Table of Contents

Foreword.................................................................................................................................................. 3  

I. Modules............................................................................................................................................... 4  

II. Module Descriptions and the Module Catalog.................................................................................. 5  

III. Module Descriptions at TUM......................................................................................................... 6  

   1. Learning Outcomes......................................................................................................................... 6  
   2. Teaching and Learning Methods.................................................................................................... 12  
   3. Content ........................................................................................................................................... 16  
   4. Assessment – Coursework and Examination Requirements.......................................................... 16  
   5. Plausibility Check.............................................................................................................................. 19  

IV. Module Description in TUMonline ................................................................................................. 21  

   Module Details  
   (Name, Organization, Organization ID, Comment, Credits, Weighting Factor, Duration,  
   Module ID, Version (abbr.), External Allocation, Validity)................................................................. 21  

   SPO Allocation...................................................................................................................................... 21  

   Courses and Exams  
   (Exam node, Offer node)..................................................................................................................... 22  

   Descriptions.......................................................................................................................................... 22  

      General Information  
      (Module Level, Abbreviation, Subtitle, Duration, Frequency, Language)....................................... 22  

      Workload  
      (Total Hours, Contact Hours, Self-Study Hours)............................................................................. 24  

   Study and Examination Performance  
   (Description of Achievement and Assessment Methods, Type of Assessment, Duration  
   of Assessment, Homework, Term Paper, Oral Presentation, Conversation, Exam Retake)............. 25  

   Description  
   (Prerequisites (Recommended), Intended Learning Outcomes, Content, Teaching and  
   Learning Methods, Media, Reading List).......................................................................................... 26  

   Organizational Information  
   (Module Coordinator, Instructor(s), Courses,  
   Degree Program Allocation)............................................................................................................. 27  

V. Appendix.............................................................................................................................................. 28  

   Contact............................................................................................................................................... 28  

   Works Cited......................................................................................................................................... 28  

   Further Reading / Links....................................................................................................................... 29
Foreword

Dear Reader,
Dear Colleagues,

The modularization of degree programs represents a key element of the Bologna Process. The module system, e.g. the grouping of courses into thematic blocks, was introduced in an effort to increase transparency, facilitate the transfer of credits between institutions and, in turn, foster mobility within the European Higher Education Area. The module system is designed to provide students insight into the connections between subjects within thematic areas, as well as relationships between different thematic areas, and to ensure that student performance is continually assessed throughout the course of study.

These objectives, however, can only be realized through careful module design and development, as well as detailed and purposeful module description. Together with degree program descriptions and regulations, module descriptions offer an exhaustive portrait of each degree program’s structure, content, outcomes and requirements and, thus, play a key role in TUM’s quality management.

In 2010, the Office of Academic and Student Affairs published its first guidelines on How to Write a Module Description as a resource for those of you charged with this new and sometimes daunting task. This second and improved version of those guidelines has been compiled on the basis of numerous discussions and feedback from module coordinators in TUM’s schools and departments. It benefits not only from their experiences but from the recommendations of expert reviewers made within the scope of TUM’s system accreditation in 2013.

Our team at the Office of Academic and Student Affairs is available to assist and advise you with any of your concerns in connection with module descriptions or other aspects of modularization and the Bologna Process.

Sincerely,

Prof. Regine Keller
Vice President of Academic and Student Affairs
I. Modules

Modules are learning units that form the “building blocks” of the new bachelor’s and master’s degree programs.

“Modules are thematically and chronologically related, self-contained units of study assigned with a certain number of credits and subject to assessment. They may combine various forms of instruction and learning (e.g. lectures, exercises, practica, e-learning, etc.)”

An Overview of Key Criteria Specified in the Bologna Process

- Modules produce **learning outcomes**, i.e. measurable achievements formulated as statements specifying what students are able to DO, e.g. what skills, knowledge or behavior they are able to demonstrate, upon completion of the module. In total, the learning outcomes of all modules in a degree program should be developed in line with the overall learning objectives of the degree program. This being the case, modules can form components of different degree programs (e.g. export/import modules, such as Fundamentals of Mathematics).

- A module generally consists of **several courses**, which may combine **various forms of instruction and learning** (e.g. lectures, exercises, seminars, projects, self-study, homework, essays, e-learning units, etc.). Examination modules, consisting of self-study units and an exam, may also be appropriate for the development of students’ understanding of broader learning contexts.

- Modules convey thematically cohesive **content**. A module coordinator, appointed by the school or department, is responsible for the design of module content.

- As a rule, student performance is assessed in the form of a module **examination**. The type of examination (e.g. written exam, seminar paper, individual interview, presentation, etc.) should correspond to the desired **learning outcomes** of the module.

- Students who successfully complete a module are awarded **credits** (ECTS points). The number of credits awarded for a module reflects the student workload required for the module. Credits may also be awarded for modules requiring forms of qualification other than graded examination, such as participation in a study-related excursion.

“Module descriptions should indicate workload and the number of credit points to be awarded.”
II. Module Descriptions and the Module Catalog

Current and prospective students, as well as teaching staff and other members of the university, require reliable information on the content of modules, their learning outcomes, and their qualitative and quantitative requirements. Module descriptions, written in accordance with university-wide guidelines and standards, are intended to provide this transparency.

“Module descriptions must contain, at least, the following information:

a) Content and desired learning outcomes
b) Teaching and learning methods
c) (Recommended) prerequisites
d) Degree program allocation
e) Requirements for the awarding of credits
f) Credits and grades
g) Frequency with which the module is offered
h) Workload
i) Duration”  

The Purpose of Module Description

Prospective students want to know before beginning their studies what qualifications they will have acquired upon graduation. Module descriptions provide students orientation throughout their studies by describing the qualifications to be attained in the respective module. As a rule, the more detailed the description of what students will be able to DO upon completion of the module, the greater their motivation to learn.

Module descriptions are a useful tool in the credit recognition process, when students transfer from one university to another, change their majors, or spend time abroad.

Module descriptions facilitate communication between teaching staff within schools and departments and promote the systematic reflection of teaching and learning processes.

The Module Catalog as a Component of Quality Management

The total of all module descriptions belonging to a particular degree program is the program’s module catalog. The module catalog can be used to ensure that course offerings comply with the overall objectives of the degree program and do not contain any unwanted overlapping of content or structural gaps in acquired qualifications. Module catalogs also serve as documentation of internal and external requirements within the scope of TUM’s QM system.

The module catalog is generated by TUMonline (also as a PDF) and is to be made accessible to everyone. Module catalogs may also be made available in other forms, as necessary, to improve accessibility.
III. Module Descriptions at TUM

Modules are components of degree programs and are to be described with regard to learning outcomes. The overall learning objectives of the degree program thus serve as the point of orientation for determining and formulating intended learning outcomes and, in turn, for writing module descriptions.

The cornerstones of module description – learning outcomes, teaching and learning methods, content, assessment – together with other general information, such as frequency, duration, etc, should be closely and logically related. Only then, can it be certain that the choice of examination method is adequate for the assessment of specified learning outcomes (keyword: competence-oriented assessment, cf. p.19).

Four guiding questions for module description:
- What learning outcomes is the student to have achieved upon completion of the module?
- What teaching and learning methods will be employed to achieve these outcomes?
- What content is the module to communicate?
- How is students’ achievement of these outcomes to be assessed?

1. Learning Outcomes

Learning outcomes measurable achievements formulated as statements specifying what students are able to DO, e.g. what skills, knowledge or behavior they are able to demonstrate, upon completion of the module.

Learning outcomes shift the focus from instructional content to student achievement, i.e. acquired competencies.

Learning outcomes describe the results of a learning process.  

The Bologna Process is characterized by the shift to a results-oriented model of education. This shift changes our perspective from the question “What content will be taught?” to “What are the intended outcomes of instruction?”

Formulating learning outcomes statements

When considering how to formulate learning outcomes, it is best to think about which knowledge and skills are to be the result of students’ successful completion of the module. Learning outcomes should not be confused with learning objectives: Objectives take the perspective of teachers, i.e. the intended outcomes of instruction. Learning outcomes are achieved results of what students learned. Put simply, the one is a hope; the other a promise.
Learning outcomes statements should specifically state the **skills students will have achieved** upon completion of the module. They should also state which level of cognitive thinking is necessary to achieve the intended outcomes. Here, it is important to select the appropriate verb corresponding to the cognitive process involved. Before turning to a more detailed discussion of verb choice, first consider the following schematic as an aid to formulating learning outcomes statements:

**Fig. 1: Schematic—Formulating Learning Outcomes**

1. **Introductory clause indicating what students are able to do**
   - Upon successful completion of this module, students are able ….

2. **Action verb indicating cognitive skill**
   - …to create
   - …to evaluate
   - …to analyze
   - …to apply
   - …to understand
   - …to remember

3. **Description of module content**
   - …basic concepts and processes of modern operating systems.

In addition, these general rules may assist you in formulating learning outcomes statements:

- Ideally, learning outcomes are described in a single sentence. (Write only multiple sentences if it serves the purpose of clarity.)
- Choose simple and unambiguous terms to describe learning outcomes, so that they are understandable for all users, both within and outside the university community.
- Learning outcomes statements should be neither too broad nor too narrow (cf. examples on page 10ff.).
- Limit the number of learning outcomes to the most significant (max. 8) rather than numerous less significant ones.

**Choosing the Right Verbs**

Selecting the appropriate action verbs corresponding to the learner’s cognitive process is key in differentiating among various types of learning outcome. Learning outcomes should be unambiguous, simple and clear, as well as verifiable and measurable. As such, selecting the appropriate verb to describe them is not a trivial matter.
Bloom’s Taxonomy

The educationalist Benjamin Bloom compiled a list of concrete verbs in the form of a taxonomy, wherein each verb corresponds to a particular cognitive level. If, after successful completion of a fundamentals module, for example, students are to be able to understand XY content and recapitulate it within a given context, students in a higher level module will be able to evaluate XY content, thus performing a cognitive transfer of their knowledge.

Anderson und Krathwohl revised Bloom’s taxonomy to serve as a tool in formulating learning outcomes statements and facilitate the writing of module descriptions:

Fig. 2: Anderson and Krathwohl's Taxonomy

<table>
<thead>
<tr>
<th>Deutsch</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. erinnern</td>
<td>1. remembering</td>
</tr>
<tr>
<td>2. verstehen</td>
<td>2. understanding</td>
</tr>
<tr>
<td>3. anwenden</td>
<td>3. applying</td>
</tr>
<tr>
<td>4. analysieren</td>
<td>4. analyzing</td>
</tr>
<tr>
<td>5. bewerten</td>
<td>5. evaluating</td>
</tr>
<tr>
<td>6. entwickeln</td>
<td>6. creating</td>
</tr>
</tbody>
</table>

NB: It is generally understood that each higher stage of cognition subsumes those below it, e.g. “apply” (stage 3) includes “remember” (stage 1) and “understand” (stage 2). Because these verbs correspond to particular cognitive levels, they are also known as keywords.

Fig. 3 provides a table of synonyms for the keywords of the above taxonomy that will help you make fine distinctions between learning outcomes within individual cognitive levels. (They also provide you with options for varying the wording of your descriptions, though the focus should remain on clarity and not stylistic flair.)
### Fig. 3: Keywords and Synonyms

| **Remembering** | recognizing, listing, describing, identifying, retrieving, naming, locating, finding, recalling, defining, marking, showing, referencing |
| **Understanding** | interpreting, exemplifying, summarizing, inferring, paraphrasing, classifying, explaining, comparing, translating, illustrating, arguing, discussing |
| **Applying** | implementing, carrying out, using, executing, demonstrating, solving, discovering, operating, preparing, transferring, predicting |
| **Analyzing** | comparing, organizing, deconstructing, attributing, outlining, structuring, integrating |
| **Evaluating** | checking, hypothesizing, critiquing, experimenting, judging, testing, detecting, monitoring, differentiating |
| **Creating** | designing, constructing, planning, producing, inventing, devising, making, generating |
**NB:** For the sake of clarity, the synonyms listed here appear only once in connection with a specific cognitive domain. They are not, however, exclusive to that domain. In some cases, verbs may be used to describe outcomes in more than one cognitive domain;¹⁰ their propriety, then, should be clear from the context.

**Cognitive Levels and the Progression of Studies**

As a rule, the levels of cognition associated with learning outcomes of sequential modules as a student moves through his or her degree program should become respectively higher, e.g. the learning outcomes of introductory/fundamentals modules equate to “remembering” and “understanding,” while those of modules completed later in the program curriculum equate to “analyzing,” “evaluating” – this progression takes place throughout the student’s studies through to the master’s degree, where students achieve outcomes, such as “creating,” corresponding to advanced stages of cognition.
More Tips for Formulating Learning Outcomes

- Use only one verb per outcome.
- List the outcomes in order of their cognitive level (ascending or descending).

Check list:
- Check for redundancies in your description e.g. have you listed the same content under more than one cognitive level?
- Ensure that the outcomes described can be adequately assessed. Keep in mind, the students' achievement of these outcomes must be measurable.
- Ensure that outcomes of module conform to the intended final outcomes of the degree program.

Sample Formulations of Learning Outcomes

**NB:** The following examples have been taken out of their original context and are provided solely for the purpose of illustration – their wholesale appropriation for other module descriptions will not create the desired results.

**Example 1**

Students acquire detailed and differentiated knowledge of classroom models together with their specifications for mathematics and science didactics, in particular, regarding the central influences on learning in the classroom and student/teacher interaction. Furthermore, they gain knowledge of relevant research designs of classroom research and their theoretical foundation. On the basis of this knowledge, students are able to develop and produce a classroom model in independent project work, to identify a research question and to deduce an appropriate research design, including a work schedule for the investigation of a specific research question.

**Example 2**

Upon completion of the module, students are able to understand and analyze:
- approaches to leadership and management
- intercultural aspects of Asian and European management, so that they are able to make basic comparisons and draw conclusions about the differences between and relationship of Europe and Asia in modern history
- the fundamentals of business administration in Asia and Europe, i.e. they have thorough knowledge of the key criteria for running a successful company in a competitive environment
- the process and importance filing patents, as well as the components of a patent.

Students are also able to search and use existing patents to assist their study, research and work.

Finally, students are able to understand globalization as a future trend, understand and analyze the problems arising in the process of globalization due to cultural, social and economic factors and apply this knowledge situationally.
2. Teaching and Learning Methods

Remember: All elements of the module description, from teaching and learning methods, content and assessment should follow from the intended outcomes of the module as a whole. This section should describe the teaching methods to be employed to achieve the intended outcomes and, correspondingly, the learning methods upon which these methods are based. Here, it is important to discuss the “how” of instruction. Consider carefully which pedagogical approaches are best suited to achieving the intended outcomes.

Example: If, after successful completion of the module, students are to be able to conduct experiments independently, lecturing alone is not an adequate teaching method for this module. Instead, a combination of methods, such as seminars, exercises, practica, tutorials, etc. would be better suited to achieving the intended outcomes by providing students guided, hands-on experience through which to acquire laboratory skills.

In practice, this means:

You should select the teaching and learning methods best suited to achieving the module’s intended learning outcomes.

The Interplay of Types of Instruction with Teaching and Learning Methods

Ideally, different methods of teaching will be employed for various types of courses (i.e. lecture, seminar, tutorial, laboratory or practical course). For a seminar, for example, you may decide that “active learning” techniques, such as “Just-in-Time Teaching (JiTT),” are best suited to achieving your outcomes. Learning methods indicate the various activities students will perform in (logical) connection with the type(s) of instruction and teaching method(s) chosen for the module. For example, students may be required to perform research of reference materials, to define a problem and develop a solution, to practice their technical/laboratory skills, to prepare and hold a presentation, etc.

For more information on teaching and learning methods in higher education, please refer to the bibliography at the end of this document or visit the ProLehre homepage for a list of courses and services designed to enhance your teaching skills.

Types of instruction, teaching and learning methods can be variously combined – the key is to keep students at the center of your decision-making.

Selecting the Appropriate Type of Instruction and Teaching Methods

The chart below (fig. 4) may help to answer the question, “Which type of instruction and teaching methods are best suited for achieving the intended learning outcomes of this module?” The chart cross-references the type of instruction with potential pedagogical methods, suggesting, in turn, the advantages and disadvantages of particular types of instruction for the outcomes of your module.
Learning is an active process. As such, the next logical step is to ask, “Which learning activities are suited for my choice of teaching method and will enable students to acquire the intended outcomes?” The table below (fig. 5) cross-references various learning activities and teaching methods to provide a useful overview of possibilities.
### Fig. 5: Teaching Methods and Learning Activities

| Learning activities | Lecture | Presentation | Individual work | Group work | Blended learning | Experiment | Case study | Peer instruction | JiTT | ...
|---------------------|---------|--------------|------------------|-----------|-----------------|------------|------------|------------------|------|---
| research reference materials | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| study of specialist literature | ✓ | ✓ | ✓ | ✓ | ✓ | |
| complete exercises | ✓ | ✓ | ✓ | | | ✓ |
| summarize documents | ✓ | ✓ | ✓ | | | |
| define and solve problems | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| practice laboratory skills | ✓ | ✓ | | | | |
| collaborative work | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| create reports, homework, etc. | ✓ | ✓ | ✓ | ✓ | | |
| rote learning | ✓ | ✓ | ✓ | ✓ | | |
| prepare and hold presentations | ✓ | ✓ | | | | |
| constructive critique of their own work | ✓ | ✓ | ✓ | | | |
| constructive critique of others’ work | ✓ | ✓ | ✓ | | | |
| revision on basis of critique | ✓ | ✓ | ✓ | ✓ | | |
| work under time constraints | ✓ | ✓ | | ✓ | ✓ | |
| ... | | | | | | |
Final Check:
We recommend you take time to ensure that your chosen type of instruction and teaching methods will enable students to achieve the intended learning outcomes of the module.

The module description should explain your choice of teaching methods from a student-centered perspective.
3. Content

The **discipline-specific, methodological and extra-disciplinary content** of the module should be described as clearly and in as much detail as possible. Experience has shown that listing 10 – 12 items generally provides a sufficient amount of detail for the module description. These may take the form of a bullet list.

As a rule, the volume of module content should be gauged by what a student can realistically achieve in the time allotted for the module (duration in semesters).

**Please note:** The relationship between content and learning outcomes can be problematic. The tendency is to become “teacher” rather than “student” centered, i.e. that you begin to think in terms of “teaching objectives” rather than “learning outcomes.” To help avoid this pitfall, we recommend that you draft your module description in the order presented on page 6 – beginning with learning outcomes, followed by teaching and learning methods, content, and ending with assessment. Formulating learning outcomes in advance of describing module content will help you maintain the proper student-centered focus of learning outcomes and avoid repeating content descriptions as pseudo-outcomes.

4. Assessment – Coursework and Examination Requirements

**Coursework** is assessed as “pass” or “fail.” **Examinations** are graded (cf. APSO (English version) § 6 Para. 7).

In addition to information on the type and duration of examination and opportunities for repeat examination, the **description of coursework and examination requirements** for the purpose of assessment forms a central element of the module description, as a whole. Learning outcomes and the assessment of students’ achievement thereof represent the bookends of the module as a self-contained unit of study. **It is learning outcomes that are to be assessed.**

> “Examinations serve to assess the degree to which students have achieved the qualification objectives specified for the module. They are related to the competencies to be acquired upon successful completion of the module.” 11

The General Academic and Examination Regulations for bachelor’s and master’s programs of the Technische Universität München (APSO), together with the program-specific regulations (FPSO), serve as the legal framework of student assessment.

The following questions may serve as a guide to completing the assessment section of the module description:

- How will I assess students’ achievement of learning outcomes?
- Why have I chosen this method of assessment?
- Will I allow students to use learning aids (notes, reference material, etc.) during the examination?
- What other information might students require about the scope of coursework and examination requirements?
- How will I calculate final grades (weighting)?
Sample Formulations of Coursework and Examination Requirements:

Example 1

Students must submit 6 lab reports. The students demonstrate with the reports that they have gained deeper knowledge of the specific lab equipment and its components, of measurement methods incl. chemical measurements and can use analytical tools, methods and programs to optimize processes, simulate activities in order to solve different problems in power plants. They show that they are able to solve extensive measurement tasks, know norms to be considered and how to evaluate results, to interprete different components, to analyze data with the aid of the equipment. Students know how to document this knowledge in reports by using literature and with more time at their disposal.

In the written examination students demonstrate by answering questions under time pressure and without helping material the theoretical knowledge of components, processes and power plants as well as of the parameters and that can evaluate the effects of parameter changes on different processes.

The final grade is an averaged grade from the written examination (40 %) and from the lab reports (10 % each / overall 60 %).

Example 2

The examination consists of a presentation of contents and results of a project in a 10 minute oral report, including subsequent discussion (30%), preparation of a written report containing the content and results of the project (40%), regular discussions with the assigned tutor (research assistant) about the progression of the project and next steps (30%). The presentation is a means to measure the student’s ability to understand a technical/scientific subject, to analyze and evaluate facts and factors of influence, to summarize the subject and present it to an audience, and to conduct a discussion about the presented subject. Written summaries measure the student’s ability to summarize the major facts and the conclusion of a presentation in a clear and concise manner, both in a short abstract (150 words) and in a one-page executive summary. Regular discussions with the tutor measure the student’s ability to develop an idea from initial concepts to the complete picture within a given timeframe, delivering interim results at relevant milestones.
Competence-Oriented Assessment

A key focus of the Bologna Process is the shift in orientation of education to outcomes. Assessment in the form of coursework and examinations plays an important role, here, but not as a means of testing students’ ability to merely internalize module content.

Competence-oriented assessment measures the student’s attainment of clearly-defined disciplinary and extradisciplinary learning outcomes at the level appropriate to the module and degree program. This is only possible when both the content and method of assessment are “aligned” with the learning outcomes of the module.

Constructive Alignment

The “alignment” of teaching, learning and assessment is referred to in English-language education theory as constructive alignment:

Assessment Methods

Under the rubric “Type of Assessment” in TUMonline, you may currently choose between “written” and/or “oral” examination – a simplification that stands for a variety of possible forms of assessment (cf. sample FPSO (English version) § 41).

Forms of written examination include:

- Essay exam
- Multiple choice (also in combination with essay exam)
- Seminar paper
- Term paper
- Portfolio
- Project report
- …
Forms of oral examination:
• One-on-one interview
• Oral report
• Presentation
• …

There are also other forms of examination, e.g. **practical examinations**, such as the **parcours exam** at the TUM School of Medicine, for which students rotate from one station to the next in standardized simulations of treatment situations to demonstrate their practical skills in treating patients. Parcours exams are currently on trial in other TUM schools and departments.

**Using Examinations to Guide the Teaching Process**

As with teaching and learning methods, there are advantages and disadvantages to each of the various types of examination. While oral examinations, for example, allow you to form a more complete picture of individual students and to respond to the dynamics of the individual exam situation, written examinations allow for the assessment of large numbers of students at the same time, in a short amount of time, under the same conditions. Because student learning behavior is shaped largely by the examination, your choice of both the form and content of the examination warrants careful consideration.

**Tip:** Think of possible learning activities that will help prepare students for the type of examination you have chosen. If, for example, the intended learning outcomes of your module correspond to an advanced cognitive level, select activities that will foster those advanced skills and abilities as they move through the module, leading up to the exam.

Explain your choice of examination method under the “Coursework and Examination Requirements” rubric of the module description.

**5. Plausibility Check**

You have now completed a draft of all four cornerstones of the module description, as outlined on page 6 of this guide. Take time before entering your description into TUMonline to review the plausibility and coherence of your module and its components by answering the following questions. If you can respond with a confident “yes” to each of them, you have fulfilled the criteria for module description at TUM:

- Have you formulated the intended learning outcomes of the module using key words from the taxonomy of cognitive levels?
- Have you selected the teaching and learning methods best suited to achieving these outcomes and provided reasons for the propriety of your choices?
- Have you carefully considered the different characteristics of various methods of assessment, selected those most appropriate for measuring the intended learning outcomes of your module, and ensured that your chosen method of assessment complies with the stipulations of the General (and program-specific) Academic and Examination Regulations? Have you provided reasons for the propriety of your choices?
Now you can test the plausibility of your module description by modifying your starting point. This time, begin with your description of module content and proceed to teaching and learning methods, learning outcomes, and, finally, assessment:

Content → Teaching/Learning methods → Learning outcomes → Assessment

If all four steps are coherently related, i.e. derive logically from one another, you have completed the core of your module description. You need only supplement the general module information and enter your description in TUMonline.
IV. Module Description in TUMonline

The input mask for module descriptions in TUMonline is divided into 8 thematic blocks. Below, you will find a brief description of each field in the mask and suggestions for completing them.

You may enter information only into fields bearing this symbol .

Fields without this symbol  are generated in the module catalog template and automatically displayed in the module description mask.

For the purpose of clarity, the following table initially includes an overview of the fields in the mask “Modulbeschreibung – Detailansicht”.

**Module Details**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>The module title must be input in both German and English (tab: Deutsch/Englisch). The English-language designation is required for the Transcript of Records.</td>
</tr>
<tr>
<td>Organization</td>
<td>Name of TUM school or department</td>
</tr>
<tr>
<td>Organization ID</td>
<td>ID of TUM school or department</td>
</tr>
<tr>
<td>Comment</td>
<td>Technical information, generated automatically.</td>
</tr>
<tr>
<td>Internal comment</td>
<td>Technical information, generated automatically.</td>
</tr>
<tr>
<td>Credits</td>
<td>Student workload expressed as ECTS Credits.</td>
</tr>
<tr>
<td>Weighting factor</td>
<td>Factor by which the module grade will be weighted in the graduation documents. The value input here may also be expressed in decimals, e.g. 1,25 [comma is German usage].</td>
</tr>
<tr>
<td>Duration [Acc. to SPO version]</td>
<td>Duration of module according to valid academic and examination regulations.</td>
</tr>
<tr>
<td>Module ID</td>
<td>Module IDs are assigned according to a university-wide standardized system.</td>
</tr>
<tr>
<td>Version (abbreviation)</td>
<td>If multiple versions of the module exist, the particular version in question will be indicated with an abbreviation.</td>
</tr>
<tr>
<td>External allocation</td>
<td>Technical information, generated automatically.</td>
</tr>
<tr>
<td>Valid from/until</td>
<td>This information is only necessary if it is known that the validity of the module is limited OR if you create a new version of the module description.</td>
</tr>
</tbody>
</table>

*(Allocations to SPO Versions)*

This information is related to the use (export) of the module in other degree programs and is generated automatically by TUMonline.
Courses and Exams

| Exam node | This information (green flag icon) is generated automatically by the module catalog template. It lists all module examinations in the academic year. |
| Offer node | This information (red flag icon) is generated automatically by the module catalog template. It lists all course components of the module. |

Descriptions

Click on this icon to open the input mask “Knotenbeschreibung – Bearbeitung”.

The tab “13W”, for example, indicates the semester in which the module description is valid, in this case, winter semester 2013. If there are multiple versions of the same module description, there will be multiple tabs with different version abbreviations. Should you wish to create a new version of the module description, you may do so by clicking on the + tab. In this case, you must enter a new “valid from” date in the “module details” mask (see above).

General

Export | Print as HTML document

General Information (Module Catalog)

| Module Level | Module level indicates the type of degree program to which the module belongs (bachelor’s, master’s). Each module is generally assigned to either a bachelor’s or master’s program. If, as an exception, a bachelor’s module is offered within the scope of a master’s degree program, justification is to be provided. “The use of bachelor’s modules in master’s degree programs is permissible in certain cases, if the partial qualifications to be acquired upon successful completion of the module adequately fulfill the requirements for the overall qualification goals of the master’s program. (…) It is the responsibility of the institution of higher education to ensure that no individual student is able to count the same module or a module with largely identical content toward both a bachelor’s and a master’s program.”

The use of master’s modules within the scope of bachelor’s programs (e.g. in electives areas from the 5th semester and beyond) is unproblematic, as a rule, and is permitted without further justification. |
| Abbreviation (DE/EN) | Note the abbreviation of the module, where applicable. |
| Subtitle | If applicable, enter the module subtitle. |
**Duration**

How many semesters are required to complete the module? Choose from the following: one semester, two semesters, multiple semesters.

“The volume of module content should be limited to what is achievable in one to two semesters. In exceptional cases where a rationale is provided, a module may extend over several semesters.”

In keeping with its principle of continuous assessment during the course of study, the Bologna system provides for modules of one to two semesters in duration. Modules may extend over several semesters, however, if the rationale for this longer period is adequately explained, in particular, with regard to student mobility. Your reasoning for modules of longer duration is to be formally presented in the “Sequence” section of the degree program documentation.

---

**Frequency**

This field indicates the semester in which the module is offered. Choose from the following:

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter semester</td>
<td>The module... is offered regularly in the winter semester.</td>
</tr>
<tr>
<td>(WS)</td>
<td></td>
</tr>
<tr>
<td>Summer semester</td>
<td>The module... is offered regularly in the summer semester.</td>
</tr>
<tr>
<td>(SoSe)</td>
<td></td>
</tr>
<tr>
<td>Winter/ Summer</td>
<td>The module... is offered regularly in both the winter and summer semesters.</td>
</tr>
<tr>
<td>semester</td>
<td></td>
</tr>
<tr>
<td>(WS/SoSe)</td>
<td></td>
</tr>
<tr>
<td>Irregularly</td>
<td>The module... is offered based on demand.</td>
</tr>
</tbody>
</table>

**Language**

What is the language of instruction for this module? Choose from the following:

<table>
<thead>
<tr>
<th>Language</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>German</td>
<td>The module... is taught in German.</td>
</tr>
<tr>
<td>English</td>
<td>The module... is taught in English.</td>
</tr>
<tr>
<td>German/English</td>
<td>The module... is taught in both German and English.</td>
</tr>
<tr>
<td>Other languages</td>
<td>The module... is taught in a language other than German or English.</td>
</tr>
</tbody>
</table>
Workload

Credits or ECTS points are awarded within the scope of bachelor’s and master’s programs in accordance with the European Credit Transfer System (ECTS). Credits provide information about the student workload associated with the module and the achievement of learning outcomes. Work load consists of a combination of contact hours and self-study hours.

<table>
<thead>
<tr>
<th>Total hours</th>
<th>Represents the total student workload expressed in the number of hours required to complete module requirements.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Hours</td>
<td>Classroom time of the module courses.</td>
</tr>
<tr>
<td>Self-Study Hours</td>
<td>Preparation and review time for courses, self-study, independent project work, exam preparation, theses, etc.</td>
</tr>
</tbody>
</table>

Calculation of total student workload:

**Contact Hours:** Classroom presence in module courses
(1 weekly hour per semester (SWS) is equivalent to 15 contact hours per semester)

**Self-Study Hours:** Preparation and review time for courses, self-study, independent project work, exam preparation, theses, etc.

= **Total Hours**

Total hours are expressed as credits

(30h ≈ 1 CP)
Sample Calculations of Contact and Self-Study Hours and Credits

Module A consists of a lecture equal to 2 SWS, an exercise equal to 1 SWS and a practicum equal to 3 SWS.

Contact Hours:
Contact hours at TUM are calculated on the following basis:
A course of 1 SWS or 45 mins. is equal to a full hour of work time, i.e. 60 mins. Each semester is attributed 15 course meetings (regardless of the actual duration of the semester).
So that:
(2 SWS lecture + 1 SWS exercise + 3 SWS practicum) x 15 meetings per semester \(\triangleq 90h\)

Self-Study Hours:
Preparation and review of lecture: 25h
Preparation and review of practicum: 30h
Completion of homework (ca. 3h per week): 45h
Preparation for exam (ca. 3-4 weeks): 50h
Total 150h

Total Hours:
Contact (90h) + Self-Study (150h) = 240h

Credits:
1 Credit \(\triangleq 30\) hours of work time \(\Rightarrow 240h/30\)
8 Credits are awarded for the module.

A guide to calculating workload [currently only in German] is available under “workload” at http://www.lehren.tum.de/downloads/.

Study and Examination Performance

<table>
<thead>
<tr>
<th>Description of Achievement and Assessment Methods</th>
<th>See detailed description on page 16 of this manual.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Assessment</td>
<td>In TUMonline, you may currently choose from among the following options: immanent exam type, oral, oral and project work, project work, written, written and oral, written or oral, written and project work.</td>
</tr>
<tr>
<td>Duration of Assessment (in minutes)</td>
<td>Time in minutes.</td>
</tr>
<tr>
<td>Homework</td>
<td>Do not enter any information into these fields.</td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>Term paper</td>
<td></td>
</tr>
<tr>
<td>Oral presentation</td>
<td></td>
</tr>
<tr>
<td>Conversation</td>
<td></td>
</tr>
<tr>
<td>Exam retake next semester</td>
<td>When may students repeat an examination? Choose from the following options:</td>
</tr>
<tr>
<td></td>
<td>- Repeat examination in following semester.</td>
</tr>
<tr>
<td></td>
<td>- Repeat examination at end of current semester.</td>
</tr>
<tr>
<td>Exam retake at the end of the semester</td>
<td>To ensure student flexibility in their studies, the APSO and FPSO specify that students must have at least one opportunity for repeat examination.</td>
</tr>
</tbody>
</table>

### Description

| Prerequisites (Recommended) | Level of knowledge, skills, abilities, and competencies considered necessary for the successful completion of this module. It is preferable to name a specific module, here, if possible. If there is no specific module whose outcomes can be named as prerequisites, you may list specific knowledge, skills, and competencies (also in combination with a particular module). You should be as concrete as possible in listing prerequisites, i.e. provide particular module numbers and specific competencies.  
Example 1: Module IN0001: Introduction to Informatics 1  
Example 2: Fundamentals of power engineering taught in the first semester.  
Example 3: Knowledge of software in R/Splus  
Example 4: none |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Intended Learning Outcomes</td>
<td>See detailed description beginning on page 6 of this manual.</td>
</tr>
<tr>
<td>Content</td>
<td>See detailed description on page 16 of this manual.</td>
</tr>
<tr>
<td>Teaching/Learning Methods</td>
<td>See detailed description beginning on page 13 of this manual.</td>
</tr>
<tr>
<td>Media</td>
<td>Media, teaching material, and forms of presentation employed in module courses, e.g. reader, scripts, overheads, blog, whiteboard, exercise sheets, exercise portfolio, flipchart, PowerPoint, films, etc.</td>
</tr>
<tr>
<td>Reading List</td>
<td>Bibliography of specialist texts students may use for preparation and review work. Works should be listed in standard bibliographic format so that students can readily locate them.</td>
</tr>
</tbody>
</table>
**Organizational Information** *(no section title in TUMonline)*

The information to be entered here regarding instructor, courses and degree program allocation serves to facilitate planning and organization. The actual **set up of the degree program** in the campus management system (e.g. the integration of modules into a degree program description and linking of courses and examinations to individual modules) is done in TUMonline’s **SPO-Management** and is not normally the responsibility of the module coordinator. (Once the respective links have been established in TUMonline, the system generates and displays this information automatically). Information relevant to daily operations in the current semester, such as different instructors for modules taught in rotation, should be entered, as usual, in the **Course Administration** mask in TUMonline.

<table>
<thead>
<tr>
<th>Module responsible</th>
<th>First name, last name, and email address of module coordinator.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecturer</td>
<td>First name, last name, and email address of the instructor. For modules taught in rotation by more than one instructor, the relevant instructor is to be named before the start of the semester.</td>
</tr>
</tbody>
</table>
| Courses            | You must provide the following information for each course of the module:  
|                    | Type of course: Lecture, exercise, seminar, or practicum, etc.  
|                    | Title: course title  
|                    | Weekly hours: number of hours per week per semester |
| Planned allocation to courses of studies | Please list all degree programs in which the module is offered as either a required or required elective module. |
| Metadata           | Status: e.g. approved  
|                    | Visibility: e.g. published  
|                    | Date processed |
V. Appendix

Contact

Have you got questions about writing or modifying a module description? We are glad to help!

Academic and Student Affairs Office
Arcisstr. 19, 80333 Munich
Fax: +49.89.289.25209
www.tum.de/studium-und-lehre

Our team:

| AR, BGU, MA | Kathrin Bach | 089.289.25412 | bach@zv.tum.de |
| IN, ME, SG, WI, WZW | Rudolf Bauer | 089.289.25210 | bauer@tum.de |
| MCTS, MSE, MW | Claudia Meijering | 089.289.25330 | meijering@zv.tum.de |
| IN, Weiterbild. Studiengänge | Adriana Tomanova | 089.289.25474 | tomanova@zv.tum.de |
| CH, EDU, EI, PH | Richard Wolf | 089.289.25447 | wolf@zv.tum.de |

Contact for the Campus Management Team (TUMonline):
Irena Zapryanova | 089.289.25518 | zapryanova@tum.de

Works Cited


2: KMK: „Ländergemeinsame Strukturvorgaben für die Akkreditierung von Bachelor- und Masterstudiengängen“, Fassung vom 04.02.2010, Appendix p. 3 (our translation).


7: Benjamin Samuel Bloom (1913-1999), PhD in Education, taught and researched at the University of Chicago, USA.


10: E.g. The verb “modify” can be used at the third cognitive level to describe the use of a mathematical formula and, in a different context, to describe the highly complex further development of a formula in the sixth cognitive level.


Further Reading

- Wegweiser zur Berechnung des studentischen Arbeitsaufwands, Handreichung des HRSL.
- Wegweiser Studiengangsdokumentation, Handreichung des HRSL.
- „Grundprinzipien und Erfolgsfaktoren guter Lehre“, Handreichung von ProLehre.
- „Constructive Alignment – Lernergebnisse, Lehrmethoden und Prüfungsformen optimal aufeinander abstimmen“, Handreichung von ProLehre.

Links

http://www.akkreditierungsrat.de/index.php?id=beschluesse&L=1robots.txt
http://www.lehren.tum.de/downloads/
http://www.lehren.tum.de/themen/lehre-gestalten-didaktik/erfolgsfaktoren-guter-lehre/constructive-alignment/