



guidelines admission process

Start winter term 2022/23

MCI | THE ENTREPRENEURIAL SCHOOL®
Master program Biotechnology

November 2021

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1 introduction

Thank you for your interest in our full-time Master program **Biotechnology**.

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

Curriculum vitae 30 %

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

Entrance exam 20 %

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

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.

We are looking forward to receiving your application.

Best regards,



Prof. Dr. Christoph Griesbeck

Head of Department & Studies

2 schedule for the admissions procedure

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

Please register yourself for the online admissions procedure in time.

For any further information please contact Ms. Anna-Lena Schöpf:

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Please note the application deadline for each session (<https://www.mci.edu/en/study/master/bio-technology>).

APPLICATION DEADLINES 2021/2022

- Date 1: **November 14, 2021**
- Date 2: **January 30, 2022**
- Date 3: **April 03, 2022**
- Date 4: **May 29, 2022**

3 curriculum vitae

A key element in the admissions process is an assessment of the candidate's CV on basis of the submitted documents. Additional qualifications beyond the basic prerequisites such as academic performance, further education, work experience and periods spent abroad will be considered.

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

4 entrance exam

The written entrance exam is an online test with multiple or single choice questions. It serves to assess the candidates' competence in engineering as well as their command of English.

It consists of the following parts:

- Chemical process engineering (20 minutes)
- Thermal process engineering (20 minutes)
- Biological Process Engineering (20 minutes)
- Biosciences (20 minutes)
- English test (60 minutes)

5 personal interview

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

We look forward to receiving your application!

6 sample questionnaires

6.1 CHEMICAL PROCESS ENGINEERING

Recommended reading

Silla: Chemical Process Engineering: Design and Economics. Marcel Dekker Inc. 2003

Jones: Elements of Chemical Process Engineering. J. Wiley 1996

Hessel: Chemical Micro Process Engineering. J. Wiley 2004

Recommended reading of the following chapters/topics

Characterization of chemical reactors

Conversion, yield and selectivity

Microkinetics of homogeneous reactions

Characterization of residence time distribution

Analysis of kinetics

Heterogeneous catalysis

Sample questionnaires

1. What is the effect of a catalyst?
 - a) shift of reaction equilibrium
 - b) reduction of activation energy
 - c) shift of product concentration
 - d) rise in temperature
2. Which statement does the Arrhenius equation describe?
 - a) the reaction rate is temperature-dependent
 - b) the reaction rate is not temperature-dependent
 - c) the reaction rate is time-dependent
 - d) the reaction rate is not time-dependent

6.2 THERMAL PROCESS ENGINEERING

Recommended reading

Sattler: Thermal Separation Processes. Wiley 1995

Mersmann: Thermal Separation Technology. Springer 2011

Recommended reading of the following chapters/topics

Phase equilibria / Evaporation

Distillation

Rectification

Absorption

Adsorption

Extraction

Drying

Sample questionnaires

1. What does the term hygroscopic mean?
 - a) binding of moisture
 - b) rejecting of moisture
 - c) reproduction of water molecules
 - d) detection of water molecules

2. What is the reverse process of absorption?
 - a) adsorption
 - b) desorption
 - c) vaporization
 - d) filtration

6.3 BIOLOGICAL PROCESS ENGINEERING

Recommended reading

Doran, P.M.: Bioprocess Engineering Principles, Academic Press (2013) (Attention: Free availability within the internet.)

Behme: Manufacturing of Pharmaceutical Proteins, Wiley-VCH (2009)

Recommended reading of the following chapters/topics

Organisms for biotechnological production

Enzyme kinetics

Sterile technique

Reactions and kinetics in bioreactors

Sample questionnaires

1. What does the kinetics of Gaden describe?
 - a) Generation of product
 - b) Formation of biomass
 - c) Encymatic reaction

2. You are starting an experiment with a cell density of $10 \cdot 10^4$ cells per ml, at the end of the experiment $1,3 \cdot 10^6$ cells per ml are measured. How many generations have passed?
 - a) 7
 - b) 1
 - c) 65
 - d) 42

3. What do submers-reactors represent?
 - a) cultivation of microorganisms in solvent
 - b) Fixed-bed reactor
 - c) Fluidized bed reactors
 - d) Cultivation of immobilized microorganisms

6.4 BIOSCIENCES

Recommended reading

Campbell: Biology. Pearson

Alberts et al.: Molecular Biology of the Cell, Norton & Company

Clark: Molecular Biology. Elsevier

Madigan et al.: Brock Brock Biology of Microorganisms, Addison-Wesley Longman

Berg et al.: Biochemistry 9th edition, WH Freeman

Recommended reading of the following chapters/topics

Principles of metabolism

Enzymes

Aerobic and anaerobic respiration, fermentation

Structure of genomes, DNA replication, gene expression

Structure of prokaryotic and eukaryotic cells

Methods of molecular biology, DNA cloning and sequencing

Sample questionnaires

1. Where does glycolysis take place in a eukaryotic cell?
 - a) Mitochondrial matrix
 - b) Outer mitochondrial membrane
 - c) Inner mitochondrial membrane
 - d) Mitochondrial intermembrane space
 - e) Cytosol

2. Photoautotrophic organisms use
 - a) Nitrogen as an energy source and carbon dioxide as a carbon source
 - b) Hydrogen sulfide as an energy source and carbon dioxide as a carbon source
 - c) Light as an energy source and carbon dioxide as a carbon source
 - d) Carbon dioxide as an energy source and as a carbon source
 - e) Light as an energy source and methane as a carbon source

3. What is not a part of a PCR reaction?
 - a) DNA-Polymerase
 - b) DNA-Ligase

- c) Nucleotides
- d) Primers
- e) Template-DNA

6.5 SOLUTIONS

CVT: 1b, 2a

TVT: 1a, 2b

BVT: 1a, 2a, 3d

BIO: 1e, 2c, 3b