

# **ENGINEERING RESEARCH PROJECTS – 2**

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## **ENGINEERING RESEARCH PROJECTS – 2**

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**THIS BOOK IS DEDICATED TO**

*All those people  
who found a  
wrench and a soldering iron  
to  
solve a problem and getting their hands  
dirty rather than solving  
it on paper*



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## THE NEED FOR THIS BOOK

Engineering Colleges in India have 4<sup>th</sup> year Project submissions for the semester exams, and each student approximately has one year to submit the project as he/she is in his/her 4<sup>th</sup> year. Now, private colleges in India, lack the infrastructure and the instruments to allow the construction of projects meant for quality engineering excellence, but 4<sup>th</sup> year students have to anyhow get a project done to submit it at the end of the semester. Also costs of standardized good engineering projects, specially for mechanical or mechatronics engineering field can range not more than Rs.7000 or more if a group of students are involved in making a project stand, but the cost of such projects can be easily split up within the group with everyone dealing with less amount of money required to make the project work out. But what can lack here in such a group of students, is the idea, the basic idea of what kind of a project to be worked on to make it stand apart from the rest in the class.

Where IITs, NITs have such allowances to allow students work on projects that can cost very high, Private colleges, don't have such allowances to be provided to the students, but that doesn't mean that a good project can't be worked upon at lower costs and from the resources available to a meager, under-funded student body of a Private Engineering College. This is why this book is needed, because not only has it got the ideas but also, it contains detailed information about the availability of the materials and the resources needed for working out such a project.

Students have a lot of headaches, during their Last year, specially, with Job interviews approaching, Job examinations appearing along with studies needed to crack such exams, also, with GATE exams and other competitive exams for higher studies approaching, students can hardly find any time to work on such projects needed for the last semester. One needs, time, patience and ideas to develop a project even on paper, and a student is devoid of that amount of time in the critical last year of his/her college life—so, the time needed for even constructing the project becomes far less, and at the end of the last semester, when semester practical exams, along with competitive exams are closing in, students struggle to get their projects done. Also, ideas developed from projects sometimes are failed to be worked on when a student does get into working on it, and that costs more time and money which goes completely to waste. An idea will not be able to stand if it is failed to be created in real life! So, here, not only will the author hand over ideas, but the author will hand over ideas that are bound to work.

This book, is a last line of defence for those students who neither did have the time or the will to get a project working in time, with their last semester exams closing in. Not only does this book have ideas but also, the various breakthroughs and ways in getting these ideas work out as required. But also, these projects are way exceptional against all the kind of projects developed by Private college students in mechanical engineering in India, and

the author is sure, that not only will these projects score high marks, but will also provide the college or institution with enough pride to keep such projects as mementos.

These projects are such easy to grasp and understand that not much specialized engineering knowledge is required to understand how these projects are to work or how these projects should be constructed. There are a lot of mechanical, electrical and electronics components used in the projects, but as far as the author's knowledge, not much information about the above mentioned fields are needed to actually use such components when they are to be installed, fixed and made to operate.

This book is especially for students of mechanical engineering, but students from electrical and electronics department can also use the ideas and the projects mentioned in this book. Also, each component mentioned in this book for every project is available in homes, hostel messes, hardware stores, and if not, then for sure in Online stores like Amazon, E-bay, Robu.in or etc. other online stores.

It's alright to buy entire projects online or from Hobby Stores and submit them for the 4<sup>th</sup> year projects, but for the author, it is a matter of pride for a student being able to understand his/her own project, construct it, make it work and if damaged, then be also able to repair it and make it presentable. That is why, this book can also be used by students who are also really passionate on Do-It-Yourself Engineering. There is a sense of joy for an engineer to get down to the intricacies of a Project with an hands on approach rather than to dwell on theories and ideas on paper, and students who are indeed passionate about getting down to that level and getting their hands dirty on working on a Project, will indeed understand this sense of pride and joy.

Such students will not wait for a semester exam to present such ideas or projects, these students will present such ideas in College Project Competitions, Project Displays held by the colleges or the universities, and it will mean a great deal of satisfaction and pride to the author if such passionate students are inspired about such ideas and projects from this book. Age is not a factor for getting one's hands dirty in such hands on approach on engineering, because to the author, anybody who wants to build a project or does build it, is an engineer, no matter his/her age or qualifications, so anybody, even school children can read this book and derive these ideas and knowledge for their own fun and pleasure for a thing that they are so passionate about.

All of us engineers—we do need jobs and lives, but passion for engineering is something different. If a student or anybody, who has this book and has this passion, then the author does appreciate if anything productive does come out. Anybody can make up their own ideas with the designs of the projects included and the author does want such a creativity to be spread among every

engineering student in this country. Creativity is an inherent part in those engineers, irrespective of their colleges, who comes to study engineering for the sake of their thirst for creativity, for the sake of actually learning to build something useful.

Those students, no matter of the colleges they are in or no matter the economic or environmental constraints present, those students will go ahead to turn their projects into wonders. This book is for those creators and future innovators of this country. Take scrap into your hands and turn it into something wonderful!!

## **COMMON MATERIALS USED IN THE PROJECTS**

*Workshop Tools that are to be of utmost requirement:*

1. Hammers with nail wrenching heads
2. Hacksaw blade with hacksaw holders, and also if possible tenon saws. It is recommended to use double-sided blades that can be used to cut both wood and metal.
3. Screwdrivers with both plus and minus heads
4. Wrenches of the shortest possible size
5. Drill machine with drill bits of as shown size. Also, saw blades for drilling large dia holes are also shown
6. Angle grinder with at least 2 blades for cutting both wood and steel
7. If possible, then it is advised to use dremmel tools rather than angle grinders
8. Scissors
9. Pliers

*Common materials used for all the projects:*

1. Aluminium sheet
2. 4mm, 6mm, 8mm, ½ inch and 1 inch plywood pieces of recommended sizes
3. Soft wood blocks of recommended sizes in the projects
4. The shortest size Bench vice available. If it is not available in local hardware stores, then it is advisable to buy it from online stores
5. Lithium Polymer or Lipo batteries of 1000mah to 2200 mah at max
6. 12 Volt lead-acid batteries of not less than 6800mah
7. Wire connectors, ranging from T-connectors to XT-60 to banana connectors
8. 9 volt batteries
9. Single core copper wires, CAT6 or DLink cable wires and if possible, aluminium wires
10. Zipties of the smallest size

11. Alligator clips
12. Laptop charger or SNPS
13. Multimeters
14. Lipo battery Balanced Charger and a 12 volt battery charger
15. Extension cord available in local electrical retailer stores

*Materials required for joining and fixing:*

1. Both plus and minus head screws and nuts of size 2mm and 3mm of various lengths
2. 4mm bolts and nuts of all sizes till 150mm in length
3. Pins and nails
4. Araldite epoxy
5. M-seal putty
6. Fevi Quick or other adhesives that help in joining materials very quickly
7. Glue gun with glue sticks
8. Solder and soldering iron
9. Electrical black tape
10. Strings and steel wires

And above all the mentioned requirements, one needs a raw hard dedication and love towards engineering to make a project stand apart.