

# 2020 CQU-UBC “2+2” Undergraduate Program of Materials Science and Engineering

1. Program Overview: The School of Materials Science and Engineering of Chongqing University owns two first-level disciplines: materials science and metallurgy. Based on the advantages of these two disciplines, the school develop an undergraduate program that integrates the characteristics of these two disciplines and cultivate students on general academic subject to fulfil the current requirements of the nation and the society on professionals in metallurgy and materials science. The aim of the undergraduate program is to gradually change the mode of cultivation from professional education in a single discipline to general education combining personal qualities and scientific spirit, and to realize personalized education in the context of interdisciplinary and comprehensive cultivation. The degree programs on materials science in Chongqing University include three degree programs: materials science and engineering (including four directions: materials science, materials processing engineering, construction materials engineering and decorative materials and engineering), materials forming and control engineering, and metallurgical engineering. Through this program, the graduates are expected to own excellent ideological character, profound humanities quality, solid foundations on basic theories, excellent professional skills and strong innovation consciousness, can work in scientific research, technology development, process design, production and management in the field of materials and metallurgy, and can develop into an adaptive and creative professional high-level leader in the future.

The program of materials science and engineering adopts the "1+3" mode, i.e., one year of general academic subject study, and then 3 years major study.

## 2. Major Overview

College of Materials Science and Engineering of Chongqing University originated from the Department of Metallurgy, which was founded in 1935. It was successively merged with the Department of Materials Science and Engineering of the former Chongqing Jianzhu University and the Department of Material Forming and Control Engineering of the College of Mechanical Engineering of Chongqing University to form the present College of Materials Science and Engineering. Now the College of Materials Science and Engineering covers all subjects of materials science and engineering, owns many advanced equipment and has a faculty team with many outstanding scholars. It has become an important base for both higher education and scientific research. At present, the college has two first-level disciplines, metallurgical engineering and materials science and engineering. It has three undergraduate degree programs: metallurgical engineering, materials science and engineering, and material forming and control engineering. The degree program of materials science and engineering includes four majors, namely materials science, building materials, material processing and building decoration materials. The college has a national key discipline of material science and a national key (nurture) discipline of iron and steel metallurgy. The school has two first-level discipline doctoral degree conferring centers and post-doctoral stations: Metallurgical engineering and Materials science and engineering. The college has many outstanding scholars, including academicians of the Academy of engineering, Yangtse river scholars, Member of the Discipline Evaluation Group of the Academic Degrees Committee of the State Council, National outstanding professional and technical personnel, The chief scientist of the national "973" project, the national "one and two levels" talent project, Member of the expert group in the field of materials of the National Eleventh Five-Year Plan "863", Winner of the Ho Leung Ho Lee Foundation Science and Technology Innovation Award, the winner of the National Science Foundation for Distinguished Young Scholars and the winners of the China

Youth Science and Technology Award. The college has a first-tier electron microscopy center in China and a modern "Metallurgy-Material Technology Experiment Building". Through decades of development, the college gradually formed a scientific research system for basic theoretical research and application technology development, including metallurgy, materials science, material processing, material forming, building materials, composite materials, environmental protection, etc. In addition, the college has established many scientific research platforms, including the National Engineering and Technology Research Center for Magnesium Alloys. The college has formed distinctive characteristics in iron and steel metallurgy, magnesium alloy, material processing and forming, new building materials, etc., and its scientific and technological strength in some research fields has entered the domestic leading and international advanced ranks.

The University of British Columbia (UBC) locates in Vancouver, which is known as the most livable city in the world. It is a multidisciplinary research university with first-class research and learning environment. UBC is ranked in the top 40 university in the world and one of the top 20 public universities in the world. Since its established in 1908, UBC has been guided by the philosophy of diligent in thinking and brave in innovation, aiming to promote a civilized and sustainable society. In the past 100 years, UBC has made remarkable achievements and cultivated many outstanding alumni. The UBC graduates distributed in 120 countries and have three Canadian Prime Ministers, 65 Olympic medalists, 195 members of the Royal Society of Canada, and eight Nobel Prize winners. The Department of Materials Engineering of UBC is a worldwide leader in materials processing engineering and has an excellent international reputation. The Department of Materials Engineering of UBC began in 1915 as the Department of Mines and Metallurgy at UBC, and has since been renamed the Department of Metallurgy, the Department of Metals and Materials Engineering, and the current Department of Materials Engineering. After 100 years of development, its scientific research and teaching cover traditional materials, new alloy design, advanced composite materials, electronic communication materials, biomedical materials, as well as new energy materials, environmental protection materials and resource regeneration and other emerging fields. Among the department's 17 professors, two professors are Fellow of Canadian Academy of Engineering, and two professors have been awarded the Order of Canada in the past 20 years. The students in Department of Materials Engineering of UBC are taught in small class by professors. Juniors and seniors can do annual internships in different companies. Students can also participate in the Corporate Paid Internship (Co-op) program from School of Engineering. In addition to solid professional training, the Department of Materials Engineering also focuses on the development of scientific research, management and communication skills, aiming to produce global leaders in the field of materials engineering.

In 2013, College of Materials Science and Engineering of CQU and Department of Materials Engineering of UBC signed an agreement to carry out joint education after many years of academic exchanges and research cooperation. After efforts of both sides, the joint program formally began to recruit students. The students spend their first 2 years in Chongqing University and another 2 years in UBC.

### **3. Standard length of schooling**

Four years.

### **4. Degree conferred**

Bachelor of engineering.

### **5. Professional training objectives and graduation requirements**

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Training objectives and specifications: The goal of this program is to cultivate research-oriented and innovative talents in the field of materials science and engineering.

Cultivate high-level, high-quality talents and innovators in either scientific research or engineering with broad basic knowledge of science and engineering in the field of materials, who can engage in scientific research and teaching, technology development, process and equipment design, technical transformation and business management in the related fields of preparation, processing & molding, material structure and

properties of various materials, or adapt to the development of socialist market economy in the new era. This direction requires students to master the instrumental knowledge, knowledge of humanities and social sciences, economy & management, natural sciences, and basic knowledge in general and specific disciplines. In the specialty, students mainly learn the basic theories and fundamental knowledge of materials science and engineering, receive basic training in materials design, preparation, processing process control, and analytical techniques on organization and structure, and have the basic ability to engage in research and development, design of new materials, engineering application of materials, and system analysis in the field of materials science and engineering.

Students should graduate with the knowledge, abilities and qualities to meet the following graduation requirements:

(1) Engineering knowledge: the ability to solve complex engineering problems in materials science and engineering via applying fundamentals and expertise of mathematical, natural science, and engineering.

① Master advanced mathematics, and apply it to the formulation, modeling and solving of engineering problems, with strong logical thinking skills and mathematical application skills.

② Acquire basic knowledge of natural sciences such as physics, chemistry, and mechanics that can be used in the design, calculation, and analysis of complex materials engineering problems.

③ Acquire knowledge of mechanical, electrical and electronic engineering technologies and engineering principles, and be able to apply the relevant engineering fundamentals for preliminary engineering design.

④ Master the basic theories and expertise related to materials science and engineering, and combine them with the knowledge of mathematical, natural science and engineering technology to solve complex engineering problems in the field of materials science and engineering.

(2) Problem Analysis: Be able to apply the basic principles of mathematics, natural and engineering sciences to identify, represent, and analyze complex engineering problems in materials science and engineering through literature survey to obtain valid conclusions.

① Ability to formulate and model complex engineering problems using basic principles learned in mathematics, natural sciences and engineering sciences.

② Be able to express complex engineering problems and seek solutions based on basic principles of materials science and engineering and related fundamental knowledge.

③Ability to apply the basic principles of relevant sciences to analyze complex engineering problems in materials preparation/processing and applications, with the help of literature survey and research to obtain valid conclusions.

(3) Design & develop solutions: be able to design solutions to complex engineering problems in the field of materials science and engineering, design systems, units (components) or processes to meet specific needs, and demonstrate a sense of innovation in the design process, taking into account social, health, safety, legal, cultural and environmental factors.

① Master the basic methods of material product development and process design. Understand the various factors that affect the product development process and process design.

② Be able to meet the specific needs of complex engineering problems in the field of materials science and engineering through rational design of processes, proper selection of materials and development of processing technologies based on the basic laws of material composition, organization, structure and properties.

③Be able to design and develop the whole process of material products, considering social, health, safety, legal, cultural and environmental factors, and propose innovative design solutions.

(4) Research: The ability to investigate complex engineering problems in materials science and engineering based on scientific principles and methods, including designing experiments, analyzing & interpreting data, and synthesizing information to reach reasonable and valid conclusions.

①To master materials engineering experimental research methods and their principles, and to have the ability to select and use appropriate experimental methods for specific materials engineering problems.

②Be able to apply the basic principles and scientific methods of materials science and engineering, to select research paths and design experimental protocols based on practical engineering problems.

③ Be able to optimize the formulation of experimental plans, select or build experimental platforms, scientifically collect experimental data, analyze and interpret experimental research results, and obtain reasonable and effective conclusions through information synthesis for complex

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engineering problems in the field of materials science and engineering.

(5) Usage of modern tools: The ability to develop, select, and use appropriate technologies, resources, and modern engineering & information technology tools for complex engineering problems in materials science and engineering, including prediction & simulation of complex engineering problems in materials science and engineering, and realizing their limitations.

①Acquire the principles and methods of using modern information technology tools, modern instruments, engineering tools, simulation software, etc., while realizing their limitations.

②Be able to develop, select and use modern professional testing equipment and analytical tools for complex engineering problems in the field of materials science and engineering, and effectively modern engineering & information technology tools to predict & simulate complex engineering problems, and eventually analyze and understand their limitations.

(6) Engineering and Society: Be able to perform sound analysis based on engineering-related background, evaluate the impacts of engineering practices and complex engineering problems on the social, health, safety, legal, and culture, and understand the responsibilities involved.

①Master the knowledge of relevant technical standards, industrial policies & laws & regulations, and culture in the field of expertise.

②Ability to objectively analyze, evaluate the impacts of engineering practices and solutions to complex engineering problems on the social, health, safety, legal, and culture, and understand the related responsibilities.

(7) Environment and Sustainability: Be able to understand and evaluate the impact of professional engineering practice on environmental, socially sustainable developments for complex engineering problems related to the field of materials science and engineering.

①Understand national strategies for environmental and social sustainable development and related policies, laws and regulations, establish the concept of environmental protection and sustainable development and understand its connotations.

②Be able to understand and evaluate the impact of engineering practices on environmental and social sustainability for complex engineering problems related to the field of materials science and

engineering.

(8) Professional Standards: Humanistic and social science literacy, social responsibility, and the ability to understand and abide by engineering professional ethics & codes, and fulfill responsibilities in the field of materials science and engineering in engineering practice.

①Have a correct outlook on life and values, understand the relationship between the individual, society, national conditions and history, have humanistic and social science literacy and social responsibility.

②Ability to understand and comply with professional ethics and codes of conduct in the practice of engineering in the field of materials science and engineering, and consciously fulfill their responsibilities.

(9) Individual and Team: Ability to undertake the roles of individual, team member, and leader in a multidisciplinary background.

①Demonstrate interpersonal and teamwork skills, be able to work independently or cooperatively in a team

②Ability to do well in the role that he/she is expected in a multidisciplinary background, via organizing, coordinating or directing the team.

(10) Communication: Ability to communicate and interact effectively with industry peers and the public on complex engineering issues in materials science and engineering, including writing reports and design briefs, presenting speeches, and articulating or responding to instructions. Have an international perspective and be able to communicate and interact in a cross-cultural background.

①Master the writing methods and presentation skills of technical documents or scientific papers, and have the ability to write reports, design drafts. Be able to communicate effectively with industry peers and the public on complex engineering problems in the field of materials science and engineering.

②Master a foreign language, understand international development trends and research hotspots in the field of materials, and have a certain international perspective and the ability to communicate and interact in a cross-cultural background.

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(11) Project Management: Understand & master the principles of engineering management and economic decision-making methods, and be able to apply them in a multidisciplinary environment.

① To master the principles of engineering management and economic decision-making methods involved in the practical activities of materials science and engineering.

② Be able to apply engineering management and economic decision-making methods in the process of engineering design and technology development in the field of materials science and engineering in a multidisciplinary environment. Apply engineering management and economic decision-making methods correctly.

(12) Lifelong learning: A sense of self-directed and lifelong learning, with the ability to continuously learn and adapt to development.

① Be able to recognize the importance of continuous exploration and learning in the context of social and technological development, and have a sense of self-directed and lifelong learning.

② The ability to be physically fit, constantly learning and adapting to development.

## 6. Professional Core course

Core courses in CQU: engineering materials, metallurgical thermodynamics, thermal metallurgy, transport phenomenon, etc.

Core courses in UBC: Simulation in material processing, mechanical behavior of materials, phase transformations, material economics, etc.

## 7. Characteristic courses (refer to seminar courses, English courses, etc.)

Freshman seminars, materials design; courses in English: engineering materials, metallurgical thermodynamics, pyrometallurgy, transport principles, etc.

## 8. Graduation credit requirements

Course category	Compulsory credits	Elective credits	Notes
General education Courses		8	
Public basic Courses	14	0	Political Education
		8	Foreign Languages
	24		Math
	9		Physics

	4	2	Military and Sports
	4.5	0	Biochemistry
	2	3	Computer Science and Technology
Major basic Courses	27	7	
Professional basic courses	27	9	
Intensive Practical courses	18		
Nonrestrictive Elective Courses		8	
The Secondary Class			
Summation	174.5		
Notes			

## 9. Schedule of courses

### Curriculum schedule of UBC class majored in materials science and engineering

Course Code	Course Name	Credit	Total Class Hours	Online Class Hours	Schedule Hours	Class Hours allocated				Recommended semester	Notes
						Theory	Experiment	Practice	Extracurricular		
1. Ideological and political theory course: 14 credits											
MT10100	Ethics and principles of law	2	32		32	32				1	
MT10200	Outline of Chinese Modern History	3	48		48	48				2	
MT00000	Situation and Policy.	2	64		64	64				1-8	
MT20400	Introduction to Mao Zedong Thought and Theoretical System of Socialism with Chinese Characteristics	4	64		64	64				3	

MT20300	Basic Principle of Marxism	3	48		48	48				4	
	<b>Total</b>	14	224		224	224					
<b>2. Military courses: 2 credits</b>											
MET1100 0	Military division (including military training and military theory)	2	2 weeks					2 wee ks		1	
<b>3. Physical courses: 2 credits</b>											
PESS020 0	Physical Health Knowledge (Theory)	1	32		32	32				1	
PESS020 3	Long-distanc e running	1	32		32	32				1-4	
PESS220 30	Self-selected Skill	2	64		64	64				1-7	
	<b>Total</b>	4	128		128	128					
<b>4. Math courses: 17 credits</b>											
MATH10 013	Advanced Mathematics I(Engineering class)	5	80		80	80				1	
MATH10 023	Advanced Mathematics II(Engineerin g class)	6	96		96	96				2	
MATH10 032	Linear Algebra (II)	3	48		48	48				3	
MATH20 041	Probability and Mathematical Statistics I	3	48		48	48			36	4	
MATH20 083	Multivariable Calculus	4	64		48	48			16	3	
MATH30 085	Ordinary Differential Equations	3	48		48	48				3	
	<b>Total</b>	24	384		384	384					
<b>5. Physical Sciences courses: 13.5 credits</b>											

CHEM1000	College Chemistry I	3.5	56		56	56				1	
CHEM1200	College Chemistry Experiment I	1	16		16		32			1	
PHYS10013	College Physics II -1	3.5	56		56	56				2	
PHYS12010	College Physics Experiment	1.5	24		24		48			2	
PHYS10023	College Physics II -2	4	64		64	64				3	
	<b>Total</b>	13.5	216		216	176	80			26	
<b>Elective courses: 13 credits</b>											
<b>1. Computer courses: 3 credits</b>											
CST11001	Fundamentals of College Computer	2	32		32	16	32		32	1	Credits required in the elective module ≥ 3.0
CST11011	Programming (C Language)	3	48		48	32	32		32	2	
CST11012	Programming (Python)	3	48		48	32	32		32	5-8	
CST11013	Programming (C++)	3	48		48	32	32		32	5-8	
CST11014	Programming (VB.NET)	3	48		48	32	32		32	5-8	
CST21001	Fundamentals of Computer Information Management	3	48		48	32	32		32	5-8	
CST21002	Big Data and Its Application	3	48		48	32	32		32	5-8	
	<b>Total</b>	20	320		320	208	224		224		
<b>2. Physical Courses: 2 credits      Take 2 credits in the optional project module</b>											
PESS0201	Optional Courses (Swimming)	1	32		32					1-4	
PESS0204	Optional Courses	1	32		32					1-4	

	(Basketball)										
PESS020 5	Optional <b>Courses</b> (Football)	1	32		32					1-4	
PESS020 6	Optional <b>Courses</b> (Air Volleyball)	1	32		32					1-4	
PESS020 7	Optional <b>Courses</b> (Table Tennis)	1	32		32					1-4	
PESS020 8	Optional <b>Courses</b> (Badminton)	1	32		32					1-4	
PESS020 9	Optional <b>Courses</b> (Tennis)	1	32		32					1-4	
PESS021 0	Optional <b>Courses</b> (Aerobics)	1	32		32					1-4	
PESS021 1	Optional <b>Courses</b> (Yoga)	1	32		32					1-4	
PESS021 2	Optional <b>Courses</b> (Dance Sport)	1	32		32					1-4	
PESS021 3	Optional <b>Courses</b> (Tai Chi Regimen)	1	32		32					1-4	
PESS021 4	Optional <b>Courses</b> (Sanda)	1	32		32					1-4	
PESS021 5	Optional <b>Courses</b> (Taekwondo)	1	32		32					1-4	
PESS021 6	Optional <b>Courses</b> (Campus Marathon)	1	32		32					1-4	
PESS021	Optional	1	32		32					1-4	

7	Courses (Fitness and Shape)										
	Total	15	480		480						
3. Foreign language courses: 8 credits    Literacy in English (4 credits, Using hierarchical) + English Extension Course (4 credits)											
ENLS100 21	Academic English Listening and Notes Taking	3	48		48	48				1	S t a r t i n g  p o i n t o f f i r s t c l a
ENWR10 011	Critical Reading and Writing in English	3	48		48	48				2	

											s
											s
EDS2030 1	Topic English Reading	2	32		32	32				3/4	S t a r t i n g  p o i n t o f f i r s t c l a s s ( C h o o s e  t w o  i n t e n )
EDS2080 1	Business English Reading and Writing	2	32		32	32				3/4	
EDS2080 3	Study Skills for Academic Success	2	32		32	32				3/4	
EGP2040 1	Topic English Writing	2	32		32	32				3/4	
EDS2070 1	Cross-Cultura l Communicati on	2	32		32	32				3/4	
EGP2010 3	News English Audio-Visual Speaking	2	32		32	32				3/4	
EGP2020 1	Presentation and Communicati on	2	32		32	32				3/4	
EGP2070 1	Chinese Culture Introduction	2	32		32	32				3/4	
GP20702	Introduction to American Society and Culture	2	32		32	32				3/4	
EGP2020 3	Advanced Communicati on English Audio-Visual Speaking	2	32		32	32				3/4	
EDS2040 1	English Academic Writing	2	32		32	32				3/4	S t a r t i
EDS2050 1	Business English	2	32		32	32				3/4	

	Translation										n g p o i n t o f s e c o n d a n d t h i r d c l a s s ( C h o o s e t w o i n s e v e n t e
EDS2050 4	Information Technology Translation	2	32		32	32				3/4	
EDS2050 6	Science And Technology Reading and Translation	2	32		32	32				3/4	
EGP2040 2	Critical Reading and Writing	2	32		32	32				3/4	
EDS2070 2	Cross-Cultura l Business Communicati on	2	32		32	32				3/4	
EDS2080 2	International Business Communicati on and Negotiation	2	32		32	32				3/4	
EDS2080 4	Critical Analysis	2	32		32	32				3/	
EGP2010 2	Listening of TED Speech	2	32		32	32				3/4	
EGP2020 2	English Speech	2	32		32	32				3/4	
EDS2050 5	Western Architectural Culture and Translation	2	32		32	32				3/4	
EGP2060 1	Appreciation of English Poetry	2	32		32	32				3/4	
EGP2060 2	Appreciation of English Novels	2	32		32	32				3/4	
EGP2070 3	Preliminary Understandin g of Greek Civilization	2	32		32	32				3/4	
EGP2070 4	Comparison of Chinese	2	32		32	32				3/4	

	and American Cultures										e n )
EGP20705	Culture and Society of Modern British	2	32		32	32				3/4	
EDS20201	Advanced Academic English Audio-Visual Speaking	2	32		32	32				3/4	
ENGL112	Strategies for University Writing	3	39		39	39					
WRDS150	Research and Writing in Humanities and Social Sciences	3	39		39	39					
EIUS20101	English Literacy for International Study - Academic Listening Comprehension	2	32		32	32				3/4	C E T - 4 ≥ 5 0 0
EIUS20301	English Literacy for International Study - Academic Reading	2	32		32	32				3/4	o r C E
EIUS20401	English Literacy for International Study - Academic Writing	2	32		32	32				3/4	T - 6 ≥
EIUS20201	English Literacy for International Study -	2	32		32	32				3/4	4 5 0

	Academic Communication										
	<b>Total</b>	68	1088		1088	1088					
<b>General education courses</b>											
<b>Requirements: ≥8 credits</b>											
GDC28000	General Education Courses	8	128		128	128				1-7	
	UBC Humanity Selectives	3	39		39	39				5-8	
	UBC Impact of Technology on Society	3	39		39	39				5-8	
	<b>Total</b>	<b>14</b>	<b>206</b>		<b>206</b>	<b>206</b>					
<b>Major Basic Courses</b>											
<b>Requirements: 4.5 credits for basic courses in major categories</b>											
<b>Compulsory Courses (4.5 credits)</b>											
MSE10000	Freshman Seminar	1	16		16	16				1	
ME10102	Engineering Drawing II	3.5	56		56	56				2	
	<b>Total</b>	<b>4.5</b>	<b>72</b>		<b>72</b>	<b>72</b>					

Curriculum Code	Course Name	Credit	Total Class Hours	Online Class Hours		Class Hours Allocated				Recommended Semester	Notes
						Theory	Experiment	Practice	Extracurricular		
Professional Foundation Courses											
Requirement: No less than 20.5 credits in the basic courses											

<b>Compulsory Courses (18.5 credits)</b>											
MSE20902	Engineering Materials	3	48		48	48				3	
MTRL 456	Environmental Degradation of Materials	3	39		39	39					
MTRL 460	Monitoring and Optimization of Materials Processing	3	39		39	39					
EE21360	Electronics in Electrical Engineering (III)	2	32		32	28	8			3	
MSE20904	Metallurgical Thermodynamics I	4	64		64	64				3	
AEME21410	Engineering Mechanics	3.5	56		56	54	4			3	
	<b>Total</b>	18.5	278		278	278	12				
<b>Elective Courses (<math>\geq 2</math> credits)</b>											
MSE20901	Technical Communication	3	48		48	48				4	
	<b>Total</b>	3	48		48	48					
<b>Professional Curriculum</b>											
<b>Requirement: no less than 38.5 credits of professional courses</b>											
<b>Required Courses (31.5 credits)</b>											
MSE20908	Materials in Design	3	48		48	48				4	
MSE20905	Transport Phenomena I	3	48		48	48				4	
MSE20906	Transport Phenomena II	3	48		48	48				4	
AEME21214	Introduction of Mechanics of Materials	3	48		48	48				4	
MSE20907	Pyrometallurgy	4	64		64	48				4	
MTRL 365	Mechanical Behaviour of Materials	3	39		39	39				5/6	
MTRL 350	Thermodynamics of Materials II	4	52		52	52				5/6	
MTRL 340	Manufacturing in Materials	3	39		39	39				5/6	

	Engineering					9					
MTRL 361	Modelling of Materials Processes	4	52		52	52				5/6	
MTRL 378	Phase Transformations	3	39		39	39				5/6	
	<b>Total</b>	33	477		477	477					
<b>Elective Courses (<math>\geq 7</math> credits)</b>											
MTRL 358	Hydrometallurgy I	3	39		39	39					
MTRL 382	Ceramics I	4	52		52	52					
MTRL 442	Coatings and Surface Modifications	3	39		39	39					
MTRL 471	Nanofibre Technology	3	39		39	39					
MTRL 381	Structure and Properties Laboratory	1	13		13	13					
MTRL 472	Welding and Joining of Materials	3	39		39	39					
MTRL 475	Microstructure Engineering	3	39		39	39					
MTRL 478	Electronic Materials	3	39		39	39					
MTRL 485	Failure of Materials	3	39		39	39					
MTRL 494	Composite Materials	3	39		39	39					
MINE 331	Physical Mineral Processes	3	39		39	39					
CHBE 455	Reactor Design	3	39		39	39					
MTRL 458	Hydrometallurgy II	3	39		39	39					
MINE 333	Flotation	3	39		39	39					
BMEG 452	Biomedical Equipment, Physiology and Anatomy	3	39		39	39					
BMEG 456	Clinical and Industrial Biomedical Engineering	3	39		39	39					

MTRL 495	Biomaterials	3	39		39	39					
MTRL 486	Nondestructive Evaluation	3	39		39	39					
CHBE 357	Interfacial Phenomena	3	39		39	39					
CHBE 381	Bioprocess Engineering I	3	39		39	39					
CHBE 401	Mechanical Pulping and Papermaking	3	39		39	39					
CHBE 455	Reactor Design	3	39		39	39					
CHBE 477	Fuel Cell and Electrochemical Engineering	3	39		39	39					
CHBE 481	Bioprocess Engineering II	3	39		39	39					
CHBE 485	Air Pollution Prevention and Control	3	39		39	39					
MECH 360	Mechanics of Materials	3	39		39	39					
MECH 435	Orthopaedic Biomechanics	3	39		39	39					
MECH 436	Fundamentals of Injury Biomechanics	3	39		39	39					
MECH 462	Finite Element Analysis	3	39		39	39					
MECH 485	Aircraft Design: Structures	3	39		39	39					
MINE 303	Rock Mechanics Fundamentals	3	39		39	39					
MINE 331	Physical Mineral Processes	3	39		39	39					
MINE 333	Flotation	3	39		39	39					
MINE 404	Mine Management	3	39		39	39					
MINE 434	Processing Precious Metal Ores	3	39		39	39					
MINE 482	Maintenance Engineering	3	39		39	39					
MINE 486	Mining and the Environment	3	39		39	39					

APSC 440	Management Fundamentals	3	39		39	39						
APSC 486	New Venture Design	3	39		39	39						
	<b>Total</b>	116	1508		1508	1508						
<b>Course Practice</b>												
<b>Requirements: 17 credits</b>												
<b>Compulsory Courses (17 credits)</b>												
MT13100	Ideological and Moral Cultivation and Legal Foundation Practice	1	2 weeks		2 weeks			2 weeks				
IPT13400	Introduction to Mao Zedong Thought and Theory of Socialism with Chinese Characteristics	1	2 weeks					2 weeks				
ENGR14003	Metalworking Practice II	3	3 weeks					3 weeks				
MSE20903	Engineering Materials Laboratory	1										
MTRL359	Hydrometallurgy I Laboratory	1										
APSC 450	Professional Engineering Practice	2										
MTRL 466	Engineering Project I	3										
MTRL 467	Engineering Project II	3										
	<b>Total</b>	17										
<b>Personalization Module</b>												
<b>Requirements: At least 8 credits during the course of study.</b>												
<b>Description: It consists of unrestricted elective courses, cross-courses, short-term international exchange programs, innovative practice sessions, and second classes.</b>												
<b>Nonrestricted Elective Courses: At least one course from one major to another.</b>												
MTRL 489	Seminar III	1	13									

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MTRL 394	Polymers and Polymer Matrix Composites	4	52							
MTRL 455	Economic Aspects of Materials Engineering	3	39							
	Total	8	32		32			32		