Appendix 2: Guidelines for industrial internships

Guidelines for mechanical engineering internships

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Valid as of the 2017/2018 winter semester The officially published GERMAN text alone has binding force!

1. Purpose of the internship

[1]Mechanical engineers work in various research and development fields. They carry out both planning and managing activities, oversee and coordinate the operation of complex systems, conduct maintenance and perform commercial and sales/marketing tasks. [2]Characteristic of these responsibilities is that a synthesis forms between the various disciplines and aspects. [3]This should also be reflected in the internship, in which the student acquires know-how and experience from the work world – not least in factories – that complements their engineering studies. [4]The internship is designed not only to familiarize students with specific technologies and work flows, but also to give them practical insights into various activities and fields of work.

[5]An additional aspect involves comprehending the social elements of such work. [6]Interns intern must perceive the operation as a social structure and become members of staff familiar with the manager-employee relationship in order to understand their position within the organization and how they can be effective on the job, frequently as a supervisor.

[7]Generally speaking, the internship can be viewed as part of the student's training and education and an important experience that serves as a building block for the career.

2. Duration and division of time

[1]The industrial internship must include a period of at least eight weeks in the area of manufacturing. This can be followed by an engineering internship of at least nine weeks.

[2]The total duration of the internship is therefore either at least 8 weeks or at least 17 weeks. [3]The manufacturing portion of the internship must be at least 8 weeks. [4]These rules apply equally to bachelor's and master's programs. [5]As an exception, the admissions committee may extend the required period by up to 8 weeks for students entering a master's program, if the internship experience in the bachelor’s degree program deviates significantly from this guideline with respect to content or duration.

2.1. Manufacturing internship

[1]The manufacturing internship serves as an introduction to industrial production and thus provides the student basic knowledge essential to this profession. [2]Under the supervision of a qualified professional, the intern should become familiar with the processability and workability of the materials and gain an overview of the production systems and processes. [3]The intern should also gain insight into quality assurance and testing.

2.2. Engineering internship

[1]The engineering internship is designed to provide general insights into the mechanical engineering profession, engineering-business and organizational contexts or the significance of technical and engineering professions in our society. [2]Depending on the inclinations of the student and the available opportunities, this part of the internship offers considerable leeway and individual responsibility in deciding how to structure the practical training.
[3]This allows the student to individually design the engineering internship in accordance with the activities outlined in the internship plan.
The 9-week engineering internship, worth 12 ECTS, can be completed as an alternative to the "Project Seminar with Soft Skills" (5th semester of program).

2.3. Timeframe structure

[1]An internship in the area of manufacturing must be completed prior to beginning the course of study. The minimum duration of the pre-internship is 8 weeks.
[2]In special cases, such as military or social service, stays abroad or language courses, the pre-internship can be partially or entirely waived. [3]In these cases, an application stating the reason(s) for the deferral must be submitted to the Internship Office. [4]Proof of completion of the (18 week) manufacturing internship must be submitted before work on the bachelor's thesis may commence.

3. Carrying out the internship

3.1. Internship plan

[1]The intern must spend at least one continuous week at the company during the training period. [2]The weekly working time is based on the standard working hours applicable in Germany. [3]The manufacturing and engineering internships are divided into the following areas:

3.1.1. Manufacturing internship

[1]The internship must include <u>at least three</u> of the areas of activity defined below. At least two of the activities must stem from F1 - F4. [2]The duration of each selected activity is at least one week.

<u>F1: Casting processes</u>
Construction and plan of a model, assembly of box components and model core, mold construction, hand molding with models and templates, familiarization with wet and dry casting, work in the core making facility, machine molding and in casting (sand, chill, pressure, centrifugal, molded masks and fine casting), sintering, powder metallurgy and plastic injection molding.

<u>F2: Cutting processes</u>
Rolling, hand and die forging, cold forming/impact extrusion, drawing, sheet metal forming, pressing, bending, shearing, laser cutting, stamping.

<u>F3: Machining processes</u>
Filing, chiseling, sawing, thread-cutting by hand, lathing, planing, milling, drilling, countersinking, chafing, stripping, grinding, honing, lapping

<u>F4: Joining and cutting processes and physical-chemical treatments</u>
Oxyacetylene, arc and resistance welding, gas cutting, special welding and cutting processes, soldering. Basic courses in gas fusion and electric welding from the German Association of Welding Technology e.V. will be recognized. Physical-chemical treatments (i.e. surface coatings)

<u>F5: Installation, assembly, integration</u>

<u>F6: Testing and quality assurance</u>

Geometric and functional testing, quality-assurance component testing, production and product monitoring

3.1.2. Engineering internship

[1]Typical activities include:

- Examining, developing, designing, calculating and testing engineering concepts, machines, components, materials, processes and methods
- Production development and planning

[2]Activities that significantly enhance or expand the university course of study are highly recommended. Examples include:

- Project management: planning, coordinating and monitoring the technical and business aspects of projects
- Technical monitoring of complex equipment and systems
- Sales and marketing activities for technical products
- Creating complex technical proposals
- Engineering-oriented corporate planning
- Reviewing existing or planned technical systems and products to determine the demand, requirements and impact under the aspects of the environment and society

[3]These activities are carried out at small-to-medium and large companies and to some extent at government agencies and organizations. The student should strive to gain experience in a variety of activities and also within different positions in order to become familiar with the various department and corporate cultures. [5]Since most of these activities require a certain learning curve, interns are advised to organize internships that last several weeks.
[6]Internships are recommended beginning in the 5th semester.
[7]Regardless of the chosen field of activity, the student should acquire an overview of the company's products and services and the technical organization structure of the departments in which the internship is carried out. [8]These activities should be outlined in the internship report.
[9]The engineering internship can be replaced in part or full by a manufacturing internship.

3.2. Report and Documentation of Internship

[1]Successful completion of the internship, or its individual aspects, shall be documented as follows:

- For the manufacturing internship, a report signed by the student that consists of approximately two pages (description, work processes, diagrams, special notes) for each selected activity group (F1, F3, etc...). For the engineering internship, in addition to the product and organization descriptions outlined in 3.1.2., the student should also document the work activities carried out during the internship (as a guideline, five pages).The latter may be omitted if the student can provide a copy of the technical report he or she provided to the company where the internship was carried out, which covers the timeframe of the internship,

together with

- relevant certificates (forms) from the company verifying the student's participation in an internship. In addition, the company must provide a separate letter of reference/performance report that at a minimum highlights the timeframe and the activities of the internship, as well as the intern's conduct.

[2]Confirmation of the internship activities occurs once the Internship Office has received the certificate/performance report and reviewed the student's report. [3]The Internship Office reserves the right to conduct a random review of the reports.

4. The intern within the training enterprise

4.1. Training enterprise

[1]The internship, which is designed to convey knowledge about manufacturing processes, provide exposure to business operations and give the student a feel for the social aspects of work processes, should be carried out at a training enterprise certified by the Chamber of Industry and Commerce. [2]The internship can be conducted at companies in industries such as machine engineering, automotive manufacturing, electronics, chemicals, mining and rail transport, as well as at large workshops, provided that all of the internship requirements are fulfilled in accordance with these guidelines. [3]Nonproducing workshops active in the maintenance and service sector, regardless of their size, are not suitable for the manufacturing internship. [4]University and non-academic research institutes are not considered suitable for the same reason.

4.2. Intern supervision

[1]At industrial companies, interns are typically supervised by a qualified trainer who ensures they receive proper practical training in accordance with the available opportunities at the company and in line with the internship guidelines. [2]The supervisor also provides technical instruction through various discussions with the interns.
[3]University interns are not required to attend vocational courses. [4]Voluntary participation in the company's own training classes should not interfere with the departmental internship activities, which are already of limited duration.

4.3. Guidelines for the intern's conduct

[1]Interns are not afforded special treatment during their practical training. [2]They can gain the respect and recognition of their supervisors and colleagues by conscientiously observing company regulations and work schedules and exhibiting exemplary operational discipline, an eagerness to learn, diligence, outstanding performance and a willingness to help. [3]Apart from the organizational contexts, engineering technology and the relationship between machine and manual labor, the intern should also acquire an understanding of the human side of the operation and how it impacts the production flows. [4]They should become familiar with the relationship between the employees and middle management and be able to empathize with their social problems.

5. Legal and social status of the intern

5.1. Applying for an internship

[1]Prior to beginning the internship, students should intern use these guidelines, or in special cases, seek the advice of the Internship Office at the Department of Mechanical Engineering, to become intimately familiar with the rules, reporting requirements and other issues that arise from the internship activities. [2]To acquire an internship position, students must take the initiative and contact companies on their own. [3]Assistance is available through the departmental student council at the TUM Department of Mechanical Engineering.

5.2. Internship agreement

[1]The relationship between the intern and the company is legally binding through the internship agreement. [2]The agreement outlines all rights and obligations of the intern and the company, as well as the duration of the internship.

5.3. Financial support

[1]Because internships and pre-internships (section 2.3.) fall into the category of post-secondary education, interns may be eligible for BAföG assistance. [2]Interns should contact the responsible authorities to determine their eligibility.

5.4. Insurance

Insurance issues are covered under applicable laws.

5.5. Vacation, illness, missing days

[1]If the intern misses more than three days of the manufacturing or engineering practical training, these days must be made up. This includes days missed because of illness, vacation or other reasons. [3]Company holidays also count as missed days. [4]Legal holidays are the only exception. [5]If days are missed, the intern should seek an extension with the training enterprise in order to complete the affected part of the training as required.

[6]Should a physician provide a statement attesting to a physical disability or chronic illness that would prevent the intern from completing the required manufacturing internship, with the agreement of the Internship Office the lost time can be compensated through activities in an engineering office, in work preparation, material inspection and laboratory activities.

6. Recognition of the internship

[1]The Internship Office at the Department of Mechanical Engineering is responsible for recognizing the internship. [2]Recognition requires that the student submit the activity report and the original internship certificate from the training enterprise.

[3]The documents must clearly indicate the type and duration of the individual activities carried out during the internship.

[4]The Internship Office decides whether the practical training complies with the internship guidelines and can thus be recognized. [5]If the internship activity report is incomplete or improperly written, the full duration of the practical training will not be recognized. [6]If the Internship Office is unable to determine through the activity report and certificate whether the student sufficiently carried out the individual activities, the student may be required to extend the internship to ensure that it complies with the guidelines.

[7]The TUM Department of Mechanical Engineering will publish a schedule in October on its website for new students who need to have a pre-internship recognized.

7. Special rules

7.1. Vocational training

[1]Pertinent on-the-job activities that comply with these internship guidelines will be credited to the maximum 17-week practical training. [2]Apprenticeships can be recognized provided they comply with the internship guidelines.

7.2. Non-industry practical training

General guidelines

[1]Non-industry internships are subject to the prior approval of the Internship Office. [2]The sum of all non-industry practical training activities may not exceed 6 weeks.

Practical training for members of the military

[3]University applicants entering military service should request placement in a suitable technical unit. [4]With the prior approval of the Internship Office, the time spent in military training programs can be applied to the internship provided the related activities comply with Section 3.1 of these guidelines. Up to six weeks can be credited. [5]For the purposes of recognizing military training as part of an internship, the appropriate documents and certificates from the Bundeswehr (German military) must be submitted to the Internship Office. [6]The German Defense Ministry approved the creation of internship reports and the issuance of practical training certificates in a 1963 publication (see page 291), as well as the amended statute dated 12 July 1967 (page 213).

[7]Apart from those performing national service, in theory these internship credit guidelines can also be applied to career soldiers and those performing community service.

7.3. Other industrial activities

[1]Work-student or other occupational activities may be recognized as practical training in order to fulfill the internship guidelines. [2]However, an engineering internship may not serve as a direct replacement for research projects that are required for the main course of study, and vice versa. [3]While internships ensure insight into a broad spectrum of technologies and workflows, research projects require students to carry out specific in-depth engineering activities on an increasingly independent basis.
[4]If possible, any doubts about the compatibility of a desired practical training program should be discussed with the Internship Office in advance.

7.4. Internships abroad

[1]Conducting part of the practical training program abroad, i.e. outside of Germany, is beneficial to the career. [2]Apart from improving their professional qualifications, aspiring engineers acquire insights into the cultural, social and business structures of other countries. [3]Students can thus complete their internships at foreign companies provided the acquired knowledge is in line with the internship plan. [4]The reports must be submitted in German, English or bilingual (German, plus the country language). [5]The internship certification must be in the country's official language. A certified German translation must also be provided. [6]Internship certifications in English are the only exception. [7]They do not require a translation. [8]Overseas internships of up to 17 weeks in duration are recognized.

8. Inquiries

Questions and applications related to these guidelines should be directed to the Internship Office. Address: Technical University of Munich
Internship Office of the TUM Department of
Mechanical Engineering 15
85748 Garching
Tel: 089/289-15 697
Email: praktikumsamt@mw.tum.de

Notes

These guidelines are valid for students who enroll in the TUM mechanical engineering program beginning with the 2017/2018 winter semester.