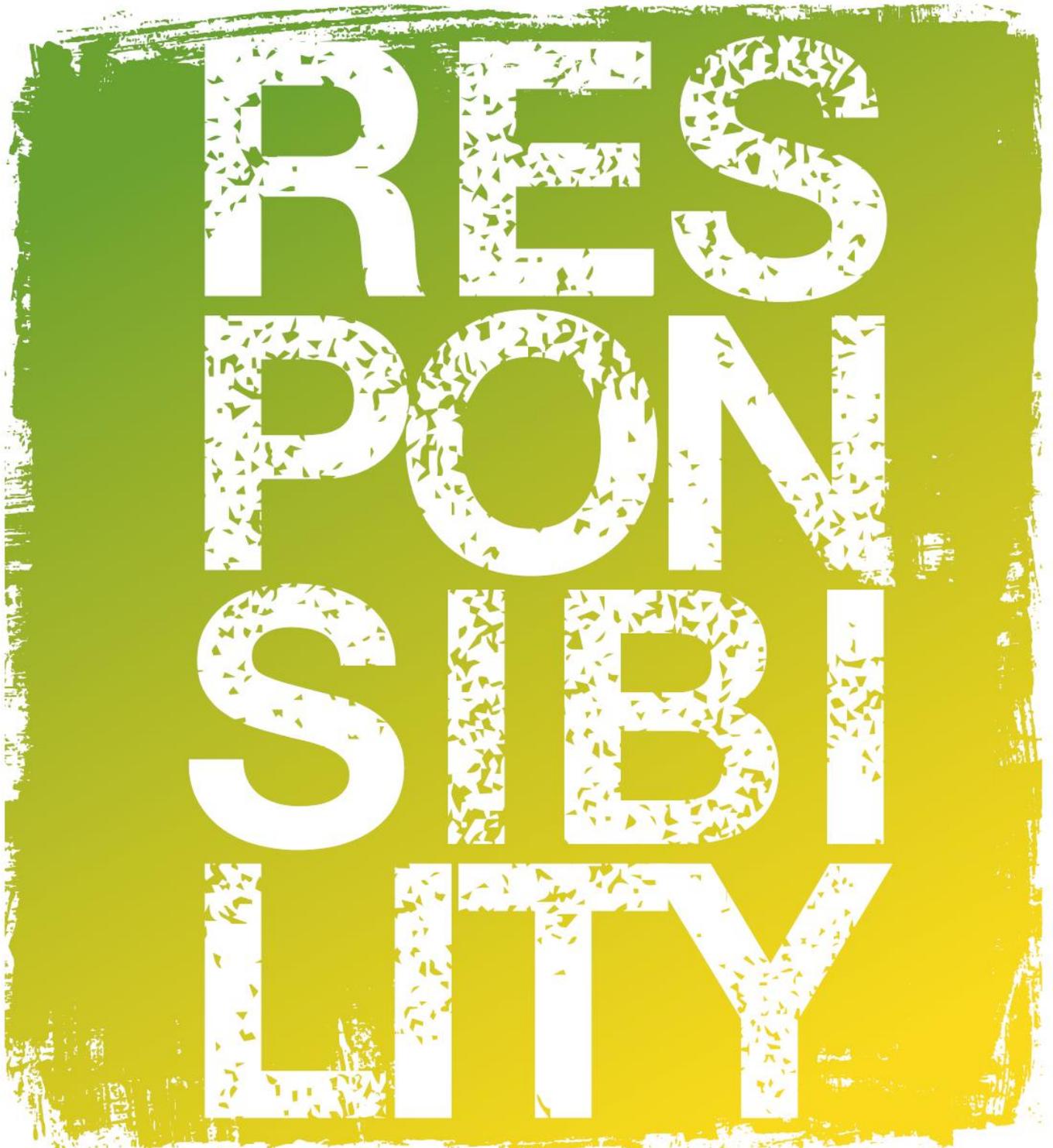


# Program Guide 2019 – 2020

Master of Arts

## Responsibility in Science, Engineering and Technology

M.A. RESET



[www.mcts.tum.de/reset](http://www.mcts.tum.de/reset)

This program guide is intended to provide students and prospective students with a general overview of the RESET Master's program. It does not replace any official university regulations and can always be subject to change.

August 2019

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TUM Fotostelle / TU Munich

# Introduction

## Welcome Message from Prof. Dr. Sabine Maasen

### **Dear students and prospective students,**

Thank you for your interest in the “Responsibility in Science, Engineering and Technology” (RESET) Master’s program offered by the Munich Center for Technology in Society (MCTS). Responsibility is a vital issue for contemporary highly technologized societies. The environmental sustainability of novel materials and means of energy production, questions of accountability related to autonomous vehicles and the impact of digitization and the Internet on democracy are just a few examples that illustrate a growing need to address questions of Responsible Research and Innovation as well as Corporate Responsibility.



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This program teaches you how to communicate between disciplinary and institutional boundaries and address societal responsibilities of the technosciences. Its innovative curriculum and renowned faculty convey the knowledge and tools necessary to understand and anticipate the consequences of established and emerging technologies. You are prepared for the task of ‘engineering’ responsibility in terms of forms and formats in which we can negotiate, accept and distribute responsibility for various kinds of technological challenges.

RESET’s innovative and interdisciplinary course structure and its focus on both social and technological aspects of responsibility reflect the mission and approach of the MCTS. Students from the humanities, social and life sciences, economics and STEM fields come together in an international and diverse academic environment. In line with the center’s guiding principles—empirical, interdisciplinary, reflexive and dialogic—you engage closely both with cutting-edge theoretical research and relevant technological practice.

This guide contains a detailed overview of the RESET Master’s program. It provides various resources you can benefit from as a RESET student and gives you several tips to help you get the most out of your time studying at TU Munich. We would like your studies here at the MCTS to be an inspirational and all-round valuable experience, and we are always open to new ideas and suggestions.

I look forward to welcoming you to the program.

Sincerely,

Prof. Dr. Sabine Maasen  
Director of the MCTS

# Why Study RESET?

## Responsibility in Science, Engineering and Technology

Science and technology are arguably among the most powerful forces of change in contemporary societies. Traditionally, their practice and governance has been entrusted to a small group of experts: scientists in research facilities and laboratories, engineers and product designers in industry, and regulators in government agencies. By and large, the general public has remained at the receiving end of scientific and technological change — those who have to live with the social, cultural, environmental and health-related consequences have rarely been directly involved in the development and regulation of science and technology.

In the past two decades, this situation has started to change. There is a growing awareness of the political, social and ethical issues inherent to science, engineering and technology. Increasingly, science and technology are becoming subject to open, deliberative processes that benefit from public input and engagement, democratic accountability and participatory processes. Responsibility has become a key concern in these discussions — as is reflected, for example, by the frameworks of Responsible Research and Innovation and Corporate Social Responsibility.

The RESET Master's program provides a graduate-level, multi-disciplinary introduction to the concept and practice of responsibility in science, engineering and technology.



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Some of the central questions the program addresses are:

- What do we mean by “responsibility” in the context of science and technology?
- Who needs to be involved and which forms of knowledge production are necessary for the development of responsible decision-making practices?
- What social challenges do emerging technologies create?
- How do notions of responsibility differ across cultural and policy contexts?
- How can we collectively govern and shape science and technology to further social goals?
- How can we democratize the governance of science and technology?

# Student Perspectives

## **Chinmayee Pai**

Bachelor in Electronics and Telecommunications

*» I chose to do the RESET program because I want to make positive contributions to society and the environment through a well-rounded education. «*



## **Fabian Kuntz**

Bachelor in Service Engineering

*» I chose the RESET program because I want to discuss emerging technologies. «*

## **Susanne Hirschmann**

Bachelor in Energy, Building Services and Environmental Engineering

*» What I like about the program is that I can combine my technical background with my interest in participative processes and social sciences. «*



## **Julia Renninger**

B.A. International Relations and Management

*» It's great that we can engage closely with professors, postdocs and PhD students at the MCTS and learn early on about research and job opportunities within the field. «*



## **Philipp Hulm**

M.Sc. in Electrical and Computer Engineering

*» I chose the RESET program because the societal dimension of engineering has always been the main motivation for my previous subject-related studies. This program is a personal 'reset' for me towards a holistic and socially responsible engineering education. «*

## **Program Director, M.A. RESET**

### **Prof. Dr. Sebastian Pfotenhauer**

Professor of Innovation Research  
Innovation, Society & Public Policy Group

*» Questions of responsibility are increasingly at the forefront of science and innovation - from gene editing and cryptocurrencies to autonomous vehicles and sustainability transitions. These responsibility challenges require new interdisciplinary perspectives and a new generation of professionals to tackle complex problems. RESET gives highly talented students from around the globe the opportunity to turn their passion for creating a better world through science and technology into a career. «*



# Goals of the Program



RESET offers a professionally and practice-oriented graduate education for students interested in both the technical and social aspects of responsibility in today's highly technologized societies. High-performing students from STEM fields, social and life sciences, psychology and the humanities come together in a highly international and interdisciplinary environment.

The program is intended to convey the knowledge, methods and analytical tools necessary for understanding and responding to the unique challenges resulting from the increasing interconnectedness of science, technology, society, politics and economics.

RESET combines rigorous training in science and technology studies (STS) with project-based immersion in engineering, science, citizen engagement and policy-making.

Photos © Astrid Eckert

Some of RESET's special features are:

- **Responsibility and responsiveness:** A distinctive focus on the socio-technological dynamics and effects of innovation and research. In particular, graduates are able to identify and critically discuss social, economic, political, cultural and legal aspects of science and technology.
- **An immersive and practice-oriented education:** An innovative term structure and hands-on immersive learning based on case studies, projects and an internship foster new forms of collaboration across institutions and disciplines.
- **Intensive academic support:** Students profit from small course sizes, intense discussions and the guidance of RESET's teaching staff. Furthermore, RESET students benefit from the support of the Elite Network of Bavaria.
- **International competitiveness:** The curriculum is completely in English. Students are able to acquire expert knowledge at the cutting edge of international technoscience research as well as extensive communication and project management skills.



## Academic Profile and Career Perspectives

Students acquire broad and in-depth knowledge of theories, methods and techniques from science and technology studies (STS), public policy, innovation studies, economics, law, media studies and ethics. The curriculum encompasses training in STEM-related fields from an STS perspective and is complemented with communications and project management courses. In immersive projects and an internship, students gain experience in applying their acquired knowledge to practical and real-world problems, thus learning how to address the challenges of responsible science and technology and laying foundations for their future careers.

Graduates of the program will be qualified internationally for a wide range of career fields, including governmental institutions, international organizations, innovative firms (both established companies and start-ups), NGOs, think tanks, consulting and academia. The degree qualifies graduates to pursue further research on a doctoral level. RESET graduates will be able to critically contribute to scholarship, decision-making and communication concerning emerging sociotechnical fields such as sustainable energy solutions, industrial biotechnology, biomedical health care, the Internet of Things, Big Data and urban infrastructure.



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# Overview of the Program

## Curriculum

RESET is a two-year full-time study program that starts in the winter semester (October). Students are required to complete a total of 120 ECTS credits in order to graduate. The RESET curriculum is based on mandatory and elective modules (90 credits) and a Master's thesis (30 credits). The language of instruction is English.

Introduction	Immersion Project	Technology and Society					Immersion Project	10	Sem 1
		Ethics	Politics	Economics	Law	Media			
		Methods in STS					5		
		Skills Courses (e.g. English Writing, Moderation)						3	
		STEM 1 & 2 with Intensive Mentoring						12	Sem 2
		STS Core Topics 1-3						15	
		Skills Courses (e.g. Project Management, Statistics)						3	
		Master's Blog					Science School	7	Sem 3
		Internship							
		Practicing Research in STS						6	
		Master's Thesis Colloquium						30	Sem 4

**The first term** is dedicated to introducing students to social, economic, political, ethical, media and legal aspects of innovation, controversies and responsibility in science and technology. This is facilitated by an innovative term structure, immersive projects, and by hands-on training in STS research methods.

**The second term** provides in-depth introductions to STEM fields, complemented by three elective specialization lectures and seminars in key STS fields.

**The third term** primarily serves to gain practical experience through an internship and a research project. Students also publish a blog and organize an interdisciplinary science workshop.

**The fourth term** is reserved for the Master's thesis, through which students learn how to carry out research that is highly relevant to stakeholders in academia, industry, government and NGOs.

# Modules

## 1st Semester

At the beginning of the semester, students are familiarized with the requirements, expectations and logistics of the RESET program and form small teams to prepare for the immersion projects.

### **Immersion Project (10 ECTS)**

In these projects, students work on a limited-scope problem at the intersection of responsible research and innovation with partners from the policy, non-profit and private sectors. This initial hands-on immersive experience combines first exposure to social science research practice with a project-based approach.

The module consists of three phases:

“Immersion Phase”: Students start working on their projects under the guidance of their project mentors and present first results.

“Revision Phase”: As they gain theoretical knowledge in the “Technology and Society” module, students continually revise and refine their immersion project. They discuss how political, economic, ethical, media-related and legal dimensions of responsibility relate to their respective immersion projects. Based on these reflections, they write short essays after each week of the revision phase.

“Return Phase”: Students return to their immersion projects and synthesize their problem analysis and empirical findings with knowledge acquired in the theoretical modules."

### **Technology and Society (12 ECTS)**

In this module, students receive intensive introductions (two-week courses) to ethics, politics, economics, law and media, with continual reference to the immersion projects. The module is a multi-disciplinary introduction to the concepts and practices of responsible innovation. Cases encountered in class draw on topics such as genetically modified organisms (GMO), climate change, geo-engineering, nuclear power, environmental policy, nanotechnology and chemical hazards. Students are encouraged to take and defend a normative position on the questions and cases they encounter during the class.

### **Methods in STS (5 ECTS)**

This module gives students an insight into social-scientific methods relevant to STS, for example qualitative videography, discourse analysis, mapping of controversies and interviews. They also learn about philosophy as well as critical methods from a techno-historical perspective.

## 2nd Semester

### **STEM module with intensive mentoring (12 ECTS)**

In this module, students elect courses in science, technology, engineering or mathematics as well as STS tutorials. In these tutorials, students reflect on the attended STEM lectures in light of their STS knowledge and write a report. The aim is a theoretically informed and methodologically controlled analysis of specific disciplinary practices.

### **STS Core Topics (3 x 5 ECTS)**

In these courses, students receive broad basic knowledge of STS subjects. Students elect three key subjects from the following list of fields, which are mostly taught in collaboration with the Master's program "Science and Technology Studies".

- Biomedicine & Health
- Epistemology & Ontology
- Risk & Security
- Responsibility & Ethics
- Gender & Diversity
- Industries & Innovation
- Infrastructures & Design
- Media & Digital Cultures
- Nature Cultures & Sustainability
- Politics & Governance
- Publics & Participation
- Co-construction of Technology & Users
- Knowledge Cultures & Institutions
- Responsible Research & Innovation

## 3rd Semester

### **Internship (17 ECTS)**

Students complete an internship of at least eight weeks, either at a company or an STS-related institution. They are prepared for the internship and receive support in virtual meetings with their peers and mentor. After the internship, students write a report and reflect on their experience from an STS perspective, particularly with regard to questions of responsibility.

## Master's Blog & Science School (7 ECTS)

In this module, students are introduced to scientific blogging and organize an interdisciplinary workshop, at which they give a presentation. They write and publish a blog post about a topic related to their chosen field of practice with a specific view on issues of responsibility. In the process, students improve their writing skills for the general public and work on finding their “own voice”. Furthermore, they learn how to give and receive constructive peer feedback. The Science School part of the module allows students to present their work to an audience of experts and to gain experience in organizing a science event.

## Practicing Research in STS (6 ECTS)

This seminar trains students to design a research project. The project is closely mentored by teaching staff and continually discussed in the seminar. The aim is to enable students to hypothesize about research questions, apply analytical methods to empirical cases from an STS perspective, to test assumptions by creating an appropriate research design and to finally present their results.



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## 4th Semester

### **Master's Thesis (30 ECTS)**

In the fourth semester, students write a Master's thesis related to aspects of responsibility in today's highly technologized society. The module includes a Master's colloquium, which allows students to give three presentations of the current state of their thesis and obtain constructive feedback from peers and researchers.

### **Additional Mandatory Elective Skills Courses (2 x 3 Credits)**

During the course of their studies, students elect a total of two mandatory elective courses, for example:

- “Moderation” familiarizes students with moderation strategies for given contexts and teaches them to structure controversial discussions on issues of responsibility.
- “Statistics” introduces students to the basics of statistics and presents them with various problems and perspectives regarding the use of statistics.
- “English Writing for Social Scientists” conveys the principles of academic writing, text formats and citation styles as well as writing strategies for a social science context.
- “International Project Management” familiarizes students with project management tools and strategies with a special focus on the challenges of international collaboration and issues of responsibility.
- “Intercultural Communication” provides students with insights into how people from different cultural and disciplinary backgrounds interact with one other and what influences their communication. Students learn to analyze these factors, to develop greater awareness for their own and other communication styles and acquire strategies to improve their communication skills.

## Going Abroad

There are several opportunities for stays abroad, which students can pursue on their own initiative. The most feasible option is for students to arrange their mandatory internship abroad during the third semester. RESET's staff and TU Munich's International Center ([www.international.tum.de/en](http://www.international.tum.de/en)) offer support and advice. The strong international network of the Munich Center for Technology in Society is a particular advantage for RESET students seeking international experience.

# Admissions

## Application Requirements

To be eligible for admission to the Elite Master's Program "Responsibility in Science, Engineering and Technology", applicants must hold a Bachelor's or equivalent degree in one of the following fields: social sciences, psychology, the humanities, economics, STEM (science, technology, engineering or mathematics), life sciences, medicine or law.

Furthermore, applicants must demonstrate proficiency in English and need to have completed at least 8 ECTS credits worth of courses in theories and methods of social science. If the latter prerequisite is unfulfilled, students can take a special preparatory course at the beginning of their first semester.

International students are required to provide proof of basic knowledge of the German language within the first year of their studies.

Work experience is welcome but not a requirement.



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# How to Apply

The application process has two main steps.

See [www.mcts.tum.de/programs/master-reset/how-to-apply/](http://www.mcts.tum.de/programs/master-reset/how-to-apply/) for detailed information.

## Aptitude Assessment

### Step 1



55-59 Points: **Admission**  
35-54 Points: **Invitation for Interview**  
0-34 Points: **Rejection**

### Step 2



35-59 Points: **Admission**  
0-34 Points: **Rejection**

1) Create an application account on the TUMonline platform and apply for admission to the program. Submit all relevant application documents for the RESET program, including a transcript of records, a written statement of motivation, and an essay response to one of two questions announced on the RESET application website in mid-December. Applications open January 1 and close May 31.

2) Applicants with less than 55 and more than 34 points are invited for an interview (in English) as part of a final aptitude assessment stage.

Students who require a visa for Germany should note that the visa application process can be lengthy and should therefore apply as soon as possible after January 1.

# About the MCTS

The Munich Center for Technology in Society is an Integrative Research Center at the Technical University of Munich (TUM). As one of the most prominent centers for Science and Technology Studies (STS) in Germany, the MCTS is dedicated to understanding and reflexively shaping the multiple interactions between science, technology and society. By engaging in interdisciplinary research, teaching and dialogue, the MCTS initiates conversations and collaborations between the social sciences, humanities, natural sciences and engineering.



# TU Munich

The Technical University of Munich (TUM) consistently ranks among Europe's top universities. TUM was one of the first German universities to be named a University of Excellence and is committed to fostering innovation and interdisciplinary research in the fields of science that promise a sustainable improvement of life in society. The university welcomes talent from across the globe and seeks to promote an open, enlightened and culturally diverse mindset among its more than 40,000 students. The university is home to 15 departments, 6 integrative research centers, 7 corporate research centers, and more than 500 professors and 10,000 staff members. The university is proud of its vast alumni network, which includes several Nobel Prize laureates. More than 800 start-up companies have come from TUM. As "The Entrepreneurial University", TUM transfers results from fundamental research into market-oriented innovation processes and encourages an entrepreneurial spirit in all aspects of university life.



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# Student Life

[www.tum.de/en/university-life](http://www.tum.de/en/university-life)

At the Munich Center for Technology in Society, students actively partake in a variety of academic events, invited talks and guest lectures, workshops, teambuilding excursions, student initiatives, discussion rounds and social functions.

Students also have various opportunities to become engaged in campus life at TU Munich, for example:

[www.asta.tum.de/en](http://www.asta.tum.de/en)

**AStA:** The student body represents student interests at the university and regularly organizes festivals, parties and film screenings.

**Music:** TU Munich is home to several orchestras, choirs, chamber ensembles and other music groups that perform publicly at concerts and events throughout the year.

[www.zhs-muenchen.de/en](http://www.zhs-muenchen.de/en)

**Sports:** Students can take advantage of the facilities and extensive course program of the University Sports Center ZHS, the largest sports community in Germany.

<https://www.elitenetzwerk.bayern.de>

The Elite Network of Bavaria, which RESET is affiliated to as an Elite Master's program, organizes several get-togethers and networking events, soft-skill seminars, and excursions for students.



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*TUM students enjoying a sunny day at the Vorhoelzer Café.*

# Studying and Living in Munich

Munich has a reputation for being one of the cities with the highest quality of living in the world. Bavaria's state capital, with its population of about 1.5 million, boasts a rich cultural life, numerous recreational facilities and parks as well as countless restaurants, beer gardens, bars and clubs. Munich is also home to many museums. The German Museum in Munich is the world's largest museum for natural science. There are several art galleries within walking distance of TUM's main campus, for example the Pinakotheken, the Lenbachhaus and the Glyptothek and State Antiques Collection. And of course you should not miss the Oktoberfest!

TUM's Language Center offers free courses in German as a foreign language for students of all levels. Furthermore, TUM's Writing Center provides one-to-one consulting and guidance for students seeking to improve their academic writing in English.

[www.sprachenzentrum.tum.de/en](http://www.sprachenzentrum.tum.de/en)

Finding affordable housing in Munich can be challenging. TUM's Student Service Center offers advice for finding an apartment in Munich as well as a listing of current rental offers both online and at its service desk. Additionally, international students can consult the university's International Office for help in finding accommodation.

[www.tum.de/en/university-life/accommodations](http://www.tum.de/en/university-life/accommodations)

There are several student residence halls in Munich run by the Munich Student Union, as well as other social and private organizations. A further option is to search for a private room, apartment or shared flat. There are often long waiting lists, so in any event it is advantageous to plan your move well in advance and be quick responding to offers.

[www.studentenwerk-muenchen.de/en/student-accommodation](http://www.studentenwerk-muenchen.de/en/student-accommodation)

While the average rent that students in Munich pay is quite high, one financial advantage of studying at TUM is that you do not have to pay tuition fees. Students only need to pay small Student Union and basic semester ticket fees. An additional semester ticket can be purchased that grants students unrestricted use of Munich's complete public transportation network during the semester.

[www.tum.de/en/studies/semester-ticket](http://www.tum.de/en/studies/semester-ticket)



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### *The Isar River and the German Museum*

[www.tum.de/en/studies/fees-and-financial-aid](http://www.tum.de/en/studies/fees-and-financial-aid)

There is ample financial aid available for TUM students. You can apply for a range of scholarships or student loans to help finance your studies, or work part-time.

[www.together.tum.de/en/career](http://www.together.tum.de/en/career)

TUM's career portal advertises openings for student jobs and internships on its online bulletin board and provides information about national labor laws and work permits for international students.

**Visitor's Address**

Augustenstraße 46, 80333 Munich (rear building, entrance 3)

**General Questions**

Student Service Center

Student Advising & Prospective Students Programs

Telephone: +49 89 289 22737

E-Mail: [studium@tum.de](mailto:studium@tum.de)

**Program-specific Questions**

Munich Center for Technology in Society

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Elitenetzwerk  
Bayern

