



UNIVERSITY OF
GEORGIA

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University Council

August 20, 2021

UNIVERSITY CURRICULUM COMMITTEE – 2021-2022

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Dear Colleagues:

The attached proposal from the College of Engineering to offer the existing major in Biomanufacturing and Bioprocessing (M.B.B.) at the Beijing University of Chemical Technology will be an agenda item for the August 27, 2021, Full University Curriculum Committee meeting.

Sincerely,

Susan Sanchez, Chair

University Curriculum Committee

cc: Provost S. Jack Hu
Dr. Rahul Shrivastav

PROPOSAL FOR AN EXTERNAL DEGREE

Date: September 1, 2020

Department/Division: School of Chemical, Materials, and Biomedical Engineering

School/College: College of Engineering

Program (Major and Degree): Master of Biomanufacturing and Bioprocessing (M.B.B.)

Which campus will offer this program? Beijing University of Chemical Technology, Beijing, China

Will any approved areas of emphasis be offered under this major? No

Proposed Effective Date: Spring 2022

Introduction: During the past five years, the School of Chemical, Materials, and Biomedical Engineering at UGA and Beijing University of Chemical Technology (BUCT) have developed a strong educational and research partnership. In 2018, the two universities established a 3+1+1 dual degree program that enabled Chinese students to obtain an undergraduate degree in Bioengineering from BUCT and an M.S. degree in Biochemical Engineering from UGA. The first two cohorts have seen six students enroll in the program, two of which have now matriculated into a Ph.D. program at UGA. In summer 2018, seven UGA College of Engineering faculty participated in a joint research symposium held at the Changzhou Institute for Advanced Materials, and in September 2018, UGA and BUCT entered into an agreement to establish a joint research center. In addition, a number of UGA College of Engineering faculty have taught summer courses at BUCT, and UGA has hosted several visiting researchers from BUCT in Athens.

In spring 2020, as part of the ongoing collaboration between UGA and BUCT, the two institutions submitted a proposal to the Chinese Ministry of Education to offer a Chinese-Foreign Cooperation in Running Schools (CCE) graduate program. The proposal received official approval from the Chinese Ministry of Education on October 28th, 2020. In this proposal, UGA will offer the Master of Biomanufacturing and Bioprocessing (M.B.B.) degree at the BUCT campus in Beijing. BUCT currently has CCE programs with four other universities in the U.S. and Europe, and they enroll 220-270 students in these programs each year. The BUCT-UGA CCE program will enroll 25 students per year, with five of those students being dual enrolled in the BUCT M.S. degree in Biological Engineering. The program will enhance international exchange and cooperation in education and promote circulation of high-quality international education resources (ideas, curriculum, teaching, and administration) to the benefit of both institutions. The program aims to develop high-quality professionals with solid academic education, internationalized learning approaches, and excellent foreign language communication skills who can excel in an international working environment.

The School of Chemical, Materials, and Biomedical Engineering now seeks approval to offer the M.B.B. degree at the BUCT campus in Beijing, China, which necessitates this Proposal for an External Degree.

1. Assessment

The external Master of Biomanufacturing and Bioprocessing (M.B.B.) program is part of a cooperative agreement between the University of Georgia and Beijing University of Chemical Technology (BUCT). An analysis of current market conditions performed by BUCT indicates each annual cohort

will consist of 25 students. For each cohort, 20% of students will also be enrolled in the BUCT Masters of Biological Engineering program. The average number of students per cohort enrolled in the M.B.B. program at UGA in Athens is less than 10.

2. Admission Requirements

Students will apply to the M.B.B. according to published guidelines set forth by UGA. UGA will accept M.B.B. students to be enrolled on the BUCT campus according to existing admission requirements established for the M.B.B. degree and use the established admission process. Students accepted into the M.B.B. offered on the BUCT campus will be UGA students with an equivalent status to UGA students enrolled on the Athens campus.

Two applications must be submitted when students apply to the M.B.B. program. The first application is submitted to the UGA Graduate School. The second application is specific to the M.B.B. Program and asks students to provide relevant information about their preparation for the program, such as work experience, internships, related coursework, etc., as well as asking students about career aspirations and specific areas of interest in the biomanufacturing industry.

Additionally, students must complete a B.S. degree with a minimum GPA of 3.0 (out of 4.0) from an ABET accredited program or program in a related field. Students whose native language is not English should have a TOEFL score of 80 or above with at least 20 on speaking and writing, or an IELTS score of 6.5 or above with no single band (score) below 6.0, or pass an English proficiency test administered by UGA.

3. Program Content

The program of study for the M.B.B. offered on the BUCT campus will be equivalent to the approved M.B.B. program of study offered on the Athens campus. The most recent version of the program of study was approved by the School of Chemical, Materials, and Biomedical Engineering Curriculum Committee in January 2020 and subsequently by the College of Engineering Curriculum Committee. The criteria for electives or substitutions for specific requirements will be equivalent at both locations. A copy of the M.B.B. (BUCT campus) program of study and the M.B.B. (Athens campus) program of study are provided in Exhibit A.

4. Student Advising

A full-time UGA employee will be permanently located in Beijing and will serve as the graduate director for students in the M.B.B. (BUCT campus) program. This individual will report directly to the Chair of the School of Chemical, Materials, and Biomedical Engineering. Regular meetings will be held to ensure consistency in advising between the BUCT campus and the UGA Athens campus.

5. Resident Requirements

Residence requirements will be identical to those established for the authorized degree program, with residence at the approved location serving to meet that requirement.

6. Program Management

A joint administration committee for the M.B.B. offered on the BUCT campus will be formed. This committee will consist of 9 members: 5 members from BUCT and 4 members from UGA. The Committee Chairperson will come from BUCT, and the Deputy Chairperson will be the Chair of the School of Chemical, Materials, and Biomedical Engineering at UGA. The UGA committee members are:

Dr. James Warnock – School Chair, Chemical, Materials, and Biomedical Engineering
Dr. Yajun Yan – Professor, Chemical, Materials, and Biomedical Engineering
Dr. David Blum – Graduate Coordinator, Masters of Biomanufacturing and Bioprocessing at UGA - Athens
Brian Watkins – Director International Initiatives

Two cooperative modes co-exist in the program, which are the Single-degree mode and the Double-degree mode. The total maximum recruitment capacity for the program is 25 students per year.

Single Degree mode: Students who successfully fulfill the M.B.B. requirements and complete the two-year graduate program offered at BUCT will earn the Master of Biomanufacturing and Bioprocessing degree from UGA. UGA shall be solely responsible for awarding the M.B.B. degree.

The maximum recruitment capacity for the single-degree mode is 20 students per year. Academic requirements for the single-degree will be determined by UGA and are subject to approval by the Board of Regents of the University System of Georgia. Degree requirements, admissions standards, course content, evaluation of instruction, evaluation of student performance, and provision of student support shall follow standard UGA policies and practices and be equivalent to the M.B.B. offered at UGA's Athens campus. Course instruction will be in English.

Double-degree mode: Students who successfully fulfill all M.B.B. requirements and the requirements for the MBE from BUCT by completing the three-year postgraduate program at BUCT will earn the M.B.B., Master of Biomanufacturing and Bioprocessing, from UGA and the MBE, Master of Engineering in Biological Engineering, from BUCT. The M.B.B. from UGA and the MBE from BUCT will be independent degrees and each institution has sole responsibility for awarding the degree for that institution.

The maximum recruitment capacity for the double-degree mode is 5 students per year. Apart from meeting all existing UGA M.B.B. academic requirements, these students will meet all BUCT MBE requirements. Admissions standards, course content, evaluation of instruction, evaluation of student performance, and provision of student support shall follow policies and practices at BUCT and UGA.

UGA Course Content

No less than one third of the total M.B.B. courses and specialized core courses taught on the BUCT campus will be taught by UGA faculty, either via online delivery or face to face. It is anticipated that UGA faculty will teach at least 18 credit hours (47%) in the M.B.B. (BUCT campus) program. Courses taught by UGA faculty are highlighted in red in Exhibit A.

The School of Chemical, Materials, and Biomedical Engineering will hire a nine-month, non-tenure track lecturer who will serve as the M.B.B. (BUCT Campus) graduate director in Beijing. The M.B.B. (BUCT campus) graduate director will teach up to 9-credit hours per semester. The successful candidate will have a Ph.D. degree in chemical engineering, biochemical engineering, biomolecular

engineering, bioprocess engineering, biotechnology, or a closely related discipline, and an excellent scholarly record in an area broadly associated with bio-based manufacturing. Additionally, they should be fluent in Chinese and English. The position will be funded through tuition collected from the M.B.B. (BUCT Campus) as detailed in the Budget section below.

The M.B.B. program of study includes two business course electives and *BIOS(PHAR) 7100E, Biostatistical Applications for the Pharmaceutical and Biotechnology Industries*. Three options have been identified for offering these courses. First, M.B.B. (BUCT Campus) students can register for online sections of these classes and complete the courses remotely. Second, UGA faculty from the Terry College of Business or the College of Pharmacy, respectively, can travel to Beijing and teach courses in person. Travel expenses and teaching salary will be covered by tuition collected from the M.B.B. (BUCT Campus) Third, BUCT faculty will teach the courses in person in Beijing. Before any BUCT faculty member is assigned as the instructor of record of a UGA approved course, the necessary forms will be submitted to and approved by the Office of Faculty Affairs. The BUCT faculty member will be assigned 90% instructional responsibility. The M.B.B. (BUCT campus) Graduate Director, who provides primary oversight of all local matters concerning the course sections, will be assigned 10% instructional responsibility, in accordance with [UGA Academic Affairs Policy 4.07-12 Instructor of Record](#). The College of Engineering has received email communications from the College of Pharmacy and the Terry College of Business offering support for this proposal.

UGA courses will be taught in Beijing in spring, summer, and fall terms. Each course taught onsite in Beijing shall consist of approximately 15 weeks of instruction followed by final exams. As with the M.B.B. offered in Athens, each UGA credit hour corresponds to approximately 750 contact minutes. The actual course calendar will be determined by both institutions and in observance of official Chinese holidays and shall be equivalent to the UGA calendar approved for the Athens campus.

Recruitment

BUCT is responsible for the program marketing and student recruitment efforts. All such student recruitment efforts shall comply with the recruitment policies of UGA. No agents or third parties will be involved in recruitment efforts.

7. Library and Laboratory Resources

BUCT will provide all facilities for delivery of the degree at its campus in Beijing. BUCT operates state-of-the-art classroom space across three campuses in Beijing, together with library, office, and student support facilities. The BUCT campus has been visited by College of Engineering leadership and has been deemed adequate for purposes of delivering the degree. Additionally, several faculty members from the UGA College of Engineering have previously taught summer courses at BUCT (e.g., Dr. Yajun Yan, Dr. William Kisaalita, Dr. James Warnock) and attest to the classroom and instructional technology as equivalent to the instructional technology in the renovated Driftmier Engineering Center at UGA.

All necessary library materials are available to M.B.B. students through online databases. BUCT will provide access to the campus library in the event that students need physical books or other library materials. BUCT has 1.73 million physical books and journals and 8752 GB of electric books and journals.

Beijing University of Chemical Technology (BUCT) is a comprehensive university with a solid foundation in science and engineering, and complimentary programs in management, economics, law, literature, education, philosophy, and medicine. BUCT offers programs from undergraduate education

to postgraduate, doctoral, postdoctoral, and international student education. At present, the school has a total of 15 colleges, 15,331 full-time undergraduates, 7,055 graduate students (of which 953 are doctoral students), correspondence education, night university, and other continuing education students.

Bioengineering at BUCT is affiliated with the School of Life Science and Technology. The department administers degrees at the bachelors, masters, and doctoral level and offers the country's first bio-engineering post-doctoral program. Additionally, Bioengineering faculty work with the National Energy Biorefinery R & D Center, Beijing Key Laboratory of Bioprocessing Process, Beijing Biosafety High Precision Center, Biorefinery Engineering Research Center of the Ministry of Education, Beijing Soft Matter High Precision Center - Synthetic Biology Subcenter, Beijing University of Chemical Technology - Xiamen Biotechnology Transfer Center, Beijing University of Chemical Technology-Bohai Rim Bio-Industry Research Institute, and Beijing University of Chemical Technology - China-Japan Hospital Biomedical Transformation Engineering Research Center. The college currently has 94 instructional faculty, including academicians of the Chinese Academy of Engineering.

8. Budget

The program will be operated as a non-profit educational program and supported by tuition revenue from the students enrolled in the M.B.B. (BUCT campus). Determination of the tuition rate will be jointly decided by BUCT and UGA and is subject to approval from the local government in China and the Board of Regents of the University System of Georgia. Tuition is currently projected to be RMB 60,000 (USD \$8,450) per year.

Tuition will be collected by BUCT. All tuition revenue will be used for program implementation and development. BUCT will remit to UGA funds to cover UGA teaching, administrative, and travel costs from collected tuition. The teaching costs include the salary and fringe benefits for a full-time lecturer, who will be permanently located in Beijing, as well as teaching salary for faculty that may travel to Beijing to teach summer courses. The full-time lecturer will be paid \$40,000 per year, which is consistent with salaries for equivalent personnel at BUCT. Expenses for the steering committee members or UGA faculty traveling to Beijing to teach will also be covered by collected tuition.

In order to monitor the revenue and expenditure of the M.B.B. in both institutions, at the end of each calendar year, a financial review will be conducted to monitor the revenue and expenses in Athens and in China, including but not limited to personnel costs, equipment, materials and supplies costs, travel, administrative expenditures, program development funds, etc. Students shall be responsible for the payment of all tuition, fees, and other expenses that are not paid for under any scholarship or other financial arrangements of the Program.

	Year 1	Year 2	Year 3	Year 4	Year 5
Cohort #1	25	25			
Cohort #2		25	25		
Cohort #3			25	25	
Cohort #4				25	25
Cohort #5					25
Total Enrollment	25	50	50	50	50
Tuition per student per year (USD) ¹	\$ 8,451	\$ 8,451	\$ 8,451	\$ 8,451	\$ 8,451
Tuition per student per year (CNY) ²	¥ 60,000	¥ 60,000	¥ 60,000	¥ 60,000	¥ 60,000
Total Tuition	\$ 211,268	\$ 422,535	\$ 422,535	\$ 422,535	\$ 422,535
Total Tuition	¥ 1,500,000	¥ 3,000,000	¥ 3,000,000	¥ 3,000,000	¥ 3,000,000
UGA Teaching Cost ^{3, 5, 6}	¥ 127,800	¥ 353,211	¥ 353,211	¥ 353,211	¥ 353,211
BUCT Teaching Cost ^{4, 5}	¥ 138,600	¥ 294,000	¥ 294,000	¥ 294,000	¥ 294,000
UGA Admin Cost	¥ 320,000	¥ 320,000	¥ 320,000	¥ 320,000	¥ 320,000
UGA Travel Cost	¥ 250,000	¥ 250,000	¥ 250,000	¥ 250,000	¥ 250,000
BUCT Admin Cost	¥ 240,000	¥ 240,000	¥ 240,000	¥ 240,000	¥ 240,000
Total Cost	¥ 1,076,400	¥ 1,457,211	¥ 1,457,211	¥ 1,457,211	¥ 1,457,211
Balance	¥ 423,600	¥ 1,542,789	¥ 1,542,789	¥ 1,542,789	¥ 1,542,789

1. Students enroll in 19 hours per year. Approximate tuition rate is \$445 per credit hour.

2. Exchange rate: \$1 = ¥ 7.1

5. UGA lecturer will be paid \$40,000 plus fringe benefits (24.37%) per academic year.

6. UGA part-time instructors hired in year 1 will be paid \$6,000 per 3 credit hour course.

9. Program Costs Assessed to Students

No additional program costs beyond tuition and fees will be assessed to students.

10. Accreditation

Appropriate accreditation procedures will be carried out by the authorized institution.

Exhibit A

**佐治亚大学与北京化工大学生物工程硕士项目单学位课程设置
Curriculum by semester for M.B.B. Taught on BUCT Campus
(Single Degree Chinese students)**

学期 /Term	课程编号 Course Code	课程名称 Course Name	英文名称 Course Name in English	学分 Credit	课程性质 Category	课程来源 Course from	教师来源 Taught by
1st year autumn	BIOE 6780	生物加工工程规范与伦理	Regulations and Ethics in Biomedical Engineering	3	Core	UGA	UGA
	BCMB (BCHE) 6030L	生物过程工艺	Bioprocess Technology	4	Core	UGA	UGA
	ENTR 7090	批判思维	Critical Design Thinking	3	Elective	UGA	BUCT
				10			
1st year spring	BCHE 6510	生化工程	Biochemical Engineering	3	Core	UGA	UGA
	BIOS(PHAR) 7100E	生物信息学在制药和生物工程行业的应用	Biostatistical Applications for the Pharmaceutical and Biotechnology Industries	3	Core	UGA	BUCT
	ENTR 7500	创新创业概论	Introduction to Entrepreneurship	3	Elective	UGA	BUCT
1st year summer	ENGR 7900	企业实习	Graduate Internship	1	Core	UGA	UGA+BUCT
				10			
2nd year autumn	BCHE 6520	生化分离工程	Design of Biochemical Separations Processes	3	Core	UGA	UGA
	-	-	Approved Science / Bioengineering Elective	3	Elective	UGA	BUCT
	-	-	Approved Science / Bioengineering Elective	3	Elective	UGA	BUCT
				9			
2nd year spring	BCHE 8210	发酵工程	Fermentation Engineering Lab	3	Core	UGA	UGA
	-	-	Approved Science / Bioengineering Elective	3	Elective	UGA	UGA
	BCHE 7010	课题研究	Project-Focused Masters Research	3	Core	UGA+BUCT	UGA+BUCT
				9			
Total				38			

**Master of Biomanufacturing and Bioprocessing
Fall 2020**

Program Requirements

Students must earn a grade of "C" (2.0) or better in all courses and must maintain an overall GPA of >3.0.

YEAR ONE					
<u>Fall Semester</u>		<u>Hours</u>	<u>Spring Semester</u>		<u>Hours</u>
BIOE 6780	Regulations and Ethics in Biomedical Engineering	3	BCHE 6510	Biochemical Engineering	3
BCMB 6030L	Bioprocess Technology	4	BIOS(PHAR) 7100E	Biostatistical Applications for the Pharmaceutical and Biotechnology Industries	3
	Business Elective	3		Business Elective	3
Total Credit Hours		10	Total Credit Hours		9
<u>Summer</u>					
ENGR 7900	Graduate Internship	1			
Total Credit Hours		1			
YEAR TWO					
<u>Fall Semester</u>		<u>Hours</u>	<u>Spring Semester</u>		<u>Hours</u>
BCHE 6520	Design of Biochemical Separations Processes	3	BCHE 8210	Fermentation Engineering Lab	3
	Science / Engineering Elective	3	BCHE 7010	Project-Focused Masters Research	3
	Science / Engineering Elective	3		Science / Engineering Elective	3
Total Credit Hours		9	Total Credit Hours		9

Business Electives (select two of the following):

ENTR 7090	Critical Design Thinking (3 hours)	ENTR 7515	Entrepreneurship (3 hours)
ENTR 7310	Innovation Management (3 hours)	ENTR 7525	Managing the Entrepreneurial Venture (3 hours)
ENTR 7320	Innovative Business Projects (3 hours)	MGMT 7220	Project Management (3 hours)
ENTR 7500	Introduction to Entrepreneurship (3 hours)	FINA 7010	Financial Management (3 hours)
ENTR 7510	Developing Successful Business Plans (3 hours)	MIST 7600	Data Management and Analytics (3 hours)

Science/Engineering Electives (select three of the following):

Track 1: Synthetic Biology		Track 2: Biopharmaceutical & Cell Manufacturing	
BCHE 6655	Metabolic Engineering and Synthetic Biology (3 hours)	BCHE 6650	Animal Cell Biomanufacturing (3 hours)
BCHE 8350	Sustainable Process Engineering (3 hours)	PHAR 6030	Current Good Manufacturing Practices (4 hours)
BIOE(BCHE) 8610	Bioelectroanalytical Techniques (3 hours)	ADSC(BIOE) 8240	Engineering Stem Cell Therapeutics (3 hours)
ENGR 6490	Renewable Energy Engineering (3 hours)	BIOE 8120	Regenerative Medicine, Cell Manufacturing and Society (3 hours)
BCHE 6550	Bioprocess Design and Simulation (3 hours)	PHAR 6010	Pharmaceutical, Biotechnology and Device Industries (4 hours)
BCHE 8220	Advanced Metabolic Engineering and Synthetic Biology (3 hours)	BCMB(CBIO)(GENE) 8113	Advanced Genetics, Cell Biology, Biochemistry, and Molecular Biology 1a (2 hours)
MIBO 6600L	Experimental Microbiology Lab (3 hours)	BCMB(CBIO)(GENE) 8213	Advanced Genetics, Cell Biology, Biochemistry, and Molecular Biology II (2 hours)
GENE 6520	Genetics of Industrial Micro-Organism (3 hours)		
GENE(MIBO) 8980	Prokaryotic Genetics (2 hours)		

Documentation of Approval and Notification

Proposal: Offer the Existing Master of Biomanufacturing and Bioprocessing (M.B.B.) at the Beijing University of Chemical Technology

College: College of Engineering

Department: School of Chemicals, Materials, and Biomedical Engineering

Proposed Effective Term: Spring 2022

Department:

- School of Chemicals, Materials, and Biomedical Engineering Chair, Dr. James Warnock, 2/16/21

School/College:

- College of Engineering Dean, Dr. Don Leo, 2/16/21

Graduate School:

- Vice Provost for Graduate Education and Dean of the Graduate School, Dr. Ron Walcott, 4/14/21