Institute of Technology Madras, Chennai
- Indian Institute of Technology Delhi, Delhi
- Indian Institute of Technology, Kharagpur
- National Institute of Technology, Tiruchirappalli
- Anna University, Chennai
- Indian Institute of Technology, Mumbai
- Institute of Chemical Technology, Mumbai
- Indian Institute of Technology, Kanpur
- Jadavpur University, Kolkata

## **Electrical And Electronics Engineering Entrance Exams**

For admission to the UG program, the understudy should need to show up in JEE Main, and for a PG program, he/she should seat for the GATE test.

Candidates can apply for JEE Main in the wake of passing their twelfth/transitional assessment for entrance into 4-years Bachelor of Technology (B.Tech) program.

Understudies looking for confirmation in IITs need to clear JEE Advanced 2020 after qualifying JEE Main. After getting a four-year college education in designing, understudies will be qualified for GATE which gives induction into M.Tech course.

## **Career Opportunities In Electrical And Electronics Engineering**

After accomplishing required occupation scholastic capability, there are plenty of electrical designing position profiles accessible for them based on their insight and interests. These specialists work on various activities through their profession, incorporating the PC, robots, phones, and route.

There are many sub-orders of electrical designing. Some of them have practical experience in one and others in a mix like a micro-electrical engineer, power engineer, instrumentation engineer, telecommunication engineer, etc.

## **Employment Sector/Industry For Electrical And Electronics Engineering**

Electrical designers can locate various business openings in various areas. Top areas that employ electrical engineers are IT Sectors, Designing Services, Electric force creating establishments, Indian Railways, Aviation Manufacturer Industry, Auto Industry, Air terminals Authority of India, Power transmission and conveyance associations, Government Electrical Works Department, Navigational gear fabricating ventures, Design and Construction Firms, etc.

## **Jobs In Electrical And Electronics Engineering**

- Acoustic consultant
- Aerospace engineer
- Broadcast engineer
- CAD technician
- Control and instrumentation engineer
- Design engineer
- Electrical engineer
- Electronics engineer
- Nuclear engineer
- Sound engineer
- Special effects technician
- Clinical technologist
- Land-based engineer
- Machine learning engineer
- Management consultant
- Project manager
- Software engineer
- Technical author
- Technical sales engineer

## Salary Of An Electrical Or An Electronics Engineering

An electrical engineer's salary varies from 3.5 lakh rupees per annum to 15 lakh rupees per annum based on the experience level of the employees. In comparison, an electronics engineer's salary can rise to 35 lakh rupees or more per annum.

## Study Material To Become An Electrical Or An Electronics Engineer

- The Art of Electronics by Horowitz and Hill
- Microelectronic Circuits by Sedra and Smith

In engineering, as the candidates have to clear Joint Entrance Examinations, they have to prepare from their schools. Thus there are no such specific books or study materials for students to become electrical engineers or electronics engineers.

## Pros And Cons Of Becoming An Electrical Or An Electronics Engineer

### Pros

- Numerous jobs
- High salary
- Opportunities to travel abroad

### Cons

- Highly competitive
- Stressful
- Higher study is important.

# BEST FIT CAREER FOR YOU

(Based on assessment and counselling process, these are your career preferences)

## MECHANICAL ENGINEERING

## How To Have A Career In Mechanical Engineering

Mechanical Engineering is one of the earliest subdisciplines of engineering and is also referred to as the 'mother of all branches in engineering'. Mechanical engineering is the study of designing, developing, constructing, and testing mechanical and thermal sensors and devices, along with various tools, engines, and machinery.

Careers in Mechanical engineering have their pivotal point as the creation of new technologies to meet human needs. The most interesting characteristic of mechanical engineering is that it is an application-based field of study. Mechanical engineering originated during the time of the industrial revolution with the advent of the steam engine. Automated manufacturing and the demands of railroad transportation required innovative engineering solutions that led to the growth of Mechanical Engineering.

Generally, mechanical engineers deal with concepts such as mechanics, principles of thermodynamics, robotics, kinematics, structural analysis, fluid mechanics and so on. With the advancement of time, many new mechanical engineering areas have developed such as nanotechnology, development of composite materials, biomedical applications and environmental conservation.

### About the Mechanical Engineer:

A mechanical engineer deals with the designing and construction of machines. Constructing an expensive machine and doing required modifications in the mechanism is the main purpose of a mechanical engineer. Mechanical engineers produce machines focusing on the designing, testing, and developing the theoretical representation for the construction. The [automobile industry](#), construction companies, and other manufacturing industries recruit mechanical engineers. There are many job profiles for mechanical engineers, including automation, aerospace engineers, control, instrumentation specialists, and maintenance specialists. As a mechanical engineer, one must have good knowledge of Physics, Applied Engineering and Mathematics.



## **Eligibility to become a Mechanical Engineer:**

- Aspiring candidates must have 60% marks in the class 10 level.
- Candidates should have passed class 12 from a recognized institution with science stream having Physics, Chemistry and Mathematics as major subjects.
- A minimum of 60-65% marks in class 12 is compulsory for undergraduate and diploma courses in mechanical engineering.
- For admission in M.Tech in Mechanical Engineering course, candidates must have a passing certificate of graduation level with a minimum aggregate of 75% in the required field.
- A valid passing scorecard of any of the required entrance exams is mandatory for undergraduate, diploma, postgraduate and PhD programmes.

## **How to Become a Mechanical Engineer:**

A bachelor's degree in this field is the minimum requirement for most entry-level positions in the field. Bachelor degree includes intermediate and advanced mathematics, life and physical sciences, engineering and design. Students may work in the lab, too while working with advanced computer-aided design (CAD) software.

Students typically opt for related courses to prepare them to specialize in one or more mechanical engineering sectors. M.E./M.Tech in Mechanical Engineering is a two-year programme.

Candidates should hold a BE/B.Tech/AMIE or equivalent degree with an aggregate of 55 per cent marks and above. In mechanical engineering, the PhD program grooms the students to advance their engineering skills to contribute to the manufacturing and mechanical research projects. The duration for a PhD program is around six years. Aspirants must have a minimum of 75 per cent marks in B.E./B.Tech and 65 per cent marks in M.E./M.Tech.

## Top Mechanical Engineering Institutes in India:

- Indian Institute of Technology Bombay (IIT Bombay)
- Indian Institute of Technology Delhi (IIT Delhi)
- Indian Institute of Technology Kanpur (IIT Kanpur)
- Indian Institute of Technology Madras (IIT Madras)
- Indian Institute of Technology Roorkee (IIT Roorkee)
- Birla Institute of Technology and Science (BITS-Pilani)
- Indian Institute of Technology – Banaras Hindu University (IIT-BHU)
- Indian Institute of Technology (IIT Guwahati)
- National Institute of Technology, Tiruchirappalli
- Indian School of Mines (ISM)
- National Institute of Technology, Surathkal
- Birla Institute of Technology
- Jadavpur University (Faculty of Engineering & Technology)
- Motilal Nehru National Institute of Technology
- PSG College of Technology
- SRM University
- PEC University of Technology
- Bengal Engineering and Science University
- Malaviya National Institute of Technology
- Visvesvaraya National Institute of Technology
- Thapar University
- College of Engineering Pune
- Manipal Institute of Technology, Karnataka
- R.V.College of Engineering
- VeermataJijabai Technological Institute
- University College of Engineering (Osmania University)
- Sri Sivasubramaniya Nadar College of Engineering – Tamil Nadu
- Sardar Vallabhbhai National Institute of Technology
- Maulana Azad National Institute of Technology
- Nirma University – Institute of Technology
- BIT Sindri

## **Mechanical Engineering Entrance Exams:**

There are few colleges in India where admission in mechanical engineering undergraduate course is made based on merit. Most of the institutes consider the marks and rank scored by a candidate in the Joint Entrance Examination (JEE) Mains.

## **Career Opportunities in Mechanical Engineering:**

Career opportunities in mechanical engineering are immense since its inception. After completing the course, aspiring students will get a lot of opportunities to undertake employment in the private and public sectors. With additional qualifications in this field, they can hold a higher designation in managerial and administrative fields. A few of the career opportunities as Mechanical Engineers have been stated below:

- Project Manager
- Senior Engineer
- Service and Maintenance Engineer
- Instructional Designer
- Professors/Lecturers

The different sectors where candidates can build a career as a Mechanical Engineer are:

- Aerospace Industries
- Automotive Industries
- Construction and Building Services
- Indian Armed Forces and Ministry of Defence
- Manufacturing Industries
- Engineering Consultancies
- Energy Utilities
- Government Agencies
- Biomedical Industries

## **Employment Sector/Industry for Mechanical Engineer:**

The top companies that recruit a large number of mechanical engineers are:

- Honda S&P Car Division
- Bharat Electronics Limited (BEL)
- Hindustan Petroleum Corporation Limited (HPCL)
- Tata Group
- National Aluminium Company Ltd. (NALCO)
- Larsen & Toubro (L&T)
- BOSCH India
- Coal India Limited (CIL)
- Oil and Natural Gas Corporation Limited (ONGC)
- Indian Oil Corporation Limited (IOCL)
- Thyssen Krupp
- Godrej Group
- Thermax
- Siemens
- Bharat Heavy Electricals Limited (BHEL)

## Jobs in Mechanical Engineering:

- Aerospace Engineer
- Maintenance Engineer
- Automotive Engineer
- Control and Instrumentation Engineer
- Contracting Civil Engineer
- Nuclear Engineer
- Senior Mechanical Engineer
- Robotic engineers
- Heating and cooling systems engineers
- Auto research engineers
- [Senior design engineer](#)
- [Powertrain engineer](#)
- [Instrumentation engineer](#)

## Salary of Mechanical Engineer:

As a fresher in a new company, a mechanical engineer can get a salary of Rs. 3-5 LPA. With higher qualifications, work experience and designation, the pay scale increases to Rs. 8-10 LPA.

## Study Material to Become Mechanical Engineer:

- GATE Mechanical Engineering - 23 Year's Chapter - Wise Solved Papers (1996 - 2018) 2019 2019 Edition by GKP
- Understanding Physics for JEE Main and Advanced Mechanics by D.C Pandey
- Mechanical Engineering - 4400 MCQs for ESE, GATE & PSUs (Fully Solved) by Made Easy Editorial Board
- Mechanical Engineering by R S KHURMI, J K GUPTA
- A Handbook for Mechanical Engineering by Made Easy Publications
- Theory of Machines by S.S. Rattan

## Pros & Cons of Becoming a Mechanical Engineer:

### Pros

- The aspirants get to learn about the construction and development of machines in details.
- There is great scope growth in this field.
- Candidates get placed in highest-paying companies with a handsome salary.
- The employment sector in this field is huge.

### Cons

- Since the level of technicalities is high, mastering the subject and the skills can be tough.
- It is a stressful field dealing with complex machinery, tools and equipment.
- The workload is immense and increases gradually with experience and designation.

## How to Have A Career In Mechanical And Automation

Mechanical engineering is all about classical mechanics and machines. Students who graduate from this engineering course are taught to apply mechanical principles in practice to reduce the time and effort taken by a machine and increase a machine's productivity.

The Study also includes an understanding of metals' properties and how machines made of them react under different conditions. Then how Mechanical stream is different from Mechanical and Automation stream?

Automation particularly involves the Study of controlling machines using gears and electrical equipment. The standard Mechanical course includes a lot more than Mechanical and Automation engineering course.

Mechanical and Automation engineering course is directed to the future as some of them are about controlling completely automated machines. Reduced and minimal human participation is a core concept of automation studies.

## About the Mechanical and Automation engineer:

Mechanical and Automation engineering course involves topics about the creation and production of machines. Engineers learn basic concepts, mechanics and instruments required to build and design a machine.

Modern Mech and Automations does not just revolve around the mechanical aspect. As machines are advancing, engineers must know the control system, information technology, thermal science, programming, electronics etc.

Design engineers design machines in real life while R&D engineers build and Maintenance and Service engineers maintain machines for long work hours.

## Eligibility to Become a Mechanical and Automaton Engineer:

One can do UG and PG both in this course. Let us talk about both.

### UG:

- Students need to qualify their 12th standard exam with major subjects as Physics, Chemistry, and Mathematics from a government recognized school.
- B.Tech courses for this subject needs at least 55% marks in 12th standard. For B.E course the eligibility percentile is 45%.
- One must not be over 21 years when applying for the graduation course.
- Colour blind, Blind, Deaf and dumb candidates are not allowed to enrol in this course. This is because jobs revolving it requires handling machinery and sharp senses.

### PG:

- One must be a graduate of the same course (Mechanical & Automation engineer) to enrol in PG programs.
- Students must sit and qualify GATE exam.

## How to Become a Mechanical & Automation Engineer:

- Students have to take the initiative from the 12th standard if the career choice is Mechanical & Automation Engineering. However, the admission in B.Tech courses is entrance exam based. But if anyone intends to take direct admission, they will need good marks in their 12th.
- For entrance-based option, the most famous exam is the Joint Entrance Examination (JEE). Every year thousands of students sit for JEE to enrol themselves in the premium engineering institutes of India.
- Many non-government colleges also conduct their entrance test. SRM Institute of Science and Technology takes SRMJEE exam. Birla Institute of Technology conducts BITSAT exam. Vellore Institute of Technology also conducts its entrance test named VITEEE.
- After graduation, one is considered as a Mech & Automation Engineer. Some may also want to pursue post-graduation. They have to take General Aptitude Test Exam (GATE).

Scoring well ensures admission in IIT's.

- After post-graduation, a candidate is considered a full-fledged Mechanical & Automation Engineer.

## Top Mechanical & Automation Engineering Institute in India:

- National Institute of Technology Tiruchirappalli.
- SRM Institute of Science and Technology, Vadapalani Campus.
- SRM Institute of Science and Technology, Ramapuram Campus.
- Netaji Subhas University of Technology, New Delhi.
- Mukesh Patel School of Technology Management and Engineering, Mumbai.
- Srinivas Institute of Technology, Mangalore.
- Indira Gandhi Delhi Technical University for Women, Delhi.
- Delhi Technical Campus, Greater Noida.
- HMR Institute of Technology and Management, Delhi.



## Mechanical & Automation Engineering Entrance Exam:

There are a few entrance exams to enrol in under-graduate and post-graduate courses in this subject.

- **JEE Main:** National Testing Agency conducts this exam for admission in IITs, NITs and CFTIs (Centrally Funded Institutions)
- **JEE Advanced:** Under Joint Admission Board conducts this exam is conducted every year by the IITs and IISCs. This exam is exclusive only to IISc and IIT admission.
- **GATE:** IITs and IISCs also conduct GATE exam for post-graduate admission. This exam helps students to enrol in M.Tech or M.E courses in various institutions across the nation.
- Various private and state-run Institutions conduct entrance exam either autonomously or by state education policies.

## Career Opportunities as A Mechanical & Automation Engineer:

This course provides great career opportunities as a fresher. As we are seeing, the world is changing. The industries are becoming more and more automated. That is why one needs a Mechanical and Automation Engineer.

An Automation Engineer is responsible for building, designing and maintaining these mechanically automated machines. That is why it is true to say that this profession will bring lots of career opportunities.

## Employment Sector/Industries for Mechanical and Automation Engineer:

- Aerospace Industry.
- Automobile Industry.
- Car Industry.
- Oil extraction sector
- Government (Some PSU) sector.
- Private Industry.
- Chemical Industry.

These are some industries that are recruiting Mech & Automation graduates regularly.

## **Jobs in Mechanical & Automation Engineering:**

- Automation Scripting.
- Service and Maintenance Engineer: Assists in post-production and maintenance.
- Instrumentation Engineer.
- Research and Development Engineer: Research and builds automated and sustainable machinery.
- Design Engineer.
- Process Engineer: Develops new industry practices and processes and simulation programs to check the efficiencies.
- Consultant: After analysis, they provide the solution for the technical issues to the client.
- Teacher.

## **Salary of a Mechanical & Automation Engineer:**

The salary in this profession varies from one profile to another. But on average the minimum salary starts from around three lakhs per annum where the maximum salary of a Consultant is around 24 lakhs.

## **Study Material to Become a Mechanical & Automation Engineer:**

- Manufacturing and Automation Technology by R Thomas Wright.
- Manufacturing Automation: Metal Cutting Mechanics, Machine Tool Vibrations, and CNC Design by Yusuf Altintas.
- Industrial Automation by Frank Lamb.

## Pros & Cons of Becoming a Mechanical & Automation Engineer:

### Pros:

- Good salary after gaining experience in the profession.
- Hands-on experience in machinery production.

### Cons:

- Growth is slower than in other industries.

## How To Have A Career In Mechanical Engineering with specialization In Artificial Intelligence

Machine Learning and [Artificial Intelligence](#) seem to be the buzzword as everyone seems to be getting into this subject or are interested in it. Machine learning or mechanical engineering uses statistical methods to allow machines to improve with experience. Artificial Intelligence is a broader term which incorporates machine learning.

Mechanical engineering emphasizes the technology of "machine learning." Artificial intelligence is a computer science section that deals with the Automation of intelligent behaviour and machine learning. The career of mechanical engineering with specialization artificial intelligence is a demanding field and has a lot to be explored and learnt.

## About the Mechanical Engineer with specialization in Artificial Intelligence:

The branch of mechanical engineering is correlated with artificial intelligence. After having basic or fundamental degrees in mechanical engineering and machine learning, mechanical engineers can move to specialize or study in details about artificial intelligence.

- Hardware technicians with depth in knowledge about machine learning, build pieces of equipment like robots to interact with the World.
- Algorithm developing takes AI research and transforms it into relatable processes through mathematical formulas that can be implemented using hardware and software.

Thorough knowledge in mathematics, science and computer science with non-tech skills such as critical thinking, curiosity for work and time investment is necessary for mechanical engineers specializing in Artificial Intelligence.

## Eligibility to Become Mechanical Engineer with specialization Artificial Intelligence:

You can opt for Mechanical Engineering at UG level and then opt for Artificial Intelligence at PG and PhD level.

- **For UG Level:** You need to get a Bachelor's degree which is B.Tech or BE in Mechanical Engineering, a four-year course. This course's minimum eligibility has a 60% aggregate in 12th standard with compulsory subjects like mathematics, physics, and chemistry.
- **For PG Level:** Since you want to specialize in Artificial Intelligence, you can opt for a Master's degree in Artificial Intelligence, a 2-years post-graduate course. The minimum qualification for this course is 50% aggregate marks in the Bachelor's degree.
- **For PhD Level:** PhD in Mechanical Engineering with specialization Artificial Intelligence is a minimum 3-year course which requires eligibility of 50% marks in M.Tech/M.E/M.S or equivalent qualification in mechanical engineering, Artificial intelligence or a related subject. Exceptional candidates have B.Tech/B.E qualification with valid GATE score can apply directly for PhD programs.

## How To Become Mechanical Engineer with specialization Artificial Intelligence:

To pursue a career in mechanical engineering with specialization in artificial intelligence, you need to have a background from science stream in your 12th standard having mathematics, physics and chemistry as compulsory subjects. During this time you also have to prepare for all India entrance exams to get admission into a good institute.

- To know the fundamentals of mechanical engineering, you need to get a Bachelor's degree that is B.Tech/B.E in mechanical engineering. You have to pass all the exams during the 4-year course to get a Bachelor's degree.
- During the final year of your Bachelor's degree take up project work in or related to Artificial Intelligence, which will be useful.
- After acquiring a Bachelor's degree, you will have to opt for a Master's degree in Artificial Intelligence. You will have to pass the main exams during the two-year course when awarded the Master's degree.
- This will make you eligible for several jobs and recruitments in the industry in mechanical engineering with specialization artificial intelligence.

Suppose you want to perform research on AI or go into the teaching profession. In that case, you can participate in the PhD course of mechanical engineering with artificial intelligence for 3-5 years and then sit for job interviews.

## **Top Mechanical Engineering with specialization Artificial Intelligence Institutes In India**

Some of the top mechanical engineering and artificial intelligence institutes in India are:

- SRM Institute of Science and Technology
- Indian Institute of Technology, Bombay, Mumbai
- Indian Institute of Technology, Kharagpur
- Indian Institute of Technology, Roorkee
- Vellore Institute of Technology

## **Mechanical Engineering with specialization Artificial Intelligence Entrance Exams**

Some of the common and well-known entrance exams for UG and PG courses are JEE Mains, JEE Advanced, SET Exam, KIITEE, SAAT, BITS HD, ITM NEST etc.

## **Career Opportunities in Mechanical Engineering with specialization in Artificial Intelligence**

Career opportunities for mechanical engineer with specialization artificial intelligence are in both the private and government sectors.

Robotics, Automation and sensor technology developers use the amalgamation of mechanical engineering and artificial intelligence, and thus mainly have career-oriented to these sectors.

## **Employment Sector/Industry in Mechanical Engineering with specialization in Artificial Intelligence**

Mechanical engineer with specialization in artificial intelligence are recruited by various industries such as aerospace, automotive, chemical, construction, electronics and robotics, defence, marine, materials, rails and utilities.

Several software engineering companies also recruit mechanical engineer with specialization in artificial intelligence.

## **Jobs in Mechanical Engineering with specialization Artificial Intelligence**

- Robotics Technicians
- Robot Design Engineer
- Automated Product Design Engineer
- Maintenance Engineers
- Machine Learning
- Research Scientist
- Professors
- Marketing
- Technicians of space vehicles in space science

## **Salary of Mechanical Engineer with specialization in Artificial Intelligence:**

The average salary for mechanical engineer's with specialization artificial intelligence is Rs. 3,87,000 that can go up to Rs, 10,00,000 p.a with more experience and work exposure.

## **Study Material to Become Mechanical Engineer with specialization Artificial Intelligence:**

Some good books on Mechanical Engineering and Artificial Intelligence are as follows:

- Application of Artificial Intelligence in Mechanical Engineering by Qi Huang
- Fuzzy Logic: A Practical Approach by F. Martin McNeill
- Introduction to Robotics: Mechanics and Control

There are several other good books and pdfs available that can be used for reference.

## **Pros & Cons of Becoming Mechanical Engineer with specialization in Artificial Intelligence:**

### **Pros:**

- Very advanced career
- Has many prospects due to heavy use of AI in our life
- Jobs with high pay-scale

### **Cons:**

- Physical and mental fatigue due to work pressure
- A lot of hours of study and practice
- Sometimes work field injury are faced

## **How To Have A Career In Mechatronics Engineering**

The multidisciplinary field of engineering that is a culmination of mechanical and electronics engineering studies, along with concepts of [robotics](#), telecommunication engineering, computer engineering, and control systems engineering, is called Mechatronics. The Mechatronics field deals with designing, manufacturing, and maintaining products consisting of both mechanical and electronic components.

## **About The Mechatronics Engineers**

One needs to have a Bachelor's (B.Tech) degree in engineering to attain an entry-level position in a Mechatronics engineer job. The works of Mechatronics engineer involves designing, testing, assembling, evaluation of components and products.

Mechatronics technicians solve technical problems by applying their knowledge of engineering and maintain mechanical automated equipment. Among the other works of a Mechatronics engineer or technician, the following are very prominent:

- Build prototypes after developing product ideas
- Manage mechanical and electrical systems
- Assist experts in designing robotic and smart types of equipment
- Assist senior engineers in industrial projects ranging from very large scale to small scale
- Test and install new equipment

## Eligibility To Become A Mechatronics Engineer

One can become a Mechatronics Engineer or Technician by pursuing the following educational courses and degrees:

- An individual can pursue the two-year associate degree course in Mechatronics, which focuses on practical applications mostly, for an entry-level job in the field.
- One can also pursue a four-year B.Tech degree in Mechatronics that will allow them to achieve better opportunities in the field.
- A Master's degree in Mechatronics or specialization in Mechatronics allows students to enter the research field or offer them a position in the industry.
- Many can also opt for a PhD in Mechatronics to make further breakthroughs in this field of engineering.

## How To Become A Mechatronics Engineer

### How To Become A Mechatronics Engineer:

You can pursue Mechatronics engineering at UG, PG, and PhD levels.

#### For UG Level:

Aspirants must have a 10+2 Science stream (including physics, chemistry, and mathematics) with a minimum of 65% to 50% aggregate marks to apply for engineering. Students will then have to get a valid rank in JEE entrance exams.

After that, they will need to pursue B. Tech or B.E degree in either, Mechatronics, Electronics and Communication, Electronics and Instrumentation, Mechanical, Robotics Engineering, Electronics, and Electrical, etc.

#### For PG Level:

Aspirants are required to have a minimum of 50% aggregate to be eligible for enrolling in the two years PG courses (M.Tech) with specialization in Mechatronics.

#### For PhD. Level:

Candidates must pass the M.Tech degree in Mechatronics or a similar field with a minimum of 55% aggregate marks (50% for SC/ST/OBC) to be able to enroll for the 3-6 years PhD courses in Mechatronics field.



## Top Mechatronics Engineering Institutes In India

Some of the most notable universities and institutes that offer courses or specialization in the field of Mechatronics are:

- Indian Institute of Engineering Science and Technology, Shibpur
- School of Engineering, University of Petroleum and Energy Studies, Dehradun
- Presidency University, Bangalore
- National Institute of Technology Karnataka Surathkal
- Netaji Subhas University of Technology, New Delhi

## Mechatronics Engineering Entrance Exams

But before engineering students can pursue M.Tech they can opt to sit for certain entrance exams like GATE, IISC entrance exam, NIT M.Tech in AI and Robotics entrance exam, IIT JAM, etc.

Some colleges and universities conduct an entrance exam of their own, which is very similar to JEE to test both UG and PG candidates before offering them admission.

## Career Opportunities In Mechatronics Engineering:

Since Mechatronics is a booming field, that is why there are several career options available for one pursuing this field of study:

- The Mechatronics professional can either be a technician or an engineer, and their work involves maintaining, troubleshooting, designing and repairing automated types of equipment.
- The Mechatronics technicians' primary work is to maintain types of machinery, whereas the Mechatronics engineers are concerned about designing and developing products as well as components.
- The Mechatronics technicians and engineers have opportunities of working in laboratories, on-site, in offices or manufacturing plants.

## **Employment Sector/Industry For Mechatronics Engineer:**

Various public and private sectors offer plenty of working positions to Mechatronics graduates. The following are some of the companies and organizations to name:

- Indian Army and Navy
- Defence Research and Development Organization of India
- Indian Space Research Organization
- Technopro India
- Indian Institute of Science, Bangalore
- DSS Automation Technologies Pvt. Ltd.

## **Jobs In Mechatronics Engineering:**

Among the many job opportunities in the Mechatronics field, the following are some of the jobs most in demand:

- Robotics engineer or technician
- Control system design
- Troubleshooting engineer
- Mechanical design engineer
- Instrumentation engineer
- Automation engineer
- Electronics design engineer
- Software engineer

## **Salary Of Mechatronics Engineer:**

The salaries of engineers often depend on their work experience and work position. Mechatronics engineering is a very sustainable field, and it offers a promising future in the industry for those who wish to pursue the course well. The following are the range of pay scale for Mechatronics engineers-

- Starting monthly salary of Mechatronics engineer: Rs.15000 to Rs.20000
- The monthly salary of an experienced Mechatronics engineer: Rs25000 to Rs40000

## **Study Material To Become A Mechatronics Engineer:**

Some of the recommended books for studying concepts of mechatronics are:

- Mechatronics Handbook by Robert H. Bishop
- Mechatronics System Design by Devdas Shetty
- Robert J. Schilling's - Fundamentals of Robotics Analysis and Control

## **Pros And Cons Of Becoming A Mechatronics Engineer:**

### **Pros**

- Mechatronics is an emerging field with a lot of opportunities in the near future.
- Mechatronics engineer gets the opportunity to build products that can be useful for industries and people.
- Since Mechatronics is an amalgamation of many engineering fields, aspiring students can choose an undergraduate major in mechanical, chemical, electrical, electronics, instrumentation, communication, industrial, engineering branches.

### **Cons**

- Applicants might need to have a master's degree to acquire a job in the Mechatronics industry.
- The core Mechatronics fieldwork might have a very heavy workload.
- Some jobs in the Mechatronics field might ask for 3-7 years of experience which might be hard for fresh graduates to achieve.

## **How To Have A Career In Robotics and Automation Engineering**

The inter-disciplinary engineering with ample opportunities to get placed in some of India's best organisations and abroad is Robotics. From manufacturing units to experimental robotics for automotive industries, medical and military robotics engineering's future finds tremendous opportunities for its budding professionals. As a career option, robotic science has a tremendous scope as robots play an important role in the industrial sector.

One of the major responsibilities of Robotics Engineering is developing and designing the robotics and automation systems cost-effectively.

## About Robotics Engineer

The engineers who do work in the field of automation and robotics are called Robotics Engineers. He/ she is mainly responsible for designing, developing, applying, and operating the robots and robotic systems.

The field of engineering that actually deals with the design, building structure, and computer applications and robots and their manipulation and processing is known as Robotics Engineering.

## Eligibility To Become A Robotics Engineer:

To pursue a career as an Engineer of Robotics, the eligibility which must be fulfilled by candidates is given in the following points:

- The candidate from a recognised institute must have pursued a diploma/Bachelor's/Master's degree in Robotics Engineering.
- A specialised course in the subject Robotics Engineering such as Design and Control/ Robot Motion Planning, Automation/ Micro robotics/ Medical Robotics etc., must be applied by the aspiring candidate.
- The candidate must have practical knowledge of Computer-Aided Manufacturing and Computer-Aided Design (CAM/ CADD).
- The candidates can pursue a degree in MS in Robotics to enhance their field expertise and get more in-depth knowledge.

## How To Become A Robotics Engineer:

- The candidates can go for a completing Bachelors like B. Tech or BE in Robotics Engineering, after completing 12th in Science stream.
- The candidate can go for a Master's like M. Tech degree in Robotics Engineering, after completing the bachelor's degree and specialised the field and enhance their knowledge base in robotics.
- To pursue a bachelor's or master's degree, various entrance exams which the candidate can opt for in Robotics Engineering include IIT JAM, Post-Graduate Engineering Common Entrance Test (PGECET), etc.
- The candidates can either go for on-campus placement or direct interviews, after completing Robotics Engineering education. Robotics Engineer can pursue their career in India as well as foreign countries.

## Top Robotics Engineering Institutes in India:

In the field of Engineering, Robotic engineering is a budding stream and offered by only a handful and few numbers of colleges at both at UG and PG level.

Some of the best and respected robotic engineering colleges are:

- IITM- Indian Institute of Technology Madras
- IITB- Indian Institute of Technology Bombay
- IITK - Indian Institute of Technology Kanpur
- IITKGP - Indian Institute of Technology Kharagpur
- OU - Osmania University
- Anna University
- Acharya Institute of Technology

## Robotics Engineer Entrance Exams

Many top universities and institutions of India like NITs, IITs etc. offers admissions to students on the basis of rank in GATE, JEE Main, JEE Advanced national level examinations.

**Engineering entrance exams are:**

- JEE Main
- JEE Advanced
- Graduate Aptitude Test in Engineering (GATE)
- Uttar Pradesh State Entrance Exam (UPSEE)
- AP EAMCET
- TS EAMCET
- BITSAT

## Career Opportunities in Robotics Engineering

In India, Robotics Engineering is considered a high-end professional career. A candidate who has professional training and completed education in Robotics engineering, there are tremendous job opportunities awaiting. A Robotic engineer can be employed in the various automation sector, life sciences, aerospace engineering, manufacturing plants, laboratories, medical fields, mining, [agricultural engineering](#), etc. In the gaming manufacturing units and industry, there is a great demand for robotic engineers. If the candidate has scored good merit records, then they can find themselves in top profiles in research organisations such as ISRO and NASA.

- Robotics Programmer
- Robotics System Engineer
- Robot Design Engineer
- Automation Product Design Engineer
- Robotics Test Engineers

## Employment Sector/Industry for Robotics Engineering

Robotics Engineers can go for both private based sectors as well as governments to design and manufacture the robotics systems. In multinational automation companies, the engineers can also opt for technician jobs.

Robotics Engineers who have true expertise in the field of automation and innovation can also become a scientist where they can invent some new specifications and use different use cases to design the robotics system for enhancement of automation.

The Robotics Engineers can also become a professor in top IITs, NITs and IIITs where they can use their expertise and knowledge to educate the students about the advancements in automation.

## Jobs in Robotics Engineering

Some of the top recruiting organisations/companies/ agencies for Robotics Engineers are given in the points below:

- Defence Research and Development Organization (DRDO)
- Bharat Heavy Electricals Limited (BHEL)
- Precision Automation & Robotics India Ltd.
- Indian Space Research Organisation (ISRO)
- Indian Institute of Technology (IIT)
- Bhabha Atomic Research Centre ( BARC )

## Salary of Robotics Engineer

For a Robotics Engineer, the pay scale depends upon the experience and expertise of the engineer. For different and unique job roles in the field of Robotics Engineering, the average pay scale on the basis of the level of experience is given:

- Robotics Programmer- 60000 INR - 2 Lakh INR per month.
- Robotics System Engineer- 50000 INR - 1.5 Lakh INR per month.
- Robot Design Engineer- 70000 INR - 2 Lakh INR per month.
- Automation Product Design Engineer- 55000 INR - 1.5 Lakh INR per month.
- Robotics Test Engineers-70000 INR - 2 Lakh INR per month.

## Study Material to Become Robotics Engineer

Some of the recommended study materials and books for Robotics Engineers are provided below: -

- **Book Name:** Fundamentals of Robotic Mechanical Systems Theory, Methods, and Algorithms by Jorge Angeles
- **Book Name:** Robotics Demystified by Edwin Wise.
- **Book Name:** Springer Handbook of Robotics by Bruno Siciliano, Oussama Khatib
- **Book Name:** Probabilistic Robotics by Sebastian Thrun, Wolfram Burgard
- **Book Name:** Robotics and Automation Handbook by Thomas R. Kurfess

## Pros & Cons of Becoming A Robotics Engineer:

### Pros:

- The demand for Robotics Engineers and also the pay scale for them is greater worldwide.
- Being an Engineer of Robotics provides various opportunities to work in different sectors such as mining, nuclear power, etc.

### Cons:

- To complete work in time and meet the deadlines, there might be higher pressure.
- To acquire expertise in the field for newly graduated engineers need a good salary package.

### Best fit courses for you

(Based on assessment and counseling process, these are your career preference)

### Suggested courses: After 10 th

- 1 st preference  
Science
  - Biology Group (Physics, Chemistry and Biology as main subjects)
  - Mathematics Group (Physics, Chemistry, Mathematics and computer science subjects)



# AREA OF IMPROVEMENTS

It was a pleasure meeting you on 22 November 2021. With a preference for and an interest in varied career possibilities, it is best to keep the options open. You can also join coaching classes to strengthen your foundation. I also suggest that you research schools in your state look at the combination of subjects of your choice.

# SUGGESTIONS

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*"A goal without a  
plan is a wish"*

*- Herman Edwards*



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