

**TENURE-TRACK POSITION FOR
MACHINERY AND PLANT
ENGINEERING DESIGN**



INFORMATION FOR APPLICANTS

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1. General Information

In accordance with its development plan, the Johannes Kepler University Linz (JKU) is going to establish a Bachelor degree program for **machinery and plant engineering** (working title) as of winter semester 2020/21. This initiative complies with JKU's strategic goal to widen the orientation of its teaching and research offer, originally adopted in 1990 with the worldwide first full curriculum in mechatronics, towards demands arising from the area of modern machinery systems (machines and plants). JKU thus conforms to the needs of many internationally successful, especially Upper Austrian companies, for highly qualified young academic engineers, for research work, and for know-how transfer in this field. With its department of mechatronics, JKU already has established a sound portfolio of competencies in modern machinery systems as well as capabilities for inter-disciplinary research and education. The planned Bachelor degree program is intended to have its focus on engineering design aspects with respect to advanced machinery systems and on modern product development -stronger than it applies to the existing mechatronics degree program. Essential ingredients of engineering education are both analytical skills (system analysis) and design competencies (system synthesis). As far as engineers with academic education are in charge of the development of modern machinery and plants, they particularly have to be capable of treating and answering system questions. The predominant high complexity of modern machinery systems can only be mastered by methods from system theory. Such methods have to allow for the integration of all involved disciplines. In this context, formal models of different nature play a central role as product development is currently changing more and more from document based to model based approaches.

Another important aspect of successful product development is to decide upon product concepts that are well in line with the customers' needs and wishes, and simultaneously comply with the strategic corporate planning regarding the company's product portfolio.

In spite of these additional competencies for the development of complex systems and despite an even stronger orientation towards customer needs and corporate strategies, an engineering education has to provide the traditional engineering and design qualifications within mechanical engineering to the necessary extent. This requires a clever concept for the teaching program and a teaching staff with a good overview of the challenges and actual methods in system development.

Hence, the successful candidate shall contribute to a considerable strengthening of these (system synthetic) competencies in both teaching and research.

The position will be established at the Institute of Structural Lightweight Design. It is one of three Institutes with an orientation towards mechanical engineering design and capable of ensuring the required continuity in the supervision of the tenure-track position holder during the qualification period.

2. Research

The position should strengthen the competencies of the mechatronics department in the field of modern, model based development of complex machinery systems (engineering design of complex machinery systems). This field has many facets, for instance, mechanical engineering informatics; CAx-methods and CAx-systems; Model Based Systems Engineering (MBSE); Product Lifecycle Management (PLM); computer aided model based product development; design of machinery systems as parts of complex cyber-physical systems; multi-criterial optimization of products and systems; effective modelling of systems including a systematic interrelation of different models; development and utilization of model hierarchies; system theoretical methods for multi-disciplinary systems; machinery systems in the realm of digitalization. Here a particular emphasis should be placed on the machinery side.

The mechatronics department is in close cooperation with both domestic and foreign companies. It is the founder and strongest scientific partner of the Linz Center of Mechatronics, a competence center supported by the COMET program of the Austrian government. Advanced product development methods are as well part of this competence center's research. The successful candidate is expected to participate in such research activities or to conduct his/her own ones according to his/her available research capacities.

The successful candidate should have the following research qualifications:

- Command of relevant methods for effective and efficient development of modern machinery systems
- High research competence in one of the research areas mentioned above, proven by peer-reviewed scientific publications
- Ability to raise external and third-party research funding and to supervise and head research groups
- Experience in the application of scientific methods to practical problems in several of the above mentioned areas as a proof of his/her ability to cooperate with industry.

3. Teaching

The successful candidate is expected – according to the valid regulations of the Collective Agreement – to autonomously hold courses for those students who have to complete their education in the field of mechanical engineering design. He/she shall coordinate the contents of his/her courses with the other professors and teaching staff from this discipline, in particular, in order to teach and impart knowledge and skills in the field of engineering design with outstanding efficiency. This is of particular interest for the engineering design basic education within the planned Bachelor program in machinery and plant engineering. Other fields of study in which contents of such education could be integrated are the Bachelor degree programs in mechatronics and in polymer engineering technologies as well as the Master degree programs in machinery and plant engineering (planned) and mechatronics.

On demand, teaching in the Master degree programs shall be offered in English language.

The successful candidate should have the following teaching qualifications:

- Teaching experience on the Bachelor, Master, and/or Doctoral level at renowned universities or other academic institutions in English and German language (excellent course evaluations expected)
- Experience in supervising students' degree theses and in holding academic examinations
- International teaching experience is desired.

4. Research Infrastructure

As it is mentioned in Section 1., the successful candidate will be assigned to the Institute of Structural Lightweight Design (IKL, Prof. Schagerl). The main focus of the Institute's tasks regarding teaching and research comprise the structural analysis and sizing of lightweight parts including their operational reliability. Apart from the required office infrastructure, the Institute has a well-equipped lightweight design laboratory including a flexible hydro-pulse load test rig and extensive measurement instrumentation. Currently, the engineering design education for the degree programs in mechatronics and polymer engineering technologies is provided by the Institutes of Mechatronic Design and Production (IMDP, Prof. Zeman), and of Machine Design and Hydraulic Drives (IMH, Prof. Scheidl). The IMDP is operating a CAD laboratory as well as a CAM laboratory. The IMH is operating

laboratories for hydraulic drives, pneumatics, and a small teaching laboratory for machine elements. Both institutes closely cooperate in teaching and coordinate their teaching contents. They are willing to coordinate their teaching with the successful candidate as well and to make their teaching infrastructure available to him/her.

5. Additional Requirements

The successful candidate should have the following additional qualifications:

- Doctorate/Ph.D. degree in a relevant discipline
- Excellent command of the German and English language (spoken and written)
- Up-to-date understanding of the operational business practice
- High motivation, pronounced team spirit, strong collaborative and communication skills
- Ability of adopting, developing, and realizing new, efficient teaching methods for the engineering design education

Experiences as a PostDoc in disciplines relevant to this job advertisement are desired.

6. Tenure (Qualification) Agreement

The position is conceived for highly qualified scientific junior staff with a Doctorate/Ph.D. that complies with the dedication as specified above. The position will be initially limited to a period of 6 years. Jobholders will be offered a tenure (qualification) agreement if the academic performance suggests that the required high qualification can be reached. If the requirements of the agreement are met, employment will be continued for an indefinite period as a tenured Associate Professor (according to § 99 Sec 5 and 6 of the Austrian University Act). Promotion to Full Professorship is possible in a simplified procedure (following § 99, Sec 4, Austrian University Act).

The following items describe the evaluation criteria for the qualification agreement:

- Excellent teaching in the field of engineering design/product development
- Supervision of student papers (Bachelor and Master theses)
- Supervision of scientific papers (dissertations, Ph.D. theses)
- Acquisition of third party funded projects (public funded or together with industry partners) with at least one Ph.D. student position
- Realization of research projects with practical relevance in the field of engineering design/product development
- Scientific collaboration with national and international universities
- Scientific publications in internationally highly ranked journals
- Lectures at relevant conferences, and scientific publications in peer-reviewed conference proceedings
- Application for habilitation (venia docendi)