

## FGL Program Undergraduate Courses Curriculum 2016

### General Education Subjects

\*\*Compulsory \*Elective Compulsory, No asterisk: Elective

#### (1) Core Subjects

Subject types	Subject Name: Course Title	Hrs./Wk.		Credits	Classes Offered
		1st year	2nd year		
Human Studies	World of Fine Arts: History of Art in Ancient Eurasia: Diffusion of Classical Greek Art into Central Asia	2		2	**AMC,*IMAC-U, **AMB
Social Studies	History and Human Society: History of Tohoku University	2		2	**AMC,*IMAC-U, **AMB
Science Studies	Life and Nature**: Study of Nature, Life and Technology	2		2	**AMC,*IMAC-U, **AMB

#### (2) Expansion Subjects

Subject types	Subject Name: Course Title	Hrs./Wk.		Credits	Classes Offered
		1st year	2nd year		
Human Sciences	History: Japanese Art History	2		2	*AMC,*IMAC-U, *AMB
	Linguistics: Introduction to Linguistics	2		2	*AMC,*IMAC-U, *AMB
Social Sciences	Economics: Japanese Business and Economy A	2	(2)	2	**AMC,**IMAC-U
			2	2	**AMB
Natural Sciences	Mathematics				
	Foundations of Calculus: An elementary introduction to calculus for functions of one or two variables.	2		2	**AMB
	Calculus A: Calculus of functions of one variable	2		2	**AMC,**IMAC-U
	Calculus B: Calculus of function of two variables	2		2	*AMC,**IMAC-U
	Calculus C: Introduction to the theory of ordinary differential equations		2	2	*AMC,**IMAC-U
	Foundations of Linear Algebra: An elementary introduction to linear algebra	2		2	**AMB
	Linear Algebra A: Fundamentals of Linear Algebra	2		2	*AMC,**IMAC-U
	Linear Algebra B: Basics of Linear Algebra	2		2	**AMC,*IMAC-U
	Probability & Statistics : An introduction to the theory of probability theory and statistics		2	2	**AMC,*IMAC-U, **AMB
	Physics				
Physics A: Mechanics	2		2	**AMC,**IMAC-U, AMB	
Physics B: Stress, Fluid Dynamics, Oscillations, Waves	2		2	*AMC,**IMAC-U, AMB	
Physics C: Electromagnetism	2		2	**AMC,*IMAC-U, AMB	

Natural Sciences	Chemistry	Chemistry A: Fundamentals of Chemical Bond Theory	2			2	**AMC,*IMAC-U,**AMB	
		Chemistry B: Fundamentals of Physical Chemistry	2			2	**AMC,**IMAC-U, AMB	
		Chemistry C: Fundamentals of Basic Organic Chemistry		2			2	**AMC,*IMAC-U,**AMB
	Biology	Biology A: Life Science A - Introductory Biochemistry I	2				2	*AMC,*IMAC-U,**AMB
		Biology B: Essential Cell Biology		2			2	AMC,**AMB
		Biology C: Integrative and engineering concepts in biology: Elements of Physiology and Systems biology		2			2	*AMC,**AMB
	Earth and Space Science	Mineralogy, Petrology & Geochemistry: Fundamentals of Crystal Structures of Solids	2				2	*AMC,*IMAC-U,**AMB
	Scientific Experiments	Introductory Science Experiments :		4			2	**AMC,**IMAC-U,**AMB

### (3) Common Subjects

Subject types	Subject Name: Course Title	Hrs./Wk.		Credits	Classes Offered
		1st year	2nd year		
Small - Group Freshmen Seminars	Introductory Seminar**; Interdisciplinary Seminar	2		2	**AMC,**IMAC-U,**AMB
Subjects for International Students	Basic Japanese 1: Japanese for beginners	8		4	**AMC,**IMAC-U,**AMB
	Basic Japanese 2: Japanese for advanced beginners	6		3	**AMC,**IMAC-U,**AMB
	Intermediate Japanese: Japanese for intermediate students		6	3	**AMC,**IMAC-U,**AMB
Information Sciences	An Introduction to Information Science B	2		2	**AMC,**IMAC-U,**AMB
Health Sciences	Sports A:	2		1	AMC
	Kyudo, Softball, Tennis, Basics of Badminton, Soccer, Volleyball	2		1	**IMAC-U
		2		1	**AMB
	Health: Health Care	2		2	AMC,*IMAC-U,**AMB

\*Credits required for curriculum completion

General Education Subjects	
AMC Course	50 credits
IMAC-U Course	49 credits
AMB Course	49 credits

## Specialized Subject

### (1) AMC Course

Subject Name	Hrs./Wk.				Credits	
	1st year	2nd year	3rd year	4th year	Compulsory	Elective
Introduction to Basic Chemistry	2				2	
General Biochemistry		2				2
Special Class in Basic Chemistry I		2				2
Special Class in Basic Chemistry II		2				2
Special Class in Basic Chemistry III		2				2
Special Class in Basic Chemistry IV		2				2
General Organic Chemistry A			2			2
Exercises in Organic Chemistry A			2			1
General Physical Chemistry A			2			2
General Physical Chemistry B			2			2
Exercises in Physical Chemistry A			2			1
General Inorganic and Analytical Chemistry A			2			2
General Inorganic and Analytical Chemistry B			2			2
Exercises in Inorganic and Analytical Chemistry A			2			1
Biochemistry IA			2			2
General Organic Chemistry C				2		2
General Organic Chemistry D				2		2
General Physical Chemistry C				2		2
General Physical Chemistry D				2		2
Exercises in Physical Chemistry B				2		1
General Inorganic and Analytical Chemistry C				2		2
General Inorganic and Analytical Chemistry D				2		2
Exercises in Inorganic and Analytical Chemistry B				2		1
General Organic Chemistry B				2		2
Polymer Chemistry I				1		1
Polymer Chemistry II				1		1
Instrumental Analysis in Organic Chemistry I				1		1
Instrumental Analysis in Organic Chemistry II				1		1
Physical Chemistry VA				1		1
Physical Chemistry VB				1		1
Organic Chemistry IA					1	1
Organic Chemistry IB					1	1
Organic Chemistry IIA					1	1
Organic Chemistry IIB					1	1
Physical Chemistry IA					1	1
Physical Chemistry IB					1	1
Physical Chemistry IIA					1	1
Physical Chemistry IIB					1	1
Physical Chemistry IIIA					1	1
Physical Chemistry IIIB					1	1
Inorganic Chemistry IA					1	1
Inorganic Chemistry IB					1	1
Inorganic Chemistry IIA					1	1
Inorganic Chemistry IIB					1	1
Analytical Chemistry A					1	1
Analytical Chemistry B					1	1
Biochemistry IIA					1	1
Biochemistry IIB					1	1
Basic Experiments in Chemistry				3	1	
Laboratory Experiments in Chemistry A				15	5	
Research in Chemistry I				6	2	

Laboratory Experiments in Chemistry B					18			6	
Special Course in Organic Chemistry I					1				1
Special Course in Physical Chemistry I					1				1
Special Course in Inorganic and Analytical Chemistry I					1				1
Special Course in Biochemistry I					1				1
Special Course in Polymer Chemistry I					1				1
Special Course in Organic Chemistry II					1				1
Special Course in Physical Chemistry II					1				1
Special Course in Inorganic and Analytical Chemistry II					1				1
Special Course in Biochemistry II					1				1
Special Course in Polymer Chemistry II					1				1
Multidisciplinary Internship**			1					(1)	
Science, Technology and Industry in Japan**		1						(1)	
Research in Chemistry II						15	15	10	

\*\* These subjects are compulsory for MEXT scholarship students.

\*Credits required for curriculum completion

Specialized Subject	
AMC Course	68 credits

## (2) IMAC-U Course

Subject Name	Hrs./Wk.				Credits		
	1st year	2nd year	3rd year	4th year	Compulsory	Recommended	Elective
Exercises in Mathematics and Physics I	2				1		
Exercises in Mathematics and Physics II		2			1		
Practice of Information Processing		2			1		
Team Based Engineering for Invention		4					2
Overview of International Mechanical and Aerospace Engineering Course	2					2	
Mathematics I		2					2
Mathematics II		2					2
Numerical Analysis	2						2
Mechanics	2						2
The Basics of Information Sciences	2						2
Fluid Mechanics I	2						2
Mechanics of Materials I		2					2
Mechanism	2						2
Electromagnetics I		2					2
Quantum Mechanics		2					2
Fundamentals of Electronic Circuits and Systems		2					2
Mechanical Vibrations I		2					2
Thermodynamics		2					2
Mechanics of Materials II		2					2
Materials Science		2					2
Systems Engineering		2					2
Computer Seminar			3		1		
Seminar I		4			2		
Electrical Engineering Laboratory		3			1		
Fundamentals of Computer Engineering			2				2
Electromagnetics II			2				2
Basic Nuclear Physics			2				2
Solution Chemistry			2				2
Environmental Geosciences			2				2
Fluid Mechanics II			2				2
Heat Transfer I			2				2

Instrumentation			2						2
Control Engineering I			2						2
Design for Materials Function			2						2
Computer Software Engineering			2						2
Theory of Elasticity			2						2
Creation and Production			2						2
Mechatronics			2						2
Electronic Devices			2						2
Laboratory Experiment I			3				1		
Design and Drawing I			3				1		
Seminar II			3				1		
Production Process Practice			3				1		
Fortran Exercises			2				1		
Introduction to Systems Design Engineering			2				2		
Introduction to Nanomechanics			2				2		
Introduction to Aerospace Engineering			2				2		
Introduction to Quantum Science and Systems			2				2		
Introduction to Biorobot System			2				2		
Introduction to Energy and Environment Technology			2				2		
Introduction to International Mechanical and Aerospace Engineering Course			2				2		
Kinetics in Reactions			2						2
Physical Chemistry of Interface			2						2
Environmental Biology			2						2
Energy Conversion System Engineering			2						2
Computational Fluid Dynamics			2						2
Heat Transfer II			2						2
Compressible Fluid Dynamics			2						2
Computational Mechanics			2						2
Fracture Mechanics			2						2
Tribology			2						2
Machine Design Engineering			2						2
Control Engineering II			2						2
Robotics			2						2
Digital Circuits			2						2
Laboratory Experiment II			3				1		
Design and Drawing II			3				1		
Aircraft Design			2						2
Applied Nuclear Physics			2						2
Radiochemistry			2						2
Introduction to Neutron Transport			2						2
Fundamentals on Backend of Nuclear Fuel Cycle			2						2
Advanced International Mechanical and Aerospace Engineering Course			2					2	
Plasma Physics					2				2
Energy Systems Engineering					2				2
Structural Mechanics					2				2
Precision Machining					2				2
Strength of Materials					2				2
Micromachine Forming					2				2
System Dynamics II					2				2
Computer Vision					2				2
Solid State Physics					2				2
Mechanoptics					2				2
Signal Processing					2				2
Environmental Science and Technology					2				2
Introduction to Industrial Chemistry					2				2
Introduction to Electrical Engineering					2				2
Introduction to Materials Science					2				2



Genetics and Breeding		2					2
Field Practice of Marine Production			3		3		2
Fishery Science Practice			12	18			10
Basic Chemistry, Practice			3				1
Basic Biology, Practice			3				1
Aqua cultural Biology					2		2
Fisheries Biology and Ecology				2			2
Aquatic Plant Ecology				2			2
Marine Biochemistry			2				2
Biological Oceanography				2			2
Marine Biotechnology				2			2
Applied Genetics in Aquatic Organisms				2			2
Aquatic Invertebrate Biology					2		2
Applied Aquatic Botany				2			2
Marine Product Technology				2			2
Seafood management					2		2
Planktonology			2				2
Integrate Aquatic Biology			2				2
Marine Applied Biochemistry					1		1
Related Subjects							4
Introduction to Fisheries Science		2					2
Practical Training					2		1
Marine Biology		2					2
Current topics of Agricultural Plant Science					2		2
Introduction to Resource and Environmental					2		2
Introduction to Applied Animal and Dairy Science					2		2
Applied Biological Chemistry					2		2
Food and Chemistry					2		2
Current topics of Shellfish Physiology					1		1
Current topics of Fish Ecology					1		1
Current topics of Fish Biochemistry					1		1
Current topics of Genetics in Aquatic organisms					1		1
Current topics of Coastal Ecology					1		1
Current topics of Fish Molecular Biology					1		1
Current topics of Plankton Biology					1		1
Multidisciplinary Internship**			1				(1)
Science, Technology and Industry in Japan**		1					(1)

\*\* These subjects are compulsory for MEXT scholarship students.

\*Credits required for curriculum completion

Specialized Subject	
AMB Course	85 credits