

International Program Curriculum for the Undergraduate Schools Faculty of Science and Engineering, Waseda University (for entrance in September 2013)

Courses at the Faculty of Science and Engineering are comprised of Group A (foreign language courses), Group B (natural sciences courses), Group C (specialized courses) and other course groups. Students earn a bachelor's degree by taking courses in each group and completing a specified number of credits. Within Group C, the courses are divided into "required courses" which are courses that the students are required to take and earn credits based on their department, "elective required courses" which are courses that the students choose within a limited group of courses, and "elective courses" which are courses that the students can choose freely from the elective course group and earn a specified number of credits.

School	Department	Specified Number of Credits Required for Groups A to D										Number of Credits to Be Earned Freely From Groups A-D and Other Courses (*1)	Total		
		Group A		Group B				Group C			Group D				
		A1	A2	B1	B2			B3	B4	Specialized courses				Optional	
		Multi-disciplinary studies	Foreign Language (English)	Mathematics	Natural Sciences			Laboratory / Recitation	Information Science	Required Courses	Elective Required Courses				Elective Courses (*2)
Physics	Chemistry				Life Science										
Fundamental	Mathematics									8	22	25	0	31	136
	Applied Mathematics									8	22	25		31	136
	Computer Science and Engineering									8	22	25		31	136
Creative	Modern Mechanical Engineering									6	40	4		36	136
	Civil and Environmental Engineering									6	36	8		36	136
Advanced	Physics (P)	6	2	20	4	4	2	8	4	22	16	17		31	136
	Applied Physics (AP)									22	16	17	31	136	
	Chemistry and Biochemistry (CB)									0	0	55	31	136	
	Applied Chemistry (AC)									0	0	55	31	136	
	Life Science and Medical Bioscience (LMB)									0	0	55	31	136	
	Electrical Engineering and Bioscience (EEB)									0	0	55	31	136	

(*1) Students can also take Japanese language courses, courses at other schools of Waseda University, and other courses of Faculty of Science and Engineering offered in Japanese. In this case, the credits earned will be counted toward the "Number of Credits to Be Earned Freely from Groups A-D and Other Courses". Also, for credits earned in excess from Groups A-D courses will also be counted toward the "Number of Credits to Be Earned Freely from Groups A-D and Other Courses".

(*2) Students can also take courses offered by other sub-programs of Faculty of Science and Engineering and specialized courses offered in English by sub-programs of other schools. In this case, the credits earned will be counted toward "Group C Elective Courses"

Common Courses in Groups A and B

Category				Course Name	Credits	Freshman		Sophomore	
						Fall	Spring	Fall	Spring
Group A	A1	Multidisciplinary Studies	Elective Required	History of Philosophy	2	●			
				Philosophy of Science	2		●		
				Introduction to Logic	2	●			
				Introduction to Ethics	2		●		
				The Chaotic Essence of Reality	2		●		
Group B	A2	Foreign Language (English)	Required	Writing for Scientists and Engineers	1			●	
				Research Presentation Skills	1				●
	B1	Mathematics	Required	Calculus A	4	●			
				Calculus B	4		●		
				Linear Algebra A	2	●			
				Linear Algebra B	2		●		
				Vector Calculus	2			●	
				Ordinary Differential Equations	2			●	
				Introduction to Probability and Statistics	2	●			
	Mathematics	Elective Required	Discrete Mathematics	2			●		
			Partial Differential Equations	2				●	
	B2	Physics	Required	Fundamentals of Mechanics	2	●			
				Fundamentals of Electromagnetism	2		●		
		Chemistry	Required	General Chemistry A	2	●			
General Chemistry B				2		●			
Life Science		Required	Introduction to Bioscience	2	●				
B3		Laboratory/Recitation	Required	Science and Engineering Laboratory 1A	3		●		
	Science and Engineering Laboratory 1B			3			●		
	Science and Engineering Laboratory 2A			2				●	
B4	Information Science	Required	Introduction to Programming	2	●				
			Introduction to Computer Science	2		●			

Group D Courses

Category		Course Name	Credits
Group D	Independent Studies	Volunteer	2
		Internship	2

Group C Courses ("Required Courses", "Elective Required Courses", "Elective Courses")

School	Required / Elective	Department	Course Name	Credits	Freshman		Sophomore		Junior		Senior				
					Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring			
Fundamental	Required	Common	Research Project B	4						●					
			Research Project C	4							●				
	Elective Required	Mathematics and Applied Mathematics	Set and Measure Theory	2			●								
			Foundations of Algebra	2			●								
			Foundations of Geometry	2				●							
			Numerical Analysis	2				●							
			Advanced Algebra	2					●						
			Advanced Geometry	2						●					
			Advanced Analysis	2						●					
			Mathematics of Simulation	2						●					
			Probability and Statistics	2						●					
			Applied Algebra	2							●				
			Applied Geometry	2							●				
			Applied Analysis	2							●				
			Number Theory	2							●				
			Functional Analysis	2							●				
			Stochastic Processes	2							●				
			Research Project A	2						●					
			Research Project D	2								●			
			Computer Science and Engineering		Circuit Theory A	2			●						
					Logic Circuits	2			●						
					Fundamentals of Programming	2			●						
	Algorithms and Data Structures	2						●							
	Computer Systems	2						●							
	Computer Science and Engineering Laboratory	2							●						
	Signal Processing	2							●						
	Information Network Systems	2							●						
	Operating Systems	2								●					
	Information Security	2								●					
	Elective	Computer Science and Engineering	Electrodynamics	2				●							
			Electronic Circuits	2					●						
			Communication Systems	2					●						
			Software Engineering	2					●						
			Teletraffic Theory	2					●						
			Information Theory	2						●					
			Transmission Theory	2						●					
			Wireless Communication	2						●					
			Multimedia Systems	2						●					
			Mobile Communications	2						●					
	Network Engineering	2							●						
Image Processing	2								●						

Group C Courses ("Required Courses", "Elective Required Courses", "Elective Courses")

School	Required / Elective	Department	Course Name	Credits	Freshman		Sophomore		Junior		Senior				
					Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring			
Creative	Required	Modern Mechanical Engineering	Graduation Thesis A	3								●			
			Graduation Thesis B	3								●			
			Graduation Thesis or Project A	3								●			
	Elective	Modern Mechanical Engineering	Graduation Thesis or Project B	3									●		
			Visual Thinking	2		●									
			Mechanical Design A	2			●								
			Mechanical Design B	2				●							
			Fundamentals of Robotics A	2			●								
			Fundamentals of Robotics B	2				●							
			Engineering Thermodynamics	2			●								
			Environmental Science A	2			●								
			Environmental Science B	2				●							
			Fluid Dynamics	2					●						
			Seminar A	2					●						
			Seminar B	2						●					
			Seminar C	2							●				
			Mechatronics Laboratory A	2						●					
			Mechatronics Laboratory B	2							●				
			Engineering Practice A	2						●					
			Engineering Practice B	2							●				
			Engineering Practice C	2								●			
			Mechanical Engineering Laboratory A	2								●			
			Mechanical Engineering Laboratory B	2									●		
			Civil and Environmental Engineering		Surveying	2		●							
					Surveying Practice	1		●							
					Civil and Environmental Engineering A	2		●							
					Civil and Environmental Engineering B	2			●						
					Soil Mechanics	2			●						
					Spatial Information and Intelligent System in Construction	2			●						
					Spatial Information Practice	1			●						
					Environmental Engineering A	2			●						
					Environmental Engineering B	2				●					
					Hydraulics A	2			●						
					Hydraulics B	2				●					
					Materials and Structures A	2			●						
					Materials and Structures B	2				●					
					Fundamentals of Urban Studies and Planning A	2			●						
					Fundamentals of Urban Studies and Planning B	2				●					
					Applied Mathematics for Engineers	2					●				
					Geotechnical Engineering	2					●				
					Structure Design Practice	1						●			
					Laboratory Work on Structures	1							●		
					Concrete Engineering	2							●		
			Steel Material and Structure	2							●				
			Laboratory Work on Concrete	1								●			
			Computer Aided Design (CAD)	2								●			
			Laboratory Work on Hydraulics and Water Quality	1									●		
			Elective	Common	E-business, Technology, and Legal Affairs	2			●						
					Resources Processing and Recycling	2					●				
					Earth and Environmental Science	2					●				
Building Environment	2							●							
Project Management	2								●						
Civil and Environmental Engineering A	2				●										
Soil Mechanics	2					●									
Hydraulics A	2					●									
Materials and Structures A	2					●									
Fundamentals of Urban Studies and Planning A	2					●									
Applied Mathematics for Engineers	2						●								
Civil and Environmental Engineering		Mechanical Design A			2			●							
		Fundamentals of Robotics A			2			●							
		Environmental Science A	2			●									

Group C Courses ("Required Courses", "Elective Required Courses", "Elective Courses")

School	Required / Elective	Department	Course Name	Credits	Freshman		Sophomore		Junior		Senior					
					Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring				
Advanced	Required	Physics (P) and Applied Physics (AP)	Graduation Thesis A	4							●					
			Graduation Thesis B	4									●			
			Intermediate Mechanics	2			●									
			Mathematical Methods for Physics A	2			●									
			Mathematical Methods for Physics B	2				●								
			Intermediate Electromagnetism	2			●									
			Quantum Mechanics A	2				●								
			Thermal Physics	2				●								
			Statistical Mechanics	2					●							
			Materials Physics A	2					●							
			Materials Physics B	2						●						
			Advanced Electromagnetism	2							●					
			Introduction to Computational Physics	2								●				
			Relativity	2							●					
			Quantum Mechanics B	2							●					
			Power Systems Engineering	2							●					
			Engineering Physics A	2								●				
			Engineering Physics B	2									●			
			Biological Physics A	2									●			
			Biological Physics B	2									●			
	Mathematical Programming	2								●						
	Electric Power Circuits	2								●						
	Frontiers of Device Engineering	2								●						
	Elective	CB / AC / LMB / EEB	Physics (P) and Applied Physics (AP)	Graduation Thesis A	4							●				
				Graduation Thesis B	4								●			
				Intermediate Mechanics	2			●								
				Mathematical Methods for Physics A	2			●								
				Mathematical Methods for Physics B	2				●							
				Quantum Mechanics A	2				●							
				Quantum Mechanics B	2					●						
				Thermal Physics	2					●						
				Statistical Mechanics	2						●					
				Materials Physics A	2					●						
				Materials Physics B	2						●					
				Relativity	2							●				
				Engineering Physics A	2							●				
				Engineering Physics B	2								●			
				Biological Physics A	2								●			
				Biological Physics B	2									●		
				Chemistry and Biochemistry (CB)			Green Materials Science	2	●							
							Inorganic Chemistry	2			●					
							Organic Chemistry	2			●					
							Physical Chemistry	2				●				
		Biochemistry	2								●					
		Physical Chemistry Laboratory	3									●				
		Inorganic Analytical Chemistry Laboratory	3										●			
		Organic Chemistry Laboratory	3											●		
		Applied Chemistry (AC)						Introduction to Applied Chemistry	2			●				
								Fundamentals of Chemical Engineering	2			●				
				Introduction to Industrial Chemistry	2					●						
				Field work in Research Institutions and Industry	2						●					
				Fundamentals of Materials Chemistry	2							●				
				Analytical Chemistry	2							●				
				Industrial Chemistry	2								●			
				Life Science and Medical Bioscience (LMB)				Molecular Cell Biology A	2			●				
								Life Science and Medical Bioscience Laboratory	6							
								Molecular Cell Biology B	2				●			
		Bioscience and Nanotechnology	2							●						
		Life Science and Medical Bioscience Seminar I	2									●				
		Intermediate Bioscience	2									●				
		Intermediate Life Science and Medical Bioscience Laboratory	2										●			
		Electrical Engineering and Bioscience (EEB)						Intermediate Electromagnetism	2			●				
								Advanced Electromagnetism	2				●			
								Introduction to Computational Physics	2					●		
				Power Systems Engineering	2							●				
				Advanced Electric Power Devices and Machines	2								●			
				Mathematical Programming	2									●		
				Electric Power Circuits	2									●		
				Frontiers of Device Engineering	2									●		
				Introduction to Solid State Physics	2									●		
				System Control	2										●	