

Department	SciTec
Degree programme	SI, WT
Module name	Precision Instrumentation
Module number	SciTec.2.204
Study and Examination Regulations	ER-version 38 (of 21.03.2018), ER-version 39 (of 23.07.2019), ER-version 41 (of 16.07.2021)
Compulsory/ compulsory optional/ optional module	compulsory optional module
Module coordinator	Prof. Dr. Martin Schröck
Module content	Introduction, classification with respect to other technological fields, function and structure of instruments, design development process, design principles, i.e.: functional separation, functional integration; accuracy enhancement by error minimisation, innocence principle, invariance principle, error compensation, adjustment; DOF in joints, degree of mobility, over determinacy and its effects; special bearings and guideways for precision instruments, drive units for precision devices, positioning systems, reliability of precision instruments
Learning objectives	After completion of the module the students are able to implement fundamental principles for the design of precision instruments as well as the rules to facilitate the accuracy of precision devices. They are enabled to perform the practical application of these rules. Furthermore they compare up-to-date elements and modules of precision instruments. Finally we evaluate possibilities to improve the reliability of precision devices.
Course type (lecture, seminar, exercises, practical course)	4 L – 0 S – 0 E – 0 P
Recommended literature	<ul style="list-style-type: none"> ▪ Blackburn, J. A.: Modern instrumentation for scientists and engineers, New York, Springer, 2001 ▪ Krause, W.: Konstruktionselemente der Feinmechanik, Hanser, 2004 ▪ Krause, W.: Gerätekonstruktion, Verlag Technik Berlin, 1986 ▪ Ringhardt, H.: Feinwerkelemente, Hanser, 1992
Learning materials	Lecture script, additional worksheets
Method(s) of instruction/ media being used	Lecture and applied project work
Level/ category	Master (category: 2)
Which semester (winter/ summer term)	Summer term
Which semester during the programme	2
Requirements for attendance, necessary knowledge	Basic knowledge in design, engineering mechanics and mechanical components
Assessment (written/ oral test, paper, etc.)	written examination (90 minutes)
ECTS credits	6
Work load in:	180 h of total work load, therefrom <ul style="list-style-type: none"> ▪ 60 h of presence at university ▪ 120 h of self-study
Usability of this module	All design-oriented modules.
Frequency of offer	Every study year
Duration of module	1 semester
Place/ room	Ernst-Abbe-Hochschule Jena - University of Applied Sciences Jena
Time	According to schedule
Language(s)	English