

**COURSE TITLE** : MINI PROJECT  
**COURSE CODE** : 4009  
**COURSE CATEGORY** : A  
**DAYS / SEMESTER** : 5 DAYS (35 periods)/4  
**CREDITS** : 5

**General Outcome:**

GO	On completion of the study of this course the students will be able:
1	To create an Industrial environment and culture within the institution.
2	To set up production lab utilizing the infrastructure of the institution.
3	To standardize laboratories to industrial standard, thereby giving exposure to industrial housekeeping standards.
4	To provide students hands on experience on, troubleshooting, maintenance, fabrication, innovation, record keeping, documentation etc thereby enhancing the skill and competency part of technical education.
5	To promote the concept of entrepreneurship.
6	To inculcate innovative thinking and thereby preparing students for main project.
7	To set up self maintenance cell within departments to ensure optimal usage of infrastructure facilities.

**Guidelines:**

The mini project can be organized into three phases based on the recommendations and evaluation criteria listed below.

**Phase1: Standardization of Laboratories**

This phase of the mini project can be clubbed with laboratory hours of the semester. Before the commencement of cycle of experiments for the semester, the students should be given instructions on 5S method of industrial housekeeping. Video resources available in the internet can be utilized for the purpose. After the initial summarizing, students should be grouped into batches of 5 and should be entrusted with activities of implementing or maintaining 5S standardization of the laboratory. This ensures that all experiments of the laboratory are performed as per industrial standard.

To elaborate the concept of standardization let us consider a typical case of machine shop. The case can suitably be adopted for any departments as standardization concept is the same for all industry, whether it is manufacturing, service or hospitality.

*Case study: Standardization of Machine shop of Mechanical Department.*

The machine shop is like any other shop floor, and thus it needs to be organized for convenience and safety. Special dedicated team should be formed for sorting, organizing, and sustaining the organized

work culture at the machine shop. The 5S Team works on the 5 Japanese principles of organization, which have been successfully implemented at various shop floors around the world. The 5 pillars of organization that we aim at are:

### **Sort (Seiri)**

Sort means that you remove all items from the workplace that are not needed for current machine shop activities. This essentially involves segregating items of immediate use from items that are not needed.

### **Set in Order (Seiton)**

Setting in order whatever has been “Sorted.” Labeling and marking down required items of usage. Creating designated areas for frequently used tools and arranging them so that they are easy to find.

### **Shine (Seiso)**

Cleaning up after the work is over. Putting tools and used materials back in their designated places, the way they were “Set in order.” Cleaning and sweeping the workplaces, so as to avoid any hazardous materials spills and other accidents at the workplace.

### **Standardize (Seiketsu)**

Standardize whatever has been achieved so far using the first three pillars. Making it a part of the daily routine and setting aside time to sort, set in order, and shine repeatedly.

### **Sustain (Shitsuke)**

Sustaining is maintaining the clean and organized work environment over a long period of time to enhance productivity.

Once the first two pillars are implemented during the initial sessions of the laboratory, third to fifth pillars should be made a regular activity before commencement of any laboratory work and after concluding any days work and should be monitored. The same criteria can be adopted for any laboratory, irrespective of the programme.

### **Evaluation of Phase1**

This part of the mini project carries 40% of the total marks. The evaluation should be made as group performance in implementing the standardization and individual contribution in setting work place clean and tidy. Evaluations by way of surprise visits made by the Head of Department and Guide during laboratory hours at least twice the semester contribute to the part of total marks.

### **Phase2: Identifying and solving real time issues**

This part of the mini project contributes to 40% of the evaluation criteria. Here the students are encouraged to find out and propose solution to real time problems they observe within the institution or pertaining to the community. Here it is intended to give students exposure to real time problems that

may occur in industry or in real life environments. Their ability to identify and solve problems based on the skills achieved so far is invoked here. It is recommended to identify and solve problems which demand effort that can be completed within the stipulated timing and does not involve complicated designing or programming. Mini projects can be a gate way to final academic projects and if any of the identified problem demands more time and effort, such cases may be carried over to as main project. All safety precautions mandate to the industry should be strictly followed during implementation of the mini project. Safety mentioned here includes both the safety of the student as well as safety of the user to the machine.

Let us consider a real time case study to elaborate the concept. The case is so selected in this context that, irrespective of the program of study, any department can take up the issue and propose a solution.

*Case study: DLP projectors installed in our class rooms are developing one of the following problems.*

- Projector not showing display.
- Images appearing on tints of a single shade.
- Patches of dots initially appearing on the screen and gradually spreads to the entire screen.

**Solution:**

1. Projector not showing display.

- Check ac mains with a multi meter. Students should be given instructions in handling AC mains for safety. If the problem is with the electrical wiring, rectify the problem. Otherwise
- Check mains cord for continuity. Students should be instructed to use multi meter for the purpose. Otherwise
- Suspect problem with the power supply. Refer to instruction manual, internet resources or video resources available in the YouTube.
- Since modern equipments are coming with advanced casings, usually without any screws, any improper attempt to dismantle the casing can result in permanent damage of the equipment. The students should refer to step by step procedure available in you tube before attempting.

2. Images appearing on tints of a single shade.

- Search internet forums for similar cases.
- Upon goggling, searching, it is identified that the problem is with missing one of R G B connections of VGA cable.
- Attempt repairing the cable. If not replace the cable.
- If not problem with the cable, check projector logical board for problem.
- It is to be noted that merely replacing the cable will not solve the problem for ever. Students should be encouraged to find the cause for the cable failure. Simply replacing the cable without solving the cause can definitely end up in repetition of the problem. In this typical

case, the cables are often damaged by keeping the loose end of the cable on the floor there by walked over by commuters. The loose end should be properly tied using cable ties so that the loose end does not fall over.

3. Patches of dots initially appearing on the screen and gradually spreads to the entire screen.

- Clean the lens for any residue. Try zooming the lens if the dots move along with axis of rotation, dirt or residue on lens is suspected. If not
- Check internet forum for solution. Upon googling, you will find that the problem can be with DLP panel and need a replacement.
- The students should be encouraged to find the reason for the failure. Internet forum suggests dampness from roof or improper shut down that accounts for DLP failure.

Case studies of similar nature impart skill and competency part into the programme.

Students as individual or a team of 2 may be entrusted with providing solution to similar problems. Cases like ceiling leakage or dampness problem of a building in case of civil engineering, trouble shooting a computer network, resource sharing through network within the institution for computer engineering students can be considered as part of the mini project. Fabrication of test jigs for electronics etc.

It is also encouraged to run production centers or running subassembly units of nearby industries within the campus are also encouraged.

### **Phase3: Documentation**

Documentation accounts for 20% of the total evaluation. Students are required to submit detailed project report of the entire semester work of mini project. They should be encouraged to make use of documentation tools like Latex for preparation of the report.

Innovative ideas of commercial values should be encouraged to be continued as main project for the forth coming semester.

Evaluation			
Standardization (30%)		Problem identification and solving (50%) or collaborative work (50%) or involvement in production centre (50%)	Documentation (20%)
Group (15%)	Individual (15%)		