



guidelines admission process.

MECHATRONICS & SMART TECHNOLOGIES

MCI MANAGEMENT CENTER INNSBRUCK

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Introduction

Thank you for your interest in our full-time Master program **Mechatronics & Smart Technologies**. This guideline should provide information on our admission process.

Completing our online application form, enables you to participate in our admission process. Places are allocated based on the following criteria:

1. Curriculum vitae 30%

Your personal and professional qualifications and experience will be assessed on the basis of the documents submitted with your application.

2. Entrance exam 20%

An online exam will be held to assess candidates' knowledge of engineering and natural science and their competence in English.

3. Interview 50%

A personal interview gives candidates an opportunity to make a personal presentation, to discuss the information provided in their application papers, and to explain their educational and professional goals.

Should you need additional information, our team is always at your disposal.

We are looking forward to receiving your application and wish you every success for the application procedure.

Kind regards,



DI Dr. Andreas Mehrle
Head of the study program



Schedule for the admissions procedure

To provide greater flexibility in meeting your needs, MCI has introduced an admissions process with sessions held on three separate dates. Since we cannot predict how many applicants will present themselves for the various sessions, and in view of the fact that only fifteen places are available for the study program, you are recommended to participate at the earliest possible date so as to secure a place as soon as possible.

You should register for the admissions procedure with the study program office two weeks prior to the chosen date at the latest. Additional information is available by mail via office-mech@mci.edu or telephone (+43-512-2070-3900).

SESSION	AVAILABLE PLACES	CANDIDATE'S PERFORMANCE	
		ABOVE AVERAGE	AVERAGE / BELOW AVERAGE
Early Sessions 03 December 2018	All places	Early allocation of a definitive place	Allocation of a place on the waiting list with the possibility of later acceptance
Main Sessions 18 February 2019 15 April 2019	Places not allocated in the early sessions	Allocation of a definitive place	Allocation of a place on the waiting list with the possibility of later acceptance
Last Session 17 June 2019	Places remaining after the early and main sessions	Allocation of a definitive place	Rejection

General information on admissions

1. Curriculum vitae

A key element in the admissions process is an assessment of the candidates' CV on basis of the submitted documents. Due account is taken of any additional qualifications over and above the basic prerequisites such as academic performance, further education, work experience and periods spent abroad.

Online applications can be submitted via

<https://www.mci.edu/en/study-program/master/mechatronics-smart-technologies/admission>

Applications can be submitted at any time, an early application is recommended.

2. Entrance exam

The written entrance exam is an online test. It is composed of two parts:

- a.) Questions from the fields of engineering and natural science
Candidates are given 90 minutes to answer 60 questions in a multiple or single choice format.
- b.) Test of English
Candidates are given 60 minutes to conduct a reading exercise and write a short essay on a given topic.

The written entrance exam serves to assess candidates' competence in engineering and natural science, as well as their command of English.

3. Personal interview

The interview, which is held with a panel of three, gives candidates the opportunity to present their goals, motives and competences, and permits an evaluation of their suitability for the study program.

Applicants may choose to have the interview conducted via Skype (Internet telephony). For details and free download, go to www.skype.com

Admission requirements

The Master program in Mechatronics & Smart Technologies is open to graduates of Bachelor and Diploma programs in the fields of engineering/engineering science or natural sciences with curricula involving at least 75 relevant ECTS credits.

The decision on the acceptability of prior qualifications is taken by the Program Director. Fifteen students can be admitted to the program each year.

We look forward to receiving your application!

Sample questionnaires

1. Engineering and Natural Science

1. Processes of an ideal gas can be characterized as:

- a. isobar
- b. isochore
- c. isocline
- d. isentrope

2. Which of the following formulas calculate a power:

- a. $i \cdot u$
- b. $\int F ds$
- c. $F \cdot v$
- d. $\frac{1}{2} \rho v^2$

3. Automated handling of work pieces has the following advantages compared to handling by humans:

- a. more precise
- b. constant quality
- c. lower investment costs
- d. faster

4. How many degrees of freedom (DOF) describe the pose of a rigid body in space:

- a. 0
- b. 1
- c. 3
- d. 6

5. Which type of degree-of-freedom possesses a nut on an bolt:

- a. linear
- b. rotational
- c. cylindrical
- d. helical

6. Zener diodes are most commonly used in:

- a. voltage amplifier circuits
- b. oscillator circuits
- c. power supply circuits
- d. current limiting circuits

7. Wien's displacement law is essential for:

- a. the design of a pyrometer
- b. structural analysis of a PCB
- c. solving convolution integrals on a DSP
- d. Satellite image processing

Solutions:

- 1. a. right, b. right, c. wrong, d. right
- 2. a. right, b. wrong, c. right, d. wrong
- 3. a. right, b. right, c. wrong, d. wrong
- 4. a. wrong, b. wrong, c. wrong, d. right
- 5. a. wrong, b. wrong, c. wrong, d. right
- 6. a. wrong, b. wrong, c. right, d. wrong
- 7. a. right, b. wrong, c. wrong, d. right

2. English

Reading „Physical and Chemical Properties and Changes“

Sugar, water, and aluminum are different substances. Each substance has specific properties that do not depend on the *quantity* of the substance. Properties that can be used to identify or characterize a substance – and distinguish that substance from other substances – are called **characteristic properties**. They are subdivided into two categories: physical properties and chemical properties.

The characteristic physical properties of a substance are those that identify the substance without causing a change in the composition of the substance. They do not depend on the quantity of substance. **A** Color, odor, density, melting point, boiling point, hardness, metallic luster or shininess, ductility, malleability, and viscosity are all characteristic physical properties. For example, aluminum is a metal that is both ductile and malleable. **B** Another example of a physical property is water. Whether a small pan of water is raised to its boiling point or a very large kettle of water is raised to its boiling point, the temperature at which the water boils is the same value, 100 degrees C or 212 degrees F. **C** Similarly, the freezing point of water is 0 degrees C or 32 degrees F. These values are independent of quantity. **D**

Characteristic properties that relate to changes in the composition of a substance or to how it reacts with other substances are called chemical properties. The following questions pertain to the chemical properties of a substance.

1. Does it burn in air?
2. Does it decompose (break up into smaller substances) when heated?
3. What happens when it is placed in an acid?
4. What other chemicals will it react with, and what substances are obtained from the reaction?

Characteristic physical and chemical properties – also called **intensive properties** – are used to identify a substance. In addition to the characteristic physical properties already mentioned, some intensive physical properties include the tendency to dissolve in water, electrical conductivity, and density, which is the ratio of mass to volume.

Additional intensive chemical properties include the tendency of a substance to react with another substance, to tarnish, to corrode, to explode, or to act as a poison or carcinogen (cancer-causing agent).

Extensive properties of substances are those that depend on the quantity of the sample, including measurements of mass, volume and length. Whereas intensive properties help identify or characterize a particular kind of matter, extensive properties relate to the amount present.

If a lump of candle wax is cut or broken into smaller pieces, or if it is melted (a change of state), the sample remaining is still candle wax. When cooled, the molten wax returns to a solid. In these examples, only a physical change has taken place; that is, the composition of the substance was not affected.

► When a candle is burned, there are both physical and chemical changes. After the candle is lighted, the solid wax near the burning wick melts. This is a physical change; the composition of the wax does not change as it goes from solid to liquid. Some of the wax is drawn into the burning wick where a chemical change occurs. Here, wax in the candle flame reacts chemically with oxygen in the air to form carbon dioxide gas and water vapor. In any chemical change, one or more substances are used up while one or more new substances are formed. The new substanc-

es produced have their own unique physical and chemical properties.

The apparent disappearance of something, like the candle wax, however, is not necessarily a sign that we are observing a chemical change. For example, when water evaporates from a glass and disappears, it has changed from a liquid to a gas (called water vapor), but in both forms it is water. This is a phase change (liquid to gas), which is a physical change. When attempting to determine whether a change is physical or chemical, one should ask the critical question: Has the fundamental composition of the substance changed? In a chemical change (a reaction), it has, but in a physical change, it has not.

1. According to paragraph 1, what do physical properties and chemical properties have in common?

- a. They are both used to create most of the substances.
- b. They include basic substances like sugar and water.
- c. They are classified as characteristic properties of substances.
- d. They change in proportion to the amount of the substance.

2. The word *pertain* in the passage is closest in meaning to

- a. compare
- b. relate
- c. explain
- d. change

3. The word which in the passage refers to

- a. properties
- b. tendency
- c. density
- d. ratio

4. According to the passage, a *carcinogen*

- a. explodes under pressure
- b. conducts electricity
- c. causes cancer
- d. tarnishes in air

5. Which of the sentences below best expresses the information in the highlighted statement in the passage? The other choices change the meaning or leave out important information.

- a. Properties that are classified as intensive identify the type of substance and the extent of it present in the surrounding matter.
- b. The quantity of a substance influences its extensive properties, but the characteristics of the substance define the intensive properties.
- c. Where the intensive and extensive properties are found in substances is important in identifying their characteristics.
- d. Both intensive and extensive properties tend to have quantitative rather than qualitative characteristics present.

6. In paragraph 8, the author contrasts the concepts of physical and chemical changes by

- a. listing several types for each concept

- b. providing clear definitions for them
- c. identifying the common characteristics
- d. using a wax candle as an example

Paragraph 8 is marked with an arrow (▶)

7. The word unique in the passage is closest in meaning to

- a. distinctive
- b. idealized
- c. primary
- d. significant

8. What can be inferred about phase changes?

- a. They are always chemical changes.
- b. They are sometimes physical changes.
- c. They are dependent on extensive properties.
- d. They usually produce new substances.

9. The word critical in the passage is closest in meaning to

- a. last
- b. important
- c. difficult
- d. simple

10. According to the passage, the classification of characteristic properties as “physical” or “chemical” is determined by

- a. whether there has been a change in the structure of the substance
- b. what happens when the quantity of the substance is increased
- c. their classification as either extensive or intensive samples
- d. the disappearance of a substance from one form to another

11. All of the following are mentioned as characteristic physical properties EXCEPT

- a. dissolving in water
- b. carrying an electrical charge
- c. resisting continuous flow
- d. decomposing when heated

WRITING

Technological advances are resulting in increasing automation. Do you think that automation will replace manpower to a large extent?

300 words

Solutions:

1. c, 2. b, 3. c, 4. c, 5. b, 6. d, 7. a, 8. b, 9. b, 10. a, 11. d, 12. b,
13. Physical properties a,d,e, Chemical properties b,c,f,h, Not used g,i