

**TRAINING OF PERSONNEL FOR THE
TECHNICAL LABORATORIES**

by

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Abstract

There are two sets of qualifications for the staff of the technical laboratories. The first set, which is of the general nature, deals with the personal qualities and attributes, the second, which is of the specific nature, measures the proficiency in fulfillment of the particular job responsibilities. The procedure required for achievement of the latter, the specific qualifications, is discussed for various types of the laboratory personnel. Suggestions are made of the activities essential for updating these people with the most recent developments achieved in their own field of education.

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Introduction

The technical laboratories of the Technical and Engineering Institutions can be engaged in a number of functions such as those that follows:

1. Teaching demonstrational, experimental and practical parts of the theoretical academic subjects.
2. Training the way to use a special piece of equipment, the method of development of a particular material or process and the methodology of the empirical studies.
3. Accomplishment of the experimental parts of project programs and research activities.
4. Serving the outside clients who request working on special assignments.

Each function is comprised of several tasks. Each task being exercised by a number of laboratory personnel. These personnel must be able to fulfill certain qualifications. Some qualifications are of the general nature and thus deal basically with the moral and ethical attitudes of such laboratory personnel as a teacher, a supervisor, a trainer, a learner, an investigator, a helper and a visitor. Other qualifications are of the scientific, engineering and technical awareness and knowledge of such personnel. Practical experience and skillfulness are also of the particular requirements attributed to a number of the above people. How to design an appropriate discipline for the achievement of such qualifications and attitudes is a subject that needs a delicate treatment.

General Requirements

A summary of the general requirements for most laboratory personnel can be made as follows:

- 1 Generosity in sharing the owns knowledge and expertise with the others.
- 2 Good morals, strong personality and co-operative character.
- 3 Demonstrating group leadership qualities and interpersonal awareness.
- 4 Innovation, planning skill, engineering inference, and awareness

of the empirical methodology.

- 5 Awareness of the specific own responsibilities and the normal mutual interactions existing amongst the various categories of the laboratory personnel.

These qualifications plus the other particular moral attributes that depend on the specific job responsibilities that a particular laboratory staff member may hold, can be acquired through a special educational program that may be designed for development of such attitudes. This program may include several in-class course studies, practical co-operative programs, leading tentative laboratory sessions, guiding and supervising small practicing groups, etc.

Laboratory Personnel and their Activities

The people involved in the laboratory activities can be categorized as follows:

1. Laboratory Instructors.
2. Technical Instructors.
3. Practical Instructors.
4. Laboratory Assistants.
5. Laboratory Technicians.
6. Students.
7. Research Staff.
8. Laboratory In-charge.

The major tasks that these people are generally concerned with, when functioning as members of the laboratory personnel, are as follows:

1. Conducting and supervising the learning experience of the students participating in the laboratory subjects.

If a laboratory subject supplements the materials taught in a theoretical subject, it would be greatly desirable that the teaching process of both subjects be conducted by the same Instructor(s). It

is even better to offer the two subjects collectively.

Training of the independent laboratory subjects is undertaken by the laboratory instructors. When such subjects consist of highly technical materials they may be instructed by or with the co-operation of the technical instructors.

The practical training subjects are conducted under the supervision of the practical instructors.

2. Supervising research and development activities.

The members of the faculty would generally undertake the direction and supervision of the research and development activities. The technical and practical instructors, the laboratory assistants and the senior graduate students associated with research activities may in some cases conduct some project programs.

3. Undertaking research programs, development tasks, (development tasks, re-production activities and outside client practical assignments.

All categories of the people concerned with the laboratories, such as teaching and research staff members, laboratory technicians, junior and senior students, laboratory assistants and outside agents attending the laboratory, can get involved in such activities.

4. Giving technical advice and consultation on how to design, how to fabricate, and how to operate a particular piece of equipment necessary for running some special investigatory tests associated with the research and development programs or service assignments.

The technical instructors can be of the greatest assistance in such cases. The members of the research team's senior research students, laboratory technicians, practical instructors and the laboratory assistants can be of a lot of help too.

5. Setting up experimental assemblies, arranging laboratory equipment, maintaining test devices, warming up furnaces, and preparing test samples necessary for instruction of the laboratory subjects, accomplishment of the investigatory tests and performance of the service assignments.

The laboratory assistants and technicians are the people whose chief functions are to perform the above preparatory actions. The students involved in the research and development activities would also take most of the preparatory measures needed for accomplishment of their own practical projects.

Specific Requirements

In contrast to the general requirements described earlier, the specific requirements of the laboratory personnel depend on their specific job

responsibilities. A list of such requirements with some recommended procedures necessary for training a number of the laboratory staff personnel are given in the following sections.

I. Laboratory Instructors

Successful completion of a graduate thesis in a technical area close to the field of the subjects to be taught, and an evidence of a high level of academic performance are the least experience required for instruction of a laboratory subject. Addition of one to two years of industrial working experience to the above conditions may be employed as a means to improve the quality of the teaching process.

II. Technical Instructors

Technical instructors must be at least a Bachelor's degree with several years of coherent work-study experience in industry and in the technical laboratories of engineering institutions. They must be aware of the national technical standards and prove great technical knowledge and know-how capabilities.

The training program for technical instructors may consist of the following stages:

1. One to two years of continuous field practice, consisting of practical training in different laboratories and various industrial centers.
2. Several years of working experience in different parts of the laboratory as a laboratory assistant. Involvement in development, research and test assignment activities, consistent work-study programs especially on the national technical standards, frequent industry visits, short-term field practices and participation in the regular seminar sessions of the laboratory instructors and the laboratory in-charge people.

III. Practical Instructors

Practical instructors must be selected from amongst the qualified industry personnel for supervision and training of the practical subjects. They should have

completed a Bachelor's degree with several years of working experience.

IV. Laboratory Assistants

The people with a Bachelor's degree and one year of industry or field practice can serve as laboratory assistants. Senior students of great technical and research capabilities may be accepted as junior laboratory assistants, while continuing their studies, too.

V. Laboratory Technicians

Senior laboratory technicians may be trained through the completion of such a training program as that which follows:

1. A technical high school Diploma is necessary as a basis for beginning of the training program.
2. Two to three years of work-study program under the supervision of the laboratory and technical instructors in several different parts of the laboratory. The laboratory technicians must learn how to work with various technical equipments. They should also learn about a special technical part of the laboratory in a greater depth and with a greater skill.
3. Industry visits and short-term field practice periods are of significant value to the technical achievements of the laboratory technicians, too.

Up-to-dateness

The laboratory personnel, specially the instructors, have the responsibility of updating themselves with the most recent developments achieved in their own field. Recognition to the required attainments can be made in the promotion criteria. The following activities are recommended as a means of implementation of the above objective:

1. Subscription and regular review of the technical journals.
2. Studying the most recent information gathered on technical equipments, laboratory facilities and industrial developments.
3. Participation in research and development activities.
4. Regular participation in the group seminars held by the help of the laboratory staff and in the annual conferences and meetings held in the region. Preparation and presentation of technical articles in the meetings and participation in the group discussions.
5. Participation in short technical courses instructed by the senior technical, practical or laboratory instructors, or by other visiting specialists.
6. Frequent visits made of the other laboratories located whether in the educational or in the industrial centers.
7. Frequent practicing assignments made in the industrial centers.
8. Obligation for attainment of certain qualifications within a limited period of time,

Summary

There are various types of functions associated with the technical laboratories. Each function may be comprised of several tasks that their implementation is of the responsibilities of the different laboratory personnel. These responsibilities dictate a set of general and a set of specific requirements essential for the people involved in the laboratory activities. For many of the laboratory personnel, the general requirements are the same. The specific requirements, however, depend on the particular duties that each individual undertake. These requirements can be achieved through several courses of work-study and field practice programs.