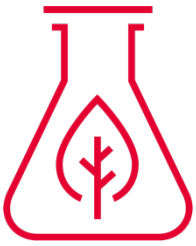
SDC

The university partnership
Denmark – China

Master's Programme in

Chemical and Biochemical Engineering



Academic Regulations

2020

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Legal Frame

Students enrolled in this programme are admitted as full-time students at University of Chinese Academy of Sciences.

This curriculum applies to students enrolled in the programme from 2020.

This master's programme is established within the framework of the following:

- Partnership Agreement between Graduate University of Chinese Academy of Sciences and University of Copenhagen (KU), Aarhus University (AU), University of Southern Denmark (SDU), Aalborg University (AAU), Roskilde University (RUC), Technical University of Denmark (DTU), Copenhagen Business School (CBS), IT University of Copenhagen (ITU), on the establishment of the Sino-Danish Centre for Education and Research, Graduate University of Chinese Academy of Sciences, signed on 12 April 2010
- Agreement between Graduate University of Chinese Academy of Sciences (GUCAS) and University of Copenhagen (KU), Aarhus University (AU), University of Southern Denmark (SDU), Aalborg University (AAU), Roskilde University (RUC), Technical University of Denmark (DTU), Copenhagen Business School (CBS), IT University of Copenhagen (ITU) concerning Master's Programmes at Sino-Danish Centre for Education and Research, Graduate University of Chinese Academy of Sciences, signed on 29 August 2011
- Agreement between Graduate University of Chinese Academy of Sciences and Technical University Denmark concerning Provision of the Master's Programme in Chemical and Biochemical Engineering – BBE (Specialization in Biomass Based Energy) at Sino-Danish Centre for Education and Research (SDC), Graduate University of Chinese Academy of Sciences, signed on 29 August 2011.

Students must observe and act accordingly to the following rules issued by the SDC Directors:

- Courses and Exams
- Exam regulations
- Thesis regulations 10 steps
- Avoid cheating on exams
- Student complaints

Students must also observe and act accordingly to Rules and Regulations for UCAS International Students.

SDC rules are published on Moodle.

Title and degree

The degree awarded by Technical University of Denmark is Master of Science in Chemical and Biochemical Engineering - Specialization in Biomass Based Energy. The degree awarded by University of Chinese Academy of Sciences is Biochemical Engineering/ Chemical Engineering.

Duration

The master's programme has a duration of two academic years equivalent to 120 ECTS points (European Credit Transfer System). 60 ECTS points correspond to one year of full-time studies.

4-YEARS LIMIT

All SDC students must complete their Danish and UCAS degree within 4 years from the enrolment. This period includes leave of absence. It is possible to apply for an exemption due to illness or other extraordinary circumstances.

When choosing thesis period *Danish/International students* must be aware of UCAS' 4 years limit for awarding diploma. UCAS' degree application procedure ***STEP 10 CN*** (see Thesis regulations 10 steps) has to be completed within four years from the enrolment. This period includes leave of absence.

Admission requirements

Admission to the Master's programme in Chemical and Biochemical Engineering (Specialization in Biomass Based Energy) is based on:

- a successfully completed bachelor 's degree (or equivalent) in chemical engineering, biochemical engineering, chemical technology, biotechnology or related fields.
- high-level English language proficiency.
- a strong, working knowledge of mathematics and natural sciences based on 1-1½ years formal courses (60-90 ECTS), distributed among different subject areas approximately thus:
    - Engineering Mathematics
    - Organic and inorganic chemistry
    - Thermodynamics and physical chemistry
    - Physics
- basics of chemical and biochemical engineering based on ½-1 year of formal courses (30-60 ECTS), distributed among different subject areas approximately thus:
    - Applied thermodynamics, mass and heat transfer, unit ops with laboratory
    - Mathematical modelling, advanced. engineering math., process control, dynamics
    - Chemical kinetics and reaction engineering
    - Basic life science, biochemistry, fermentation technology

General programme regulations

The language of instruction in the SDC master's programmes is English. Teaching, supervision and assessment will be carried out in English.

Students will be graded according to both the Chinese and the Danish grading scale with the following correlation:

DK	12	10	7	4	02	00	-3
CN	100-95	94-90	89-76	75-61	60	59-40	39-0

For the Master's Thesis, students will be graded according to the Chinese 4-point scale. See Thesis regulations 10 steps.

Leave of absence can be granted to students on the grounds of becoming a parent, illness, military service or exceptional circumstances

Students who wish to complete degree programme elements at another university or institution of higher education in Denmark, China or abroad as part of their degree programme may apply the Teaching Committee for advance approval of transfer credit for planned subject elements.

Students can maximum be granted 30 ECTS credit transfer.

Either the Teaching Committee or the SDC Directors may grant exemptions to the academic regulations or other SDC rules. Applications for exemption are submitted to the SDC Secretariat.

Qualifications

Purpose
The programme focuses on theoretical, experimental and practical aspects of chemical and biochemical process engineering that are of relevance for the use of biomass and waste as feedstocks and energy sources, replacing fossil resources and fuels. Key elements are:

- Processes rooted in chemical or biochemical engineering, but applicable to the biomass and energy field.
- Cross-disciplinary and cross-cultural design and development.
- Sustainability of biomass based chemical production and fuel conversion.
- Knowledge about Chinese culture and business environment integrated in the programme

Qualification Profile

The programme has two central objectives:

- Academic cutting-edge qualifications
- Polytechnic holistic qualifications that, in addition to an identity-creating professionalism, also include being able to gain an overview of a complex technical problem and being able to think in technical terms in commercial and societal contexts

The graduate has the qualifications required to analyse, synthesise and evaluate theory and experiments relating to complex and complicated engineering systems, issues and solutions for the benefit of society.

Knowledge and understanding

The graduate:

- has a solid understanding of and a firm base of knowledge in natural sciences and technological principles, possesses comprehensive knowledge within a given subject area, and is familiar with the current development trends and opportunities within the academic area.
- can identify and reflect on technical scientific issues and understand the interaction between the various components of an issue.
- can, based on a clear academic profile, apply elements of current research at international level to develop ideas and solve problems.
- has insight into and understanding of the internal interaction between the various engineering domains and other competences in connection with solving specific engineering problems.
- possesses knowledge about sustainability, innovation and entrepreneurship.
- is familiar with the application of relevant natural sciences to process and product-oriented technical issues.
- possesses knowledge about mathematical and model-based description at scientific level of chemical and biochemical process equipment and the processes to be found in the same.
- can differentiate between stationary conditions for open systems and equilibrium.
- possesses knowledge about the use of numerical tools (programming in high-level language or professional simulation software) for analysing chemical and biochemical engineering problems and dimensioning equipment.
- is familiar with methods for addressing process and/or product-oriented open design issues.
- is familiar with chemical and biochemical process equipment and its application, including ongoing development and research results within one or more delimited areas.

Skills

The graduate:

- masters technical scientific methodologies, theories and tools, and has the capacity to take a holistic view of and delimit a complex, open issue, put it into a broader academic and societal perspective and, on this basis, propose a variety of possible actions.
- can, via analysis and modelling, develop relevant models, systems and processes for solving technological problems.
- can communicate and mediate research-based knowledge both orally and in writing.
- can discuss technological issues with various types of stakeholder.
- is familiar with and can seek out leading international research within his/her specialist area.
- is trained in the assessment of process and product engineering knowledge in relation to chemical and biochemical engineering problems in development and research.
- can understand and critically assess knowledge in the professional field—both internally and in partnership with external players.
- can apply advanced chemical, physical-chemical, biochemical and biological knowledge to process and/or product-oriented technical issues.
- can scale chemical and biochemical processes up from laboratory to industrial production.
- can dimension equipment for both rate-based and equilibrium-based processes.

Competences

The graduate:

- masters technical problem-solving at a high level through project work, and has the capacity to work with and manage all phases of a project – including preparation of timetables, design, solution and documentation.
- can work independently and reflect on his/her own learning, academic development and specialisation.
- can independently combine his/her technological knowledge with knowledge about business, management, organization and project work.
- can organize the operation and optimization of chemical and biochemical production, including reduction of energy consumption and environmental impact.
- can analyse, process and assess issues, both qualitatively and quantitatively, in operation, development and research within one or more specialist areas.
- can apply advanced chemical and biochemical engineering theory for the solution of research or development assignments.
- can present results of research and development work in writing and orally, and can mediate results to people with the same or a different professional background—both those with and without a scientific education.
- can plan, execute and manage experimental studies on any scale from laboratory to production facility, including handling large datasets.
- can launch and participate in development and research teams involving laboratory staff, technicians and other people who have completed professional and/or short-term courses of higher education.
- can synthesise commercially viable and societally acceptable proposals for operational improvements and process or product development in chemical and biochemical plants.
- can - on the basis of the programme - participate in the management of research teams.
- can account for objectives, challenges and methods included in interdisciplinary research, development and innovation groups.

- can assimilate new and relevant natural science knowledge, and develop this in a commercial chemical and biochemical engineering context.

Structure

Semester	Course / Programme element	Exam	Grading	Examiners	ECTS
1	Industrial Reaction Engineering	Assignments and oral	7/100 scale	External	7,5
	Transport Processes	Assignments and written presence examination	7/100 scale	External	10
	Industrial BioReaction Engineering	Assignments and written presence examination	7/100 scale	Internal	5
	Biorefinery	Assignments and written presence examination	7/100 scale	Internal	5
2	Green Chemical Engineering	Assignments	7/100 scale	Internal	5
	Process Design - Principle and Methods	Assignments and oral	7/100 scale	Internal	10
	Coatings Science and Technology	Written	7/100 scale	Internal	7.5
	SDC Green Challenge	Assignments and oral	Pass/Not-pass	Internal	5
	SDC Summer School in Unit Operation/SDC Research Immersion*	Assignments	7/100 scale	Internal	5
3	Laboratory Experiments	Assignments	7/100 scale	Internal	5
	Progress in Research	Assignments	Pass/Not-pass	Internal	5
	Technology, Economics, Management and Organization	Assignments	7/100 scale	External	10
	Combustion and High Temperature Processes	Assignments	7/100 scale	Internal	5
	Fluidization and Multiphase Flow	Assignments	7/100 scale	Internal	5
4	Thesis	Assignment and oral	7/4 scale	External	30

The programme contains the following elements:

*SDC Research Immersion can only be taken by students who have had similar laboratory courses in unit operation in DTU during bachelor study.

All programme elements are mandatory.

Commencement

Effective as of 01.09.2020

Changes to Academic Regulations

No changes yet.