

GUIDELINES FOR THE FINAL YEAR B.E. PROJECTS 2014

Final year project: All Final Year BE students are required to follow the Guidelines, as given below:

➤ **Phase I – till 31st JULY 2014:**

The students are required to form teams of 3-4 students for working on their Final Year project. With the guidance of a Faculty Member they will start working to find a problem, the solution of which would constitute their project.

The problem may be found by studying the products or processes of an industry through a Shodhyatra¹. A project based on such a problem is called an Industry Defined Project (IDP).

Alternatively a project may be based upon the needs of NGOs, informal sectors, Govt. organizations and society at large. Alternatively the UDP can be on a research problem identified by the faculties. Or it could be the idea of student himself. Such a project is called a User Defined Project (UDP).

By 31st July every team must register online the title of the project, the names of the team members, the name of the Faculty-guide, the name of the industry and the industry-mentor for an IDP.

➤ **Phase II - 31st JULY 2014 to 15TH AUGUST:**

The team of students is required to study the literature and five patents in the area of the project that they have selected. A Patent Search and Analysis Report (PSAR) is to be submitted online by 15th August 2014.

During the seventh semester the team of students is required to complete about 1/3rd of the work and submit a Report to the University.

During the eighth semester, the team has (i) to complete the project, (ii) to make a presentation to the class (iii) to participate in an exhibition of the projects at the College/ Institution (iv) to submit a Report to the University.

Please see FAQ – Appendix 1 on pages 2-4.

Please see Appendix 2 on pages 5- 13 for a detailed description of the processes of Phase I and II. The Final Framework is on the last page.

APPENDIX 1:

FAQs

IDP/UDPs/Research Projects in the curricular is to make sure that students do some innovative work, which can be related to the product / process within/ outside the industry. Or the IDP/UDPs/Research Projects may be based on some unsolved problems of the society.

Notes:

- Innovative work can be defined as attempting different things in different ways and making a difference.
- A Final year student at GTU may work on one of the two types of projects, as a part of the requirements for the Degree/Diploma. The two types are IDPs or UDPs.
- Both IDPs and UDPs will follow similar procedures (protocols) and in both the cases the authenticity of the project is to be verified by the internal project guide.
- The Project may be done at either the College or at the industry according to the inputs from the internal guide.
- Industry Defined Projects (IDP): is a project, which is designed to improve (either a product or a process in either forms/features/functions based on a real life challenge from an industry. Dedicated hours have been allotted every week for all branches for interaction with industries and for working on the IDP/UDP. The term depicts that the projects is to be anchored upon an industrial use and it is to be done under the guidance of both an internal guide at the College and an external mentor from the industry. However whether the definition is appropriate for a Final Year project is to be decided by the faculty only and its related issues will be binding to the students group.
- User Defined Projects (UDP): is a project based upon the needs of NGOs, informal sectors, Govt. organizations and society at large. Alternatively the UDP can be on a research problem identified by the faculties. Or it could be the idea of student himself.
- Guides: A faculty from the educational Institution of the student will be the guide for the project. The industry persons or any other experts can mentor the projects. (For some projects, multiple guides can be taken.) During the final project examinations, the projects are evaluated by a group of two examiners consisting of an internal examiner and the external examiner appointed by the University. However for a project, based on an IDP, the Principal/Director of the educational institution should invite the Industry mentor/guide to join the group of examiners for evaluation of the project, as the 3rd examiner.
- The final year project is divided into two semesters (7th & 8th).

Note: For IT projects, if a student is able to complete the project work during the first semester, he/she may apply to the HOD for permission to take an additional project during the second semester. (The guides/HOD/students have to check the progress and in suitable cases only a new project is to be allowed with a record keeping at corresponding department)

- Generally, students will be expected to complete one third of the total work expected from the Project Definition, during the 7th Semester. The remaining two third work will have to be completed before the end of 8th Semester. However if the Project Definition given at 7th Semester, requires less work to be done, then a new definition, requiring proportionate work corresponding to the time and credits allotted at the 8th Semester, will be given to the students, during the start of 8th Semester, with the permission of the Head of Department and the Faculty-Guide.
- A student may take either I D P or UDP. However the proposal for the Final Year project will have to be submitted in the required format.
- Kho-Kho model (relay) of projects can be allowed where a semi finished project done by the previous year's students, at a particular department, can be adopted by the students of the next year.
- The number of students per team for a project has to be decided by the college/ department/ project guides. (In specific cases the guides may allow inter college projects after mutual consent of both the Principals.) Team size should always depend on the size of the projects and required man-hours to implement the defined work.
- Any student can go to any industry in or outside his Sankul for defining the IDPs. (There are 25 GTU Innovation Sankuls. Every College/ Institution/ Polytechnic, affiliated with GTU is a member of one of the 25 Sankuls.)
- The students can take inter-disciplinary projects during the final year after consultation with the guide in his/ her department.
- The final year students may seek the help of Coordinator of the GTU Innovation Club (Udisha Club) / Departmental Coordinators for assignment to an appropriate industry or any help while doing the IDPs/UDPs.
- The Principals/ Directors of the colleges are required to coordinate with Sankul Co-Chairman (Academic) and Sankul Co-Chairman (Industry) and build relationships with industries.
- The students have to mention the name of the industry / source of the industry defined project while submitting the project definition immediately after commencement of the academic session during the first semester of the Final Year.
- Those students who have already undergone the training or industrial visit can define a project definition from the respective industries, based on the training or visit to the industry.

If the Final Year project done by a team of students is such that:

1. The industry or other users who gave the challenge start using the solutions;
2. The technology got transferred to the industry or other industries through transfer of IP or as open source technology;
3. The team takes the innovation ahead to build a concrete product, bench-marked and tested by a competent authority;
4. The team initiates a start-up, based on their IDP/UDP, either while studying or soon after they graduate;
5. The team gets national or other recognition, awards, investment support, resource support, publication in a reputed journal/conference;
6. The team/ mentor industry files a patent with genuine novelty, the team will be given an Award by GTU for the outstanding project. (Every such project will be evaluated through proper indicators in any of the above 6 cases for the Award.)

Wherever feasible the students have to demonstrate a proof of prototypes/working model during the final examinations. Each team has to keep all their progress documented while working on the project.

IMPORTANT: The following entities must not be used as industries for IDPs:

1. Businesses or industries having no concrete product/service delivery track record,
2. Institutes, which are mainly in the business of giving training or providing coaching on various technical skills within or outside syllabus ,
3. Vendors/Institutes which make prototypes of various concepts and demonstrate to students as a part of training to serve their academic needs.

Such projects will not be accepted by concerned department even if the business/industry/institute is a registered unit. GTU welcomes the involvement of genuine industries with the Colleges/ Institutions/ Polytechnics. **However businesses, which sell ready-made projects to students and which make it possible for a student not to apply his own mind and hands for working on the project must be avoided as a plague for technical education.**

APPENDIX 2:

PROCESSES FOR THE FINAL YEAR B.E. PROJECTS 2014

and

THE IDEA OF INDUSTRIAL SHODHYATRAS

Final year project: Final Year projects are the capstone of engineering education. After going through technical subjects during six semesters in degree engineering, the young brains have the necessary background and have learnt how to acquire technical knowledge for solving real life challenges. The work on the Final Year project helps a student integrate the knowledge, from various courses that he/she has studied, for solving a problem.

GTU wants the projects to be socially relevant and/or to be able to meet industry's requirements.

The users of an engineering product or process may be MSMEs, Large Scale Industries, Informal Sectors, Expert Individuals or Institutions.

GTU requires that each team of students should interact with the user of their choice and map **the unmet needs** of respective users. The need may be for improving a product or a process. Or it may be required to develop a new product for satisfying **the need**. The team of students will develop the improved or a new product or process as their Final Year project, with the approval of the faculty-guide.

The Concept of IDP / UDP: A final year project may satisfy **the needs** of a specific user. Such a project is called an Industry Defined Project (IDP), if **the need** is of a specific or a group of industries. If a final year project is defined by a user, other than an industry, it is called a User Defined Project (UDP).

The students, who want to work on an IDP, should begin with studying the product or process in the industry. For this purpose, they have to identify some industries and visit at least one of them for such a study. The visit for study of a product or process is called an Industrial Shodh Yatra.

Industrial Shodh Yatra: Industrial Shodh Yatra (ISY) is the course of action, that leads a team of students towards a creative interaction with diverse users to discover a challenge-problem, the solution of which would lead to a better product or a more efficient process for a particular user or for a group of users.

In this process of ISY the team members are required to follow design thinking approach and create a problem definition through the process of immersion, observation and engagement. During an ISY, a team of students, accompanied by their faculty guides, are required to interact with one (or more) industry/user and adopt a systematic approach to document the opportunity of improvement or of finding a new solution.

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Generally an Industrial Shodh Yatra is organized by a College/ Institution or by a Head of Department (HOD) or by a Faculty Member. A team of students visit an industry and spend some time to study the products and processes and to have technical discussions with the personnel at the industry. The visit may culminate in discovery of an appropriate problem for the Final Year project for the team of students.

The concepts of IDP/UDP and ISY were defined by GTU in 2010-2011.

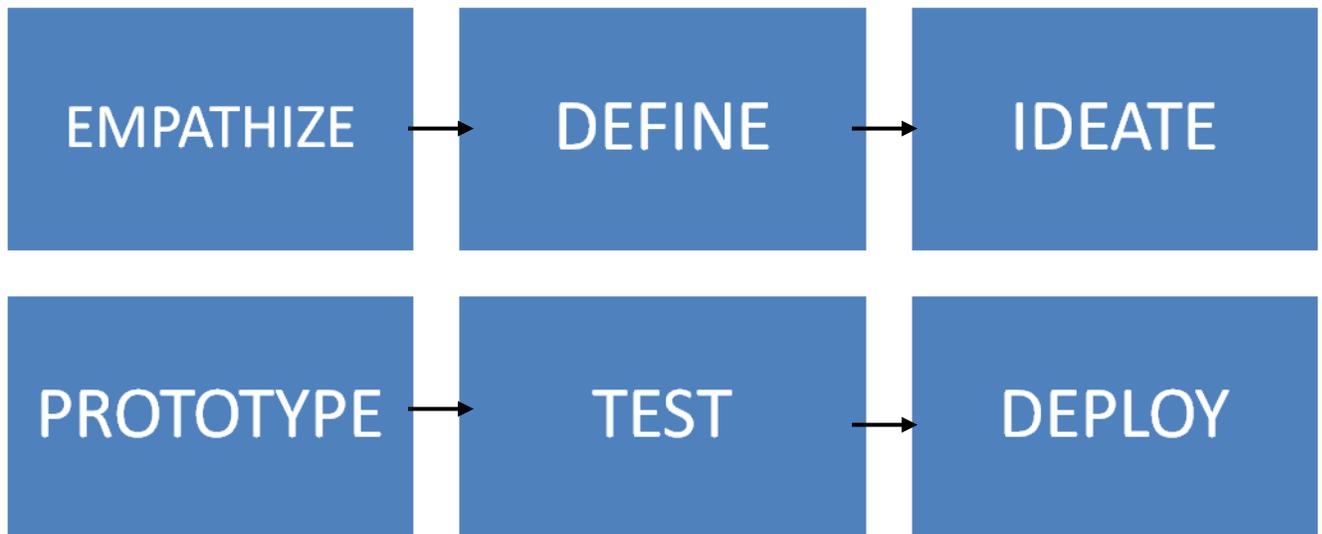
Objectives of Industrial Shodh Yatra (ISY):

- Forging linkages between Industry-Academia
- Mapping real -life need of users/MSMEs/Industry/Others/Innovators
- Codifying scouted challenges with the help of industry
- Scouting innovations done by MSMEs and benchmark them w.r.t. global solutions
- Mapping the Gap & converting it into final year projects as a part of Academic Research
- MSMEs can leverage final year students as a skilled technical Human Resource for technology development, while students will get learning opportunity. This is particularly helpful to MSMEs since they may not be able to afford their own full-fledged R&D facility.
- Using design thinking approach for developing incremental innovations for existing products or processes by doing innovations in form/feature/function and material/method/application of product. This process is called Design Driven Innovation (DDI).

Whether a student chooses to take up an IDP or a UDP, the Final Year project should use the approach of Design Driven Innovation. This will make the work on the Final Year project both interesting and educative, leading to the graduation of an engineer, who may be able to face the challenges of designing new products or processes successfully.

METHODOLOGY OF DESIGN-DRIVEN INNOVATION

Every team of students should use the methodology of Design-Driven Innovation for their project. An engineer is a problem solver and as such he/ she has to inculcate the process of thinking as a designer of new products or processes. The design thinking process can be divided into 6 interactive steps:-



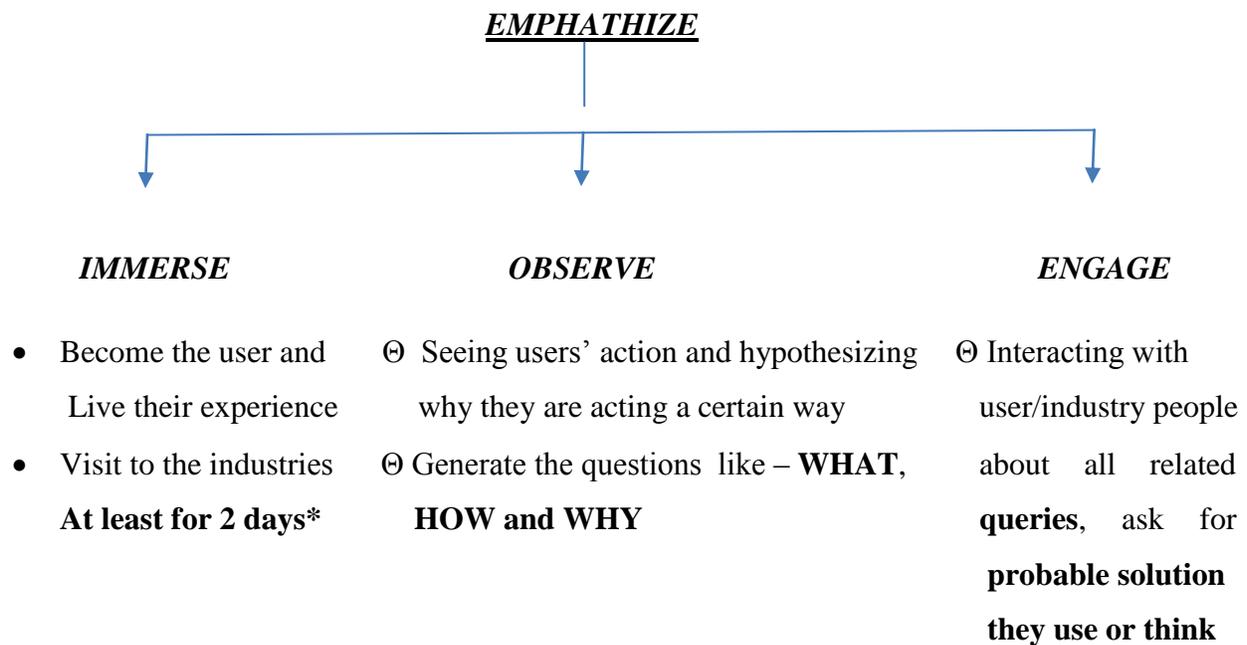
For the work on IDPs: Industrial Shodh Yatra involves two of the above six steps: 'EMPATHIZE' and 'DEFINE' only. The team of students should inter-act with the personnel in the industry as much as possible before they complete the work on the two steps.

For the work on IDPs: The team of student should go through the steps of 'EMPATHIZE' and 'DEFINE' by a systematic process, even though an external user like a specific industry may not be available for a UDP.

The Timeline of the Final Year Project

➤ Phase I – till 31st JULY 2014:

I. EMPATHIZE



* For IDP, it is required. For students working on a UDP, it is better for they also obtain experience of the culture on the shop floor by visiting some industries for an extended period.

Immerse:

Become the user and actually live their experiences. During this process the innovator needs to envisage himself/ herself as the user of the desired product and identify, codify various needs from his/her perspective. During the immersion process, students and their guide can get insights about the non codified and undocumented needs of the contemporary user/industry

Observe:

View users and their behaviour in the context of their lives. Watching people is always fun but observing is about seeing user's actions and hypothesizing why they are acting in a certain way. This can also be a powerful tool to step into their shoes without disrupting their normal behaviours.

Observation technique:

1. *What is this person (or persons) doing?*

-What is the person you're observing doing in a particular situation? Note the obvious as well as the surprising. Just report the objective facts.

2. *How are they doing it? (Body Language, etc.)*

-How is he doing it? Does it require effort? Does he appear rushed? Pained? Happy? Is the activity impacting the user in either a positive or a negative way?

3. *Why are they doing it this way?*

-Why is he doing what he's doing, in the way he's doing it? This step usually requires that you make informed guesses regarding motivation and emotions. This step will reveal assumptions that you should ask users about, and it will often uncover unexpected realizations.

Engage:

Interact and interview users through both scheduled and short "intercept" encounters.

Getting out of the building and actually talking to your users is probably the most uncomfortable but potentially most effective way, if it is done right. The thing here is not to directly go up and ask your user for the solution because most of the time they really don't know about the solution. Engage them in conversations that allow users to tell stories of their experiences and a likely solution.

The above process leads one towards the second component of design driven innovation:

II. DEFINE:

By the process of immersion, observation and engagement, students would be able to understand the problem of industries/ users whether the problem is in **Form, Feature or Function and/or Material, Method or Application.**

Workshop using the design canvas of the following Observation Matrix (It is on the next part of the process of 'DEFINE'.): All the student-teams, after going through EMPATHIZE, are required to participate in the workshop, involving the whole of the class.

Please see the next page for the Observation Matrix.....

Design For :

Design BY :

Date :

Version :

Observation Matrix

<p>Observations</p>	<p>Scouted Challenges</p>
<div style="border: 1px solid black; display: inline-block; padding: 5px;">Photo Grid</div>	
<p>Final Problem Select 1 from Top 5</p>	<p>Top 5 Problem on the basis of Desirability, Feasibility and Viability</p>

Every student-team should fill up the data in the above design canvas by noting down all insights from all who are present in the class. Every team will comment on each other's problem definition and the respective team has to note down the suggestions. The above canvas is to be made in A1 sheet and after this session, each team will present their canvas in a mini-exhibition format. During this mini-exhibition session the corresponding users or MSMEs, who helped in defining the problem, may be invited. Each team of students is required to take photograph of each poster and store its soft copy of documentation. As per university circular each team will upload their data online at the university server. (It is suggested that GTU Innovation Club must be activated in every College/ Institution, if it is not already active. The Club membership includes one Faculty Member from every branch. This Faculty Member of the GTU Innovation Club may be called the Branch Coordinator of the particular college.) The Branch Coordinator will keep track of the above process in coordination with students and faculty guides.

➤ **Phase II - 31st JULY 2014 to 15TH AUGUST:**

I. PAS: Prior Art Search activity

Increasing the innovation quotient of each of your IDP/UDP

PAS: Prior Art Search activity

What it includes:

- Web search/research publication
- User feedback
- Patent search¹ (PSAR)
- Vendor/market search

¹During this Patent Search and Analysis Report (PSAR) generation activity, every student within a team has to study at least 5 patents related either to his/her IDP/UDP or related to his/her area of interest. Analyzed data of each of these five patents is to be submitted online once the university declares the web link along with the project progress details at a due date to be announced. The team needs to compile the findings of each member during PSAR and make a report on

- What are the other solutions already existing and what are specific patent claims solving particular need or adding value related to your project?
- How the team wishes to improve existing patent claims by their own project?
- What would be new value addition/distinct feature the team will add to ensure their solution becomes unique and novel?
- Which innovator /industry has already started working on improvements, the like of which you have taken up as your Final Year project? This will let the team understand the orientation of future research in academia. The academic R&D can be streamlined by tapping such data where industry aspires to build product/process which is going to come to market in future.

A detailed circular will be released soon mentioning various steps related to PSAR activities as required to be done by every final year student as a part of their final year project.

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Student teams need to note down all their data while doing the above activities and need to upload the soft copies at GTU online project management server. A detailed instruction regarding this will be published in another circular.

- **Phases after 15TH AUGUST:** A separate circular will define the next parts of the process.

Final Framework for Final Year Engineering Projects

