

2015-2016

POSTECH Undergraduate Catalog



POSTECH
POHANG UNIVERSITY OF SCIENCE AND TECHNOLOGY



Contents

Academic Calendar (2015)	4
Statutes of Pohang University of Science and Technology	6
POSTECH Academic Operations Guidelines	30
Division of Humanities and Social Sciences	50
Department of Mathematics	79
Department of Physics	91
Department of Chemistry	103
Department of Life Sciences	114
Department of Materials Science and Engineering (MSE)	125
Department of Mechanical Engineering	136



Department of Industrial and Management Engineering	146
Electrical Engineering	158
Department of Computer Science and Engineering	171
Department of Chemical Engineering	183
Department of Creative IT Engineering	196
Activity-Based General Education Curriculum (ABC)	205
Requirements for Double Majors and Minors	213

Academic Calendar (2015)

	Schedule	Description
3	3. 1 (Sun.)	National Holiday: Independence Movement Day
	3. 2 (Mon.)	First Day of Spring Classes
	3. 4 (Wed.) ~ 12 (Thu.)	Confirmation and Change of Course Registration
	3. 23 (Mon.) ~ 5. 1 (Fri.)	Withdrawal from Courses
	3. 27 (Fri.)	1/4 of Semester: Last Day to Apply for Transfer of Credits
4	4. 17 (Fri.)	Last Day to Submit List of Courses for Summer Session & Fall Semester
	4. 20 (Mon.) ~ 24 (Fri.)	Midterm Examinations
	4. 24 (Fri.)	2/4 of Semester
5	5. 5 (Tue.)	National Holiday: Children's Day
	5. 11 (Mon.) ~ 13 (Wed.)	Pre-Registration for Humanities & Social Sciences Courses for Summer Session
	5. 14 (Thu.) ~ 15 (Fri.)	Sunrise Festival (No Classes for Undergraduates)
	5. 19 (Tue.) ~ 21 (Thu.)	Course Registration for Summer Session
	5. 22 (Fri.)	3/4 of Semester: Last Day to Submit Leave of Absence Petitions
	5. 25 (Mon.)	National Holiday: Buddha's Birthday
6	6. 2 (Tue.) ~ 11 (Thu.)	Course Registration & Submission of Double Major/Minor Petitions for Fall Semester
	6. 6 (Sat.)	National Holiday: Memorial Day
	6. 15 (Mon.) ~ 19 (Fri.)	Final Examinations
	6. 22 (Mon.) ~ 8. 31 (Mon.)	Summer Recess
	6. 22 (Mon.) ~ 7. 31 (Fri.)	Summer Session
	6. 30 (Tue.)	Last Day to Submit Reports on Final Thesis Defense (for August Degree Candidates)
7	7. 1 (Wed.) ~ 10 (Fri.)	Withdrawal from MS-Ph.D. Integrated Program (for Fall 2015)
	7. 3 (Fri.)	Spring Grades Due
	7. 3 (Fri.)	Last Day to Submit Final Theses and Dissertations (for August Degree Candidates) / Last Day to Withdraw from Summer Session Courses
	7. 10 (Fri.)	Last Day to Petition for Grade Change / Last Day to Petition for Readmission (for Fall 2015)
8	8. 10 (Mon.) ~ 31 (Mon.)	Last Day to Request for Change of Major (for Fall 2015)
	8. 14 (Fri.)	Degrees Awarded (Commencement: Feb. 19, 2016)
	8. 15 (Sat.)	National Holiday: Liberation Day
	8. 24 (Mon.) ~ 27 (Thu.)	Fall Semester Enrollment
	8. 24 (Mon.) ~ 31 (Mon.)	Fall Semester Enrollment for Returning Students

	Schedule	Description
9	9. 1 (Tue.)	First Day of Fall Classes
	9. 3 (Thu.) ~ (Mon.)	Confirmation and Change of Course Registration
	9. 18 (Fri.) ~ 19 (Sat.)	POSTECH-KAIST Science War (No Classes for Undergraduates)
	9. 22 (Tue.) ~ 10. 30 (Fri.)	Withdrawal from Courses
	9. 25 (Fri.)	1/4 of Semester: Last Day to Apply for Transfer of Credits
	9. 26 (Sat.) ~ 29 (Tue.)	National Holiday: Chuseok (Korean Thanksgiving Day)
10	10. 3 (Sat.)	National Holiday: National Foundation Day
	10. 9 (Fri.)	National Holiday: Hangul Day
	10. 16 (Fri.)	Last Day to Submit List of Courses for Winter Session & Spring Semester
	10. 20 (Tue.) ~ 26 (Mon.)	Midterm Examinations
	10. 26 (Mon.)	2/4 of Semester
11	11. 9 (Mon.) ~ 11 (Wed.)	Pre-Registration for Humanities & Social Sciences Courses for Winter Session
	11. 17 (Tue.) ~ 19 (Thu.)	Course Registration for Winter Session
	11. 23 (Mon.)	3/4 of Semester: Last Day to Submit Leave of Absence Petitions
12	12. 1 (Tue.) ~ 12. 10 (Thu.)	Course Registration & Submission of Double Major/Minor Petitions for Spring 2016
	12. 3 (Thu.)	University Foundation Day
	12. 15 (Tue.) ~ 21 (Mon.)	Final Examinations
	12. 22 (Tue.) ~ 16. 2. 29 (Mon.)	Winter Recess
	12. 22 (Tue.) ~ 16. 2. 1 (Mon.)	Winter Session
	12. 25 (Fri.)	National Holiday: Christmas
1	1. 1 (Fri.)	National Holiday: New Year's Day
	1. 4 (Mon.)	Fall Grades Due / Last Day to Withdraw from Winter Session Courses
	1. 4 (Mon.) ~ 15 (Fri.)	Withdrawal from MS-PhD Integrated Program (for Spring 2016)
	1. 8 (Fri.)	Last Day to Submit Reports on Final Thesis Defense (for February Degree Candidates)
	1. 8 (Fri.)	Last Day to Submit Final Theses & Dissertations (for February Degree Candidates) / Last Day to Petition for Readmission (for Spring 2016)
	1. 11 (Mon.)	Last Day to Petition for Grade Change
2	2. 7 (Sun.) ~ 10 (Wed.)	National Holiday: Lunar New Year's Day
	2. 11 (Thu.) ~ 29 (Mon.)	Last Day to Request for Change of Major (for Spring 2016)
	2. 19 (Fri.)	Commencement
	2. 22 (Mon.) ~ 25 (Thu.)	Spring 2016 Enrollment
	2. 22 (Mon.) ~ 29 (Mon.)	Spring 2016 Enrollment for Returning Students
	2. 29 (Mon.)	Matriculation

Statutes of Pohang University of Science and Technology

Established Nov. 25, 1986	Amended Dec. 1, 1999	Amended May 21, 2006	Amended Jul. 8, 2012
Amended May 12, 1988	Amended Mar. 1, 2000	Amended Oct. 12, 2006	Amended Nov. 16, 2012
Amended May 18, 1990	Amended Jul. 1, 2000	Amended Nov. 1, 2006	Amended Feb. 6, 2013
Amended Aug. 27, 1991	Amended Jul. 20, 2000	Amended May 16, 2007	Amended Apr. 1, 2013
Amended Nov. 10, 1994	Amended Oct. 12, 2000	Amended Dec. 21, 2007	Amended Sep. 1, 2013
Amended Apr. 25, 1996	Amended Nov. 20, 2000	Amended Jan. 1, 2008	Amended Apr. 17, 2014
Amended Mar. 1, 1997	Amended Jun. 1, 2001	Amended Mar. 1, 2008	Amended Nov. 2, 2014
Amended Jul. 1, 1998	Amended Jul. 1, 2001	Amended Mar. 1, 2009	
Amended Nov. 11, 1998	Amended Aug. 8, 2003	Amended Mar. 24, 2009	
Amended Mar. 1, 1999	Amended Jan. 31, 2004	Amended Dec. 27, 2009	
Amended Jul. 5, 1999	Amended Mar. 1, 2005	Amended Nov. 26, 2010	
Amended Jul. 7, 1999	Amended Apr. 21, 2005	Amended Dec. 9, 2010	
Amended Jul. 19, 1999	Amended Jul. 15, 2005	Amended Apr. 1, 2011	
Amended Nov. 17, 1999	Amended Aug. 28, 2005	Amended Jan. 1, 2012	

Chapter 1 General Provisions

Article 1 (Purpose) Pohang University of Science and Technology (hereinafter referred to as “University”) is a research-oriented university and a leader in science and technology whose goal is to contribute to the advancement of the nation and the betterment of humanity through collaboration with industries, academia, and research institutes and to train and foster creative individuals with a well-rounded education.

Article 2 (Undergraduate and Graduate Programs) ① The University offers bachelor’s degree programs, master’s degree programs (hereinafter referred to as “Master’s Program”), doctoral degree programs (hereinafter referred to as “Doctoral Program”), and programs combining Master’s and Doctoral Programs (hereinafter referred to as “MS/PhD Integrated Program”). Matters pertaining to the graduate programs shall be governed by the Statutes of the Graduate School of Pohang University of Science and Technology.

② Undergraduate programs are offered by the Department of Mathematics, Department of Physics, Department of Chemistry, Department of Life Science, Department of Materials Science and Engineering, Department of Mechanical Engineering, Department of Industrial and Management Engineering, Department of Electrical Engineering, Department of Computer Science and Engineering, Department of Chemical Engineering, and Department of Creative IT Excellence Engineering. Graduate programs in the General Graduate School are offered by the Department of Mathematics, Department of Physics, Department of Chemistry, Department of Life Sciences, Department of Materials Science and Engineering, Department of Mechanical Engineering, Department of Industrial & Management Engineering, Department of Electrical Engineering, and Department of Computer Science and Engineering, Department of Chemical Engineering, Department of Creative IT Excellence Engineering, Division of Advanced Materials Science, Division of Integrative Bioscience and Biotechnology,

Division of Information Technology Convergence Engineering, and Division of Advanced Nuclear Engineering as well as by interdisciplinary programs in Environmental Science and Engineering, Interdisciplinary Bioscience and Bioengineering, Technology Innovation & Management, and Wind Energy. (Amended November 16, 2012)(Amended April 1, 2013)(Amended April 14, 2014)

③ The University shall have a Division of Humanities and Social Sciences to provide a liberal arts education.

④ The University shall have the Graduate Institute of Ferrous Technology and the POSTECH Ocean Science and Technology Institute as professional graduate school, and the Graduate School for Information Technology as a special graduate school.

Article 3 (Departments and Admission Capacities) The admission capacity of each department for an undergraduate program shall be specified in Table 1 (attached). However, an exception shall be granted when stipulated by the provisions of laws and regulations.

Article 4 (Affiliated Centers and Affiliated Research Centers) ① The University shall have the following affiliated centers and affiliated research centers:

1. Affiliated centers: POSTECH Center for Excellence in Education, POSTECH Leadership Center, POSTECH Language Education Center, POSTECH Counseling Center, The POSTECH Times, Technical Support Center, and Center for Business Development
2. Affiliated research centers: Pohang Accelerator Laboratory, POSTECH Information Research Laboratories, POSTECH Biotech Center, National Center for Nanomaterials Technology, POSTECH-CATHOLIC Biomedical Engineering Institute, POSTECH Future IT Innovation Laboratory, Polymer Research Institute, Basic Science Research Institute, National Nanotechnology Center for Industry, Brain Research Center, Biotechnology Research Center, Automotive Mechatronics Center, Advanced Environmental Biotechnology Research Center, Advanced Ferrous Technology Research Center, Steel Processing Automation Research Center, Institute of Environmental & Energy Technology, Center for Advanced Aerospace Materials, Micro Electro Mechanical System (MEMS) Research Center for National Defense, and Tae-Joon Park Institute

② Details pertaining to the organizations and operations of the affiliated centers and affiliated research centers shall be stipulated separately.

Article 4-2 (POSTECH Research and Business Development Foundation) ① The University shall have POSTECH Research and Business Development Foundation. The POSTECH Research and Business Development Foundation shall be established pursuant to the Promotion of Industrial Education and Industry-Academic Cooperation Act. (Established January 31, 2004)

② Details pertaining to the operations of the POSTECH Research and Business Development Foundation shall be stipulated separately.

Chapter 2 Minimum Time Required to Graduate, Enrollment Time Limit, and Accelerated Programs

Article 5 (Minimum Time Required to Graduate) ① The minimum time required to complete a bachelor's degree at the University shall be four years.

② For early graduation, the period may be reduced by up to one year.

Article 6 (Enrollment Time Limit) ① The enrollment time limit in the University shall be six years. However, the enrollment time limit for readmitted students and transfer students shall be 1.5 times the remaining period they are required to complete at the University.

② A student who fails to complete a degree program at the University within the enrollment time limit shall be dismissed from the University.

③ The period of leave of absence shall not count towards the enrollment time limit.

Article 6-2 (Accelerated Programs) ① The University shall offer Accelerated Programs to foster talented students in undergraduate programs. (Established July 15, 2005)

② Details pertaining to the operations of the accelerated programs shall be stipulated separately. (Established July 15, 2005)

Chapter 3 Academic Years, Semesters, Days of Instruction, and Breaks and Holidays

Article 7 (Academic Years and Semesters) An academic year shall begin on March 1 and end on the last day of February the following year.

① An academic year shall be divided into two semesters and may include a summer and winter session as follows:

1. 1st Semester (Spring): March1-August31

2. 2nd Semester (Fall): September1-LastdayofFebruarythefollowingyear

3. Summer/Winter Session

A. Terms: Summer and Winter session

B. Length of Instruction: four to eight weeks

C. Credits that can be earned: a maximum of six credits per session

Article 8 (Days of Instruction) ① The total days of instruction in an academic year shall be a minimum of 30 weeks (a minimum of 15 weeks for each semester).

② If completing the minimum days of instruction specified in Clause 1 is not possible due to natural disasters or special circumstances at the University, the days of instruction may be reduced by up to two weeks upon approval by the Minister of Education.

Article 9 (Breaks and Holidays) ① No classes shall be held on the following days and periods:

1. Summer break

2. Winter break

- 3. University Foundation Day
- 4. Sundays and national holidays
- ② Summer and Winter break periods shall be determined separately.
- ③ Temporary closing days shall be determined separately by the President of the University if deemed necessary.
- ④ Experiments and lab hours may be assigned on breaks or holidays if deemed necessary.

Chapter 4 Admissions, Transfers, and Readmissions

Article 10 (Time of Matriculation) Matriculation to the University shall take place within 30 days from the first day of a semester.

Article 11 (Admissions Eligibility) An applicant must meet one of the following eligibility requirements to be considered for admission to the first year of the University:

- 1. Have graduated from a high school or passed the high school graduation qualifying examination.
- 2. Have completed 12 or more years of school education in a foreign country.
- 3. Is recognized to have qualifications equivalent to Clause 1 or Clause 2 by the relevant laws and regulations.

Article 12 (Application Process) ① An applicant for the University shall prepare the documents required by the University for a given academic year and submit them with the application fee within the prescribed period.

- ② The documents submitted and the application fee shall not be returned.

Article 13 (Evaluation for Admission) A comprehensive evaluation of an applicant's scholastic aptitude and potential shall be conducted to make an admission decision. Details shall be determined separately.

Article 13-2 (Fair Admissions Review Board) The University shall have a review board for the fair management of admissions process.

Article 14 (Required Documents for Successful Candidates) ① An applicant who is accepted to the University must complete the necessary procedures required for enrollment within the prescribed period.

- ② The admission may be revoked if the procedures mentioned in Clause 1 are not completed.

Article 15 (Guarantor) ① The guarantor must be the parent of a student. If unavoidable, however, a person capable of taking full responsibility for tuition fees and other personal matters during the period a student is enrolled at the University shall serve as a guarantor.

- ② Any change in the address or other personal information of the guarantor must be promptly reported to the University.

Article 16 (Transfers) ① Transfer students may be accepted based on the prescribed procedures if a department has not reached its admission capacity.

- ② A person who wishes to transfer to the second or third year at the University must have completed courses up to the prior year (or up to the prior semester of the year for students who wish to transfer to the second/fall semester) or be recognized to have the equivalent education to be eligible for the transfer.

③ If a person who has obtained a bachelor's degree from another university transfers to the third year and graduates, such shall be regarded as a separate quota. However, the number of such students in each academic year shall not exceed 5% of the total admission capacity of the year, and the number of such students in each department shall not exceed 10% of the admission capacity of a department.

Article 16-2 (Transfer Credits) The course credits earned by a transfer student in the previous university shall be reviewed, and only the courses and credits required by the University shall be acknowledged.

Article 17 (Readmissions) If a person who has voluntarily withdrawn or has been dismissed from the University applies for readmission, he/she may be granted readmission only when the admission capacity of the department has not yet been reached for his/her class. However, the following persons shall not be readmitted to the University:

1. A person who has reached the enrollment time limit as provided for in Article 6, Clause 2 of these Statutes
2. A person who has been dismissed from the University for receiving the maximum number of academic warnings as provided for in Article 49, Clause 4 of these Statutes
3. A person who has been dismissed from the University for disciplinary reasons pursuant to Article 50 of these Statutes

Chapter 5 Enrollment and Course Registration

Article 18 (Enrollment) ① Students must enroll within the prescribed enrollment period each semester.

② Students shall complete the enrollment process by registering for courses and paying the tuition fees.

Article 19 (Course Registration) ① A student shall select the courses he/she wishes to take each semester with the help of the academic advisor and submit the list for approval by the head of his/her department.

② A student may make a change to the courses approved pursuant to Clause 1 during the course registration change period after consulting his/her academic advisor and head of the department.

Chapter 6 Change of Major

Article 20 (Quota and Timing) A student who has completed at least one year of his/her program may be allowed to change his/her major. The number of students granted change of major shall be within 20% of the admission capacity of each department.

② An application for change of major must be submitted between the start of a student's third semester and the start of the fifth semester, and shall be approved and go into effect between the start of a student's third semester and the start of the sixth semester.

Article 21 (Procedures) A student wishing to change his/her major shall complete and submit a prescribed application form to the Office of Academic Affairs with approval from his/her academic advisor, the head of the current department, and the head of the department the student wishes to transfer to.

Article 22 (Approval and Courses to Complete after the Change) A student whose application for change of major has been approved by the President of the University must complete the courses for his/her new major as required by the new department.

Chapter 7 Leave of Absence, Returning from Leave, Withdrawal and Dismissal from the University

Article 23 (General Leave of Absence) ① A student wishing to take a general leave of absence during a semester due to unavoidable circumstances shall submit a completed Application for Leave of Absence co-signed by a guarantor with a statement of the reasons attached for approval by his/her academic advisor, head of the department, and the President of the University within the first three-fourths of the semester. However, if a student is unable to continue attending school due to illness, natural disasters, or legal reasons, a leave may be granted by the President of the University even after three-fourths of a semester has passed.

② Each general leave shall not exceed two semesters, and a student shall not be granted more than two general leaves during his/her enrollment at the University. However, the President of the University may grant additional leaves for unavoidable reasons such as illness.

③ Notwithstanding Clause 2, a leave of absence for business creation may be granted for a maximum of four semesters; such leave of absence shall not be granted more than once.

④ The President of the University may order a student to take a leave of absence if he/she is deemed unable to study in a sound and reasonable manner.

Article 24 (Military Leave) ① A student who joins the military to fulfill the compulsory military duty (including voluntary enlistment) and is unable to continue his/her studies shall still be required to obtain approval for a leave of absence from the President of the University following the procedures in Article 23, Clause 1. The period of military leave may be regarded separately from the period of a general leave of absence, notwithstanding Article 23, Clause 2. If a student takes a military leave during the same semester in which he/she has taken a general leave of absence, such shall be regarded as a military leave.

② A student joining the military during a general leave of absence shall still be required to submit an application for leave of absence.

Article 25 (Returning from a Leave of Absence) ① If a student's leave of absence has expired or the reason for the leave has become no longer valid, the student shall submit a Request to Return from Leave of Absence form during the enrollment period of the returning semester and obtain approval from the head of his/her department and the President of the University.

② Returning from a military leave shall only be allowed within one year from a student's discharge; if the date of discharge falls within the first one-fourth of the total days of instruction in a semester, the student may be allowed to enroll for the semester, notwithstanding Clause 1.

Article 26 (Voluntary Withdrawal) Any student wishing to voluntarily withdraw from the University shall submit an application for withdrawal with the reasons specified and co-signed by his/her guarantor to

obtain approval from his/her academic advisor, the head of the department, and the President of the University.

Article 27 (Dismissal from the University) A student in any of the following categories shall be dismissed from the University by the President of the University following deliberations by the University Administration Council, and the student and his/her parent(s) shall be notified accordingly:

1. A person who fails to return to school in the semester following the expiration of his/her leave of absence
2. A person who fails to enroll within the designated enrollment period for each semester
3. A person who has received a total of three academic warnings and is considered unable to complete his/her program
4. A person who has received a disciplinary dismissal from the University pursuant to Article 50 of these Statutes
5. A person who fails to complete his/her program within the enrollment time limit

Article 27-2 (Appeals) A student may appeal the decision of dismissal made by the University Administration Council within two weeks of receiving the notice of dismissal.

Chapter 8 Courses, Classes, Credits, and Graduation

Article 28 (Course Categorization) Courses shall be divided into humanities and social sciences courses and major courses; each category is further divided into requirements and electives.

Article 29 (Credits) The unit representing the completion of a course shall be a credit; one credit shall represent a minimum of 15 class hours in a semester. For lab/experiments, physical education, and other courses designated by the President of the University, one credit shall represent a minimum of 30 class hours in a semester.

Article 30 (Credit Requirements for the Completion of the Program) The number of credits required to graduate shall be equal to or more than the number of credits required by each department (120 credits) including a minimum of 29 credits from humanities and social sciences courses and the minimum number of credits from major courses required by each department; a minimum of 21 credits shall be required to complete a minor program.

Article 31 (Credits per Semester) ① The standard number of credits a student takes each semester shall be 15; the maximum number of credits a student can take in a semester shall be stipulated in the POSTECH Academic Operations Guidelines. However, a student whose GPA from the previous semester is 3.4 or higher and has not failed any of the courses taken in the previous semester may take more than the maximum credits allowed per semester upon approval from his/her academic advisor and the head of his/her department. (Amended September 1, 2013)

② A student must register for a minimum of 10 credits each semester. However, exceptions may be granted by the head of the department for illness or other unavoidable reasons.

Article 32 (Special Credits) ① Credits for certain courses may be earned by passing an exemption exam.

② (Deleted March 1, 2005)

③ The credits from Advanced Placement courses completed in high school may be acknowledged by following a prescribed procedure. The AP credits thus acknowledged, however, shall not be subject to the credit limit provided in Article 51 of the Statutes. (Amended September 1, 2013)

④ A student in an Accelerated Program may earn credits by taking an exemption examination. (Established July 15, 2005)

Article 33 (Curriculum) Matters concerning the planning and operation of the academic curricula shall be approved by the President of the University through deliberations and a resolution by the Education Committee. (Amended October 12, 2006)

Article 34 (Graduation) ① A student who has completed all the requirements prescribed by the Statutes, obtained a cumulative GPA of 2.0 or higher, passed the thesis review, and completed the English Certificate Program while enrolled shall be granted a diploma. If a student fails to satisfy the graduation requirements because he/she is unable to complete the English Certificate Program, he/she shall be granted the Completion of Coursework status without the conferment of a degree. (Amended March 1, 2009)

② Students who complete all the graduation requirements and maintain a cumulative GPA of 3.4 or higher may be allowed to graduate early upon completion of a minimum of six semesters.

Article 35 (Degree Conferment) A graduate shall be awarded an appropriate degree from the following; if the graduate has also completed a minor program, the minor shall also be noted on his/her diploma:

1. Bachelor of Science (BS): Department of Mathematics, Department of Physics, Department of Chemistry, and Department of Life Science
2. Bachelor of Science in Engineering (BSE): Department of Materials Science and Engineering, Department of Mechanical Engineering, Department of Industrial and Management Engineering, Department of Electrical Engineering, Department of Computer Science and Engineering, Department of Chemical Engineering, and Department of Creative IT Excellence Engineering

Article 36 (Class Year Based on Credits Earned) A student's class year shall be determined by the credits he/she earned as follows:

Number of Earned Credits	Class Year
30 credits or less	First year
31 credits - 60 credits	Second year
61 credits - 90 credits	Third year
91 credits or more	Fourth year

Chapter 9 Majors, Minors, Double Majors

Article 37 (Major Credits) The number of major credits required for graduation shall be equal to or more than the number of credits prescribed by each department.

Article 38 (Minors) A student will be granted a minor if he/she earns 21 credits or more in accordance with the procedures prescribed by the department.

Article 39 (Double Majors) To declare a double major, a student must complete the major credit requirements of both majors. Details on declaring a double major shall be determined separately by the President of the University.

Chapter 10 Examinations and Grades

Article 40 (Examinations) ① Examinations shall be held at least twice a semester including final exams.

② If necessary, however, an examination may be replaced with other forms of assessment. (Amended September 1, 2013)

Article 41 (Grading) A student shall receive a grade based on his/her overall performance pertaining to various criteria including examinations, assignments, and attendance. However, separate criteria may be used to evaluate a student's performance in special courses such as experiment and laboratory courses.

Article 42 (Grades) ① Grades shall be given as follows, and only the credits from courses with a grade of D- or higher or S shall be recognized as earned credits:

Grade	A+	A0	A-	B+	B0	B-	C+	C0	C-	D+	D0	D-	F	S	U	W	I
Points	4.3	4.0	3.7	3.3	3.0	2.7	2.3	2.0	1.7	1.3	1.0	0.7	0.0	N/A	N/A	N/A	

② Certain courses designated by the President of the University shall be graded with "S" (Satisfactory) and "U" (Unsatisfactory) to indicate Pass or Fail respectively.

Article 43 (Repeating a Class) If a student repeats a course and obtains a new grade, the original grade shall not be recorded in the transcript. However, a student cannot be given a grade higher than B+ in a repeated course.

Article 44 (Attendance Requirements) ① A student must attend a minimum of three-fourths of the total class hours of a course to have his/her grade acknowledged.

② The number and reasons of excused absences allowed shall be stipulated separately.

Article 45 (Make-up Examinations) ① A student who is unable to take an examination due to illness or other unavoidable circumstances must submit a request for make-up examination with supporting documents before the original examination begins to the President of the University after obtaining approval from the course instructor and the head of his/her department.

② If the make-up examination request has been approved, the student shall provisionally receive a grade of "T" (Incomplete) until his/her final grade is determined after the make-up examination. If the student fails to take the make-up examination, he/she shall receive a final grade of F.

③ A make-up examination must be taken by the last day of the grade correction period of a given semester. (Amended September 1, 2013)

Article 46 (Thesis) ① All candidates for graduation shall submit an undergraduate thesis paper. However, in

certain departments where the submission of the thesis is considered inappropriate due to their course characteristics, the thesis may be replaced by experiment reports, practice reports, practical presentations, or comprehensive examinations for graduation.

② Details concerning the undergraduate thesis shall be stipulated separately.

Chapter 11 Honors and Disciplinary Measures

Article 47 (Semester Honors) A student of good conduct who has not received a grade of F in any of the courses taken, earned 15 credits or more, and maintained a GPA of 3.6 or higher for a semester shall be recorded as an honor student on his/her academic records at the end of the semester.

Article 48 (Graduation Honors) ① A student who showed good conduct and outstanding academic performance throughout his enrollment at the University shall be recognized with the following honors, and the honors shall be recorded on his/her academic records and diploma:

Honors	GPA
Summa Cum Laude	3.9 or higher
Magna Cum Laude	3.6 or higher
Cum Laude	3.4 or higher

② A student against whom a disciplinary measure was taken during his/her enrollment at the University cannot be a candidate for the honors.

Article 49 (Academic Warning) ① A student who shows poor academic performance and earns a grade point average below 2.0 for a semester shall be given an academic warning.

② If a decision of academic warning is made pursuant to Clause 1, a notice of academic warning must be served to the student, his/her guarantor, the head of his/her department, and his/her academic advisor without delay.

③ The head of the department and the academic advisor may limit the number of credits a student on academic warning can take.

④ A student who has been placed on academic warning for two consecutive semesters shall be suspended for one year. If placed on academic warning for a total of three times during his/her enrollment at the University, the student will be dismissed from the University.

Article 50 (Grounds for Disciplinary Measures) ① A disciplinary measure may be taken against a student who falls in any of the following categories:

1. A student with bad conduct and behavior who shows no possibility of improvement
2. A student with poor academic performance who is deemed highly unlikely to complete his/her course of studies
3. A student who has been extensively absent from school without proper or justifiable reasons
4. A student who disrupts the public order of the university community or damages/vandalizes university

property

5. A student who violates these Statutes and neglects his/her duty as a student

② Disciplinary measures shall include probation, suspension (for a definite or an indefinite period), and dismissal from the University.

③ Details on disciplinary measures shall be stipulated separately.

Chapter 12 Cross-Registration

Article 51 (Cross Registration) A student may be given credits for courses taken in other domestic or overseas institutions in the following cases. However, such credits cannot exceed one-third of the credits required for graduation: (Amended September 1, 2013)

1. Credits earned in an overseas partner university

2. Credits earned in domestic universities that have entered into a cross-registration agreement with the University

3. Credits earned in other domestic and overseas universities that are especially approved by the President of the University

Chapter 13 Tuition and Fees

Article 52 (Payment of Tuition Fees) Students must pay the prescribed amount of tuition fees during the enrollment period of each semester. However, students with financial hardships may be allowed to pay the tuition fees in installments.

Article 53 (Entrance Fees and Tuition Fees) The University may charge students entrance fees, tuition fees, and other fees authorized by the Minister of Education.

Article 54 (Notice of Tuition Fees) The amount of tuition fees and the due date shall be announced before each semester starts.

Article 54-2 (Refund of the Tuition Fees) Matters regarding the refund of the tuition fees already paid shall be stipulated separately.

Article 54-3 (Tuition Review Committee) ① The University shall have a Tuition Review Committee composed of faculty, staff, students and relevant experts in order to determine appropriate tuition amounts at the University.

② Matters concerning the organization and operation of the Tuition Review Committee shall be stipulated separately.

Chapter 14 Scholarships

- Article 55 (Scholarships)** ① A student with outstanding academic performance and good conduct who has financial needs may be granted a scholarship.
- ② Details on the granting of scholarships shall be stipulated separately.

Chapter 15 Entrusted Students and International Students

- Article 56 (Entrusted Students)** ① An employee of a government agency may be admitted to the University as an entrusted student at the request from the head of the agency with a recommendation from the Minister of Education.
- ② A degree may be conferred to an entrusted student who meets the prescribed qualifications for transfer or admission to the University and completes his/her program.
- ③ An entrusted student shall be automatically dismissed from the University when his/her employment at the entrusting agency is terminated.
- ④ The quota for entrusted students shall be considered separate from and in addition to the numbers stipulated in Article 3.
- Article 57 (Overseas Korean Nationals or Children of Diplomats)** The quota for the admission of persons specified in the following clauses shall be considered separate from and in addition to the numbers stipulated in Article 3. However, the total number of students specified in Clause 1 cannot exceed 2% of the total admission capacity for a given academic year.
- ① Overseas Korean nationals or children of diplomats (Overseas Korean nationals and foreigners specified in Clause 2 are excluded.)
- ② Overseas Korean nationals and non-Korean nationals who have completed the course of study equivalent to elementary and secondary education in a foreign country

Chapter 16 Public Lectures

- Article 58 (Public Lectures)** ① The University may offer public lectures to disseminate knowledge on theories and their applications necessary for practical business or research.
- ② Subjects, registration eligibility, maximum number of registrants, and other matters shall be stipulated separately.

Chapter 17 The Faculty and Faculty Senate

- Article 59 (The Faculty and Faculty Senate)** The University shall have the Faculty and the Faculty Senate to

deliberate on important matters concerning school affairs.

Article 60 (Members) ① The Faculty shall consist of tenured and tenure-track faculty members at the rank of Assistant Professor or higher. Non-tenure-track faculty may attend the Faculty Meeting but shall not have a voting privilege.

② The Faculty Senate shall act as a representative body of the faculty. Its organization and operation shall be stipulated separately.

Article 61 (Convening a Faculty Meeting) The President of the University may convene and preside over a Faculty Meeting. When requested by the Faculty Senate or one-third or more of all faculty members, the President of the University shall promptly convene a Faculty Meeting.

Article 62 (Deliberations) ① Unless specified otherwise, the following matters shall be deliberated on during a Faculty Meeting:

1. Matters concerning admissions, completion of coursework, and graduation
2. Matters concerning student advising and counseling, scholarships, and student welfare
3. Matters concerning the benefits and welfare of faculty members
4. Matters concerning the opening and closing of departments and short-term programs
5. Other important matters concerning the overall operation of the University which may influence the entire faculty members

② A resolution requires a quorum of a majority of the faculty and a majority vote of the present.

③ The Faculty Senate shall deliberate on medium- and long-term plans for important matters concerning each item in Article 62, Clause 1.

Chapter 18 University Administration Council

Article 63 (University Administration Council) The University shall have a University Administration Council to deliberate on important matters concerning the educational and operational affairs of the University.

Article 64 (Organization) The University Administration Council shall consist of the President of the University, Executive Vice Presidents of the University, Dean of Graduate School, Vice President of each Office, Head of each Department, and Head of the Division of Humanities and Social Sciences, Directors of affiliated centers and research centers designated by the President of the University, and the Chairman of the Faculty Senate. If necessary, the President of the University may allow any person outside the council to attend a meeting and present an opinion.

Article 65 (Convening a Meeting) The President of the University may convene a University Administration Council meeting and act as Chair.

Article 66 (Deliberations) The University Administration Council shall deliberate on the important matters concerning the following:

1. Policies on admissions, completion of coursework, and graduation (including admission and graduation review processes)

2. Policies on student advising and counseling, scholarships, and student welfare
3. Matters concerning changes in academic structure such as departments, short-term programs, and majors and administrative structure of Office-level or higher
4. Policies on curriculum changes
5. Policies on changes in the admission process
6. Matters concerning the establishment and modification of major personnel policies for faculty members
7. Matters concerning the establishment and modification of major research policies
8. Matters concerning the creating of a business by a staff or faculty member
9. Other matters presented by the President of the University

Chapter 19 Organizational Structure

Article 67 (Organizational Structure) The organizational structure of the University shall be stipulated separately.

Chapter 20 Chair Professor and Professor Emeritus

Article 68 (Chair Professor and Professor Emeritus) The University may appoint chair professors and professors emeritus if necessary for research and education. Details concerning the management of such positions shall be stipulated separately.

Chapter 21 Student Activities

Article 69 (Undergraduate Student Association) ① The University shall have an Undergraduate Student Association that consists of all current undergraduate students to foster their self-governing ability and promote extra-curricular activities.

② Matters concerning the organization and operation of the Undergraduate Student Association shall be specified in the Constitution of the Undergraduate Student Association with approval from the President of the University.

③ In case of a war, unavoidable/uncontrollable event or disaster, national emergency, or the equivalent, the Undergraduate Student Association shall cease to operate.

Article 70 (Student Affairs Committee) ① The University shall have a Student Affairs Committee to provide consultation and counseling to students on various issues concerning student life such as scholarships, students' self-governing activities, and disability support.

② The Student Affairs Committee shall consist of the Vice President of Admissions and Student Affairs,

Dormitory Directors, Physical Education faculty, and department heads or other professors recommended by department heads.

③ Details concerning the operation of the Student Affairs Committee shall be stipulated separately.

Article 71 (Approval for a Student Organization) Establishing a student organization other than the Undergraduate Student Association requires deliberations of the Student Affairs Committee and approval of the President of the University.

Article 72 (Student Activities) Detailed criteria and procedures concerning student activities shall be stipulated separately.

Article 73 (Restricted Activities) Students shall not engage in any of the activities described below. Otherwise, disciplinary measures may be imposed on them:

1. On-campus political activities
2. Off-campus political activities under the name of the University
3. Activities that impede the basic functioning of the University
4. Other activities that go against the education objectives or disrupt public order within the school

Article 74 (Student Advising) ① The President of the University shall establish a student advising plan and appoint academic advisors at the beginning of each academic year.

② Academic advisors shall make their best effort to help students become outstanding scientists with sound mindset.

Chapter 22 School Enterprise

Article 75 (Establishment of School Enterprise) ① The University shall establish a school enterprise pursuant to the Promotion of Industrial Education and Industry-Academic Cooperation Act and name the enterprise “NSB (NanoSurface Biosciences) POSTECH, Inc.” (Established April 25, 2006)

② The school enterprise shall be located on campus (address: San 31 Hyoja-dong, Nam-gu, Pohang.) (Established April 25, 2006)

③ The school enterprise shall engage in R&D in chemistry, biology, and biotechnology in collaboration with the Department of Chemistry of the University as well as in manufacture and sale of the products. (Established April 25, 2006)

Article 76 (On-The-Job Training) Students may receive on-the-job training at the school enterprise. However, students shall not earn academic credits with such training. (Established April 25, 2006)

Article 77 (Reward Criteria) ① If the operation of the school enterprise yields profit, the faculty/staff members or students who have contributed to generating the profit may be given a reward of up to 20% of the net profit. (Established April 25, 2006)

② The total amount of rewards granted to one faculty or staff member in a year shall not exceed 5% of the total net profit. (Established April 25, 2006)

③ A reward to a student shall be given in the form of a scholarship, and the total amount of the reward shall not exceed the student's total tuition fees for a year. (Established April 25, 2006)

- ④ Notwithstanding Clauses 2 and 3, if a faculty/staff member or a student has assigned intellectual property rights such as patent to the University to carry out a business for the school enterprise, he/she may be given compensation based on separate criteria. (Established April 25, 2006)
- ⑤ Additional details on reward criteria may be stipulated separately. (Established April 25, 2006)

Chapter 23 Self-Evaluation

- Article 78 (Self-Evaluation)** ① The University shall conduct a self-evaluation for the improvement of its educational conditions and the enhancement of the quality of its education and research. (Amended December 27, 2009)
- ② Necessary matters concerning the criteria, methods, and procedures of the self-evaluation shall be determined separately by the President of the University.

Chapter 24 Amendment of Statutes

- Article 79 (Statutes Amendment Process)** Amendments to these Statutes shall take effect after advance notice and deliberations by the University Senate. (Amended May 16, 2007)

Addendum

These Statutes shall take effect on March 1, 1987.

Addenda

1. These Statutes shall take effect on March 31, 1988.
2. Notwithstanding the amendment of Articles 3, 16, 17, 20, and 49, the previous version of the Statutes shall apply to students who were admitted in 1987 and graduate by 1990.

Addendum

These Statutes shall take effect on May 12, 1988.

Addendum

These Statutes shall take effect on May 18, 1990.

Addendum

These Statutes shall take effect on August 27, 1991.

Addendum

These Statutes shall take effect on November 10, 1994.

Addenda

1. (Effective Date) These Statutes shall take effect on April 25, 1996 and apply to academic year 1996 and thereafter.
2. (Interim Measures) The amendment of Article 34 shall apply to students admitted in 1995 and thereafter.

Addendum

These Statutes shall take effect on March 1, 1997.

Addendum

These Statutes shall take effect on July 1, 1998.

Addendum

These Statutes shall take effect on November 11, 1998.

Addenda

1. (Effective Date) These Statutes shall take effect on March 1, 1999.
2. (Interim Measures) ① With respect to Article 2, a student who was admitted to the Department of Computer Science pursuant to the previous version of these Statutes and is currently enrolled (or on leave of absence) shall be deemed a registered student under these amended Statutes.
② The Completion of Coursework status provided in Article 34 shall apply to the degree candidates for February 1998 and thereafter.

Addendum

These amended Statutes shall take effect on July 5, 1999.

Addendum

These amended Statutes shall take effect on July 7, 1999.

Addenda

1. (Effective Date) These Statutes shall take effect on July 19, 1999.
2. (Interim Measures) Article 43 shall apply to students repeating a class he/she originally took in the fall semester of 1999 and thereafter.

Addendum

These amended Statutes shall take effect on November 17, 1999.

Addendum

These amended Statutes shall take effect on December 1, 1999.

Addenda

1. (Effective Date) These Statutes shall take effect on March 1, 2000.
2. (Interim Measures) Articles 30 and 37 of these amended Statutes shall apply to students admitted in 2000 and thereafter. The previous version of these Statutes shall apply to Students admitted in 1999 or before.

Addendum

These amended Statutes shall take effect on July 1, 2000.

Addendum

These amended Statutes shall take effect on July 20, 2000.

Addendum

These amended Statutes shall take effect on October 12, 2000.

Addendum

These amended Statutes shall take effect on November 20, 2000.

Addendum

These amended Statutes shall take effect on June 1, 2001.

Addendum

These amended Statutes shall take effect on July 1, 2001.

Addenda

1. (Effective Date) These amended Statutes shall take effect on August 8, 2003.
 2. (Interim Measures) Articles 31, 36, and 47 of these amended Statutes shall apply to students admitted in 2000 and thereafter. The previous version of these Statutes shall apply to students admitted in 1999 or before.
- Article 31 shall apply from the spring semester of 2004.

Addendum

These amended Statutes shall take effect on January 31, 2004.

Addenda

1. (Effective Date) These amended Statutes shall take effect on March 1, 2005.
2. (Interim Measures) The official name “Department of Industrial and Management Engineering” stated in Article 2, Clause 2 shall apply to students who were enrolled in 2005 and thereafter. The changes to the list of affiliated research centers in Article 4 shall apply retroactively from the date of establishment or closure of the affiliated research centers.

Addendum

These amended Statutes shall take effect on April 21, 2005.

Addenda

1. (Effective Date) These amended Statutes shall take effect on July 15, 2005.
2. (Interim Measures) The deletion of Article 32, Clause 2 shall apply retroactively from the spring semester of 2005.

Addenda

1. (Effective Date) These amended Statutes shall take effect on August 28, 2005.
2. (Interim Measures) The changes to the list of affiliated research centers in Article 4 shall apply retroactively from the date of establishment or closure of the affiliated research centers.

Addenda

1. (Effective Date) These amended Statutes shall take effect on May 21, 2006.
2. (Interim Measures) ① The changes to the list of affiliated research centers in Article 4 shall apply retroactively from the date of establishment or closure of the affiliated research centers.
② Articles 75, 76, and 77 shall apply retroactively from April 25, 2006.

Addendum

These amended Statutes shall take effect on October 12, 2006.

Addendum

These amended Statutes shall take effect on November 1, 2006.

Addendum

These amended Statutes shall take effect on May 16, 2007.

Addendum

These amended Statutes shall take effect on December 21, 2007.

Addendum

These amended Statutes shall take effect on January 1, 2008.

Addenda

1. (Effective Date) These amended Statutes shall take effect on March 1, 2008.
2. (Interim Measures) Article 31, Clause 1 of these amended Statutes shall apply to students admitted in 2008 and thereafter. The previous version of these Statues shall apply to students admitted in 2007 or before.

Addenda

1. (Effective Date) These amended Statutes shall take effect on March 1, 2009.
2. (Interim Measures) Article 31 of these amended Statutes shall apply to students admitted in 2009 and thereafter. The previous version of these Statutes shall apply to students admitted in 2008 or before.

Addendum

These amended Statutes shall take effect on March 24, 2009.

Addendum

These amended Statutes shall take effect on December 27, 2009.

Addendum

These amended Statutes shall take effect on November 26, 2010.

Addendum

These amended Statutes shall take effect on December 9, 2010.

Addendum

These amended Statutes shall take effect on April 1, 2011.

Addenda

1. (Effective Date) These amended Statutes shall take effect on January 1, 2012.
2. (Interim Measures) The amendment of Article 2 (Undergraduate and Graduate Programs) shall take effect on September 1, 2011.

Addendum

These amended Statutes shall take effect on July 8, 2012.

Addenda

1. (Effective Date) These amended Statutes shall take effect on November 16, 2012.
2. (Interim Measures) Matters executed before the effective date of these Statutes shall be deemed to have been executed according to these Statutes.

Addenda

1. (Effective Date) These amended Statutes shall take effect on February 6, 2012.
2. (Interim Measures) Matters executed before the effective date of these Statutes shall be deemed to have been executed according to these Statutes.

Addendum

These amended Statutes shall take effect on April 1, 2013. The changes to the list of affiliated centers in Item 1 of Clause 1 of Article 4, however, shall take effect on April 22, 2013.

Addenda

1. (Effective Date) These amended Statutes shall take effect on September 1, 2013.
2. (Interim Measures) The changes to the list of affiliated research centers in Article 4 shall apply retroactively from the date of establishment or closure the affiliated research centers.

Addendum

These amended Statutes shall take effect on November 2, 2014.

Attached Form

No. _____

Certificate of Degree

Name: _____

Date of Birth: _____

I certify that the person whose name appears above has successfully completed the prescribed courses (in _____ major) and obtained the degree of Bachelor of _____.

Month/Day /Year

○ ○ ○

President, Pohang University of Science and Technology

Degree Registration Number: POSTECH ○ ○ (Bachelor)- ○ ○ ○

POSTECH Academic Operations Guidelines

(Undergraduate Program)

1. Registration

- Students must pay their tuition within the registration period each semester and complete course registration within the designated period.
- The amount of tuition and the payment period will be announced before the registration period begins.

1.1 Tuition

Classification	Semester	Amount of Tuition	Remarks
Regular semester	Up to 8th semester	Full amount of tuition	Students qualified for a scholarship should pay the reduced amount (i.e. the full tuition amount less exempted portion of tuition).
Additional semester	From 9th semester	Amount of tuition to be determined based on enrolled credits. • 1-3 credits: 1/6 of full tuition • 4-6 credits: 1/3 of full tuition • 7-9 credits: 1/2 of full tuition • 10 credits or more: Full tuition	This classification will be applied to dual major students from the 11th semester.

1.2 Installment Payment

- ① Students experiencing financial hardship are allowed to pay the tuition in 2 installments.
- ② Students who wish to make installment payments should enter all necessary data into POVIS within the designated request period.

1.3 Tuition Refund

- ① If a student admitted to POSTECH has already paid the tuition but decides not to attend or a current student wishes to withdraw from the University during a semester, he/she will be eligible for a refund.
- ② Tuition will be refunded in accordance with the refund conditions set forth in section 1.4 below for students that fall in one of the following categories.
 - a. Prohibited by law from enrolling in a university (including reentrance and transfer)
 - b. Accepted by the University but decides not to enroll
 - c. Withdrawing from the University voluntarily
 - d. Prevented from enrolling in the University by inevitable reasons including death, illness, or natural disasters.

1.4 Refund Conditions

- ① If a cause for the refund occurs on or after the second day of the semester, the initial entrance fees will not be refunded, and the amount of tuition refund will be determined as indicated in the following.
- ② Refund Schedule
 - a. Up to the 30th day of class in a semester: 5/6 of tuition fees
 - b. 31st - 60th day: 2/3 of tuition fees
 - c. 61st - 90th day: 1/2 of tuition fees
 - d. 91st day and thereafter: No refund
- ③ If a student is required to withdraw due to a violation of University regulations or if a special circumstance acknowledged by the President of the University exists, the tuition may not be refunded.

1.5 Tuition Refund for Students Who Exceeded the Standard Years to Graduate

- ① If a student takes a leave of absence after paying tuition, the tuition will be applied to the semester in which the student returns. The amount of tuition charged for the returning semester will be determined based on enrolled credits, and any difference will be refunded to the student.
- ② The amount of tuition to be applied to the semester in which the student returns varies depending on at which point the leave was initiated. The detailed schedule is as follows:
 - a. General leave initiated before the start of the semester: Full amount
 - b. General leave initiated within the first quarter of the semester: Full amount
 - c. General leave initiated during the second quarter of the semester: 50% of the paid tuition
 - d. General leave initiated during the second half of the semester: None
 - e. Students on a general leave who join the military within the semester the general leave started: Full amount
 - f. Students taking a military leave: Full amount
- ③ The amount of refund for students who voluntarily withdraw from the University during a semester will be determined according to the refund conditions set forth in section 1.4.

1.6 Prohibition of Dual Registration

POSTECH students are not allowed to register at another university or college unless a special exception has been granted by the University.

2. Curriculum Summary

Courses are categorized as follows: 1. Humanities and Social Science (HASS) Requirements, 2. HASS Electives, 3. Basic Requirements, 4. Major Requirements, 5. Major Electives, 6. Free Electives, 7. Minor, 8. Double Major, 10. ABC Requirements, 11. ABC Electives

2.1 Humanities, Arts and Social Sciences (HASS) Requirements

All undergraduate students are required to fulfill HASS requirements by completing 14 credits as follows: 2

credits in Expository Writing, 4 credits in English Certification Program, 2 credits in Physical Education, and 6 credits in Integrated HASS (A minimum of two credits in total must be earned from physical education courses: one credit from Physical Fitness and another from 14 courses.)

2.2 Humanities, Arts and Social Sciences (HASS) Electives

In addition to the HASS requirements indicated above, all undergraduate students are required to choose and earn 15 or more credits in Humanities, Social Sciences, and Arts.

2.3 General Requirements

General requirements include courses that need to be completed for all majors and a few courses that apply to certain majors only. The list of general requirement courses is as follows, and students must earn 27 credits.

- General requirements for all majors (27 credits)

Mathematics (Calculus, Calculus Lab., Applied Linear Algebra), Physics (General Physics I&II or Introductory Physics I&II or General Physics I(H)&II(H), General Physics Laboratory I&II), Chemistry (General Chemistry(H), General Chemistry Laboratory), Life Sciences (General Life Science or General Life Science(H)), and Computer Science and Engineering (Programming and Solving problem).

2.4 Major Requirements

All students must meet major requirements in order to complete a major program. The total number of required credits varies by major and ranges from 32 to 49. Certain departments subdivide the requirements into major core requirements and major elective requirements.

2.5 Major Electives

Major electives refer to all courses under a major excluding the major requirements. Students can take courses that are related to their area of concentration or what they plan to study in graduate schools. Students may also take courses offered by other majors that are cross-listed with their own major to fulfill the required number of major elective credits.

2.6 General Electives

Students can take any general elective courses of interest regardless of their major. Undergraduate students may take courses offered by the Graduate Institute of Ferrous Technology for general electives credits. A student may declare a minor or double major in a field based on the courses that he/she has taken for general elective credits if he/she develops sufficient interest in that field.

2.7 ABC Requirements

ABC Requirements refer to courses that must be completed in order to fulfill the Activity Based Curriculum, and 2 units must be earned from ABC courses including College Life & Future Plan.

2.8 ABC Electives

ABC Electives refer to all of the ABC courses except for the ABC requirements and are divided into Liberal Humanities, Cultural Humanities, and Leadership Development tracks. There is no maximum limit of credits earned in each track, and at least 5 units or more must be completed.

2.9 Minor Courses: See Section 10 Minor

2.10 Double Major Courses: See Section 11 Double Major

[Lists of STC courses]

Department	Mathmatics	Sciences	Conditions for STC completion	
			Mathmatics	Sciences
Mathematics	- MATH 200 Differential equation - MATH 210 Applied Complex Variables - MATH230 Probability and statistics (or MATH231 Statistics for Experimental Research/IMEN272 Probability and statistics for Engineers) - MATH261 Discrete mathematics - MATH311 Analysis I	-	Choose 5 including at least 1 course of Sciences	
Physics		- PHYS201 Introduction to Modern Physics - PHYS203 Mechanics	Choose 5 including course(s) of Physics	
Chemistry		- CHEM221 Organic Chemistry I - CHEM243 Chemical Analysis	Choose 5 including course(s) of Chemistry	
Life Sciences		- LIFE319 Biochemistry I - LIFE 321 Molecular Biology	Choose 5 including course(s) of Life Sciences	
Materials Science and Engineering		- AMSE201 Introduction to Materials Science and Engineering - AMSE208 Crystal Structure	Choose 1	Choose 4 including course(s) of Materials Science
Mechanical Engineering		- MECH240 Solid Mechanics I - MECH250 Thermodynamics	Choose 2 including Differential Equation (Required)	Choose 3 including course(s) of Mechanical Engineering
Industrial and Management Engineering		- IMEN261 Introduction to Operations Research - IMEN281 Information System Technology	Choose 5 including course(s) of Industrial and Management Engineering	
Electrical Engineering		- EECE231 Basic Circuit Theory - EECE233 Signals and Systems - EECE261 Electromagnetics	Probability and Statistics, Differential Equation	3 courses of Electrical Engineering
Computer Science and Engineering		- CSDE232 Object-oriented Programming - CSDE233 Data Structure	Probability and Statistics, Discrete mathematics	2 courses of Computer Science and Engineering
Chemical Engineering		- CHEB201 Physical Chemistry for Chemical Engineering I - CHEB208 Fundamentals in Engineering Biology	Choose 5 including course(s) of Chemical Engineering, Differential Equation	
Creative IT Engineering			Choose 3 out of all STC courses	

3. Course Schedule

3.1 Session Period

Duration	1st Period	2nd	3rd	4th	5th	6th	7th	8th
75 min.	08:00 - 09:15	09:30 - 10:45	11:00 - 12:15	12:30 - 13:45	14:00 - 15:10	15:30 - 16:45	17:00 - 18:15	18:30 - 19:45

3.2 Student-oriented Course Scheduling

- ① Lectures and lab courses should be scheduled so that sessions are evenly distributed throughout the weekly timetable.
- ② A course cannot be scheduled on two consecutive days (e.g. Mon.+Tue. or Tue.+Wed.) and cannot last for three consecutive hours in a day. Exceptions may be made in special cases upon approval by the Dean of Academic Affairs.
- ③ It is not recommended to schedule a course after 7 p.m.

3.3 Modifying Finalized Course Schedule

To modify a course for reasons such as addition of sections, cancellation, or change of class hours or instructor after the schedule of classes has been finalized, a Petition to Modify a Finalized Course Schedule should be submitted to and approved by the Dean of Academic Affairs.

4. Course Registration

4.1 Registration Period and Procedure

- ① Course Registration Period
 - Summer and Winter sessions: 12th week of the preceding regular semester
 - Regular semester: 14th week of the preceding regular semester
- ② Students should select courses for enrollment after consulting with their academic advisor and enter the information on POVIS and obtain their academic advisor's approval within the designated period.

4.2 Number of Credits per Semester

- ① Students whose GPA from the preceding semester is 3.4 or higher and who have successfully completed all courses may take additional credits in excess of the maximum load allowed in a semester upon approval from the academic advisor and the department head.

[Number of credits per semester]

Classification	Year of Entrance from 2000 to 2008	Year of Entrance from 2009 to 2010	Year of Entrance 2011~
Maximum	18 credits	20 credits	22 credits
Standard	15 credits	15 credits	15 credits
Minimum	10 credits	10 credits	10 credits
Excess of Maximum	No limit (applicable only to students who satisfy the condition stated in ①)		

② Students on Academic Warning are restricted to 15 credits, except when approved by the academic advisor and the department head to exceed the limit up to five additional credits for enrollment of 20 credits in total.

4.3 Course Numbering System

① Course numbers are composed of four letters and three numbers. The four letters indicate the department offering the course. The first of the three numbers indicates an intended grade level (or a course level) and the last two numbers are randomly assigned for identification purposes.

② The 100-level course generally corresponds to freshman-level courses, 200 to sophomore-level, 300 to junior-level and 400 to senior-level. Courses numbered from 500s to 800s are graduate-level courses. However, the level indicated by the numbers does not necessarily limit or segregate enrollment. In certain cases, sophomores or seniors may take 300-level courses. Upon approval from the academic advisor, seniors may even take 500-level courses or higher.

4.4 Prerequisites

Some courses have prerequisites or recommended prior courses. Prerequisites are courses that must be completed before enrolling in a course. Recommended prior courses are courses recommended in order to enhance the students' probability of success in a course.

4.5 Course Registration Confirmation and Changes

① Course registration changes (add/drop) are carried out during the Course Change Period starting on the 3rd day of the semester in which the courses begin, and students are not allowed to make registration changes after the adjustment period.

② To make registration changes, students must fill out a Registration Confirmation and Change Form, obtain approval from their academic advisor and department head, enter the data into POVIS, and submit the form to their department office.

③ Students should review their course registration on POVIS on the third week of a semester and make sure that the course registration is correct and complete.

4.6 Course Withdrawal

① To withdraw from a course after the designated add/drop period, students must obtain approval from their

course instructor, academic advisor, and department head and submit a completed form of Petition to Withdraw from a Course to their department office.

② Withdrawal from a course after the end of 3rd week through the 9th week of a semester carries the grade of “W” on the transcript. (Courses marked with “W” are not included in the calculation of total credits earned or GPA.)

③ If a student repeats and completes a withdrawn course, the “W” is replaced with “RW” (Repeated after Withdrawal). (If a withdrawn course is not taken again, however, “W” would remain on the transcript.)

4.7 Repeating a Course

① Students may repeat a course regardless of their previously earned grade including a course in which they received F.

② Students cannot earn a grade higher than B+ for the repeated course.

③ The last grade received is recorded on the transcript while the previously earned grade is removed. Repeated courses are indicated with “R” on the transcript.

④ There is no limit to how many times students can repeat a course.

5. Change of Major

5.1 Definition

Change of major refers to changing a student’s major within the University when there are vacancies in the major to which he or she wishes to change.

5.2 Eligibility and Filing Period

Refer to Article 20 and 21 of the University Statutes.

5.3 Procedure

Students must have their requests for change of major approved by their academic advisor, the heads of their current and new departments, and the President of the University.

5.4 Completing Courses after Change of Major

Students who changed their major should take all courses required to complete their new major program.

6. Readmission

6.1 Eligibility

Refer to Article 17 of the University Statutes.

6.2 Procedure and Approval

Applicants must complete the Application for Readmission, attach transcripts, obtain approval from their previous academic advisor and department head, and submit to the department office of their intended major.

6.3 Academic Records

Students' academic records prior to withdrawal or dismissal are restored and reapplied once they are readmitted to the University.

6.4 Credits Recognition

Credits earned prior to readmission will be re-evaluated.

6.5 Registration Fees

Readmitted students must pay readmission fees in addition to their tuition and fees.

7. Leave of Absence, Returning from Leave, Withdrawal & Dismissal

7.1 Types of Leave

- a. General Leave: Leave of absence for medical, family-related, or other unavoidable reasons
- b. Military Leave: Leave of absence for mandatory military service

7.2 Filing Period for Leave of Absence

Students who wish to take a leave of absence should apply by the following deadlines:

- a. General Leave: Students taking a general leave during a semester must apply during the first 3/4 of the semester.
- b. Military Leave: Students must apply for a military leave as soon as they receive the notice of military service if the service start date falls within a semester. However, if the service start date is after the end of a semester (or after the finals), students should apply for a military leave after the semester comes to an end.

7.3 Procedures

- ① Students taking a general leave should submit an application co-signed by a parent or guardian with a statement of reasons attached for approval by their academic advisor, department head and the President of the University.
- ② Students taking a leave for starting business should submit an application attached with a business license, a certified copy of corporate register, and a certificate of corporate seal to be approved by their academic advisor, department head, and the President of the University. However, the students who are listed as an auditor of the board are not eligible for the leave.

- ③ Students taking a military leave should submit an application with the notice of military service attached to obtain approval from their academic advisor, department head, and the President of the University.
- ④ Students called for military service while suspended or on leave should also apply for a military leave at the University.
- ⑤ Students on a military leave who are ordered to postpone enlistment or re-take the physical examination should change their leave status to a general leave. If the date of the order falls within the first quarter of a semester, the students may return to school by submitting the certification from the military.

7.4 Leave Period

- ① The duration of each general leave may not exceed 2 consecutive semesters, and a general leave may not be granted for a student more than twice during his/her enrollment at the University.
- ② Despite of the rule ①, students may be allowed one time only for a maximum of 4 extra semesters of leave under the purpose of starting up one's own business.
- ③ Military leave is not counted towards the maximum number of leaves allowed as it is mandatory service required by law.
- ④ If a student is unable to continue taking classes due to unavoidable reasons such as illness, natural disaster, or legal reasons, a leave may be granted by the President even after 3/4 of the semester has passed.
- ⑤ A leave granted after 3/4 of the semester (as in ④) may only last until the end of the semester (or the last day of final exams).

7.5 Grades for Students Taking Leave of Absence

If a student takes a leave during a semester, the grades for that semester will not be honored, and the registration for the semester will be removed from their records.

7.6 Returning from Leave

- ① Refer to Article 25 of the Statutes of Pohang University of Science and Technology
- ② Students who are on a leave for start-up yet no longer eligible due to changes in circumstances must return from the leave within the same academic year in which their qualification has lapsed.
- ③ Students returning from a military leave must return to school within one year from the date of discharge (i.e. students must be enrolled and attending academic courses within one year from discharge) and submit the proof of discharge to the University.

7.7 Tuition for Returning Students

Students who had paid their full tuition for the semester in which the leave started will be charged for the returning semester as follows depending on at which point the leave was initiated:

- a. General leave initiated before the start of the semester: Waived
- b. General leave initiated within the first quarter of the semester: Waived
- c. General leave initiated during the second quarter of the semester: 50% of full tuition
- d. General leave initiated during the second half of the semester: Full tuition

e. Students on a general leave who join the military within the semester the general leave started: Waived

f. Students taking a military leave: Waived

7.8 Withdrawal from the University

- ① Refer to Article 26 of the University Statutes.
- ② Filing Period: Students may withdraw from the University at any time. However, to withdraw during a semester, the request must be submitted by the end of the semester (or the last day of the final exams).
- ③ Grades: If a student withdraws from the University during a semester, the grades for that semester will be disregarded under all circumstances.

8. Graduation

8.1 Graduation Requirements

Refer to Articles 30 and 34 of the University Statutes.

8.2 Degree Conferment Date

- ① Degrees are conferred twice a year on the second Friday of February and August.
- ② A commencement ceremony is held only in February. Students who receive their degrees in August should join the ceremony in February.

8.3 Credits Required for Graduation

The following will be applied to students admitted in 2015 or thereafter.

Department	HSS* Courses		General Require- ments	Major courses			General Electives	Total	ACB Require- ments	ABC Electives
	Required	Electives		Required	Electives	Total				
Mathematics	14	15	27	33	21	54	24	134	2	5
Physics	14	15	27	39	21	60	15	131	2	5
Chemistry	14	15	27	40	15	55	18	129	2	5
Life Sciences	14	15	27	43	12	55	21	132	2	5
Materials Science and Engineering	14	15	27	47	21	68	10	134	2	5
Mechanical Engineering	14	15	27	49	12	61	17	134	2	5
Industrial and Management Engineering	14	15	27	37	18	55	23	134	2	5
Electronic and Electrical Engineering	14	15	27	46	23	69	9	134	2	5

Department	HSS* Courses		General Requirements	Major courses			General Electives	Total	ACB Requirements	ABC Electives
	Required	Electives		Required	Electives	Total				
Computer Science and Engineering	14	15	27	46	13	59	18	133	2	5
Chemical Engineering	14	15	27	32	21	53	22	131	2	5
Creative IT Engineering	14	15	27	31	33	64		120		5

8.4 Completion of Program (without Degree Conferment)

① In accordance with Article 34 of the University Statutes, the following students will be considered to have completed their major program:

- Students admitted in or after 2008 who have not obtained the English Certification
- Students admitted in or before 2007 who have finished all courses designated by the University for their degree program but failed to earn the minimum TOEFL score of 550 (CBT scores: 213, iBT scores: 59 - speaking excluded).

② Certificate of Program Completion: Students who wish to obtain the Certificate of Program Completion must submit an application approved by their academic advisor and department head to the Office of Academic Affairs. (Due by the degree conferment date of a given year/semester)

③ Obtaining a degree after Program Completion

- Students admitted in or after 2008: If students take the English Certification Program and complete level 1 courses, a degree will be awarded at the end of the semester in which the students complete the level 1 courses.
- Students admitted in or before 2007: A degree will be awarded at the end of the semester in which the students earn a TOEFL score of 550 or above. However, if the students fail to earn the minimum TOEFL score within a year from the Program Completion, they are allowed to submit a TEPS score of 680 or above or a TOEIC score of 800 or above to satisfy the TOEFL requirement.

8.5 POSTECH English Certification Program

The University has implemented the English Certification Program, which took effect starting with students admitted in 2008, in order to strengthen English education.

① Overview

Based on their placement test results, students are assigned from level 1 to 5 with 5 being the lowest. Once a student passes the courses in his/her designated level, he/she can take courses of the next level. Students must finish level 1 courses to receive the English certification.

② Details

- All English courses are graded on a S/U basis. However, students admitted in or before 2007 academic year are given letter grades in courses other than English I-IV. English I-IV courses are graded on a S/U

basis starting with students admitted in 2005 and do not count toward the credits required for graduation.

- At most 4 credits earned through the POSTECH English Certification Program may count toward the credit requirements for graduation in the category of Humanities and Social Sciences.
- Students are not allowed to take courses of the next level if they receive a “U” in a course of their current level.
- Students should take the next level courses in sequence except in the following cases, where they may apply to retake the placement test.

(Exceptions: When a rapid and significant improvement is expected in a student’s English proficiency for reasons such as completion of a short-term study abroad program or a language training program or serving in KATUSA, the student may be re-evaluated and allowed to move up to the appropriate level.)

- Students who are exempted from taking English classes as a result of their placement tests will be given the English Certification and 4 credits, which may count toward the credits required for graduation.

③ Courses by level:

Level	Courses	Requirements/Electives
Level 5	Speaking+Writing: English I , II	2 courses required
Level 4	Speaking+Writing: English III, IV	2 courses required
Level 3	Speaking: Campus Everyday English, Intermediate English Conversation, Intermediate Speech, Intermediate Audiovisual English	2 courses out of 4 required
Level 2	Writing: Intermediate Writing, Intermediate Reading, Grammar Speaking: Advanced English Conversation, Advanced Speech, Advanced Audiovisual English	1 course in Writing and 1 course in Speaking required
Level 1	Writing: Advanced Writing, Advanced Reading, Thesis	1 course out of 3 required

④ Records of English Certification: Students who earn English Certification will have “Graduated with English Certification” printed on their transcripts and academic record.

The details of

8.6 Graduation Thesis Evaluation Requirements

The following table stipulates the details of Article 46 of the University Statutes concerning the undergraduate thesis.

Major	Classification	Details	Remarks
Mathematics	Graduation thesis evaluation or Graduation examination	- Eligible candidates for Graduation thesis evaluation: students who have earned outstanding grades in major courses. - Graduation examination on basic requirements or major requirements.	-

Major	Classification	Details	Remarks
Physics	Graduation thesis evaluation	-	-
Chemistry	Graduation thesis evaluation	CHEM499 Undergraduate Thesis Research (major requirement)	Course completion
Life Science	Graduation thesis evaluation	LIFE402 Undergraduate Thesis Research (major requirement)	Course completion
Materials Science and Engineering	Experiment practice report (Assignment presentation)	AMSE 403 Materials Process Design I (Major Requirement) AMSE 404 Materials Process Design II (Major Requirement)	Course completion
Mechanical Engineering	Experiment practice report (Assignment presentation)	MECH333 System Planning (Major Requirements) MECH433 System Planning (Major Requirements)	Course completion
Industrial and Management Engineering	Experiment practice report (Assignment presentation)	IMEN390 Engineering Planning I (Major Requirements) IMEN490 Engineering Planning II (Major Requirements)	Course completion
Electronic and Electrical Engineering	Experiment practice report (Assignment presentation)	EECE491 Planning Assignment I (Major Requirements) EECE492 Planning Assignment II (Major Requirements)	Course completion
Computer Science and Engineering	Experiment practice report (Assignment presentation)	CSED491 I (Major Requirements) CSED491 II (Major Requirements)	Course completion
Chemical Engineering	Graduation thesis evaluation	-	-
Creative IT Engineering	Experiment practice report (Assignment presentation)	CITE201 Creative IT Planning (Major Requirements) CITE202 Creative IT Planning II (Major Requirements) CITE301 Creative IT Planning III (Major Requirements) CITE302 Creative IT Planning IV (Major Requirements)	Course completion

9. Management Engineering Program

9.1 Purpose

The program aims to educate science and engineering students about the basics of business and to nurture science and engineering professionals who have comprehensive knowledge and skills in business as well as science and technology.

9.2 Application Procedure

Students who wish to participate in the program must fill out an application and obtain approval from their academic advisor and the Dean of Academic Affairs.

9.3 Application Period and Eligibility

Students can apply at anytime during their course of study, and there is no restriction on who may apply.

9.4 Required Number of Credits

- ① Students in the program must complete 18 credits or more in accordance with the course requirements and curriculum determined by the Management Engineering Program.
- ② Credits earned through the Management Engineering Program may also count towards a major, double major, or minor.
- ③ Credits earned through the Management Engineering Program count towards graduation.

9.5 Records of Completion

Students who have satisfied all program requirements will have “Completed Management Engineering Program” printed on their official transcript even before they graduate.

10. Minors

10.1 Purpose

To broaden academic understanding and develop specific skills and knowledge to better cope with our rapidly changing society, students may complete a minor program in addition to their major by following the designated procedures.

10.2 Procedures

- ① Students should take several courses of the intended minor before applying.
- ② When applying for a minor, students must obtain approval from their academic advisor, department head, and the President.

10.3 Required Number of Credits

- ① Students must earn at least 21 credits in accordance with each department's guidelines for a minor program.
- ② Students who wish to minor in a department that does not have a specified minor program must follow the direction of the department head to complete appropriate courses.
- ③ Credits earned from a single course are applied to either a major or minor, but not both.

11. Double Major

11.1 Purpose

The purpose of this section is to establish detailed procedures in obtaining a double major in accordance with Article 39 of the University Statutes.

11.2 Procedures

- ① Students should take several courses of their intended second major before applying for a double major.
- ② When applying for a double major, students must attach their transcript to a completed application and obtain approval from their academic advisor, the heads of their first and second departments, and the President of the University.

11.3 Required Number of Credits

- ① Students must earn at least 35 credits in accordance with the guidelines specified by each department for a double major. For majors with 35 or more credits of major requirement courses, completing all major requirements satisfies the number of credits required for a double major. For majors with fewer than 35 credits of major requirement courses, students should take some major elective courses (including courses offered by other departments that are acknowledged as major electives) in addition to all major requirements to meet the minimum number of credits required for a double major.
- ② Credits earned from a single course may be applied to both the primary and second majors.

11.4 Obtaining a Degree

- ① If a student fails to satisfy the credit requirements for graduation in his/her primary major, he/she will not be awarded a degree in his/her second major even though he/she has completed all requirements for it.
- ② Students will be awarded a degree with a double major only when they have completed all requirements for graduation in both majors, and both majors will be indicated on one diploma.

12. Examinations and Grades

12.1 Examinations

- ① There are regularly scheduled exams such as midterms and final exams, irregular exams such as quizzes, reports, experiment reports and projects, and course exemption exams for certain courses.

② Midterms are generally given during the 8th week of a semester and final exams in the 16th week. However, the exam schedules, frequency, and the percentage point of the final grade that exams represent may vary by instructor.

③ Exams for Humanities and Social Sciences requirement courses and general requirement courses are given according to a designated schedule. Time and place of exams given for all other courses may be decided by each course instructors.

12.2 Course Exemption Exams

① A student who shows a significant level of proficiency in a certain area of study may earn credits without taking a course by passing an exemption exam. By doing so, students have more time to take other courses and may redirect their time and effort to explore other options and opportunities such as pursuing early graduation, declaring a minor or double major, or expediting completion of their degree.

② There is no limit on the number of credits that may be earned by exemption exams. Students who pass an exemption exam will be given a grade of A+, A, or A-, which will count towards the credits required for graduation. Since credits earned through an exemption exam do not count towards the maximum number of semester credits, students may take additional courses within the limit of the maximum credits.

12.3 Evaluation/Grading

① Students in courses combining lectures and laboratories are evaluated with letter grades. Courses such as seminars, theses, or project evaluations that are unsuitable for letter grades may be graded on a Satisfactory (S)/Unsatisfactory (U) basis.

② Each instructor is responsible for writing questions, printing and keeping the tests, and supervising and grading the exams. The answer sheets and the class rosters should be kept by each instructor.

12.4 Grade Submission and Modification Period

① Each instructor should submit a grade report within 14 days from the final exams.

② To modify grades after the grade submission period, an instructor should submit a Petition for Grade Change with supporting documents and obtain approval from the Dean of Academic Affairs within 7 days from the end of the grade submission period.

12.5 GPA Calculation

① A course grade point can be obtained by multiplying the grade point corresponding to the letter grade of a given course by the number of course credits. A sum of all course grade points divided by the total number of credits taken in a given semester yields the grade point average (GPA) of the semester. The formula is as follows:

$$\frac{\text{Sum of Each Course Grade Point (Grade Point x Credits)}}{\text{Total Credits Taken in the Semester}}$$

② When calculating a GPA, the end result should be rounded to two decimal places.

③ Courses graded with "S" (Satisfactory) are not included in GPA calculation but the credits count towards graduation.

13. Awards & Disciplinary Actions

13.1 Awards

- ① There are two kinds of awards; Semester Honors awarded at the end of each semester and Graduation Honors awarded at graduation.
- ② Receipt of Semester Honors is recorded on the students' academic record and Graduation Honors on their academic record and diploma.

13.2 Award Criteria

- ① Semester Honors: Refer to Article 47 of University Statutes.
- ② Graduation Honors: Refer to Article 48 of University Statutes.

13.3 Academic Warning

Refer to Article 49 of University Statutes.

14. Summer/Winter Session

14.1 Period

Summer/winter sessions are offered during summer and winter breaks, respectively.

14.2 Eligibility

- ① The following students are eligible to take summer/winter sessions.
 - a. Current students
 - b. Students scheduled to return from leave (Students returning from a leave of absence may register for a summer or winter session that immediately precedes the regular semester in which they are to return.)
- ② Credits earned in a summer/winter session which immediately follows a student's very last regular semester in school may not count towards graduation.

14.3 Tuition Payment and Refund Policy

- ① Tuition for a summer/winter session must be paid during the designated payment period.
- ② Tuition that has already been paid shall not be refunded to students except in the following cases.
 - a. If there is an overpayment
 - b. If the student drops a course before the session begins
 - c. If an inevitable circumstance occurs and approval is granted by the Dean of Academic Affairs

14.4 Dropping a Course

If a student wishes to drop a course, the student shall obtain approval from the course instructor and his/her academic advisor and submit a Petition to Drop a Course.

14.5 Grading

- ① Credits earned in summer/winter sessions shall count towards graduation.
- ② Grades earned in summer/winter sessions shall not influence a student's academic standing such as Semester Honors or Academic Warning.

15. Cross-Registration

15.1 Participating Institutions

Students may cross-register at other domestic and overseas institutions which have signed a cross-registration agreement with POSTECH.

15.2 Cross-registration at Domestic Institutions

- ① Eligibility: Cross-registration is available only to students who are currently registered at POSTECH. (Summer and winter sessions: Students returning from a leave of absence are eligible to cross-register for a summer or winter session that immediately precedes the semester in which they are scheduled to return to POSTECH.)
- ② Course registration: Students who wish to cross-register must obtain approval from their academic advisor and department head and register for the courses within the period designated by POSTECH. POSTECH will notify the host institutions of the cross-registration results.
- ③ Course restrictions: Students are not allowed to cross-register for courses that they have previously taken at POSTECH. In principle, if a student wishes to repeat a course which was originally taken in a host institution, he/she must repeat it in the host institution. However, exceptions may be made if a substitute course is offered at and acknowledged by POSTECH.
- ④ Grading: The host institution shall grade the cross-registered courses according to the institution's grading guidelines. Credits and grades earned from the host institution will be recognized as they are but will not be included in GPA calculation (effective Winter 2001).
- ⑤ Tuition fees: Tuition for regular semesters should be paid to POSTECH. Tuition for summer or winter sessions is initially collected by POSTECH and transferred to the host institution under the terms of that institution.

15.3 Cross-registration at Overseas Universities (Short-Term Study Abroad Program)

- ① Eligibility: Students in their junior year whose cumulative GPA from the first two years in school is 3.3 or higher and who received at least 88 points on the TOEFL iBT test. (Students may not participate in a short-term study abroad program during their last semester before graduation.)
- ② Duration: one or two semesters (depending on host institutions)
- ③ Required documents:
 - Application form
 - Personal statements (one in Korean and one in English)
 - Official transcript

- Official TOEFL score (obtained within two years dating back from April of a given year)

④ Course registration: Students must submit a list of courses to be taken at a host institution to their department office after obtaining approval from their academic advisor and department head. Students are required to take at least 8 credits. For a summer session, students may take 3 to 6 credits.

⑤ Course restrictions: Students are highly recommended to register for courses in their major. Credits earned from Humanities and Social Sciences courses must not exceed 1/3 of the total credits earned during a study abroad program. Students are not allowed to register for courses that they have previously taken at POSTECH. In principle, HSS requirement courses should be taken at POSTECH. Credits earned from non-regular courses at the host institution (e.g. ESL courses) are not recognized by POSTECH. HSS courses taken at the host institution may not be acknowledged as general electives.

⑥ Grading

- Only the official transcripts sent directly from the host institution to POSTECH are acceptable.

- The course names and grades provided by the host institution are recorded as they are on POSTECH's transcripts. A separate approval process is required for the credits earned from the host institution to be recognized. Credits thus earned may count towards graduation but will not be included in GPA calculation.

- Earned credits may not be withdrawn.

- Students should submit course syllabi and course materials so that they may be used as a basis for POSTECH's credit approval process.

- Credit approval process:

Students present their transcript to their advisor for consultation → Visit the departments or professors offering courses similar to what they have taken at the host institution and request credit approval → Obtain confirmation from their academic advisor and department head → Submit it to the department office → The department will send it to the Academic Records Division → Credits will be approved and entered into the student's academic record by the Academic Records Division → Credit approval is completed.

※ For HSS courses, confirmation from a member of the curriculum committee in the Division of Humanities and Social Sciences is required.

⑦ Penalty for not earning enough credits

- 1 to 4 credits earned: The student will forfeit a general scholarship for the following semester.

- 0 credits earned: The student will be given an Academic Warning, forfeit a general scholarship for the following semester, and must return 50% of the financial support he/she received for the study abroad program.

(In the case of a Summer session, if a student earns 0 credits or does not submit a credit approval request within the designated period, he/she must return 100% of the financial support he/she received for the study abroad program.)

15.4 Short-Term Study Abroad Program Acknowledged by University

The operation of special short-term study abroad programs run by each department/division is subject to '15.3 Cross-registration at Overseas Universities.' Details regarding eligibility and course completion

requirements, however, shall be determined after consultation with the department concerned and review by the Education Committee.

16. Change of Information on Academic Records

- ① If there is any discrepancy between a student's personal information on the academic record and that on the family register, the student may request that the Office of Academic Affairs change his/her academic record by submitting a Petition to Change Information on Academic Record along with supporting documents which specify the reasons for the change.
- ② Information that may be changed include name (Korean), date of birth, and resident registration number
- ③ Acceptable supporting documents: Certificate of Family Relations or a copy of the Resident Registration

17. Certificate Requests

17.1 How to order

Certificates can be ordered using a certificate kiosk located in the Administration Building or over the Internet. Order by mail or fax is also available.

17.2 Service Hours

Certificates can be issued 24 hours a day through the certificate kiosks or over the Internet, but only during regular office hours by mail or fax.

17.3 Certificate Types

Enrollment Verification, Enrollment Status (for students who are suspended or on leave), Dismissal, Expected Graduation/Degree, Graduation/Degree, Completion of Coursework, Official Transcript, and Research Records (for research students who are working on their dissertation after the completion of Ph.D. coursework)

(Please note that the Certificate of Expected Graduation/Degree can be issued only after a request is submitted on POVIS.)

17.4 Fees

1,000 won per copy (Extra fees will be charged for certificates issued over the Internet.)

Division of Humanities and Social Sciences



1. Education Aim

The Division of Humanities and Social Sciences offers a broad spectrum of liberal education encompassing humanities, social/natural and engineering. We aim to help students foster their critical analysis, creative synthesis and effective communication abilities and to prepare them to become global leaders in a multicultural knowledge-based society.

2. Program Overview

As of 2014, the Division consists of 13 tenured or tenure-track faculty members, eight full-time visiting professors and eight full-time native-speaking English instructors. We offer opportunities for first-class interdisciplinary research and courses in Literature, History, Philosophy, Foreign Languages, Psychology, Sociology, Political Science, Economics, Business Administration, Arts, and Physical Education. Our faculty members have made remarkable research achievements in their areas of expertise. By attracting the world's finest faculty, students, and researchers, the Division is planning to strengthen its education and research capacity substantially in the interdisciplinary fields of Science and Technology Studies, Cognitive Science, Integrated Communication Studies, and Art & Technology.

3. List of HASS Courses

Category	Course No.	Course Title	lec-lab. -cr.	Remarks
Humanities, Arts, and Social Sciences (HASS) Require ments	GEDU100	Expository Writing	3-0-2	2 credits
	GEDU111 GEDU112	English I English II	3-0-2 3-0-2	- English Certification Level 5 - Both courses required - Not taken concurrently
	GEDU116 GEDU117	English III English IV	3-0-2 3-0-2	- English Certification Level 4 - Both courses required - Not taken concurrently
	GEDU121 GEDU122 GEDU123 GEDU124	Intermediate English Conversation Intermediate Audiovisual English Intermediate Speech Campus Everyday English	3-0-2 3-0-2 3-0-2 3-0-2	- English Certification Level 3 - Choose two courses.
	GEDU131 GEDU132 GEDU133 GEDU136 GEDU137 GEDU138	Intermediate Writing Intermediate Reading Grammar Advanced English Conversation Advanced Audiovisual English Advanced Speech	3-0-2 3-0-2 3-0-2 3-0-2 3-0-2 3-0-2	- English Certification Level 2 - Writing: Choose one course from Int. Writing, Int. Reading and Grammar. - Speaking: Choose one course from Adv. Conversation, Adv. Audiovisual and Adv. Speech.
	GEDU141 GEDU142 GEDU143	Advanced Writing Advanced Reading Thesis	3-0-2 3-0-2 3-0-2	- English Certification Level 1 - Choose one course.
	* An English level is determined by placement test scores. A student can advance to the next level after completing the assigned level course offered by the English Certification Program (ECP).			
	* A student must complete the ECP Level 1 course to earn four credits toward graduation. This policy applies to those admitted in 2008 or after.			
	GEDU151	Physical Fitness	0-3-1	Offered to those admitted in 2009 or after
	GEDU152	Kumdo	0-2-1	- Offered to those admitted in 2009 or after - Required to complete two credits from the list including the GEDU151 course
	GEDU153	Golf	0-2-1	
	GEDU154	Basket Ball	0-2-1	
	GEDU155	Dance	0-2-1	
	GEDU156	Racket Ball	0-2-1	
	GEDU157	Badminton	0-2-1	
	GEDU158	Swimming	0-2-1	
	GEDU159	Ski	0-2-1	
	GEDU160	Baseball	0-2-1	
	GEDU161	Orienteering	0-2-1	
	GEDU162	Rowing	0-2-1	
	GEDU163	Soccer	0-2-1	
	GEDU164	Table Tennis	0-2-1	
	GEDU165	Tennis	0-2-1	

Category	Course No.	Course Title	lec-lab. -cr.	Remarks
HASS Electives (Humanities)	HASS201	Art and Humanities	3-0-3	Offered to those admitted in 2011 or after
	HASS202	Crossing boundaries of Science and Society	3-0-3	
	HUMN311	Understanding of Literature	3-0-3	Complete 15 credits from the list.
	HUMN312	Understanding Popular Literature	3-0-3	
	HUMN313	Understanding Contemporary Korean Literature	3-0-3	
	HUMN314	Understanding the World Literature	3-0-3	
	HUMN315	Literature of Social Reflection	3-0-3	
	HUMN411	Reading of Oriental Classics	3-0-3	
	HUMN412	Reading of Western Classics	3-0-3	
	HUMN413	Literature and Mass Culture	3-0-3	
	HUMN414	Feminism Literature	3-0-3	
	HUMN415	Culture Content and Storytelling	3-0-3	
	HUMN419	Special Topics in Literature	3-0-3	
	HUMN321	Logic and Critical Thinking	3-0-3	
	HUMN322	Classics in Eastern and Western Philosophy	3-0-3	
	HUMN323	Great Debates in Philosophy	3-0-3	
	HUMN324	Knowledge and Reality	3-0-3	
	HUMN325	Philosophical Understanding of Contemporary Society	3-0-3	
	HUMN326	Business Ethics	3-0-3	
	HUMN421	Philosophy of Mind	3-0-3	
	HUMN422	Applied Ethics	3-0-3	
	HUMN423	Culture and Philosophy	3-0-3	
	HUMN424	Political Philosophy	3-0-3	
	HUMN429	Special Topics in Philosophy	3-0-3	
	HUMN331	The World History of 20th Century	3-0-3	
	HUMN332	Culture History of East Asia	3-0-3	
	HUMN333	Western Culture History	3-0-3	
	HUMN334	Traditional Society and Culture of Korea	3-0-3	
	HUMN335	Understanding of World Civilization	3-0-3	
	HUMN431	Understanding Modern History of Korea	3-0-3	
	HUMN432	Understanding Modern History of China	3-0-3	
	HUMN433	Understanding Modern History of Europe	3-0-3	
	HUMN434	American History	3-0-3	
	HUMN435	History of Japan	3-0-3	
	HUMN436	History of Korea Enterprise	3-0-3	
	HUMN439	Special Topics in History	3-0-3	

Category	Course No.	Course Title	lec-lab. -cr.	Remarks
HASS Electives (Humanities)	HUMN341	History of Science	3-0-3	
	HUMN342	Philosophy of Science	3-0-3	
	HUMN343	Science Technology Studies	3-0-3	
	HUMN344	modern society and Scienc	3-0-3	
	HUMN345	Art and Science	3-0-3	
	HUMN441	Policy for Science and Technology	3-0-3	
	HUMN442	Science Communication	3-0-3	
	HUMN443	History of Science and Technology in KoreaKorea	3-0-3	
	HUMN444	History of Science and Technology in East Asia	3-0-3	
	HUMN449	Special Topics in Science Technology Studies	3-0-3	
HASS Electives (Social Sciences)	SOSC311	Understanding Modern Politics	3-0-3	Complete 15 credits from the list.
	SOSC312	Understanding International Politics	3-0-3	
	SOSC419	Special Topics in Politics	3-0-3	
	SOSC321	Principles of Economics	3-0-3	
	SOSC322	Microeconomics	3-0-3	
	SOSC323	Macroeconomics	3-0-3	
	SOSC324	Principles of Business Administration	3-0-3	
	SOSC325	Financial Management	3-0-3	
	SOSC326	Organizational Behavior	3-0-3	
	SOSC327	Strategic Management	3-0-3	
	SOSC328	Econometrics	3-0-3	
	SOSC329	Money and Banking	3-0-3	
	SOSC421	Game Theory	3-0-3	
	SOSC422	Industrial Organization	3-0-3	
	SOSC423	International Finance	3-0-3	
	SOSC424	Financial Economics	3-0-3	
	SOSC425	Introduction to Fixed Income Markets	3-0-3	
	SOSC426	Behavioral Economics	3-0-3	
	SOSC427	Behavioral Finance	3-0-3	
	SOSC429	Special Topics in Economics	3-0-3	
	SOSC331	Understanding modern society	3-0-3	
	SOSC332	Political Sociology	3-0-3	
	SOSC333	Sociology of Science	3-0-3	
	SOSC334	Social Studies of Economics and Finance	3-0-3	
	SOSC431	Contemporary society and multiculturalism	3-0-3	
	SOSC432	Anthropology	3-0-3	
	SOSC433	Gender Studies	3-0-3	
	SOSC439	Special Topics in Social Science	3-0-3	

Category	Course No.	Course Title	lec-lab. -cr.	Remarks
HASS Electives (Social Sciences)	SOSC341	Psychology: Human mind, brain and behavior	3-0-3	Complete 15 credits from the list.
	SOSC342	modern society and Mental Health	3-0-3	
	SOSC343	Social Psychology	3-0-3	
	SOSC344	Industrial and Organizational Psychology	3-0-3	
	SOSC441	Cognitive Psychology	3-0-3	
	SOSC442	Abnormal Psychology	3-0-3	
	SOSC443	Psychology of Sleep	3-0-3	
	SOSC444	Cognitive Neuropsychology	3-0-3	
	SOSC449	Special Topics in Psychology	3-0-3	
	SOSC351	Mass Communication and modern society	3-0-3	
	SOSC352	Information Society and Emerging Media	3-0-3	
	SOSC353	Professional Communication	3-0-3	
	SOSC354	Interpersonal Communication	3-0-3	
	SOSC355	Business Communication	3-0-3	
	SOSC451	Persuasion Strategy and Attitude Change	3-0-3	
	SOSC452	Communication in Multicultural Society	3-0-3	
	SOSC459	Special Topics in Communication	3-0-3	
	SOSC361	The World of Law	3-0-3	
	SOSC461	Understanding Intellectual Property Right	3-0-3	
	SOSC469	Special Topics in Law	3-0-3	
HASS Electives (Arts)	ARTS311	Introduction to Contemporary Art	3-0-3	
	ARTS312	Understanding Art	3-0-3	
	ARTS313	Understanding Music	3-0-3	
	ARTS314	Introduction to Theatre	3-0-3	
	ARTS315	Understanding Architecture	3-0-3	
	ARTS316	Introduction to Film	3-0-3	
	ARTS411	Art and Society	3-0-3	
	ARTS412	Art, Science, and Technology	3-0-3	
	ARTS413	Media Art	3-0-3	
	ARTS414	Art and Entrepreneurs	3-0-3	
	ARTS419	Special Topics in Music and Art Studies	3-0-3	
Free Electives	GEDU181	Ethics of Research	3-0-2	
	GEDU182	Presentation and Debate	3-0-2	
	GEDU184	Essay Writing	3-0-2	
	GEDU185	Reading Discussion	3-0-2	
	GEDU186	Artistic Promenade	3-0-2	
	GEDU187	Understanding the Arts	3-0-2	
	GEDU191	Basic Japanese	3-0-2	
	GEDU192	Intermediary Japanese	3-0-2	

Category	Course No.	Course Title	lec-lab. -cr.	Remarks
Free Electives	GEDU193	Basic Chinese	3-0-2	
	GEDU194	Intermediary Chinese	3-0-2	
	GEDU195	German	3-0-2	
	GEDU196	French	3-0-2	
	GEDU197	Spanish	3-0-2	
	GEDU401	HSS Colloquium	3-0-2	
	GEDU409	Special Topics in HASS	3-0-2	

* English Certification Program

Level	Course	Requirement/ Elective
Level 5	Speaking+Writing: English I, II	• 2 courses required • Not taken concurrently
Level 4	Speaking+Writing: English III, IV	• 2 courses required • Not taken concurrently
Level 3	Speaking: Intermediate English Conversation, Intermediate Audiovisual English, Intermediate Speech, Campus Everyday English	Choose two courses.
Level 2	Writing: Intermediate Writing, Intermediate Reading, Grammar	Choose one course.
	Speaking: Advanced English Conversation, Advanced Audiovisual English, Advanced Speech	Choose one course.
Level 1	Writing: Advanced Writing, Advanced Reading, Thesis	Choose one course.

* An English level is determined by placement test scores. A student can advance to the next level after completing the assigned level course offered by the English Certification Program (ECP).

4. Course Description



• **HASS Requirements** •
(Basic requirements)

[Expository Writing]

GEDU 101 Expository Writing (3-0-2)

This composition course is designed to prepare students for college-level and professional writing and to help them acquire the strategies and techniques necessary for effective communication. Class meetings and activities are conducted in settings that encourage students’ active participation to utilize the skills they acquire during class.

[English Certification Program]

GEDU 111 English I (3-0-2)

The first of the two Level 5 courses in the English Certification Program. The course is conducted in English only, and students practice their writing, listening and speaking skills. Writing activities focus on sentence-level structure and grammar. Students will also take part in an intensive reading program designed to improve all skill areas. The course is graded as Satisfactory/Unsatisfactory only.

GEDU 112 English II (3-0-2)

The second of the two Level 5 courses in the English Certification Program. The course is conducted in English only. Students practice their reading skills through both intensive and extensive reading activities. Speaking activities include both informal conversation and formal presentations. Building on sentence-level skills, writing activities begin to consider paragraph-level organization and structure. The course is graded as Satisfactory/Unsatisfactory only.

GEDU 116 English III (3-0-2)

The first of the two Level 4 courses in the English Certification Program. The course is conducted in English only. Students practice their reading skills through both intensive and extensive reading activities. Speaking activities include both informal conversation and formal presentations. Writing activities begin with paragraph-level organization and structure and conclude with basic short essays.

GEDU 117 English IV (3-0-2)

The second of the two Level 4 courses in the English Certification Program. The course is conducted in English only. Students practice their reading skills through both intensive and extensive reading activities. Speaking

activities include both informal conversation and formal presentations. Writing activities develop the organization and structure for various types of essays.

GEDU 121 Intermediate English Conversation..... (3-0-2)

One of the four elective courses in Level 3 of the English Certification Program. This course aims to help students improve their confidence in using conversational English in a variety of situations. A great focus will be placed on everyday idioms and expressions and how they are used in context. The majority of class time is spent talking with classmates in small groups.

GEDU 122 Intermediate Audiovisual English..... (3-0-2)

One of the four elective courses in Level 3 of the English Certification Program. The course is designed to develop listening and speaking skills. A combination of visual and oral information from authentic sources, such as movies, situational comedies, commercials, and documentaries will be presented. Students learn useful and practical expressions and participate in discussions of related topics.

GEDU 123 Intermediate Speech (3-0-2)

One of the four elective courses in Level 3 of the English Certification Program. It is designed to improve confidence and fluency in public speaking. The course will help students develop oral presentation skills in English including pronunciation, articulation, diction, and delivery. Students gain an understanding of both basic communication principles and public speaking strategies and practice applying these principles to a variety of speaking assignment.

GEDU 124 Campus Everyday English..... (3-0-2)

One of the four elective courses in Level 3 of the English Certification Program. The course is offered every summer and provides a chance to practice common English expressions through live interactions with native English speaking students as peer instructors.

GEDU 131 Intermediate Writing (3-0-2)

One of the three elective courses in Level 2 of the English Certification Program focusing on writing practice. Students learn about sentence structures, paragraph composition, various expressions and how to develop their writings logically. Students utilize these skills to create clear, well-organized essays and research papers.

GEDU 132 Intermediate Reading..... (3-0-2)

One of the three elective courses in Level 2 of the English Certification Program. The course is designed to improve English proficiency by using extensive reading materials including literary works. Students also practice other language skills by writing response journals and participating in discussions.

GEDU 133 Grammar.....(3-0-2)

One of the three elective courses in Level 2 of the English Certification Program. It focuses on the application and correct use of English grammar. The course will help students acquire the knowledge of basic sentence structures and the skills to build complex sentences and short essays using the basic structures.

GEDU 136 Advanced English Conversation (3-0-2)

One of the three elective courses in Level 2 of the English Certification Program. It focuses on conversational skills. Using various reading materials, this course aims to refine oral proficiency by encouraging accurate and fluent speaking skills.

GEDU 137 Advanced Audiovisual English (3-0-2)

One of the three elective courses in Level 2 of the English Certification Program. It is designed to develop listening and speaking skills. A combination of visual and oral information from authentic sources, such as movies, situational comedies, commercials, and documentaries will be presented. Students learn useful and practical expressions and participate in discussions of related topics. The audiovisual materials used in this course are more advanced than the materials used in Intermediate Audiovisual English.

GEDU 138 Advanced Speech..... (3-0-2)

One of the three elective courses in Level 2 of the English Certification Program. It is designed to improve confidence and fluency in public speaking. The oral presentation skills required for international conferences will be primarily practiced along with the necessary linguistic aspects for academic discourse.

GEDU 141 Advanced Writing (3-0-2)

One of the three elective courses in Level 1 of the English Certification Program. It focuses on the research skills necessary to write compelling papers for a variety of situations. Additionally, the editing and revision process is explored as students complete four major assignments and numerous, small practice writings. Students also present their major papers to the class.

GEDU 142 Advanced Reading (3-0-2)

One of the three elective courses in Level 1 of the English Certification Program. Students improve their reading comprehension and writing skills by using extensive reading materials from various fields such as science, economics, education, religion, and culture. Students read various literary texts, discuss related topics, and write response journals. The reading materials used in this course are more advanced than the materials used in Intermediate Reading.

GEDU 143 Thesis..... (3-0-2)

One of the three elective courses in Level 1 of the English Certification Program. The course focuses on the major organizational principles and writing techniques involved in reporting technical information. Students practice the techniques by writing academic journal papers and giving oral presentations. Graduate students do not earn credits for taking this course.

[Physical Education]**GEDU 151 Physical Fitness..... (0-3-1)**

This course evaluates the physical strength of each student and assigns them 16 week customized exercise programs for strength and health promotion. This course enables students to learn systematic ways of enhancing stamina and health through exercise and to improve their individual physical strengths.

GEDU 152 Kumdo..... (0-2-1)

This course provides students with practical instructions related to the basic skills and understanding of Kumdo as a traditional martial art for physical and mental discipline. It also enhances knowledge about the functional principles of Kumdo including how to control one's mind, how to use the sword, and how to protect one's body enabling students to continue practicing Kumdo in the future.

GEDU 153 Golf.....(0-2-1)

Golf is a sport which people can enjoy outdoors. Playing golf requires the ability to swing effectively and accurately, and demands a balance between the physiological and the psychological.

GEDU 154 Basket Ball (0-2-1)

Basketball is one of the most popular sports among young students. It requires lots of exercise, quickness, agility, and physical strength. In this course, students will acquire basic skills (including passing, dribbling, and shooting) and practice offense and defense techniques through practice games. Students will improve their overall basketball skills through regular games.

GEDU 155 Dance (0-2-1)

Dancing is an artistic indoor sport and a popular social activity for Western upper classes. This course enables students to easily understand and learn dancing and increase physical strength.

GEDU 156 Racket Ball (0-2-1)

Racquetball requires basic abilities such as agility, quickness, flexibility, and endurance. Using six sides of a handball court, racquetball games are played very quickly and improve one's ability to make quick judgments. This course mainly concentrates on fundamental skills including forehand and backhand strokes.

GEDU 157 Badminton..... (0-2-1)

Playing badminton requires quick and agile movements, but the skills may be acquired in a relatively short period of time. This course teaches basic skills including footwork and overhand and underhand strokes, and badminton rules so that beginners can become skilled enough to enjoy a competitive game.

GEDU 158 Swimming..... (0-2-1)

Swimming is a whole-body exercise which can help develop balance in students' bodies. Also it is one of the basic physical activities like walking, running, and jumping.

GEDU 159 Ski.....(0-2-1)

This course provides students with basic skiing skills including snow plough and stem turn and safety tips. This course is available only in winter sessions with an intensive 4-day training at a ski resort.

GEDU 160 Baseball..... (0-2-1)

Baseball is one of the most popular sports worldwide and a whole-body exercise. Because throwing, catching, hitting and running require agility, quickness and endurance, playing baseball strengthens a heart, lungs and muscles. Also, the ability to make quick decisions is necessary during games.

GEDU 161 Orienteering.....(0-2-1)

Orienteering is a sport which requires navigational skills using a map and a compass. Cultivating reasoning power, judgment and insight, the course is fun, nature friendly and appropriate to topographic characteristics of Korea with not high mountains and hills.

GEDU 162 Rowing (0-2-1)

Rowing is an aquatic sport of propelling a boat on water using oars. It requires muscular activities throughout a body, cardiopulmonary fitness and teamwork as important factors. Executed in natural environments such as a river or a lake, the course helps improve mental and physical health.

GEDU 163 Soccer (0-2-1)

Soccer requires players to handle a ball with their feet, head, or body (except for their hands and arms). Soccer is both an aerobic and anaerobic exercise because a player has to run fast, ease off, or run backward and sideward while playing a game. Also playing soccer can greatly improve a student's psychological aspects because confidence, creativity, and quick judgments are necessary to cope with the drastic changes in a game.

GEDU 164 Table Tennis (0-2-1)

Table tennis is a popular sport which people of all ages can enjoy. Involving lots of physical exercise, it is relatively safe, easy to learn, enjoyable all-year-round.

GEDU 165 Tennis..... (0-2-1)

This course teaches the basic movements of tennis including grip, stance, step, back swing, and forward swing. Students acquire basic skills in forehand, backhand, and ground strokes, and services tailored to their individual abilities. The course also deals with game rules, strategies, and the etiquette of watching games so that students may enjoy playing or watching games in the future.

[Integrated HASS]

HASS 201 Art and Humanities(3-0-3)

This class is an interdisciplinary course that incorporates philosophy, history, and art. Understanding humanities and art will enhance creativity and capability of critical thinking. Collective instructors will propose a subject

matter for each semester, and students are expected to participate in team projects and discussions.

HASS202 Crossing boundaries of Science and Society.....(3-0-3)

This course investigates various aspects of science and technology and social phenomena by way of methods from social sciences and science studies. The aim of this course is to explore the nature of modern science and technology, the relationship between science and society, problems with science in social and historical contexts in order to foster humanistic scientists and engineers. Furthermore, the course provides political, economic, sociological and psychological insights for understanding socio-cultural contexts of science and technology.



• HASS Electives - Humanities •

■ Humanities

[Literature]

HUMN 311 Understanding of Literature..... (3-0-3)

The course provides students with the essential basic knowledge of literature. Students gain an understanding of literature from various perspectives by studying the concepts and functions of literature, the relations with other studies, the basic concepts of literary theories, the development of Korean literature, the world of Eastern and Western classics, and literature in movies and media.

HUMN 312 Understanding Popular Literature.....(3-0-3)

The course aims to teach students to have the proper view of popular literature. Its purposes include: 1) understanding the characteristics and role of general literature; 2) looking into the characteristics of popular literature; 3) studying the characteristics of popular literature's subgenres; 4) developing discernment for popular literature.

HUMN 313 Understanding Contemporary Korean Literature.....(3-0-3)

The course aims to cultivate an appreciation of many literary works, to recognize reality objectively through them and to communicate with the real world. Students are asked to read a lot of Korean contemporary novels and poems, to write book reports and to join discussions about the important issues in Korean contemporary literature.

HUMN 314 Understanding the World Literature..... (3-0-3)

The course helps students approach literature and culture in both the characteristic and universal aspects of the major pieces of world literature.

HUMN 315 Literature of Social Reflection (3-0-3)

This subject induces students to read diverse works of the world's distinguished authors, in which ethical issues are dealt with, and to discuss ethical dilemmas. After exploring critical issues such as class, race, gender and age in modern society, students will pursue not only an ethical understanding but also introspective attitudes toward human and society.

HUMN 411 Reading of Oriental Classics(3-0-3)

The course helps students to deeply appreciate the world of Eastern literature and to understand the significance of classics. It provides Eastern values increasingly requested in modern society pervaded with many problems such as greed, alienation, anomies, etc.

HUMN 412 Reading of Western Classics(3-0-3)

The course helps students to deeply appreciate the world of Western literature and to understand the historical value and realistic significance of those works. Reading and discussing Western classics will provide creative and imaginative thinking methods for students.

HUMN 413 Literature and Mass Culture(3-0-3)

The course aims to survey and examine the cultural significance of the masses and the relation with literature in modern society. Helping students to understand mass-cultural phenomena closely related to the new trends of literature, this course enhances insights to the relation of literature, human and society.

HUMN 414 Feminism Literature(3-0-3)

The course helps students to understand the theories and the practices of feminism, and consider how masculinity, femininity and the identity of sexual minorities have been constructed and represented in each period of times, society and culture. To this end, this subject induces them to read and appreciate its related literary works which represent the East and West, and each period. Furthermore, students can understand modern society and have critical thinking from a feminist perspective.

HUMN 415 Culture Content and Storytelling(3-0-3)

The course helps students to understand the characteristics and effects of cultural content delivered by the mass media and the significance of storytelling developed in our society. It also encourages them to create cultural content using storytelling in groups. In this class students will appreciate the cultural characteristics of our society.

HUMN 419 Special Topics in Literature..... (3-0-3)

Specific topics in the field of literature will be chosen and discussed systematically and in depth.

[Philosophy]**HUMN 321 Logic and Critical Thinking** (3-0-3)

The main goal of the course is to improve critical and logical reasoning skills. Students will see how our ordinary intuitions on good or bad reasoning can be articulated explicitly in formal systems, and gain a new ability to evaluate arguments and reasoning they encounter every day with rigorous logical concepts and tools.

HUMN 322 Classics in Eastern and Western Philosophy (3-0-3)

The course aims to explore various ways of understanding the world and enhance ability to think reflectively and critically by reading and discussing classics in Eastern and/or Western philosophy. The main works of Eastern philosophy include those of ancient Chinese thoughts, Hinduism, Buddhism, etc. For Western philosophy, we discuss the works of Plato, Aristotle, Descartes, Hume, Kant, and so forth.

HUMN 323 Great Debates in Philosophy (3-0-3)

The course introduces philosophy by investigating important historical and current issues in philosophy in the form of a debate. The questions include theism vs. atheism, free will vs. determinism, skepticism vs. problems of knowledge, realism vs. antirealism, moral relativism vs. objectivism, debates on justice and other ethical issues.

HUMN 324 Knowledge and Reality (3-0-3)

The course deals with key epistemological questions such as ‘What is the nature of knowledge?’ ‘What conditions presuppose the acquisition of knowledge?’ and ‘What distinguishes knowledge from mere belief?’ and also with metaphysical questions like ‘Exactly what exist?’ ‘What am I?’ ‘What is the world like?’, ‘Does God exist?’, ‘What is truth?’, etc.

HUMN 325 Philosophical Understanding of Contemporary Society (3-0-3)

Through a philosophical reflection the course examines the nature of human beings, the impacts of industrialization and capitalization on human lives such as alienation, the changes in ways of interacting with one another, which rapid technological advances and globalization bring, and the prospect of social changes and future progress.

HUMN 326 Business Ethics (3-0-3)

The purpose of this course is to reason on the role of ethics in business administration in a complex, dynamic, global environment. The course explores the social and ethical challenges facing contemporary organizations and develops the knowledge and skills necessary to manage these challenges effectively. Throughout the course, students will be encouraged to think deeply about the nature of business, the responsibilities of the management, and how business and ethics can be put together. The emphasis is on enhancing personal moral insight, developing individual and organizational strategies for dealing with social and ethical problems, critically evaluating relevant tools, and managing for global corporate responsibility.

HUMN 421 Philosophy of Mind (3-0-3)

The course aims to analyze problems concerning the nature of mind and mental phenomena such as the relation between mind and body, the nature of the self and personal identity, free will, action and behavior, thinking machines, knowledge of other minds, etc.

HUMN 422 Applied Ethics.....(3-0-3)

Normative ethics investigates what is good/evil, right/wrong, justice/injustice in individuals and in our relationships to people and all other things. In this course students learn how to apply various fundamental theories in normative ethics to various practical and real ethical problems. The main topics are bio/medical ethics, information ethics, animal and environmental ethics, business ethics, theories of social and economic justice, etc.

HUMN 423 Culture and Philosophy.....(3-0-3)

The course deals with such topics as the notion of culture, its structure, the logic of its changes, theoretical analyses of important cultural phenomena, its role in the life of an individual and in a society/state, and the relations among science, technology, arts and religion.

HUMN 424 Political Philosophy (3-0-3)

The course deals with such topics as liberty, equality, justice, property, rights, law and politics: what they are; why they are needed; what makes a government legitimate; what rights and freedoms it should protect and why; what form it should take and why; what the law is; and what duties citizens owe to a legitimate government.

HUMN 429 Special Topics in Philosophy (3-0-3)

The course aims for an intensive investigation of selected issues, major figures, or historical periods in philosophy. It involves extensive writing and supervised research.

[History]

HUMN 331 The World History of 20th Century..... (3-0-3)

The course examines the major issues in the 20th century such as imperialism, nationalism, fascism, anti-fascism, the Cold War, the decline of socialism, the third world countries and revolutions, and the rise of neoliberalism and civil society from diverse perspectives and stances.

HUMN 332 Culture History of East Asia (3-0-3)

Students will investigate the similarities and characteristics of Asian customs and cultures by way of how they were exchanged before the modern era.

HUMN 333 Western Culture History (3-0-3)

The course covers the following three cultures considered fundamental to Western civilization to understand how Western society is different from Eastern society. Hellenism was a people-oriented culture in the Mediterranean period. Hebraism was Jewish culture spanning from the late Roman Empire to the Middle Ages.

Germanism laid the foundation for feudalism, a new social system.

HUMN 334 Traditional Society and Culture of Korea (3-0-3)

This course deals with the lives of pre-modern Koreans in terms of social and cultural history so that students can understand Korean historical traditions and think about progressive ways to learn from them.

HUMN 335 Understanding of World Civilization (3-0-3)

Human history is closely linked to the rise and fall of civilizations built in the intersection between time and space. In this regard, this course aims to review the meaning and foundations of the emergence of world civilizations, and the process of their rise and fall. Furthermore, it analyzes the formation process, ruling and management systems of empires including the four ancient civilizations. At the end, the methods for managing modern civilization will be sought from humanistic perspectives.

HUMN 431 Understanding Modern History of Korea (3-0-3)

Following the open-door policy adopted in 1876, Korean history could be summarized into two major events. One is the establishment of an independent nation-state and the other is the overcoming of the division of Korea. From a critical and reflective point of view, the course examines the efforts to address these national issues and the problems caused in the process.

HUMN 432 Understanding Modern History of China (3-0-3)

The course studies the directions of the modern nation-state that China has been seeking to establish by exploring the failure and recovery in the course of China's modern revolution.

HUMN 433 Understanding Modern History of Europe (3-0-3)

The changeover from a feudal society to a modern one resulted from civil revolutions brought about by the growth of the bourgeoisie. This class covers the elimination of feudal vestiges by the Glorious Revolution in the 17th century and the American Revolution and the French Revolution in the 18th century. It also deals with the backgrounds of the international conflicts and wars caused by the imperialistic international order in the 19-20th centuries.

HUMN 434 American History (3-0-3)

The course investigates American history in terms of politics, economy, society and culture to understand comprehensively the status and influence of American history on the world's history and to think about future perspectives.

HUMN 435 History of Japan (3-0-3)

The course covers the characteristics of modern Japanese society by viewing the Meiji Restoration and the US occupation policies in Japan after the Second World War to understand Japan of the 21st century.

HUMN 436 History of Korea Enterprise..... (3-0-3)

This course explores the history of Korean enterprises that have greatly contributed to economic and political developments in Korea. Students study historically verified cases of Korean entrepreneurs' challenges and successes by looking into four different periods of Korean history: the late years of the Joseon dynasty (17th century to early 19th century), the port-opening period (late 19th century), the Japanese Colonial period (early 20th century), and post-Liberation (late 19th century).

HUMN 439 Special Topics in History..... (3-0-3)

The course offers some topics in history not restricted to only Eastern or Western history. Experts in each field will be invited to give special lectures or joint lectures.

[Science Technology Studies]

HUMN 341 History of Science..... (3-0-3)

The course introduces the history of science from ancient times to the present. The course provides an overview of the Greek natural philosophy, scientific thought in the Middle Ages, and the Scientific Revolution and its effect on the emergence of modern science. It also briefly covers the history of physics, chemistry, and biology.

HUMN 342 Philosophy of Science..... (3-0-3)

The course seeks to answer three sets of separate but closely related questions: (1) In what respects is science distinguished from other human intellectual activities and pseudo-science?; (2) What does science aim to do? Does science provide the correct understanding and explanation of the true nature of the world?; (3) In what sense and to what degree can we say that scientific knowledge is objective?

HUMN 343 Science Technology Studies..... (3-0-3)

The course presents the social aspects of science and technology covering the history and philosophy of science, the sociology of scientific institutions, post-colonial studies, anthropology, and feminism. Students explore theories and methods in science and technology studies.

HUMN 344 Modern society and Science..... (3-0-3)

The course examines the developments of modern science in diverse cultural contexts spanning the nineteenth century to the present centering on Europe and the United States.

HUMN 345 Art and Science..... (3-0-3)

The course explores the relationship between science and art. Art historians, artists, historians of science, and scientists participate in the lectures on wide-ranging topics of science, art and technology.

HUMN 441 Policy for Science and Technology..... (3-0-3)

The course examines the politics and policymaking for science and technology in the world.

HUMN 442 Science Communication (3-0-3)

The course examines the nature of science communication. It includes various features of science in newspapers, magazines, TV programs and films.

HUMN 443 History of Science and Technology in Korea (3-0-3)

The course explores the history of science, technology, and medicine in Korea from ancient times to the present.

HUMN 444 History of Science and Technology in East Asia (3-0-3)

The course covers East Asia's science, technology, and medicine from ancient times to the present. It includes issues in disciplines such as astronomy, mathematics, alchemy, medicine, and technology.

HUMN 449 Special Topics in Science Technology Studies (3-0-3)

The course deals with current issues such as bioethics, science and women, etc. in the history of science through special lectures.

• HASS Electives-Social Sciences •

■ Social Sciences

[Political Science]

SOSC 311 Understanding Modern Politics (3-0-3)

What is the meaning of politics in modern society? This course analyzes political events in modern society and looks into the characteristics of modern politics. Also it deals with the fundamental concepts and issues in modern politics such as modern political ideas, the forms of practices, the political systems of major countries, comparative politics, political processes, and international relations.

SOSC 312 Understanding International Politics (3-0-3)

The course presents the fundamental concepts of modern international politics including boundary issues between nations, international disputes, wars, international cooperation and conflicts in order to discuss its present state. The course also covers major changes in international relations and their main motives such as the appearance of imperialism, the outbreak of the World Wars, the Americanization of the world, the formation of multi-cultural societies, and the new world order.

SOSC 419 Special Topics in Politics (3-0-3)

This course selects major political issues such as the politics of the Cold War and post-Cold War, globalization and nationalism as topics for systematic in-depth discussions to identify appropriate solutions.

[Economics]

SOSC 321 Principles of Economics (3-0-3)

The course provides an overview of fundamental economic issues. It introduces basic concepts in microeconomics, macroeconomics and their applications. Topics include supply and demand, market equilibrium, efficiency, externalities, imperfect competition, national income, unemployment, inflation, monetary and fiscal policies, and economic growth.

SOSC 322 Microeconomics (3-0-3)

Microeconomics is the study of decision making and the interaction of economic agents against resource constraints. This course presents theories in microeconomics and their applications. Main topics include consumer theory, the theory of the firm, competitive equilibrium, imperfect competition, externalities, public goods, asymmetric information, and general equilibrium and welfare.

SOSC 323 Macroeconomics (3-0-3)

The course provides the basic concepts and tools for understanding macroeconomic variables such as national income, consumption, savings and investment, production, government budget, money, interest rate, inflation, unemployment, and growth. Using macroeconomic models, students will examine the effects of monetary and fiscal policies and international economic issues.

SOSC 324 Principles of Business Administration (3-0-3)

The course introduces the basic concepts and methodology necessary to understand business and management. Topics include management theory and practices, functional management (accounting, finance, production, marketing and human resources), and the major issues and trends of contemporary business.

SOSC325 Financial Management (3-0-3)

The course is an introduction to finance and thus provides a general survey of finance. The objective of the course is to help students to understand the basic concepts of finance and their applications. Main topics covered in this course include the valuation of bonds and stocks, investment decisions, portfolio management, the capital asset pricing model (CAPM), capital structures, and futures and options.

SOSC326 Organizational Behavior (3-0-3)

The course studies human behavior in organizations. Students will understand the basic concepts of organizational behavior, and the relationship of individual and group behavior to the organization, and acquire the ability to improve organizational relationships and performance. Topics include individual behavior, motivation, group behavior, communication, leadership, power, conflict and negotiation, organizational structures, and organizational cultures.

SOSC327 Strategic Management (3-0-3)

To succeed in competitive markets, a firm must develop its strategies to gain and sustain competitive advantages

in the markets. This course introduces the basic concepts of strategic management and provides students with the broad perspectives of strategic management. Topics covered in this course include the goals of a firm, market structures and strategies, strategy implementation, product differentiation, vertical integration, corporate diversification, mergers and acquisitions, and international strategic management.

SOSC328 Econometrics (3-0-3)

Econometrics studies the methods of unifying empirical and theoretical approaches to economic problems. This course introduces simple regression models, multiple regression models, least square estimation, hypothesis tests, maximum likelihood estimation, GMM estimation, and the identification and estimation in simultaneous equations models.

SOSC329 Money and Banking (3-0-3)

The course helps students to understand the basic concepts of money and banking, and their applications to financial markets. Topics include money and financial systems, interest rates and the term structure, stock markets and Efficient Market Hypothesis, banking, central banking, banking regulations, money supply and demand, monetary policies, transmission mechanisms, and money and inflation.

SOSC421 Game Theory (3-0-3)

Game theory analyzes economic agents' choices of strategies and the equilibrium outcomes in game situations where they are strategically interdependent. Topics to be covered in this course include strategic-form games, extensive-form games, Nash equilibrium, subgame perfect equilibrium, repeated games, Bayesian games, sequential games, signaling games, reputation, and auction.

SOSC 422 Industrial Organization (3-0-3)

Industrial organization is an advanced course in microeconomics focusing on the theories of firms and markets. Based on game theory and the economics of information, the course analyzes firms' strategic actions and equilibrium outcomes in markets. Topics include price competition, quantity competition, advertising, price discrimination, collusion, vertical integration, and government regulations.

SOSC423 International Finance (3-0-3)

International finance is a field of international economics. This course introduces the basic concepts of international finance and their applications. Topics include the determination of exchange rates, currency derivatives and risk management, capital markets and corporate finance in an open economy, capital liberalization and international capital flows, foreign direct investments, international financial markets, and international financial systems.

SOSC424 Financial Economics (3-0-3)

In financial economics, we analyze the valuation of securities and investors' decision-making on consumption and investment. Topics to be covered in this course include single-period financial models, state prices, risk-

neutral prices, the fundamental theorem of asset pricing, pricing in incomplete markets, the Modigliani-Miller theorem, multi-period financial models, equivalent martingale measures, the term structure of interest rates, the pricing of financial derivatives, optimal consumption and investment, and the Capital Asset Pricing Model (CAPM).

SOSC425 Introduction to Fixed Income Markets..... (3-0-3)

Fixed income markets play an important role in allocating assets in capital markets. This course introduces the basic concepts and functions of fixed income markets, and makes students learn the basic methods of valuing fixed income securities and their derivatives. Topics include fixed income markets, interest rates, central banks and fixed income markets, repo markets, government bond auctions, duration and convexity, yield curves and the term structure, credit risk and corporate debt, mortgages and mortgage-backed securities, inflation-linked debt, and fixed income derivatives.

SOSC426 Behavioral Economics (3-0-3)

Behavioral economics is a new branch of economics that incorporates insights from psychology into economics to explain economic phenomena. This is an introduction course to behavioral economics and provides a general survey of behavioral economics. The objective of the course is to help students to understand the basic concepts of behavioral economics and their applications. Main topics include expected utility, prospect theory, heuristics and biases, mental accounting, intertemporal choice, behavioral game theory, social preferences, and neuroeconomics.

SOSC427 Behavioral Finance..... (3-0-3)

The course is an introduction to behavioral finance. It helps students to understand the basic concepts of behavioral finance and their applications to financial markets. Topics include a review of standard finance, the Efficient Market Hypothesis (EMH), limits to arbitrage, prospect theory, ambiguity aversion, the Equity Premium Puzzle (EPP), the Closed-end Funds Puzzle, investor psychology and behavior, behavioral corporate finance, bubbles, and hedge funds.

SOSC 429 Special Topics in Economics (3-0-3)

In this course, the topics considered important in contemporary society are selected and discussed. The course may be taken as a complement to other economic courses.

[Social Sciences]

SOSC 331 Understanding modern society (3-0-3)

Due to urbanization, industrialization, and information-oriented transition, modern society is becoming increasingly complex. This course investigates the characteristics, social problems, cultures, and ideologies of modern society to give students basic perceptions for better understanding of complex modern society.

SOSC 332 Political Sociology..... (3-0-3)

The aim of the course is to introduce a variety of methodological approaches in order to help students to understand the political aspects of social phenomena. Political sociology also provides theories and empirical case studies to help understand power, political systems, political participation, public policy and civil society.

SOSC 333 Sociology of Science (3-0-3)

Science provides a great amount of benefits for human beings while causing negative impacts on society such as pollution, environmental deterioration, the proliferation of nuclear weapons, the alienation of human beings and global warming. This course examines the dual nature of science and technology by using the tools of sociology.

SOSC 334 Social Studies of Economics and Finance..... (3-0-3)

The aim of the course is to investigate the basic assumptions of various economic, financial and market related practices. The course offers political, sociological, cultural and anthropological approaches to economy. Economics has taken for granted a variety of concepts and economic factors which should be re-examined and reconceptualized as social, political and cultural concepts.

SOSC 431 Contemporary society and multiculturalism..... (3-0-3)

The course aims to understand the ways in which globalization works at the different levels of our social lives. Specifically, we will explore the concepts of cultures, nations, nationalism, citizenship, migration and diaspora which condition the modern phenomena of diversity. We then move on to critically examine the possibilities and limits of multiculturalism by way of discourse and practices.

SOSC 432 Anthropology..... (3-0-3)

The course helps students to understand humans as cultural beings and develop the capability to better understand themselves and the others around them. Students will discuss the cultural diversity of human beings and the general matters related to it while comparing various kinds of social-cultural systems in many different human communities. Also, this course seeks to develop insights into our own culture by understanding different cultures.

SOSC 433 Gender Studies (3-0-3)

The course examines how gender differences are closely related to individual identities, classes, family, work, love, marriage, etc. It also discusses how gender differences work as a fundamental element in society. Based on modern women's life and experience, and the relationships between men and women, the course presents the visions of a gender-equal society and helps to gain the 'feminist' imagination.

SOSC 439 Special Topics in Social Science (3-0-3)

In this course, important contemporary issues in social sciences are selected as topics followed by systematic in-depth discussions to find solutions.

[Psychology]

SOSC 341 Psychology: Human mind, brain and behavior (3-0-3)

The course examines major issues and research findings in the field of modern psychology, the scientific study of human mind and behavior. Main topics include research methods in psychology, mind-brain-behavior relations, the states of consciousness, human development, learning and memory, social influences, psychological disorders and psychotherapy. This course also enables students to understand how the brain creates a complex human mind (mental life) and behavior.

SOSC 342 a modern society and Mental Health..... (3-0-3)

The course studies how psychological principles can help us cope with our lives’ challenges in modern society. Topics include: stress and coping processes; interpersonal relations such as friendship, love, marriage and intimate relationships; personality and behavior; self-concept and self-esteem; mental and physical health.

SOSC 343 Social Psychology..... (3-0-3)

The course explores major issues and research findings in the field of social psychology, the study of how our mind and behavior are influenced by others. Major topics include: social influences, persuasion, and attitude changes; social interaction and group phenomena; altruism and aggression; stereotyping and prejudice; interpersonal attraction and close relationships; everyday social reasoning and judgment.

SOSC 344 Industrial and Organizational Psychology (3-0-3)

‘Work’ is very significant to humans, and thus, ‘work and workplace’ is an important area of research in psychology. As the scientific study of human behavior in the workplace, Industrial and Organizational (I-O) Psychology applies psychological theories and principles to organizations such as workplaces and organizational societies. This course explores the major areas of modern I-O psychology such as how to improve the performance, satisfaction, safety, and well-being of an organization’s employees by hiring practices, training programs, feedbacks, and management systems. The course is expected to help cope with diverse challenging management situations with flexibility and creativity.

SOSC 441 Cognitive Psychology..... (3-0-3)

The course examines major issues and research findings in cognitive psychology, and the scientific study of human cognition (information processing). Major topics include the concepts of cognition such as information processing or computation, perception, attention, consciousness, memory, language, and thinking. The course also involves developing the conceptual tools for the nature of mind and its relationship to the brain and a computer. Furthermore, it explores how research findings in cognitive psychology are applied to human factors.

SOSC 442 Abnormal Psychology..... (3-0-3)

As an introduction to psychopathology, this course covers the definition, diagnostic classifications, etiology, and the treatment of mental disorders. Students study major mental disorders including schizophrenia as well as mood, anxiety, and personality disorders. The course explores theoretical and empirical approaches to the

psychological, biological, and social (including cultural and historical) aspects of psychopathology.

SOSC 443 Psychology of Sleep (3-0-3)

The course examines the psychological study of sleep, a relatively new science. Major topics include: the scientific measurements and functions of sleep and a dream; the developmental aspects of sleep; sleep deprivation in modern society, cognitive/emotional/physical effects of insufficient sleep; sleep disorders and their treatments; the characteristics of healthy sleep.

SOSC 444 Cognitive Neuropsychology (3-0-3)

How do our brain create our mind? Specifically, how are mental processes related to neural activities? What are the methods used to answer the questions? This course explores these questions in the processes such as perception, attention, memory, language, emotion, and social cognition.

SOSC 449 Special Topics in Psychology (3-0-3)

An in-depth exploration of selected areas in the field of modern psychology.

[Communication]

SOSC 351 Mass Communication and modern society (3-0-3)

The course introduces the fundamental theoretical concepts and models of mass communication. It covers: various messages created by media industries; specific message patterns; message processing by media audience; message effects; media systems; the relationships with other society systems.

SOSC 352 Information Society and Emerging Media (3-0-3)

The course presents the roles of communication in social changes and the diffusion of innovations. It covers emerging communication technologies, the characteristics of technology adopters, and the ongoing convergence of various medium types such as smart devices, broadcasting, films and the internet.

SOSC353 Professional Communication (3-0-3)

The course deals with theories, skills and strategies that help students become effective communicators, particularly in business and professional contexts. Aware of a series of circumstances requiring professional communication, students will understand the dynamics of human communication, and make full use of skills and strategies that maximize effective message creation and presentation.

SOSC354 Interpersonal Communication (3-0-3)

The course explores the fundamental roles of communication that establishes and maintains human relationships. It covers the key research and theories of interpersonal communication that deal with how people initiate, maintain, and finally terminate human relationships.

SOSC355 Business Communication (3-0-3)

The course offers the diverse theoretical approaches and processes of communication in business contexts. Specifically, students learn theories, skills, and strategies to become effective communicators in official business organizations and professional settings. Th a series of conditions for effective communication in particular business contexts and understand the responsibilities, expectations, or dynamics of human/organizational communication. Consequently, they can adapt to specific business contexts, select and make full use of appropriate communication strategies.

SOSC451 Persuasion Strategy and Attitude Change (3-0-3)

The course introduces students to the field of persuasion. It examines the theories of persuasion, research on persuasive communication, and the formation of social and political attitudes. Topics include the dynamics of attitude changes, interpersonal persuasion, brainwashing, subliminal persuasion, and media information campaigns.

SOSC452 Communication in Multicultural Society (3-0-3)

The course analyses cultural differences in the ways of communication. It covers the cultural foundations of communication behaviors, such as various ethnicities and countries, an understanding of different cultures, adaptations to different cultures, and cultural differences in verbal and nonverbal messages. Students will be trained as global leaders who can develop effective intercultural communication strategies.

SOSC 459 Special Topics in Communication (3-0-3)

The roles of communication are important in forming public opinions in society, having mutual understanding and harmonious relationships among society members, and generating the future of communities. This course covers interpersonal and group communications, broadcasting, films, journalism or mass communication. Topics may vary per semester.

[Law]

SOSC 361 The World of Law (3-0-3)

The course introduces students to the basic concepts and daily practice of law. Students are encouraged to think critically about whether these concepts and practices are commonsensical and rationally constructed. The course also presents various laws for scientists.

SOSC 461 Understanding Intellectual Property Right (3-0-3)

The course deals with patent laws, copyright laws, and case studies to learn how to handle legally experiments, research, and inventions conducted by scientists or engineers and how to protect their rights. Students study basic concepts including technology transfer agreements, patent problems and tax issues related to intellectual property rights, online crimes and e-commerce to build their abilities to understand specific cases and make proper assessments.

SOSC 469 Special Topics in Law (3-0-3)

The course covers fundamental issues of law and other legal issues faced by our society through systematic and in-depth discussions. Students can take a closer look into our actual society by understanding the spirit of the law.

• HASS Electives - Arts •

■ Arts

[Arts]

ARTS 311 Introduction to Contemporary Art..... (3-0-3)

Exploring the various fields of contemporary art, the course identifies their commonalities, differences and influences. By looking at classical humanities, such as social, political, cultural, historical and aesthetic studies, as well as the recent developments of science and technology, students will broaden their perspectives on contemporary society and culture.

ARTS 312 Understanding Art..... (3-0-3)

Aiming to build a vision for globalization, this introductory course is designed to better understand important works of art in the East and West. Through slide lectures and class discussions, students learn how to analyze the basic elements of art works. The course presents the basic characteristics of East Asian art and Western art for a better understanding of the wide variety of artistic expressions and aesthetic thoughts. By broadening background knowledge of art, students can appreciate their forms and content.

ARTS 313 Understanding Music..... (3-0-3)

The course deals with the basic factors of music, musical media, the structures and principles of musical composition, and the theories and practices for listening to music. It helps to understand the beauty of music, and develop creativity and a harmonious personality.

ARTS 314 Introduction to Theatre..... (3-0-3)

The course introduces the history of the Western and Korean theater, and the general elements such as dramaturgy, directing, stage designs, and acting for a general understanding of the art of theater.

ARTS 315 Understanding Architecture..... (3-0-3)

The course is designed to understand architecture from classical Western structures including Greek temples, Roman public facilities and monuments, Gothic Catholic churches, Renaissance architectures, and Baroque churches to modern city constructions. It also deals with architectural changes in Eastern temples, fortresses, houses, gardens and modern cities.

ARTS 316 Introduction to Film..... (3-0-3)

The course introduces the history, current development, future prospects of film, and film production technology. It will provide students with theories and practices for film appreciation.

ARTS 411 Art and Society (3-0-3)

The course explores major artistic trends and issues with each society’s cultural conditions and historical changes. Students will deepen an understanding of art’s influence on society.

ARTS 412 Art, Science, and Technology (3-0-3)

Art has interacted with the advances of science and technology of its own time. This course examines how scientific and technological developments are adopted by art and architecture, and how art works are influenced by the views and values of the world which have been constantly renewed by new scientific discoveries.

ARTS 413 Media Art (3-0-3)

Built upon the convergence of art and science, media art appeared in the 20th Century. Students study the history of media art as a crucial part of contemporary art. The course intends to equip students with aesthetic sensibility and theoretical knowledge for further discussions on its future prospects.

ARTS 414 Art and Entrepreneurs..... (3-0-3)

The course introduces art patrons of the Western world from the Middle ages to the present. Aiming to reevaluate both the material and immaterial values of art and culture, the course studies the patronage provided by historical entrepreneurs with significant footprints in art history.

ARTS 419 Special Topics in Music and Art Studies (3-0-3)

The course is designed to broaden an understanding of art by discussing specific themes of various artistic forms.

• Free Electives •

GEDU 181 Ethics of Research (3-0-2)

The course focuses on researchers’ unethical behaviors caused by excessive competition for research funds and on manipulating research results against humanity and nature for the benefit of corporations and technical feasibility.

GEDU 182 Presentation and Debate..... (3-0-2)

The course intends to improve presentation and discussion skills in response to an increasing demand for communication skills in modern society. Students will develop their presentation skills to influence an audience in different situations and for various purposes, and their ability to persuade others to their point of view on academic issues or social problems and to criticize constructively. The course offers a number of practices and feedback sessions.

GEDU 184 Essay Writing (3-0-2)

Aiming to advance writing skills, the course deals with various types of writings. Students will acquire practical writing skills to express their ideas appropriately in ways specific to purposes, given conditions, and expected readers.

GEDU 185 Reading Discussion (3-0-2)

The course presents how to read a text for maximum learning and how to discuss diverse topics in the fields of humanities, social sciences, and science and technology. Students will enhance their capability of reading a text, making a summary and a presentation, discussing various topics and cooperating with others.

GEDU 186 Artistic Promenade (3-0-2)

The course understands the history, present states, and future prospects of various areas of art. Lectures are given by artists and practitioners from the schools of music, drama, film, dance, visual arts, and Korean traditional arts at Korea National University of Arts. In this course, students will learn theoretical knowledge about various areas of art and enjoy lectures filled with the experiences of invited speakers.

GEDU 187 Understanding the Arts (3-0-2)

The course is an intensive version of “Artistic Promenade”, an academic exchange program. Aiming to understand the history, present states, and future prospects of art, the course offers the different types of participatory art practice. It presents theoretical knowledge and specific techniques in art practices and creation in a field-oriented approach. Lectures are given by distinguished artists and scholars renowned in their fields in Korea.

GEDU 191 Basic Japanese (3-0-2)

The course is an introduction to Japanese. Students learn the fundamental structures, grammar, vocabulary, everyday expressions of Japanese language through in-class learning activities such as reading, listening, writing, and speaking. In this course, students will attain an elementary level of proficiency in the three basic skills ? speaking, reading, and writing.

GEDU 192 Intermediary Japanese (3-0-2)

The course is an extension of Basic Japanese. Students learn structures, grammar and vocabulary for the practical use of Japanese through in-class learning activities such as reading, listening, writing and speaking. In this course, students will attain an advanced level of proficiency in the three skills ? speaking, reading, and writing.

GEDU 193 Basic Chinese (3-0-2)

The course compares the linguistic characteristics of Chinese with those of Korean for better understanding. Students learn the fundamental pronunciation and structures of Chinese.

GEDU 194 Intermediary Chinese..... (3-0-2)

The course is an extension of Basic Chinese. Students learn structures, grammar, and vocabulary for the practical use of Chinese through in-class learning activities such as reading, listening, writing, and speaking. In this course, students are encouraged to attain an advanced level of proficiency in the three skills - speaking, reading, and writing.

GEDU 195 German (3-0-2)

The course provides fundamentals on the pronunciation, grammar, vocabulary and everyday expressions of German through audio-visual aids.

GEDU 196 French (3-0-2)

The course provides fundamentals on the pronunciation, grammar, vocabulary and everyday expressions of French through audio-visual aids.

GEDU 197 Spanish..... (3-0-2)

The course provides fundamentals on the pronunciation, grammar, vocabulary and everyday expressions of Spanish through audio-visual aids.

GEDU 401 HSS Colloquium (3-0-2)

The course invites specialists in humanities and social sciences to provide profound insights and knowledge about the changes of contemporary society.

GEDU 409 Special Topics in HASS..... (3-0-2)

The course selects and discusses in depth special topics in literature, philosophy, history, science and technology, psychology, social sciences, political science and economics.

Department of Mathematics



1. Education Aim

As the natural science and engineering have developed rapidly, the research area of modern mathematics has greatly expanded. The Department of Mathematics takes aim at fostering talents who can contribute with their basic knowledge of mathematics to the theoretical advances in mathematical sciences, the development of cutting-edge technologies in science and engineering, and the advancement of humanities in general.

2. Program Overview

Mathematics is the language for all sciences. It has thousands of years of history, but the modern mathematics has been developed very rapidly and profoundly.

Not only basic sciences but also social sciences, liberal arts, engineering, politics and economics all employ mathematical principles and techniques. This kind of trend is all the more so in modern sciences and engineering, and mathematics has expanded and branched out to meet the needs.

In particular, much progress has been made recently in applied mathematics in conjunction with the development in engineering, computational mathematics, and computer science.

The curriculum in the Department of Mathematics prepares students to understand the basic and important theories in pure mathematics such as algebra, analysis, geometry and topology; applied mathematics such as nonlinear analysis, applied statistics, fluid mechanics; and computational mathematics such as numerical analysis, combinatorics, coding theory, and cryptography. Upon completing the curriculum, students will possess basic knowledge of mathematics, experience and confidence well enough to continue their graduate studies in mathematics or to join in any other areas of science and engineering.

Since the year of 2000, the new curriculum has greatly emphasized the students' self driven learning that cultivates students' creativity and habit of thinking outside the box.

Major requirement courses in the Department of Mathematics include MATH 200, 210, 230, 261, 301, 302, 311, 312, 351, 421 and 426. These major courses are the basic building blocks for various mathematical research.

There is no restriction on the major electives, and students can take 21 or more credits from major electives, depending on their individual plans.

Students can build their own study plans with the assistance from an academic adviser assigned to each student for guidance.

In addition, Independent Study course is offered to help students learn the subjects that are not offered on a regular basis. Through this course, students may carry out research on their own or in a small group under the supervision of a professor.

A minimum of 134 credits must be earned to meet the graduation requirements, which include 14 credits of HASS requirements, 15 credits of HASS electives, 27 credits of basic requirements, 33 credits of major requirements, 21 credits of major electives, and 24 credits of free electives.

Graduation Requirements

Bachelor's Thesis/Comprehensive Examination:

A bachelor's thesis must be submitted in order to obtain a bachelor's degree. However, a comprehensive examination may be substituted for the graduation thesis.

- **Bachelor's Thesis:**

An application form for bachelor's thesis must be submitted. Then the student must write the bachelor's thesis under the guidance of his/her academic advisor and submit the result of thesis review to the Department of Mathematics after deliberations by the thesis committee.

- **Comprehensive Examination:**

A comprehensive examination takes place once every semester to verify students' basic knowledge of mathematics including the one gained from basic requirements and major requirements. Any student who wishes to take the exam must submit the application form for the comprehensive examination at the beginning of his/her graduating semester.

Requirements for Double Majors and Minors

Double Major Policy

A minimum of 35 credits in total must be earned from major requirements (33 credits) and major electives.

Minor Policy

A minimum of 21 credits must be earned from four courses out of the following six major requirements. (However, these credits may only count towards either major or minor requirements)

MATH301 Modern Algebra I

MATH311 Analysis I

MATH351 Introduction to Numerical Analysis

MATH302 Modern Algebra II

MATH312 Analysis II

MATH426 Introduction to Differential Geometry

3. Course Requirements

Category	Course Title	Credit	Remarks
HASS Requirements	Expository Writing	2	2 courses
	English Certification Program	4	
	Physical Education	2	
	Integrated HASS	6	
	Sub Total	14	
HASS Electives	Humanities	15	
	Social Sciences		
	Arts		
	Sub Total	15	
Basic Requirements	Calculus	3	
	Calculus Lab.	1	
	Applied Linear Algebra	3	
	Choose 1 among General Physics I, General Physics I(H), Introductory Physics I	6	
	Choose 1 among General Physics II, General Physics II(H), Introductory Physics II		
	General Physics Lab. I, II(Design & Build)	2	
	General Chemistry(H)	4	
	General Chemistry Lab.	2	
	Choose between General Life Science and General Life Science(H)	3	
	Programing and Problem Solving	3	
	Sub Total	27	
Major Requirements		33	
Major Electives		21	
General Electives		24	
Total		134	
ABC Requirements	Planning for College Life and Future	2	
ABC Electives	Humanities	5	
	Culture		
	Leadership Development		
Total		7	

※ HASS Requirements (Div. of Humanities and Social Sciences)

- Physical Education (2 credits): Physical Fitness (1) plus one out of 14 courses
- Integrated HASS (6 credits): Arts and Humanities, Crossing Boundaries of Science and Society

※ STC Courses: Choose five courses including a minimum of one science course

4. List of Major Courses

Category	Course No.	Course Title	lec-lab. -cr.	Recommended Pre-req/Pre-req
Major Requirements	MATH200	Differential Equations	3-1-3	
	MATH210	Applied Complex Variables	3-1-3	
	MATH230	Probability and Statistics	3-1-3	
	MATH261	Discrete Mathematics	3-1-3	
	MATH301	Modern Algebra I	3-1-3	
	MATH302	Modern Algebra II	3-0-3	Modern Algebra I
	MATH311	Analysis I	3-1-3	
	MATH312	Analysis II	3-0-3	Analysis I
	MATH351	Introduction to Numerical Analysis	3-0-3	Applied Linear Algebra
	MATH421	General Topology	3-0-3	
	MATH426	Introduction to Differential Geometry	3-1-3	
Major Electives	MATH201	Introduction to Mathematics	2-0-2	
	MATH202	Set Theory	3-0-3	Calculus
	MATH231	Statistics for Experimental Research	3-1-3	
	MATH304	Introduction to Number Theory	3-0-3	
	MATH324	Introduction to Geometry	3-0-3	
	MATH333	Applied Statistics	3-1-3	Probability and Statistics
	MATH342	Engineering Mathematics	3-1-3	Applied Linear Algebra
	MATH345	Introduction to Coding Theory	3-0-3	
	MATH346	Introduction to Cryptography	3-0-3	
	MATH360	Practice in Programming	3-0-3	
	MATH400	Linear Algebra	3-0-3	Modern Algebra I
	MATH401	Algebraic Curves	3-0-3	Modern Algebra II
	MATH403	Introduction to Group Representations	3-0-3	Applied Linear Algebra, Modern Algebra I
	MATH410	Theory of Analytic Functions	3-0-3	Applied Complex Variables
	MATH412	Theory of Ordinary Differential Equations	3-0-3	Analysis I
	MATH413	Partial Differential Equations	3-0-3	Analysis I
	MATH422	Surface Topology	3-0-3	General Topology
	MATH430	Introduction to Mathematical Statistics	3-0-3	Probability and Statistics
	MATH431	Introduction to Probability Theory	3-0-3	Probability and Statistics
	MATH434	Introduction to Actuarial Mathematics	3-0-3	Probability and Statistics
	MATH443	Mathematical Modelling	3-0-3	Probability and Statistics
	MATH445	Mathematical Continuum Mechanics	3-0-3	
	MATH447	Tensor Analysis	3-0-3	
	MATH451	Applied Numerical Analysis	3-0-3	Introduction to Numerical Analysis

Category	Course No.	Course Title	lec-lab.-cr.	Recommended Pre-req/Pre-req
Major Electives	MATH461	Introductory Combinatorics	3-0-3	Discrete Mathematics
	MATH464	Graph Theory with Applications	3-0-3	
	MATH472/IMEN486	Introduction to Financial Engineering	3-0-3	
	MATH484	Logic and Foundation	3-0-3	
			1-0-1	
	MATH409-489	Topics	2-0-2	
			3-0-3	
	MATH490A~Z	Seminar A-Z	1-0-1	
Free Electives	MATH491A~Z	Independent Study A-Z	1-3-3	
	MATH100	Introduction to Calculus	3-0-3	

5. Major Course Plan (Template)

Year/ Semester	Spring Semester			Fall Semester		
	Category	Course No.	Course Title	Category	Course No.	Course Title
First Year	Basic Requirements	MATH110	Calculus	Basic Requirements	MATH120	Applied Linear Algebra
		MATH113	Calculus Lab		MATH230	Probability and Statistics
Second Year	Major Requirements	MATH200	Differential Equations	Major Requirements	MATH210	Applied Complex Variables
		MATH202	Set Theory			
		MATH261	Discrete Mathematics			
Third Year	Major Requirements	MATH301	Modern Algebra I	Major Requirements	MATH302	Modern Algebra II
		MATH311	Analysis I		MATH312	Analysis II
		MATH351	Introduction to Numerical Analysis			
Fourth Year				Major Requirements	MATH421 MATH426	General Topology Introduction to Differential Geometry

6. Cross-listed Courses (Counted as major electives)

Category	Course No.	Course Title	lec-lab.-cr.
Major Electives	MATH360/ CSED232	Object Oriented Programming	3-0-3
	PHYS201	Introduction to Modern Physics	3-1-3
	PHYS203	Mechanics	3-1-3
	PHYS206	Electromagnetism I	3-1-3
	PHYS307	Electromagnetism II	3-1-3
	CHEM221	Organic Chemistry I	3-0-3
	CHEM243	Chemical Analysis	3-0-3
	LIFE319	Biochemistry I	3-0-3
	LIFE321	Molecular Biology	3-0-3
	AMSE201	Introduction to Materials Science	3-1-3
	AMSE208	Crystal Structure	3-1-3
	MECH240	Solid Mechanics I	3-1-3
	MECH250	Thermodynamics	3-1-3
	IMEN261	Introduction to Operations Research	3-0-3
	IMEN281	Information System Technology	3-1-3
	IMEN371	Quality Engineering	3-0-3
	IMEN461	Mathematical Programming	3-0-3
	MECH686	Computational Fluid Mechanics	3-0-3
	IMEN666	Applied Stochastic Process	3-0-3
	IMEN766	Queueing Theory	3-0-3
	EECE231	Basic Circuit Theory	3-0-3
	EECE233	Signals and Systems	3-0-3
	EECE261	Introduction to Electromagnetics	3-0-3
	EECE514	Pattern Recognition	3-0-3
	CSED211	Microprocessor Application and Assembly Programming	2-2-3
	CSED233	Data Structure	3-0-3
	CSED341	Automata and Formal Languages	3-0-3
	CSED436	Graph Theory and Algorithm	3-0-3
	CSED442	Introduction to Artificial Intelligence	3-0-3
	CSED451	Computer Graphics	3-0-3
	CHEB201	Chemical Engineering Physical Chemistry I	3-0-3
	CGEB208	Fundamentals in Engineering Biology	3-0-3

7. Course Description

MATH 100 Introduction to Calculus (3-0-3)

Functions, limits and continuity, differentiation and integration, transcendental functions, vectors and their inner products and cross products

MATH 109 Calculus(E) (5-0-3)

Logarithmic and exponential functions, trigonometric functions, series, convergence test, Taylor's theorem, partial differentiation, double and triple integration, Green's theorem and Stokes' theorem.

MATH 110 Calculus (4-0-3)

Series, convergence test, Taylor's theorem, partial differentiation, double and triple integration, Green's theorem and Stokes' theorem.

MATH 112 Calculus Lab(E) (0-2-1)

The exercise problems of Calculus are discussed and solved to help students to develop a deeper understanding of Calculus (MATH 109).

MATH 113 Calculus Lab (0-2-1)

The exercise problems of Calculus are discussed and solved to help students to develop a deeper understanding of Calculus (MATH 110).

MATH 120 Applied Linear Algebra (3-1-3)

Simultaneous linear equations, matrix and Gaussian elimination, inverse matrix, Gram-Schmidt orthogonalization, orthogonal projections, least squares, eigenvalues, eigenvectors, diagonalization and sign of matrix.

MATH 200 Differential Equations (3-1-3)

First order equations, higher order ordinary differential equations, Laplace transformations, convolution, and systems of ordinary differential equations.

MATH 201 Introduction to Mathematics (2-0-2)

Overview of the mathematics research at the undergraduate level or above, introduction to international trend and achievements in mathematics

MATH 202 Set Theory (3-0-3)

Prerequisites : MATH 110

Basic concepts and properties of an infinite set and the properties of a compact set in a metric space: Countable Set, Uncountable Set, Well Ordered Set, Axiom of Choice, Cardinal Number, Ordinal Number, Metric Space

and Compact Set.

MATH 210 Applied Complex Variables..... (3-1-3)

Analytic functions, Cauchy-Riemann equations, integration in complex domain, Taylor and Laurent series, residues and poles, Cauchy's theorem and conformal mapping.

MATH 230 Probability and Statistics..... (3-1-3)

Elements of probability, expectation, probability distribution, estimation, hypothesis test, correlation, analysis of variance, This course is designed for scientists as well as engineers.

MATH 231 Statistics for Experimental Research (3-1-3)

Equivalent of Math 230. For non-mathematics majors.

MATH 261 Discrete Mathematics (3-1-3)

Sets, relations, algorithm and its analysis, regression relation, graph theory, Boolean algebra, logical networks, language and grammar, design and construction of finite state machines, and Turing machine.

MATH 301, 302 Modern Algebra I, II (3-1-3, 3-0-3)

Group theory, Ring theory, ideal, maximal ideal, polynomial rings, the fundamental theorem of abelian groups, field theory and Galois theory.

MATH 304 Introduction to Number Theory (3-0-3)

Congruence and residues, reduced residue systems, primitive roots, quadratic residues and continued fractions.

MATH 311, 312 Analysis I, II (3-1-3, 3-0-3)

Number systems, set theory, metric spaces, numerical sequences and series, Riemann-Stieltjes integral, uniform convergence, equicontinuity, power series, inverse function and implicit function theorem, and Lebesgue measure.

MATH 324 Introduction to Geometry..... (3-0-3)

Euclid geometry, Hilbert's axioms, hyperbolic geometry, non-Euclidean geometry, independence of the parallel postulate, and geometric transformations.

MATH 333 Applied Statistics (3-1-3)

Prerequisites : MATH 230

Applied probability and introductory statistics, Data processing by package programs, regression analysis, and standard parameter statistics methods

MATH 342 Engineering Mathematics..... (3-1-3)

Prerequisites : MATH 120

Introductory partial differential equations needed for engineering science and physics, vector calculus, separation of variables, Fourier series and integrals, numerical methods, tensor methods related to fluid mechanics and electro-magnetic fields, and complex variable methods for engineering problems

MATH 345 Introduction to Coding Theory (3-0-3)

Introductory concepts, linear codes, Hamming codes and Golay codes, finite fields, cyclic codes, BCH codes, weight distributions, The MacWilliams equation, designs, The Assmus-Mattson theorem and uniqueness of codes

MATH 346 Introduction to Cryptography (3-0-3)

Classical cryptosystems, basic number theory, data encryption standard (DES), RSA algorithm, discrete logarithms and ElGamal cryptosystem, digital signatures, secret sharing schemes, introductory Elliptic Curve Cryptosystems

MATH 351 Introduction to Numerical Analysis (3-0-3)

Prerequisites : MATH 120

Numerical methods for simultaneous linear equations, numerical methods for nonlinear equations, interpolation and polynomial approximation, numerical differentiation and integration, initial value problems for ordinary differential equations, and stability.

MATH 360 Object Oriented Programming (3-0-3)

Refer to CSED 232

MATH 400 Linear Algebra (3-0-3)

Prerequisites : MATH 301

Rings and modules, finitely generated commutative groups, direct decomposition of a finitely generated module over a PID, linear transformations and matrices, Jordan canonical forms, and characteristic polynomials.

MATH 401 Algebraic Curves (3-0-3)

Prerequisites: MATH 302

Affine space and algebraic sets. Hilbert's Nullstellensatz, affine and projective algebraic varieties, algebraic varieties, and Riemann-Roch theorem.

MATH 403 Introduction to Group Representations (3-0-3)

Prerequisites: MATH 120, 301

Group representations, characters of a group, character's properties, character table, Induced representation, Mackey's Theorem, Transitive groups, Induced characters of symmetric groups, and some applications like Burnside's Theorem

MATH 410 Theory of Analytic Functions (3-0-3)

Prerequisites : MATH 210

Schwarz Lemma, Conformal mapping, Rouch's Theorem, Hurwitz's Theorem, topological property of $H(G)$, and Harmonic function related to Poisson Integral formula

MATH 412 Theory of Ordinary Differential Equations (3-0-3)

Prerequisites : MATH 311

Power series solutions, Bessel functions, Poincar-Bendixson's theorem and Liapunov's method,

MATH 413 Partial Differential Equations (3-0-3)

Prerequisites : MATH 311

Parabolic, hyperbolic and elliptic equations. Dirichlet and Neumann boundary value problems, existence and uniqueness theorems, Maximum principle, existence and uniqueness, potential theory, separation of variables, Fourier series methods, and Hilbert space methods

MATH 421 General Topology (3-0-3)

Sets and logics, Topological space, continuous functions, metric spaces, connection, compactness, separation axiom and countability axiom, and Tychonoff's theorem.

MATH 422 Surface Topology (3-0-3)

Prerequisites : MATH 421

Triangulation, Classification of surfaces, maps and graphs, Fundamental Groups

MATH 426 Introduction to Differential Geometry (3-1-3)

Differential forms, Frenet formula, covariant vector, connection forms, structural equations, second fundamental form, curvature, geodesics, parallel vector fields, and Gauss-Bonnet theorem.

MATH 430 Introduction to Mathematical Statistics (3-0-3)

Prerequisites : MATH 230

Order statistics, maximum likelihood estimator, Pitman estimates, consistence statistics, parameter confidence interval, Cramer-Rao limit, Fisher's information matrix, limitations of estimator deviation

MATH 431 Introduction to Probability Theory (3-0-3)

Prerequisites : MATH 230

Random variables, distribution functions, moment generating functions, random variables' properties, and limit theorems,

MATH 434 Introduction to Actuarial Mathematics (3-0-3)

Prerequisites : MATH 230

Topics: Actuarial models, Principles in stochastic modelling, Premium rates & losses, Life table analysis, Regression models, Time series analysis, and Simulation

MATH 443 Mathematical Modelling (3-0-3)

Prerequisites : MATH 230

Deformation of the natural phenomena to mathematical model problems, stage of the solution seeking by mathematical way of thinking, Population dynamics model and Epidemic dispersion model

MATH 445 Mathematical Continuum Mechanics (3-0-3)

Elasticity, fluid mechanics, Cauchy stress tensor, pressure momentum, force, turbulence, hyperelasticity, Eulerian and Lagrangian coordinates, and vorticity.

MATH 447 Tensor Analysis (3-0-3)

Change of variables, contravariant/covariant tensor, metric tensor, Ricci tensor, Applications to geometry, geodesic, fundamental forms, Applications to analytic mechanics, Newtonian Principle, and Applications to continuum mechanics

MATH 451 Applied Numerical Analysis (3-0-3)

Recommended Prerequisites: MATH 351

Numerical solutions for polynomials, Newton's method, orthogonal polynomials and least-squares approximation, eigenvalues and eigenvectors, boundary value problems for ordinary differential equations,

MATH 461 Introductory Combinatorics (3-0-3)

Generating Functions, Recurrence relations, Polya enumerations, Covering circuits and Colorings

MATH 464 Graph Theory with Applications (3-0-3)

Prerequisite : MATH 261

Graph and tree, cycles, Euler tours, Hamilton cycles, Ramsey, Turan, Schur, Kuratowski theorem, and Networks.

MATH 472/ IMEN 486 Introduction to Financial Engineering (3-0-3)

Prerequisite : IMEN 203

Fixed income securities (cash flow, structure of interest rates), contemporary portfolio theory (Mean-Variance, CAPM, APT), Theories of Derivatives (forward, future, swap, option,), MATLAB practice, and various mathematical approach to the financial models distinct from traditional finance management

MATH 484 Logic and Foundation (3-0-3)

Boolean Algebra, first order postulate, recursive function, Zermelo-Frankel set theory, ordinals and order, choice axiom, and incompleteness theorem

MATH 409-489 Topics I , II , III (1-0-1, 2-0-2, 3-0-3)

MATH 490 Seminar A-Z..... (1-0-1)

An adequate subject in many areas of mathematics is chosen under the guidance of a student’s academic advisor. Students are expected to give a presentation and lead discussions to deepen the knowledge they have attained from regular courses. This course can be taken multiple times.

MATH 491 Independent study A-Z (1-3-3)

Students and their academic advisors choose an adequate subject. This course can be taken multiple times.

Department of Physics



1. Education Aim

Physics is a branch of basic sciences, which provides an understanding, explanations, and predictions of natural phenomena based on the fundamental principles. Contemporary physics has been applied to the various fields of science and engineering, and its achievements have had tremendous effects on the development of cutting-edge technologies and on the understanding of the origins of the universe and life.

The Department of Physics at POSTECH aims to produce science and engineering talents with creativity, progressive spirit, and global leadership. The department offers an academic curriculum that encompasses the concepts and methodologies of theoretical, experimental and computational physics and helps to produce the intellectuals of the future who create new paradigms.

2. Program Overview

Physics can be classified into the following two areas: Theoretical Physics and Experimental Physics. The former approaches natural phenomena by giving a mathematical description of the phenomena, thereby pursuing the unified theory toward the basic principles while the latter seeks to confirm theories or to discover new phenomena by conducting experiments. These two areas are complementary and are closely related to each other with the common purpose of the complete understanding of physics phenomena. In addition, Computational Physics makes possible the third way of the physics research, where the complex natural phenomena can be understood using the computers which are rapidly developing.

Physics is an extensive field which includes condensed matter, fluid and plasma physics, atomic and molecular physics, optics, nuclear and particle physics, bio physics, complex system and computational physics. Material physics, astrophysics, planetary physics, chemical physics and bio physics are providing the basic knowledge for related science fields.

Recently even in the area of the social sciences such as econometrics and financial engineering, the physics methodologies have been being used, thereby enhancing the utility of physics. In the future information era, intellectuals who create new paradigms based on the basic principles are needed rather than the ones with much

knowledge. Thus, physics graduates are expected to play a key role not only in the traditional physics area, but also in existing related areas and newly created areas. The undergraduate curriculum of the Department of Physics is designed to teach physics methodologies to the students entering into other fields as well as the students continuing to study physics in the graduate school. To this end, many courses are formed into modules so that students of different needs can take different modules of courses. In addition, in the General Physics, Mechanics, Electromagnetism, Quantum Mechanics and Statistical Mechanics, many of the course contents are interconnected to reduce redundancies. Rather, a variety of courses are offered, and undergraduates who demonstrate exceptional academic performance are allowed to take graduate courses so that they can carry out research early in their graduate program.

Freshmen can learn the basic principles and concepts of Physics from General Physics I, II and the basics of the physical experiments through General Physics Lab. I, Design & Build Lab. In a course, Introduction to Modern Physics, students learn the directions of the contemporary physics research and the applications of physics in modern society to obtain comprehensive knowledge of Physics. For sophomores and juniors, Mechanics, Electromagnetism I, II, Quantum Physics I, II, and Thermal Physics are offered, and experimental courses of Physics Laboratory I, II and III are opened. In addition, various major electives are provided for students who wish to continue their study in a graduate program or advance into different fields.

Furthermore, Trends in Physics Research, Physics Research I and II, and Physics Seminar are opened to help undergraduate students to learn the current research trends, to train them through research activities and to prepare them to make oral presentations or produce research papers.

Electronics and Instrumentation Lab. and Practical Physics Lab. are offered to cultivate students' basic capacity for experimental research through electronic measurements and machine work training.

Mathematical Methods for Physics provides the basic knowledge of mathematics and Computer for Physics exposes students to the various usages of computers. These two courses are open to sophomore students.

Furthermore, for senior students planning to enter the graduate program, Intermediate Mathematical Methods for Physics and Computational Physics Lab are provided. The former deals with more advanced mathematical concepts while the analysis of the physics phenomena using computers and the methods of the simulation are covered in the latter course.

The current curriculum at the Department of Physics is well-balanced between theory learning and experiment practices. By providing students with discussion and presentation opportunities, the Department of Physics aims to enhance students' problem solving abilities and representation skills. Physics is the basis of other natural sciences and engineering. Graduates from the Department of Physics can show their rationality and creativity with knowledge that they have obtained from the undergraduate courses when they are admitted to other graduate programs or advance into society.

- Undergraduate thesis

1. Physics majors must submit the undergraduate thesis as graduation requirement.

2. The thesis format may be chosen from among New Physics, JKPS, Physical Review or Graduate Thesis Format of POSTECH.

3. Submission Deadline & Evaluation

A degree candidate must submit a thesis draft to his/her thesis advisor by November 30. (for August degrees: May 30) After evaluation by the advisor, the final thesis must be submitted to the department with the approval of the thesis advisor by December 31 (for August degrees: June 30)

- Double major policy:

A minimum of 41 credits in total must be earned from major requirements and major electives. Students are exempt from submitting graduation thesis.

- Minor Policy:

A minimum of the following four courses including Mechanics, Electromagnetism I and Quantum Physics must be taken. In addition, no fewer than 24 credits in total must be earned (a minimum of 12 credits must be earned from the physics major requirements or major electives).

PHYS201 Introduction to Modern Physics

PHYS203 Mechanics

PHYS206 Electromagnetism I

PHYS301 Quantum Physics I

PHYS302 Quantum Physics II

PHYS304 Thermal Physics

PHYS307 Electromagnetism II

- A student from other departments must consult his/her academic advisor when planning to take a course with prerequisite requirement course.
- Introductory Modern Physics, Trends in Physics Research are graded with “S” (Satisfactory) or “U” (Unsatisfactory).

3. Course Requirements

Category	Course Title	Credit	Remarks
HASS Requirements	Expository Writing	2	
	English Certification Program	4	
	Physical Education	2	
	Integrated HASS	6	2 courses
	Sub Total	14	
HASS Electives	Humanities	15	
	Social Sciences		
	Arts		
	Sub Total	15	
Basic Requirements	Calculus	3	
	Calculus Lab.	1	
	Applied Linear Algebra	3	
	Choose 1 among General Physics I, General Physics I(H), Introductory Physics I	6	
	Choose 1 among General Physics II, General Physics II(H), Introductory Physics II		
	General Physics Lab. I, II(Design & Build)	2	
	General Chemistry(H)	4	
	General Chemistry Lab.	2	
	Choose between General Life Science and General Life Science(H)	3	
	Programing and Problem Solving	3	
	Sub Total	27	
Major Requirements		39	
Major Electives		21	
Free Electives		15	
Total		131	
ABC Requirements	Planning for college Life and Future	2	
ABC Electives	Humanities	5	
	Culture		
	Leadership Development		
Total		7	

※ HASS Requirements(Div. of Humanities and Social Sciences)

- Physical Education (2 credits): Physical Fitness(1) plus one out of 14 courses
- Integrated HASS (6 credits): Arts and Humanities, Crossing boundaries of Science and Society

※ STC Course Requirements: Choose five courses including two physics courses.

4. List of Major Courses

Category	Course No.	Course Title	lec-lab. - cr.	Recommended Pre-req/Pre-req	Remarks
Major Requirements	PHYS201	Introduction to Modern Physics	3-1-3		STC
	PHYS203	Mechanics	3-1-3		STC
	PHYS206	Electromagnetism I	3-1-3		
	PHYS209	Mathematical Methods for Physics	3-1-3		
	PHYS212	Computers for Physics	2-2-3	Mechanics	
	PHYS231	Electronics and Instrumentation Laboratory	0-6-3		
	PHYS250	Physics Laboratory I	0-6-3		
	PHYS351	Physics Laboratory II	0-6-3		
	PHYS352	Physics Laboratory III	0-6-3		
	PHYS301	Quantum Physics I	3-1-3		
	PHYS302	Quantum Physics II	3-1-3	Quantum Physics I	
	PHYS304	Thermal Physics	3-1-3		
	PHYS307	Electromagnetism II	3-1-3	Electromagnetism I	
Major Electives	PHYS109	Introductory Modern Physics	1-0-1		
	PHYS315	Introduction to Astrophysics	3-0-3		
	PHYS360	Pioneers in Physics	3-0-3		
	PHYS399A-D	Research Participation A-D	0-3-1		
	PHYS401	Solid State Physics	3-0-3	Quantum Physics I, Thermal Physics	
	PHYS403	Nuclear and Elementary Particle Physics	3-0-3	Quantum Physics I, II	
	PHYS406	Plasma Physics	3-0-3	Mechanics, Electromagnetism I	
	PHYS407	Introduction to Accelerator Physics	3-0-3		
	PHYS408	Intermediate Mathematical Methods for Physics	3-1-3		
	PHYS410	Optical Physics	3-0-3	Electromagnetism I, Quantum Physics I	
	PHYS412	Practical Physics Laboratory	0-6-3		
	PHYS413	Biological Physics	3-0-3		
	PHYS420	Special Topics in Condensed Matter Physics	3-0-3		
	PHYS422	Special Topics in Modern Physics	3-0-3		
	PHYS431	Physics Research I	0-6-3		
	PHYS432	Physics Research II	0-6-3		
	PHYS434	Physics Seminar	3-0-3		
	PHYS460	Trends in Physics Research	1-0-1		

5. Major Course Plan (Template)

Year/ Semester	Spring Semester			Fall Semester		
	Category	Course No.	Course Title	Category	Course No.	Course Title
1st Year	Basic Requirements	MATH110 MATH113 PHYS101H PHYS103 CHEM106 CHEM102	Calculus Calculus Lab General Physics I(H) General Physics Lab. I General Chemistry (H) General Chemistry Laboratory	Basic Requirements	PHYS102H PHYS104 LIFE103 CSED101	General Physics II(H) Design & Build Lab. General Life Science Programming and Problem Solving
2nd Year	Major requirements	PHYS203 PHYS209 PHYS231	Mechanics Mathematical Methods for Physics Electronics and Instrumentation Lab.	Major requirements	PHYS201 PHYS206 PHYS212 PHYS250	Introduction to Modern Physics Electromagnetism I Computers for Physics Physics Laboratory I
3rd Year	Major requirements Major electives	PHYS301 PHYS307 PHYS351 PHYS360	Quantum Physics I Electromagnetism II Physics Laboratory II Pioneers in Physics	Major requirements Major electives	PHYS302 PHYS304 PHYS352 PHYS315 PHYS460	Quantum Physics II Thermal Physics Physics Laboratory III Introduction to Astrophysics Trends in Physics Research
4th Year	Major electives	PHYS401 PHYS407 PHYS410 PHYS413 PHYS431	Solid State Physics Introduction to Accelerator Physics Optical Physics Biological Physics Physics Research I	Major electives	PHYS403 PHYS406 PHYS408 PHYS412 PHYS432	Nuclear and Elementary Particle Physics Plasma Physics Intermediate Mathematical Methods for Physics Practical Physics Lab. Physics Research II

6. Cross-listed Courses (Counted as major electives)

Category	Course No.	Course Title	lec-lab.-cr.	Remarks
Major elective	MATH200	Differential Equations	3-1-3	STC
	MATH210	Applied Complex Variables	3-1-3	STC
	MATH230	Probability and Statistics	3-1-3	STC
	MATH261	Discrete Mathematics	3-1-3	STC
	MATH301	Modern Algebra I	3-1-3	
	MATH311	Analysis I	3-1-3	STC
	MATH333	Applied Statistics	3-1-3	
	MATH342	Engineering Mathematics	3-1-3	
	MATH351	Introduction to Numerical Analysis	3-0-3	
	MATH360	Practice in Programming	3-0-3	
	MATH413	Partial Differential Equations	3-0-3	
	MATH421	General Topology	3-0-3	
	MATH426	Introduction to Differential Geometry	3-1-3	
	CHEM211	Physical Chemistry I	3-0-3	
	CHEM221	Organic Chemistry I	3-0-3	STC
	CHEM245	Analytical Chemistry Laboratory	0-6-3	
	CHEM243	Chemical Analysis	3-0-3	STC
	CHEM314	Physical Chemistry and Instrumental Analysis Laboratory	0-8-4	
	CHEM331	Inorganic Chemistry	4-0-4	
	CHEM451	Macromolecular Chemistry	3-0-3	
	LIFE319	Biochemistry I	3-0-3	STC
	LIFE321	Molecular Biology	3-0-3	STC
	LIFE217	Cell Biology	3-0-3	
	LIFE216	Physiology	3-0-3	
	LIFE314	Physical Biochemistry	3-0-3	
	AMSE201	An Introduction to Materials Science and Engineering	3-1-3	STC
	AMSE208	Crystal Structure	3-1-3	STC
	AMSE313	Electrical, Magnetic and Optical Properties of Materials	3-1-3	
	AMSE388	Semiconductor Devices	3-0-3	
	AMSE483	Semiconductor Laboratory	1-3-2	
	AMSE451	Electronic Materials Device Physics	3-0-3	
	AMSE464	Physical Properties of Polymers	3-0-3	
	MECH240	Solid Mechanics I	3-1-3	STC
	MECH250	Thermodynamics	3-1-3	STC
	MECH370	Fluid Mechanics	3-1-3	
	MECH371	Heat Transfer	3-1-3	

Category	Course No.	Course Title	lec-lab.-cr.	Remarks
Major elective	MECH470	Applied Fluid Mechanics	3-0-3	
	IMEN261	Introduction to Operations Research	3-0-3	STC
	IMEN281	Information System Technology	3-1-3	STC
	EECE211	Semiconductor Electronics I	3-0-3	
	EECE231	Basic Circuit Theory	3-0-3	STC
	EECE233	Signals and Systems	3-0-3	STC
	EECE261	Electromagnetics	3-0-3	STC
	EECE303	Physical Electronics	3-0-3	
	EECE401	Semiconductor Electronics II	3-0-3	
	EECE411	Optoelectronics-display Eng.	3-0-3	
	CSED211	Microprocessor Application and Assembly Programming	2-2-3	
	CSED232	Object Oriented Programming	3-0-3	STC
	CSED233	Data Structure	3-0-3	STC
	CSED321	Programming Languages	3-0-3	
	CHEB201	Physical Chemistry for Chemical Engineering I	3-0-3	STC
	CHEB208	Fundamentals in Engineering Biology	3-0-3	STC

7. Course Description

PHYS 101, 102 General Physics I, II (3-1-3)

General Physics I, II introduce the basic concepts and methods in physics.

General Physics I deals primarily with mechanics and thermodynamics, which include space and time, equilibrium of forces, Newton's law, momentum, energy conservation, movement under centripetal force, rigid body motion, mechanics of continuous media, wave and thermal phenomena.

General Physics II deals primarily with the concepts and methods in electromagnetism and optics. The contents include the concepts of electric field and potential, electric current and magnetism, law of induction, dielectric material and magnetic material, electromagnetic waves and optics, and a part of the basic concepts of quantum physics.

PHYS 101H, 102H General Physics I(H), II(H)..... (3-1-3)

These are more advanced courses of PHYS 101, 102, and students work out problems that broadly apply the basic concepts of physics.

PHYS 103 General Physics Lab. I..... (0-2-1)

The course helps students to understand basic contents and concepts through experiments.

PHYS 104 Design & Build Lab..... (0-2-1)

In this course, the student-led experiments based on individuals' creativity are conducted beyond the text-based typical experiments. To carry out the project, students should be actively involved in the whole process of the experiments, the design of the experimental apparatus, construction, results analysis, the demonstration and presentation of experiment results.

PHYS 105, 106 Introductory Physics I, II..... (3-1-3)

This course is designed for students who did not learn physics in senior high schools. The contents would be similar to General Physics I, II but the course emphasizes the conceptual understanding of physics principles rather than the mathematical formulation.

PHYS 109 Introductory Modern Physics..... (1-0-1)

The course introduces the examples of the applications of physics in this contemporary society. Student are exposed to the various research directions of modern physics and get the overall pictures of physics.

PHYS 201 Introduction to Modern Physics..... (3-1-3)

Students learn the basics of modern physics, special relativity and the basics of quantum physics. The topics include atomic, molecular, solid state, statistical and particle physics.

PHYS 203 Mechanics..... (3-1-3)

The course covers the Newtonian mechanics of particles and rigid bodies. It introduces more analytical methods than the basic mechanics covered in General Physics I. The topics include Newtonian mechanics, conservation laws, gravitational potential and the problems of centripetal forces.

PHYS 206 Electromagnetism I..... (3-1-3)

The electromagnetic phenomena are covered in a more advanced level than they are in the General Physics II. The topics include charges and electric fields, electric potentials, conductors, Laplace equations and their solutions, magnetic fields and vector potentials and Maxwell's equations.

PHYS 209 Mathematical Methods for Physics..... (3-1-3)

Students learn the basic mathematical methods commonly used in physics. The topics include vector analysis, linear algebra, coordinate transformation, Fourier series, complex variables, ordinary differential equations and some special functions.

PHYS 212 Computers for Physics..... (2-2-3)

Recommended Prerequisite: Mechanics (PHYS 203)

This is an introductory course for computer-aided physics. Using the various methods of computers, students solve the physics problems numerically. The course covers the introduction to computer simulation, the exploration of interesting physics problems using the numerical analysis of MATLAB and the graphic user

environment.

PHYS 231 Electronics and Instrumentation Lab..... (0-6-3)

The course aims to help students understand the basic electronics and carry out basic experiments. Students develop problem-solving skills in actual research by working out the design, manufacturing and characteristics measurements of the simple electronic circuits.

PHYS 250, 351, 352 Physics Laboratory I, II, III..... (0-6-3)

In this course, students reconfirm the basic physics principles through the measurements and analysis of experiments. The main contents include experiments related to mechanics, electromagnetism, optics and modern physics.

PHYS 301 Quantum Physics I..... (3-1-3)

Students learn the basic concepts of quantum physics, quantum systems and their applications to simple quantum systems. The topics include the duality of particle and wave, uncertainty principle, wave functions, Schrodinger equations, operator methods, one dimensional problem, harmonic oscillator and hydrogen atom.

PHYS 302 Quantum Physics II..... (3-1-3)

Recommended Prerequisite: Quantum Physics I (PHYS301)

Based on the basic concepts covered in PHYS 301, the angular momentum and spin, perturbation theory, theory of radiation are introduced so that students can understand the phenomena in atomic physics.

PHYS 304 Thermal Physics (3-1-3)

The course covers the thermal physics and its multi particle phenomena based on the statistical physics, which probabilistically explains the material property out of the atoms and molecules consisting of the material.

PHYS 307 Electromagnetism II..... (3-1-3)

Recommended Prerequisite: Electromagnetism I (PHYS206)

The course aims to promote the understanding of electric and magnetic phenomena through the application of Maxwell's equations. The topic includes electromagnetic wave, wave guide, wave optics and special relativity.

PHYS 315 Introduction to Astrophysics..... (3-0-3)

The course introduces the basic knowledge in astronomy and the theory of universe. The topics include the basics of astronomical observation, the structure of the sun and the solar system, black hole, galaxy, the structure of the universe, standard cosmology and the theory of big bang.

PHYS 360 Pioneers in Physics..... (3-0-3)

By studying the biographies of great physicists, students learn the trends of the physics and the effects of the great physicists' accomplishments on the progress of physics.

PHYS 399A-D Research Participation A-D..... (0-3-1)

Students learn the trends of physics and the technologies needed by participating in the research activities.

PHYS 401 Solid State Physics..... (3-0-3)

Recommended Prerequisite: Quantum Physics I (PHYS301), Thermal Physics (PHYS304)

Students learn the basics of the physics phenomena in solids. The topics include crystal structure, lattice vibration, the theory of metal and its thermal property, and the theory of energy band.

PHYS 403 Nuclear and Elementary Particle Physics..... (3-0-3)

Recommended Prerequisite: Quantum Physics I (PHYS301), Quantum Physics II (PHYS302)

The course introduces the basic concepts of the nuclear and particle physics.

The topics include the basic classification of the elementary particles, the basic properties of nucleus, nuclear forces, the strong and weak interactions of elementary particles, symmetry and conservation laws.

PHYS 406 Plasma Physics..... (3-0-3)

Recommended Prerequisite: Mechanics (PHYS203), Electromagnetism I (PHYS206)

This is the introductory course for plasma physics and covers the plasma in magnetic field and related phenomena. The topics include the motion of charged particles in magnetic fields, the waves created in plasma and their equilibrium and stability, linear and nonlinear theory, and the introduction to the theory of diagnosis methods.

PHYS 407 Introduction to Accelerator Physics..... (3-0-3)

The course covers the structure and principles of linear accelerators and circular accelerators. Other topics included in this course are basic theories of particle beam physics.

PHYS 408 Intermediate Mathematical Methods for Physics..... (3-1-3)

This course introduces advanced mathematical methods for physics. The topics include the method of variation, integral equation, special functions and group theory.

PHYS 410 Optical Physics..... (3-0-3)

Recommended Prerequisite: Electromagnetism I (PHYS206), Quantum Physics I (PHYS301)

The course deals with wave optics and quantum optics. The topics include the wave as the solution of Maxwell's equations, polarizations, interference, diffraction, the interaction between light and matter, laser and holography and fiber optics.

PHYS 412 Practical Physics Lab...... (0-6-3)

The course is intended for students who plan to major in experimental physics. The course aims to enhance students' understanding of mechanical devices and to help them obtain the knowledge of the basic concepts and technologies for various processes needed for experiments. The contents of the course include the design for

processes, process manufacturing exercise, equipment making, and enhancing the processing ability.

PHYS 413 Biological Physics (3-0-3)

The course introduces the basics of biophysics, which attempts to understand the biological phenomena using the physical concepts and methods. Introduced are the biophysics approaches to important biological phenomena at the molecular level or cell level, thereby enhancing the ability to understand biological organism from the physics viewpoint.

PHYS 420 Special Topics in Condensed Matter Physics (3-0-3)

The course is to study various phenomena in condensed matters based on statistical physics and solid state physics. The topics include many body theory, surface physics, phase transition and critical phenomena, nonequilibrium phenomena and complex systems, superconductors and superfluids, and semiconductors.

PHYS 422 Special Topics in Modern Physics (3-0-3)

The recent theories of modern physics are introduced to students. The topics will be determined by lecturers.

PHYS 431, 432 Physics Research I, II (0-6-3)

Students carry out physics research under the supervision of the professors in charge. Students are trained in seminar presentation and writing technical papers.

PHYS 434 Physics Seminar (3-0-3)

Students are expected to give presentations and have discussions under the specific topic in this course. By doing so, students learn the recent research trends and acquire the abilities to read research papers and to give an oral presentation.

PHYS 460 Trends in Physics Research (1-0-1)

The course takes the form of seminar whose speakers are either the faculty members of the Department of Physics or scholars invited from outside POSTECH. The students can learn the recent trends of physics research, which helps students set the specific directions in PHYS 431, 432.

Department of Chemistry



1. Education Aim

Chemistry is the fundamental science that studies the structure, properties and transformation of matter. The discipline provides the key to understanding and advancing medicines, materials, energy and other areas pertaining to human welfare. Humans have overcome disease and famine by creating medicines, agricultural chemicals, fertilizers, and synthetic resins. Also, new breakthroughs in fields such as electronic engineering, life sciences, and renewable energy are all driven by chemistry through the development of new materials, chemical reactions and analytical techniques. Scientists have pursued new understanding and applications of chemistry to lay a broad foundation for scientific and technological advancements.

The Department of Chemistry provides lecture courses in general areas of organic, physical, analytical, and inorganic chemistry, plus many more specialized courses including macromolecular chemistry, biochemistry, nano chemistry, chemical biology, medicinal chemistry and computational chemistry covering the forefront of modern chemistry.

Since chemistry embraces a wide range of applications closely linked to human welfare, graduates have established diverse career paths. We prepare students to contribute to all branches of chemistry by extending the depth and breadth of knowledge.

Today, researchers with solid understanding of the basics of chemistry are in demand in almost all fields of application science and technology. Pharmaceuticals, macromolecules, petrochemistry, and catalysts are the career fields that interest many chemistry majors. Well trained research chemists have been making growing contributions to recently emerging basic research areas such as the electronic industry, bioengineering and pollution related fields of environmental science. With an increasing emphasis on basic research to enhance global competitiveness, the demand for high-quality researchers is soaring more than ever before.

Therefore, students are encouraged to undertake further degrees with a view to better preparing themselves for careers in industrial or academic research. We offer all graduate students scholarships and unparalleled research environments to guarantee creativity and autonomy in research, and bring out the best of them.

2. Program Overview

Chemistry is the scientific study of matter's synthesis and properties. It studies the composition, structure and properties of matter, chemical reactions and the resulting energy transfer. Since matter makes up all living things, the earth, and even the universe, the range of applications of modern chemistry is broad. The Department of Chemistry offers courses in the following fields of studies:

- **Physical Chemistry:** Physical chemistry focuses on the basic principles of chemistry, including the structures and characteristics of atoms/molecules and chemical kinetics. It also studies thermodynamics, chemical equilibria, statistical thermodynamics, kinetics, quantum chemistry, the structures of atoms and molecules, molecular spectroscopy, the structures of solids and liquids, photochemistry, and molecular dynamics.
- **Organic Chemistry:** Organic chemistry is the study of the structures, reactions and synthesis of organic compounds. Organic compounds make up most living organisms including the human body. Organic chemistry stresses the separation, identification and chemical synthesis of these compounds to develop useful substances. It also involves stereochemical characteristics, reaction mechanisms, and spectroscopic analyses.
- **Inorganic Chemistry:** Inorganic chemistry studies the chemical bonds and molecular structures of every element in the periodic table, especially the theoretical fundamentals of complexes containing transition metals. This field covers transition metal catalysts and the properties, reactions, and syntheses of organometallic and inorganic compounds.
- **Analytical Chemistry:** Analytical chemistry is a scientific discipline that analyzes the structure, composition, and relative ingredients of substances. In addition to quantitative analysis based on chemical equilibrium, the courses introduce instrumental analysis which studies the principles and applications of various analytical instruments.
- **Polymer Chemistry:** Polymer chemistry is concerned with the physical/chemical properties and synthesis of polymers, such as synthetic resins, synthetic fibers, synthetic rubbers, bio-macromolecules, etc. The courses involve both purely academic areas and industrial applications.
- **Biochemistry:** Biochemistry deals with life phenomena from chemical viewpoints. Its main focus is in understanding of life phenomena and inducing the applications by means of research on the functions and structures of bio-substances. Almost all areas of bio sciences are engaged in biochemistry.

In addition to those listed above, chemistry requires understanding other fields to undertake research in each field. Furthermore, chemistry is a basic science that provides fundamentals for chemical engineering, material science, life science, pharmaceuticals, physics, electronic and electrical engineering, etc. Thus, the curriculum of the Chemistry Department aims to be interdisciplinary and to integrate the various fields of science and engineering.

* Course requirements

General Chemistry (H) is a basic course for the first-year students who major in science and engineering. It covers basic principles and their applications to chemistry-related fields. The course helps students acquire knowledge and basic skills in synthesis, analysis, and quantitative measurements needed for chemical

experiments by offering lectures and experiments in parallel. There is Introductory General Chemistry, a course for students who have not taken High School Chemistry II in high school to prepare them for General Chemistry (H). Starting the second year of the program, students may focus their studies in specific areas of interests by selecting major requirements and major electives under the guidance of their academic advisors.

■ Requirements for double majors and minors

- * Double major policy: No fewer than 40 credits must be earned from major requirement courses within the Department of Chemistry. Credits from each course will count toward both majors and double majors.
- * Minor policy: A minimum of 21 credits must be earned from major requirement courses and major elective courses within the Department of Chemistry. Credits from each course will count toward either majors or minors.

3. Course Requirements

Category	Course Title	Credit	Remarks
Humanities, Arts, and Social Sciences (HASS) Requirements	Expository Writing	2	
	English Certification Program	4	
	Physical Education	2	
	Integrated HASS	6	
	Sub Total	14	
HASS Electives	Humanities	15	
	Social Sciences		
	Arts		
	Sub Total	15	
Basic Requirements	Calculus	3	
	Calculus Lab.	1	
	Applied Linear Algebra	3	
	Choose 1 from the following: General Physics I, General Physics I (H), Introductory Physics I Choose 1 from the following: General Physics II, General Physics II (H), Introductory Physics II	6	
	General Physics Lab. I, II (Design & Build)	2	
	General Chemistry (H)	4	
	General Chemistry Lab.	2	
	Choose either General Life Science or General Life Science (H)	3	
	Programing and Problem Solving	3	
	Sub Total	27	
Major Requirements		40	STC courses included
Major Electives		15	STC courses included
Free Electives		18	
Total		129	
Active Based Curriculum (ABC) Requirements	Planning for college Life and Future	2	
ABC Electives	Humanities	5	
	Culture		
	Leadership Development		
Total		7	

※ HASS requirements (Division of Humanities and Social Sciences)

- Physical Education (2 credits): Physical Fitness (1) plus one out of 14 courses.
- Integrated HASS (6 credits): Arts and Humanities, Crossing boundaries of Science and Society

※ STC course requirements: Choose five courses including two major requirements (Organic Chemistry I, Chemical Analysis).

4. List of Major Courses

Category	Course No.	Course Title	lec-lab. -cr.	Recommended Pre-req/Pre-req
Major Requirements	CHEM211	Physical Chemistry I	3-0-3	General Chemistry
	CHEM221	Organic Chemistry I (STC)	3-0-3	General Chemistry
	CHEM222	Organic Chemistry II	3-0-3	Org. Chem. I
	CHEM226	Chemical Reaction Lab.	0-6-3	Org. Chem. I
	CHEM243	Chemical Analysis (STC)	3-0-3	
	CHEM245	Analytical Chemistry Lab.	0-6-3	General Chemistry
	CHEM311	Physical Chemistry II	4-0-4	Phys. Chem. I
	CHEM314	Physical Chemistry & Instrumental Analysis Lab.	0-8-4	Phys. Chem. I, Anal. Chem. Org. Chem., Inorg. Chem,
	CHEM321	Synthesis Lab.	0-8-4	Chemical Reaction Lab.
	CHEM331	Inorganic Chemistry	4-0-4	Phys. Chem. I, Anal. Chem.
	CHEM342	Instrumental Analysis	3-0-3	Anal. Chem., Phys. Chem. I, II
	CHEM499	Undergraduate Chemical Research	0-9-3	Advanced Experimental Chem.
Major Electives	CHEM100	Introductory General Chemistry	2-0-2	Noncredit course
	CHEM109	Introduction to Current Chemistry	1-0-1	
	CHEM213	Mathematics for Chemistry	3-0-3	General Chemistry
	CHEM224	Introductory to Organic Chemistry (for students of other majors)	3-0-3	
	CHEM399A~D	Research Participation A~D	0-4-1	General Chemistry
	CHEM451	Macromolecular Chemistry	3-0-3	General Chemistry
	CHEM461	Biochemistry	3-0-3	
	CHEM481A~D	Special Topics in Chemistry A~D	Variable Credits	2 Research Participations
	CHEM497	Advanced Experimental Chemistry	0-9-3	
	CHEM498	Literature Research	0-6-2	

5. Major Course Plan (Template)

Year/ Semester	Spring Semester			Fall Semester		
	Category	Course No.	Course Title	Category	Course No.	Course Title
First Year	UC	CHEM106	General Chemistry I	UC	CHEM106	General Chemistry (I)
	UC	CHEM102	General Chemistry Lab.	UC	CHEM102	General Chemistry Lab.
Second Year	Maj. Req. (STC)	CHEM221	Organic Chemistry I	Maj. Req.	CHEM 211	Physical Chemistry I
	Maj. Req. (STC)	CHEM243	Chemical Analysis	Maj. Req.	CHEM 222	Organic Chemistry II
	Maj. Req.	CHEM245	Analytical Chem. Lab.	Maj. Req.	CHEM226	Chemical Reaction Lab.
Third Year	Maj. Req.	CHEM311	Physical Chemistry II	Maj. Req.	CHEM314	Physical Chemistry Lab.
	Maj. Req.	CHEM321	Synthesis Lab.	Maj. Req.	CHEM342	Instrumental Analysis
	Maj. Req.	CHEM331	Inorganic Chemistry			
Fourth Year	Maj. Req.	CHEM499	Undergrad. Chem. Research	Maj. Req.	CHEM499	Undergrad. Chem. Research

6. List of Field Courses

Field	Course No.	Course Title	lec-lab.-cr.
Physical Chemistry	CHEM211	Physical Chemistry I	3-0-3
	CHEM213	Mathematics for Chemistry	3-0-3
	CHEM311	Physical Chemistry II	4-0-4
	CHEM314	Physical Chemistry & Instrumental Analysis Lab.	0-8-4
Organic Chemistry	CHEM221	Organic Chemistry I	3-0-3
	CHEM222	Organic Chemistry II	3-0-3
	CHEM224	Introductory to Org. Chem. (for students of other majors)	3-0-3
	CHEM226	Chemical Reaction Lab.	0-6-3
	CHEM321	Synthesis Lab.	0-8-4
Inorganic Chemistry	CHEM331	Inorganic Chemistry	4-0-4
Analytical Chemistry	CHEM243	Chemical Analysis	3-0-3
	CHEM245	Analytical Chemistry Lab.	0-6-3
	CHEM342	Instrumental Analysis	3-0-3
Polymer Chemistry	CHEM451	Macromolecular Chemistry	3-0-3
Biochemistry	CHEM461	Biochemistry	3-0-3
Others	CHEM100	Intro. General Chemistry (S/U)	2-0-2
	CHEM109	Intro. to Current Chemistry (S/U)	1-0-1
	CHEM399A~D	Research Participation A~D (S/U)	0-4-1
	CHEM481A~D	Special Topics in Chemistry A~D	Variable Credits
	CHEM497	Advanced Experimental Chemistry	0-9-3
	CHEM498	Literature Research (S/U)	0-6-2
	CHEM499	Undergraduate Chemical Research	0-9-3

7. Cross-listed Courses (Counted as major electives)

Category	Course No.	Course Title	lec-lab.-cr.
Major Electives	MATH210	Applied Complex Variables(STC)	3-1-3
	MATH231	Statistics for Experimental Research (STC)	3-1-3
	MATH261	Discrete Mathematics(STC)	3-1-3
	MATH301	Modern Algebra I	3-1-3
	MATH311	Analysis I (STC)	3-1-3
	MATH324	Introduction to Geometry	3-0-3
	MATH333	Applied Statistics	3-1-3
	MATH342	Engineering Mathematics	3-1-3
	MATH351	Introduction to Numerical Analysis	3-0-3
	MATH360 / CSED232	Practice in Programming / Object-Oriented Programming (STC)	3-0-3
	MATH413	Partial Differential Equations	3-0-3
	MATH426	Introduction to Differential Geometr	3-1-3
	PHYS201	Introduction to Modern Physics(STC)	3-1-3
	PHYS203	Mechanics(STC)	3-1-3
	PHYS206	Electromagnetism I	3-1-3
	PHYS209	Mathematical Methods for Physics	3-1-3
	PHYS212	Computers for Physics	2-2-3
	PHYS231	Electronics and Instrumentation Lab	0-6-3
	PHYS250	Physics Laboratory I	0-6-3
	PHYS301	Quantum Physics I	3-1-3
	PHYS302	Quantum Physics II	3-1-3
	PHYS304	Thermal Physics	3-1-3
	PHYS307	Electromagnetism II	3-1-3
	PHYS351	Physics Laboratory II	0-6-3
	PHYS401	Solid State Physics	3-0-3
	PHYS408	Intermediate Mathematical Methods for Physics	3-1-3
	PHYS410	Optical Physics	3-0-3
	PHYS413	Biological Physics	3-0-3
	PHYS420	Special Topics in Condensed Matter Physics	3-0-3
	LIFE209	Modern Life Science Laboratory	1-6-4
	LIFE215	Cell Biology and Genetics Laboratory	0-6-3
	LIFE217	Cell Biology	3-0-3
	LIFE303	Microbiology	3-0-3
	LIFE314	Physical Biochemistry	3-0-3
	LIFE318	Molecular Biology and Biochemistry Lab.	0-6-3

Category	Course No.	Course Title	lec-lab.-cr.
	LIFE319	Biochemistry I	3-0-3
	LIFE320	Biochemistry II	3-0-3
	LIFE321	Molecular Biology(STC)	3-0-3
	LIFE416	Biotechnology	3-0-3
	LIFE420	Immunology	3-0-3
	AMSE201	Introduction to Materials Science and Engineering (STC)	3-1-3
	AMSE208	Crystal Structure (STC)	3-1-3
	AMSE313	Electrical, Magnetic and Optical Properties of Materials	3-0-3
	AMSE315	Microstructural Evolution	3-0-3
	AMSE388	Semiconductor Devices	3-0-3
	AMSE451	Electronic Materials Device Physics	3-0-3
	AMSE464	Physical Properties of Polymers	3-0-3
	AMSE481	Semiconductor Processing	3-0-3
	MECH202	Computer Aided Drawing and Design	1-2-2
	MECH240	Solid Mechanics I (STC)	3-1-3
	MECH250	Thermodynamics (STC)	3-1-3
	MECH323	System Control	3-1-3
	IMEN261	Introduction to Operations Research(STC)	3-0-3
	IMEN281	Information System Technology (STC)	3-1-3
	EECE211	Semiconductor Electronics I	3-0-3
	EECE231	Basic Circuit Theory (STC)	3-0-3
	EECE233	Signals and Systems (STC)	3-0-3
	EECE261	Electromagnetics (STC)	3-0-3
	EECE273	Digital System Design	3-2-4
	EECE303	Physical Electronics	3-0-3
	EECE331	Electronic Circuits I	3-0-3
	EECE332	Introductory Experiments on Electronics	0-4-2
	EECE411	Optoelectronics-display Eng.	3-0-3
	CSED211	Microprocessor Application and Assembly Programming	2-2-3
	CSED232	Object-Oriented Programming (STC)	3-0-3
	CSED233	Data Structure (STC)	3-0-3
	CHEB208	Fundamentals in Engineering Biology (STC)	3-0-3
	CHEB303	Mathematical Methods in Chemical Engineering	3-0-3
	CHEB308	Introduction to Biotechnology	3-0-3

8. Course Description

CHEM 100 Introductory General Chemistry (2-0-2)

The course is designed for students who need the foundation principles of chemistry. Introduction to atomic structure, the periodicity of the elements, chemical bonding, intramolecular forces, common inorganic/organic compounds, chemical reactions, kinetics, chemical equilibrium, acid-base reactions and redox reactions.

CHEM 102 General Chemistry Laboratory (0-4-2)

The course develops laboratory skills by practicing the theoretical knowledge acquired in CHEM 101 through actual experiments. It must be taken with CHEM 101.

CHEM 106 General Chemistry (H) (4-1-4)

The course is intended for properly qualified students with the same objectives as CHEM 101. (Honor Course)

CHEM 109 Introduction to Current Chemistry (1-0-1)

Introduction to current research trends and research interests of faculty members. The course aims to broaden insight into the recent developments and trends in chemistry.

CHEM 211 Physical Chemistry I (3-0-3)

Recommended Prerequisites : General Chemistry

Basics of quantum chemistry, atomic/molecular structures, the theory of chemical bonding, and the principles of spectroscopic techniques.

CHEM 213 Mathematics for Chemistry (3-0-3)

The course enhances the skills needed to solve chemistry problems using mathematical methods. It is intended for students who have completed Calculus and Linear Algebra in Math Level 1. The course provides an understanding of the essence of various chemistry problems, and a basic knowledge of probability and statistics essential to the analysis of experimental results.

CHEM 221 Organic Chemistry I (3-0-3)

Recommended Prerequisites : General Chemistry

The course covers the reactivity and structure of organic compounds, chemical changes on the common groups of aromatic/aliphatic compounds, and the synthesis and structure confirmation of them.

CHEM 222 Organic Chemistry II (3-0-3)

Recommended Prerequisites : Organic Chemistry I

Continued from Organic Chemistry I. Introduction to the reactivity/stereochemistry of carbanion, carbonium ion, carbene, etc. and physiologically important compounds including carbohydrates, amino acids, peptides and hetero compounds.

CHEM 224 Introductory to Organic Chemistry (3-0-3)

Recommended Prerequisites : General Chemistry

The course presents foundation principles of organic chemistry. This course is intended for majors in engineering and biological sciences.

CHEM 226 Chemical Reaction Laboratory (0-6-3)

Recommended Prerequisites : Organic Chemistry I

Basic techniques of experiments including performing reactions and separation/purification/structure confirmation of compounds are explored through a series of organic reaction experiments.

CHEM 243 Chemical Analysis (3-0-3)

Recommended Prerequisites : General Chemistry

Principles of equilibria (acid-base, metal-complex, redox, solvent extraction and ion exchange equilibria), and applications for laboratory work to solve real-world problems.

CHEM 245 Analytical Chemistry Laboratory (0-6-3)

Recommended Prerequisites : General Chemistry

Principles of equilibria (acid-base, metal-complex, redox, solvent extraction and ion exchange equilibria), with laboratory work to solve real-world problems.

CHEM 311 Physical Chemistry II (4-0-4)

Recommended Prerequisites : Physical Chemistry I

The course provides the principles of thermodynamics, statistical mechanics and kinetics.

CHEM 314 Physical Chemistry & Instrumental Analysis Laboratory (0-9-3)

Recommended Prerequisites : Physical Chemistry I, Analytical Chemistry

Understanding the structure and physical/chemical properties of molecules, chemical reaction dynamics, etc. with experiments. The course further explores principles and techniques to measure various chemical phenomena.

CHEM 321 Synthesis Laboratory (0-8-4)

Recommended Prerequisites : Organic Chemistry, Inorganic Chemistry, Chemical Reaction Laboratory

Basic synthesis reactions of organic/inorganic chemistry in the laboratory.

CHEM 331 Inorganic Chemistry (4-0-4)

Recommended Prerequisites : Physical Chemistry I, Analytical Chemistry

Introduction to the basic principles of modern inorganic chemistry. The course emphasizes the combination, structure, synthesis and reactivity of inorganic compounds, and especially transition metal complexes. It includes ligand field theory of transition metal compounds, their spectroscopic/thermodynamic properties and periodicity

of elements.

CHEM 342 Instrumental Analysis (3-0-3)

Recommended Prerequisites : Chemical Analysis 225

Principles of instrumental methods of analysis, and their applications to solve real-world problems.

CHEM 399 A~D Research Participation A~D (0-4-1)

The second and third year students accumulate experience with original research under the guidance of faculty.

CHEM 451 Macromolecular Chemistry (3-0-3)

Recommended Prerequisites : General Chemistry

Introduction to Polymer Science: Polymerization methods and mechanism, molar mass distribution, characterization methods, physical properties and applications of various polymers.

CHEM 461 Biochemistry (3-0-3)

Recommended Prerequisites : General Chemistry

Introduction to basics of biochemistry and molecular biology. The course includes the structures and functions of proteins, instruments of biochemical reactions, intermediary metabolism and biomedical control mechanism.

CHEM 481 Special Topics in Chemistry A~D (variable credits)

A select subset of topics in advanced physical chemistry and modern organic chemistry. Topics include quantum mechanics, group theory, and high level computational chemistry.

CHEM 497 Advanced Experimental Chemistry (0-9-3)

Recommended Prerequisites : 2 courses of Research Participations

Properly qualified students pursue original research under the guidance of faculty.

교과과정(대학)

CHEM 498 Literature Research (0-6-2)

Designed for those who haven't taken CHEM 497. This course involves literature research of a specific topic in chemistry. Students are required to submit a review paper.

CHEM 499 Undergraduate Chemical Research (0-9-3)

Recommended Prerequisites : Advanced Experimental Chemistry

The course provides the basic skills required for pursuing original research under the guidance of faculty and writing a thesis on the research. The course is designed for undergraduates wishing to continue their studies at graduate school to be a professional researcher. It is recommended to take CHEM 497 one year prior to graduation and CHEM 499 in the last semester of undergraduate study.

Department of Life Sciences



1. Education Aim

The education aim of the Department of Life Sciences' undergraduate program is to foster future-oriented scientists who can play world-leading roles in the field of life science in the 21st century. Elaborated goals are as follows:

- The department aims to allow students to explore the multiple aspects of life sciences by offering a curriculum that broadly touches upon various subjects including the functional characterization of genes and proteins, the development of novel drugs, the understanding and regulation of an organism's metabolism and aging, the treatment of genetic diseases through genome research, the understanding of ecosystems, and environmental improvement.
- The department aims to offer academic environments that stimulate students' creative ideas in order to help them grow into bioscientists equipped with capacity to challenge conventional notions and make a new horizon in the field of biosciences.
- The department aims to produce independent scientists who will take the lead in basic and applied research and ultimately pioneer the future of Korea's life sciences by allowing students to gain both microscopic and macroscopic insights into the field of life science through liberal but rigorous training.

2. Program Overview

Life sciences is a basic science and, at the same time, a composite study. It can be classified into zoology, botany, and microbiology based on the research subjects; biochemistry, physiology, biophysics, genetic engineering, molecular biology, and cell biology based on the research methods; pharmacology, medical science, agricultural science, food and nutritional science, and environmentology based on the application fields of research findings. Such classifications continue to become more complex and the boundaries get blurred due to the rapid development of life sciences and the subsequent expansion of the scope and fields of application.

The Department of Life Sciences focuses on the research and education that look into the true nature and principles underlying the phenomena of life; a knowledge that is considered essential in all of the

aforementioned fields.

The undergraduate curriculum is designed with a focus on developing students' capabilities to comprehend the principles of living systems based on sound theoretical foundations and to apply acquired knowledge to interpreting biological characteristics of various living organisms. Students gain the foundations through coursework in elementary courses, including mathematics, physics, and chemistry, which are necessary for a deeper understanding of life sciences, and through experimental practices.

To accomplish this goal, the department offers various types of independent research, independent study, and research participation programs via individual-based tailored tutorial and mentoring systems.

Students are able to not only select the programs based on their interests, aptitudes, and levels of academic performance, but also receive guidance from an academic advisor of their choice.

In addition, seniors are offered with an undergraduate thesis program that allows them to perform in-depth research on chosen subjects and benefit from an education in which theories and cutting-edge experimental skills are integrated.

Since current trends in life sciences show that advancements in the field largely derive from interdisciplinary research, the scope of department's major electives includes courses from other departments to help lay the foundation for multidisciplinary education.

The graduate curriculum aims to nurture scientists with broad and unique insights who are capable of dealing with theories and research at a more advanced level in their respective major fields of study to independently carry out their research using various approaches. To accomplish this, the department focuses on maintaining close connections among the courses in the curriculum and providing students with education and research opportunities on cutting-edge research topics that follow global trends.

Requirements for Double Majors and Minors

- * Double Major Policy: Students wishing to obtain a double major in life sciences and another department must complete 43 credits of major requirement courses and determine the contents and scope of an undergraduate thesis after consulting with a chair professor of academic affairs.
- * Minor Policy: Students wishing to obtain a minor in life sciences must complete 9 credits of major requirement courses including LIFE217/Cell Biology, LIFE319/Biochemistry I, and LIFE321/Molecular Biology. It is also required that students must have completed additional 12 credits of major requirement or major elective courses offered by the Department of Life Sciences.

3. Course Requirements

Category	Course Title	Credit	Remarks
HASS Requirements	Expository Writing	2	
	English Certification Program	4	
	Physical Education	2	
	Integrated HASS	6	
	Subtotal	14	
HASS Electives	Humanities	15	
	Social Sciences		
	Arts		
	Subtotal	15	
Basic Requirements	Calculus	3	
	Calculus Lab.	1	
	Applied Linear Algebra	3	
	Choose 1 from General Physics I, General Physics I(H), or Introductory Physics I Choose 1 from General Physics II, General Physics II(H), or Introductory Physics II	6	
	General Physics Lab. I, II(Design & Build)	2	
	General Chemistry(H)	4	
	General Chemistry Lab.	2	
	General Life Science or General Life Science(H)	3	
	Programing and Problem Solving	3	
	Subtotal	27	
Major Requirements	Complete 25 credits of major requirements and 18 credits of major elective requirements. However, a minimum of 9 credits out of major elective requirements must be obtained from courses offered by the Department of Life Sciences.	43	
Major Electives	Complete 12 credits of major elective requirements or major electives	12	
Free Electives		21	
Total		132	
ABC Requirements	Planning for college Life and Future	2	
ABC Electives	Humanities	5	
	Culture		
	Leadership Development		
Total		7	

※ HASS Requirements (Humanities, Arts, and Social Sciences)

- Physical Education (2 credits): Students must take Physical Fitness (1 credit) and complete another credit by taking one out of 14 courses related to Physical Education
- Integrated HASS (6 credits): Students must take both Art and Humanities (3 credits) and Crossing boundaries of Sciences and Society (3 credits).

※ STC Course Requirements: Students must choose and complete 3 courses out of all STC courses.

The following diagram summarizes the basic structure and the names of major courses offered by the Department of Life Sciences.

Major Requirements (8 courses : 25 credits)

The Principles of Life Science, Modern Life Science Laboratory, Cell Biology and Genetics Laboratory, Cell Biology, Molecular Biology and Biochemistry Laboratory, Biochemistry I, Molecular Biology, Undergraduate Thesis



Major Elective Requirements (18 credits)

Offered by the Department of Life sciences (9 credits out of 13 courses)

Ecology & Field Study, Physiology, Microbiology, Physical Biochemistry, Genetics, Biochemistry II, Systems Biology, Modern Plant Biology, Biotechnology, Developmental Biology, Comprehension of brain and human behavior, Immunology, Introduction of Biomedical Science

Cross-listed Courses (Counted as major electives) (9 credits out of 14 courses)

Applied Statistics (MATH333), Mechanics (PHYS203), Electromagnetism I (PHYS206)/Electromagnetics (EECE261), Introductory to Organic Chemistry (CHEM224), Analytical Chemistry Laboratory (CHEM245), Physical Chemistry I (CHEM211/CHEB201), An Introduction to Materials Science and Engineering (AMSE201), Crystal Structure (AMSE208), Introduction to Mechanical Engineering I (MECH101), Computer Aided Drawing and Design (MECH202), Sensors and Measurements (MECH280), Ergonomics and Human Factors Engineering (IMEN343), Database Systems (IMEN382)



Major Electives (12 credits)

Offered by the Department of Life Sciences

Clinical Pathology, Research Participation I, Research Participation II, Independent Research Program A~F, Special Topics in Life Sciences A~Z,

Offered by other departments but admissible as major electives

Object Oriented Programming (MATH360/CS232), Organic Chemistry II (CHEM222), Physical Chemistry II (CHEM311), Chemical Reaction Laboratory (CHEM226), Introduction to Biotechnology (CHEB308), Biochemical Engineering I (CHEB406), Biochemical Engineering II (CHEB408)

※ Course completion guidelines for each category

- (1) “Completion of major requirements” means the completion of a total of 43 cumulative credits comprised of 25 credits (8 courses) of major requirements and 18 credits (from chosen courses out of 27 courses) of major elective requirements. But, among the major elective requirements, at least 9 credits must be obtained from courses offered by the Department of Life Science.
- (2) “Completion of major elective requirements” means the completion of a total of 12 cumulative credits earned from either the 13 courses listed as major electives or any courses that are not completed as major requirements out of the 27 courses listed as major elective requirements.
- (3) “Completion of major electives” means the completion of a total of 13 courses that include 5 courses offered by the Department of Life Sciences and 8 courses offered by other departments. The list of courses that are offered by other departments and also considered admissible as major electives of the Department of Life Sciences can be found in item 5 “Courses from other disciplines or majors that may replace major electives of the Department of Life Sciences.”

4. List of Major Courses

Category	Course No.	Course Title	Lec-Lab -Cr.	Recommended Pre-req/Pre-req	Remarks
Major Requirements	LIFE209	Modern Life Science Laboratory	1-6-4		
	LIFE215	Cell Biology and Genetics Laboratory	0-6-3	Modern Life Science Laboratory	
	LIFE217	Cell Biology	3-0-3	General Life Science, The Principles of Life Science	
	LIFE218	The Principles of Life Science	3-0-3		
	LIFE318	Molecular Biology and Biochemistry Laboratory	0-6-3	Cell Biology and Genetics Laboratory	
	LIFE319	Biochemistry I	3-0-3		STC
	LIFE321	Molecular Biology	3-0-3	Modern Life Science Laboratory	STC
	LIFE402	Undergraduate Thesis	0-9-3	Research Participation	
Major Elective Requirements	LIFE204	Ecology & Field Study	2-2-3		
	LIFE216	Physiology	3-0-3		
	LIFE303	Microbiology	3-0-3	General Life Science, Cell Biology	
	LIFE314	Physical Biochemistry	3-0-3		
	LIFE315	Genetics	3-0-3		
	LIFE320	Biochemistry II	3-0-3	Biochemistry I	
	LIFE414	Systems Biology	3-0-3		
	LIFE415	Modern Plant Biology	3-0-3	Cell Biology, Biochemistry I	
	LIFE416	Biotechnology	3-0-3		
	LIFE417	Developmental Biology	3-0-3	Cell Biology	

Category	Course No.	Course Title	Lec-Lab -Cr.	Recommended Pre-req/Pre-req	Remarks
Major Electives	LIFE419	Comprehension of brain and human behavior	3-0-3		
	LIFE420	Immunology	3-0-3		
	LIFE421	Introduction of Biomedical Science	3-0-3		
	LIFE311	Research Participation I	0-6-3		
	LIFE411	Research Participation II	0-6-3		
	LIFE412 A-F	Independent Research Program A~F	0-2-1	General Life Science or Gener Life Science(H)	
	LIFE418	Clinical Pathology	3-0-3		
	LIFE451 A-Z	Special Topics in Life Sciences A-Z	Variable Credit		

5. Major Course Plan (Template)

Year/ Semester	Spring Semester		Fall Semester	
	Course No.	Course Title	Course No.	Course Title
1st Year	LIFE103 LIFE103(H)	General Life Science General Life Science(H)	LIFE103 LIFE103(H)	General Life Science General Life Science(H)
2nd Year	LIFE204 LIFE209 LIFE218	Ecology & Field Study Modern Life Science Laboratory The Principles of Life Science	LIFE215 LIFE216 LIFE217	Cell Biology and Genetics Laboratory Physiology Cell Biology
3rd Year	LIFE315 LIFE318 LIFE319	Genetics Molecular Biology and Biochemistry Laboratory Biochemistry I	LIFE303 LIFE320 LIFE321	Microbiology Biochemistry II Molecular Biology
4th Year	LIFE311/ LIFE411 LIFE415 LIFE416 LIFE417 LIFE420	Research Participation I / Research Participation II Modern Plant Biology Biotechnology Developmental Biology Immunology	LIFE414 LIFE419 LIFE421 LIFE402 LIFE451A-Z	Systems Biology Comprehension of brain and human behavior Introduction of Biomedical Science Undergraduate Thesis Special Topics in Life Sciences A-Z

6. Cross-listed Courses (Counted as major electives)

Course No.	Course Title	Lec-Lab-Cr.
MATH360/CSED232	Object Oriented Programming	3-0-3
CHEM222	Organic Chemistry II	3-0-3
CHEM311	Physical Chemistry II	4-0-4
CHEM226	Chemical Reaction Laboratory	0-6-2
CHEB308	Introduction to Biotechnology	3-0-3
CHEB406	Biochemical Engineering I	3-0-3
CHEB408	Biochemical Engineering II	3-0-3

7. Course Description

LIFE 103 General Life Science (3-0-3)

This course introduces the fundamental principles of life sciences. Emphasis is on the structure and characteristics of animal or plant cells in the aspect of heredity, growth, division, differentiation, and cell death. Also the structure and physiology of animal or plant organs in the aspect of how these organs function and how these organs process information will be covered.

LIFE 103H General Life Science (H) (3-0-3)

This course is especially appropriate for upper-level students who already have taken biology classes in high school. It will provide the students with an advanced appreciation of biological sciences, although the lecture covers largely identical contents with General Life Science class.

LIFE 204 Ecology and Field Study (2-2-3)

Recommended prerequisite: LIFE 103 General Life Science or LIFE103(H) General Life Science(H)

Ecology and Field Study provides, through lectures and field trips, basic knowledge and principles of ecology required to understand the ecosystem including biological community and population.

LIFE 209 Modern Life Science Laboratory (1-6-4)

This course introduces the fundamental principles of experimental biology. Laboratory exercises focus on basic methodology of biochemistry, molecular biology, and cell biology.

LIFE 215 Cell Biology and Genetics Laboratory (0-6-3)

Prerequisite: LIFE 209 Modern Life Science Laboratory

The aim of this course is to teach students how to perform basic experiments used in modern cell biology and genetics. The techniques covered in the course include the followings such as immunostaining, transfection,

microscopy, genetic crosses, molecular genotyping, and phenotypic analysis.

LIFE 216 Physiology (3-0-3)

Life exhibits a variety of physiological functions. This course provides information and knowledge at various levels of organs, tissues, cells, and molecules to give insight into and understanding of the functions of life.

LIFE 217 Cell Biology (3-0-3)

Recommended prerequisite: LIFE 103 General Life Science or LIFE 103(H) General Life Science(H)

This course is designed as a comprehensive introduction for undergraduate students to cell biology with an aim to present the essential principles, processes, and methodology of modern cell biology.

LIFE 218 The Principles of Life Sciences (3-0-3)

This course provides basic knowledge and principles of molecular and cell biology at the introductory level.

LIFE 303 Microbiology (3-0-3)

Recommended prerequisite: LIFE 103 General Life Science or LIFE103(H) General Life Science(H), LIFE 217 Cell Biology

The objective of this course is to understand the microorganisms (bacteria and viruses) in the following aspects: structure and function of microorganisms; activities of bacteria in the ecosystem; and, the relationship between microorganisms and humans.

LIFE 311 Research Participation I (0-6-3)

This course provides opportunities for senior level students who are interested in different research areas of modern life sciences to participate in a research project pertaining to their interest and gain a deeper understanding and research experience in the field.

LIFE 314 Physical Biochemistry (3-0-3)

In this course, we decipher chemical and physical properties of biological molecules, which are required to maintain life. In order to maintain proliferation and division, numerous molecules interact each other forming diverse networks. During the process, their activities must be properly controlled. Although proteins play central roles in these events, other macromolecules such as nucleic acids, carbohydrates, and lipids play important roles. We aim to study tools and methods to understand the structures and functions of these macromolecules. This course requires some background in biochemistry and organic chemistry as pre-requisites.

LIFE 315 Genetics (3-0-3)

Genetics is one of the most important and powerful tools used in biological sciences. The purpose of this course is to train and equip students with basic knowledge in genetics. Main contents of the course include Mendelian genetics, mutations, genome instability, genetic screens, and techniques used in genetics and genomics.

LIFE 318 Molecular Biology and Biochemistry Laboratory..... (0-6-3)

Recommended prerequisite: LIFE 215 Cell Biology and Genetics Laboratory

This course allows students to gain hands-on experience of experiments and a practical understanding of basic biochemical and molecular biological tools widely used in the laboratory, including molecular cloning, mammalian expression of a transgene, western blotting, fluorescence microscopy, coimmunoprecipitation, etc.

LIFE 319 Biochemistry I..... (3-0-3)

Biochemical principles and methods are covered integrally to understand the biological structures and functions at levels of cell, tissue and organism. Based on the understanding of biochemical structure-function relationship, biological macromolecules consisting of nucleic acids, proteins, carbohydrates and lipids are studied to characterize/identify/elucidate the structure, property, role, and functional mechanism of them. Also, integral approaches utilizing modern biophysical, molecular biological, and biochemical methods are dealt with simultaneously to understand metabolism, regulatory mechanism, and signal transduction of biomolecules emphasizing on structure-function relationship, mechanistic action, transduction of energy/signals associated with effector molecules like proteins.

LIFE 320 Biochemistry II..... (3-0-3)

As a continuation of Biochemistry I, Biochemistry II addresses biological questions and phenomenon at molecular level and explains molecular mechanism underlying the cellular and organismal events.

LIFE 321 Molecular Biology..... (3-0-3)

Recommended prerequisite: LIFE 218 The Principles of Life Science

This course is intended for understanding the basic principles of how transcription, processing of transcripts, DNA replication and translation occur in prokaryotic and eukaryotic cells, and how DNA in the nucleus is organized into the chromatin structure. In addition, this course provides basic ideas about how these principles have been obtained experimentally.

LIFE 402 Undergraduate Thesis (0-9-3)

Recommended prerequisite: LIFE 311 Research Participation I or LIFE 411 Research Participation II

This course is designed for students to carry out and write a undergraduate thesis on a research topic that is chosen by students and their academic advisors.

LIFE 411 Research Participation II..... (0-6-3)

This course provides opportunities for senior level students who are interested in different research areas of modern life sciences to participate in a research project pertaining to their interest and gain a deeper understanding and research experience in the field.

LIFE 412 A-F Independent Research Program A-F (0-2-1)

Recommended prerequisite: LIFE 103 General Life Science or LIFE103(H) General Life Science(H)

Students will experience advanced levels of research. They will be required to take initiatives in the whole process of forming creative research ideas, performing research, and analyzing the results. Students whom wish to take this course need to obtain their academic advisor's permission and submit a research proposal beforehand to the department office.

LIFE 414 Systems Biology..... (3-0-3)

This course introduces students to systems biology focusing on genome, transcriptome, proteome, biological networks, and circuit analysis related to understanding diversity and dynamics of complex biological systems.

LIFE 415 Modern Plant Biology..... (3-0-3)

Recommended prerequisite: LIFE 217 Cell Biology, LIFE 319 Biochemistry I

This course provides basic knowledge of structures and functions unique to plants, recent research trends, and the impact of such research on the human society and the environment.

LIFE 416 Biotechnology..... (3-0-3)

The development of recombinant DNA technology has enabled the beginning of modern biotechnology era, which has brought new forms of biology-based technologies with the massive genetic information in prior to whole genome sequencing. This course aims to provide interdisciplinary information on the fundamental concepts of life, current state-of-art of fast-changing biotechnology, and future applications of emerging biotechnologies in the field of functional genomics, proteomics, development of personalized medicine, discovery of novel drug target, acceleration of new drug development, and analyses of massive information from datasets.

LIFE 417 Developmental Biology..... (3-0-3)

Recommended prerequisite: LIFE 217 Cell Biology

The main objective of this course is to introduce students to cellular and molecular mechanisms underlying animal development. Students are encouraged to participate in discussions on recent issues in various area of modern developmental biology.

LIFE 418 Clinical Pathology..... (3-0-3)

In this course, we will discuss the clinical pathology of human diseases, which are closely related with immunology. This course will deliver information on the mechanisms of disease onset, progression, and therapeutics, along with case examples in clinic.

LIFE 419 Comprehension of brain and human behavior (3-0-3)

Scientific understanding of the brain and human behavior continues to grow at an exponential pace. Communicating the recent excitement in the brain science, in this course, we will examine the nervous system with a focus on how our brain and our behavior interact. Students will be exposed to the fundamentals of brain function and behavior by discussing several key issues: (1) Why do we have brain?; (2) How is the nervous

system organized?; (3) How do drugs affect our behavior?; and, (4) How does the brain learn and think? To this end, the course will serve as a good introduction to basic neuroscience.

LIFE 420 Immunology (3-0-3)

Students will learn the basic principles governing the mammalian immune system which is essential for the host defenses against infection at the cellular and molecular levels.

LIFE 421 Introduction of Biomedical Science (3-0-3)

Recommended prerequisite: LIFE 103 General Life Science, LIFE 210 Biochemistry I

This course introduces the recent advances in biomedical technologies such as gene therapy, stem cell therapy, animal cloning, and nanobiotechnology. Students will also learn how these state-of-art biomedical technologies are applied to the prevention and treatment of various diseases including cancer, chronic hepatitis, and diabetes.

LIFE 451 A-Z Special Topics in Life Sciences A-Z (Variable Credit)

This class will be opened upon request when there is a special need for lectures/discussions to update on the latest development and technology in the biological fields.

Department of Materials Science and Engineering (MSE)



1. Education Aim

The Department of Materials Science and Engineering (MSE) is dedicated to providing the basic theories and principle education for each material structure and characteristics. The study of material science and engineering encompasses profound knowledge and practical applications ranging from nanoscale devices, electronic materials for information technologies, advanced structural materials to environment/energy materials, bio materials, etc.

2. Program Overview

The curriculum of MSE focuses on developing and improving engineering materials which play an essential role in the advancement of a high technology industry. With the engineering materials mainly branching into conventional metallic, ceramic, electronic, and polymer/biomaterials, the curriculum is composed of the following four fields.

- Metallic materials: This field studies the mechanical, physical, and chemical properties of metals and practical applications such as various manufacturing processes based on a general understanding of the crystal structure, microstructure, and phase transformation of metallic materials. We also introduce alloy designs and plastic working for the development of materials and processing methods that are used for multiple purposes.
- Ceramic materials: Courses in ceramic materials cover the characteristics, uses, manufacturing processes, mechanical and physical properties, atomic bonding structure, microstructure, and phase transition of various ceramic materials such as ceramic semiconductors, structural materials, ferroelectric materials, optical materials, and sensors.
- Electronic materials: Courses intend to offer an understanding of the properties and working principles of electronic materials and devices, particularly focusing on semiconductors. To this end, they deal with semiconductor physics, the basic theories and working principles of semiconductor electronic/optical devices, and various manufacturing processes.

- Polymer/biomaterials: To help understand organic polymers, courses focus on the synthesis, structure, structure-property relations, and physical and chemical structure of polymers. The field introduces the importance and extensive applications of advanced polymer materials, and the fundamental concepts of biomaterials.

Based on an understanding of each material's characteristics and manufacturing processes, MSE aims to develop new materials in demand by various fields of engineering. The first and second years of study introduce basic theories and principles on the structures and properties of materials in major requirement courses to build up fundamentals required to develop new materials. The third- and fourth-year curriculum includes major elective courses such as electronic materials, advanced structural materials, environment/energy materials, and biomaterials to provide diverse and systematic education.

Requirements for Double Majors and Minors

*** Double major policy**

Students must earn no fewer than 24 credits from major requirement courses (Material/Process Design III & IV excluded), and 13 or more credits from major elective courses. Credits from each course will count toward both majors and double majors.

*** Minor policy**

A minimum of 28 credits must be earned from major requirement courses and major elective courses within the Department of Materials Science and Engineering. Credits from each course will count toward either majors or minors.

3. Course Requirements

Category	Course Title	Credit	Remarks
Humanitie, Arts, and Social Sciences (HASS) Requirements	Expository Writing	2	2 courses
	English Certification Program	4	
	Physical Education	2	
	Integrated HASS	6	
	Sub Total	14	
HASS Electives	Humanities	15	
	Social Sciences		
	Arts		
	Sub Total	15	
Basic Requirements	Calculus	3	
	Calculus Lab.	1	
	Applied Linear Algebra	3	
	Choose 1 from the following: General Physics I, General Physics I (H), Introductory Physics I. Choose 1 from the following: General Physics II, General Physics II (H) , Introductory Physics II.	6	
	General Physics Lab. I, II (Design & Build)	2	
	General Chemistry (H)	4	
	General Chemistry Lab.	2	
	Choose either General Life Science or General Life Science (H).	3	
	Programing and Problem Solving	3	
	Sub Total	27	
Major Requirements		41	
Major Electives		24	
Free Electives		12	
Total		133	
Active Based Curriculum (ABC) Requirements	Planning for college Life and Future	2	
ABC Electives	Humanities	5	
	Culture		
	Leadership Development		
Total		7	

※ HASS requirements (Division of Humanities and Social Sciences)

- Physical Education (2 credits): Physical Fitness (1) plus one out of 14 courses.
- Integrated HASS (6 credits): Arts and Humanities, Crossing boundaries of Science and Society

※ STC course requirements: Choose one mathematics course and four science courses including Materials Science and Engineering courses.

4. List of Major Courses

Category	Course No.	Course Title	lec-lab. -cr.	Recommended Pre-req/Prereq	Remarks
Major Requirements	AMSE201	STC Introduction to Materials Science and Engineering	3-1-3	General Physics, General Chemistry	
	AMSE204	Fundamentals in Materials Science II	3-0-3	Thermodynamics	
	AMSE208	STC Crystal Structure	3-1-3		
	PHYS201	STC Introduction to Modern Physics	3-1-3		
	MECH250	STC Thermodynamics (3 Placement)	3-1-3		
	AMSE301	Materials Laboratory	1-4-3		
	AMSE311	Mechanical Properties of Materials	3-0-3		
	AMSE315	Microstructural Evolution	3-0-3		
	AMSE405	Material/Process Design III	0-0-2		
	AMSE406	Material/Process Design IV	0-0-2		
	AMSE321	Introduction to Metallic Materials	3-0-3	Introduction to Materials Science and Engineering	Complete a minimum of three courses.
	AMSE341	Introduction to Ceramics	3-0-3		
	AMSE361	Introduction to Polymers	3-0-3		
	AMSE388	Semiconductor Devices	3-0-3		
	AMSE326	Lab. for Metallic Materials	1-3-2		Complete a minimum of two courses.
	AMSE344	Ceramics Design and Laboratory	1-3-2		
	AMSE463	Polymer Design and Laboratory	1-3-2		
	AMSE483	Semiconductor Laboratory	1-3-2		
Major Electives	AMSE101	Advanced Materials and Future Science and Technology	1-0-1	Introduction to Modern Physics, Thermodynamics	
	AMSE313	Electrical, Magnetic and Optical Properties of Materials	3-0-3		
	AMSE317	Changes and Kinetics	3-0-3		
	AMSE401	Field Studies	0-0-1		
	AMSE414	Environments and Energy Materials	3-0-3		
	AMSE416	Biomaterials	3-0-3		
	AMSE417	Numerical Analysis for Materials	3-0-3		
	AMSE421	Deformation Processing	3-0-3		
	AMSE422	Advanced Technology for Steels	3-0-3	Mechanical Properties of Materials Thermodynamics, Introduction to Metallic Materials	

Category	Course No.	Course Title	lec-lab.-cr.	Recommended Pre-req/Prereq	Remarks
	AMSE441	Energy Ceramics	3-0-3	Introduction to Ceramics	
	AMSE451	Electronic Materials Device Physics	3-0-3		
	AMSE452	Physics of Optoelectronic Materials and Devices	3-0-3		
	AMSE464	Physical Properties of Polymers	3-0-3		
	AMSE481	Semiconductor Processing	3-0-3		
	AMSE490	Special Topics in Materials Science	3-0-3		

5. Major Course Plan (Template)

Year/ Semester	Spring Semester	Fall Semester
1st-Year		AMSE101 Advanced Materials and Future Science and Technology
2nd-Year	AMSE201 STC Introduction to Materials Science and Engineering PHYS201 STC Introduction to Modern Physics	AMSE204 Fundamentals in Materials Science II PHYS201 STC Introduction to Modern Physics MECH250 STC Thermodynamics (3 Placement) AMSE208 STC Crystal Structure
3rd-Year	AMSE301 Materials Laboratory AMSE311 Mechanical Properties of Materials AMSE315 Microstructural Evolution AMSE341 Introduction to Ceramics AMSE344 Ceramics Design and Laboratory AMSE361 Introduction to Polymers	AMSE301 Materials Laboratory AMSE313 Electrical, Magnetic and Optical Properties of Materials AMSE317 Changes and Kinetics AMSE321 Introduction to Metallic Materials AMSE326 Lab. for Metallic Materials AMSE388 Semiconductor Devices
4th-Year	AMSE405 Material/Process Design III AMSE414 Environments and Energy Materials AMSE417 Numerical Analysis for Materials AMSE421 Deformation Processing AMSE451 Electronic Materials Device Physics AMSE463 Polymer Design and Laboratory AMSE464 Physical Properties of Polymers	AMSE406 Material/Process Design IV AMSE416 Biomaterials AMSE422 Advanced Technology for Steels AMSE441 Energy Ceramics AMSE452 Physics of Optoelectronic Materials and Devices AMSE481 Semiconductor Processing AMSE483 Semiconductor Laboratory
	AMSE401 Field Studies	

6. List of Field Courses

Field	Category	Course No.	Course Title	lec-lab.-cr.
Major Core Courses	Major Electives	AMSE101	Advanced Materials and Future Science and Technology	1-0-1
	Major Requirements	AMSE201	Introduction to Materials Science and Engineering	3-1-3
	Major Requirements	AMSE204	Fundamentals in Materials Science II	3-0-3
	Major Requirements	AMSE208	Crystal Structure	3-1-3
	Major Requirements	AMSE301	Materials Laboratory	1-4-3
	Major Requirements	AMSE311	Mechanical Properties of Materials	3-0-3
	Major Electives	AMSE313	Electrical, Magnetic and Optical Properties of Materials	3-0-3
	Major Requirements	AMSE315	Microstructural Evolution	3-0-3
	Major Electives	AMSE317	Changes and Kinetics	3-0-3
	Major Electives	AMSE401	Field Studies	0-0-1
	Major Requirements	AMSE405	Material/Process Design III	0-0-2
	Major Requirements	AMSE406	Material/Process Design IV	0-0-2
	Major Electives	AMSE414	Environments and Energy Materials	3-0-3
	Major Electives	AMSE417	Numerical Analysis for Materials	3-0-3
	Major Electives	AMSE490	Special Topics in Materials Science	3-0-3
Metals	Major Elective Requirements	AMSE321	Introduction to Metallic Materials	3-0-3
	Major Elective Requirements	AMSE326	Lab. for Metallic Materials	1-3-2
	Major Electives	AMSE421	Deformation Processing	3-0-3
	Major Electives	AMSE422	Advanced Technology for Steels	3-0-3
Ceramics and Semiconductors	Major Elective Requirements	AMSE341	Introduction to Ceramics	3-0-3
	Major Elective Requirements	AMSE344	Ceramics Design and Laboratory	1-3-2
	Major Elective Requirements	AMSE388	Semiconductor Devices	3-0-3
	Major Electives	AMSE441	Energy Ceramics	3-0-3
	Major Electives	AMSE451	Electronic Materials Device Physics	3-0-3
	Major Electives	AMSE452	Physics of Optoelectronic Materials and Devices	3-0-3
	Major Electives	AMSE481	Semiconductor Processing	3-0-3
	Major Elective Requirements	AMSE483	Semiconductor Laboratory	1-3-2
Polymers	Major Elective Requirements	AMSE361	Introduction to Polymers	3-0-3
	Major Electives	AMSE416	Biomaterials	3-0-3
	Major Elective Requirements	AMSE463	Polymer Design and Laboratory	1-3-2
	Major Electives	AMSE464	Physical Properties of Polymers	3-0-3

7. Cross-listed Courses (Counted as major electives)

Course No.	Course Title	lec-lab.-cr.
MATH230	Probability and Statistics(STC)	3-1-3
PHYS206	Electromagnetism I	3-1-3
PHYS209	Mathematical Methods for Physics	3-1-3
PHYS301	Quantum Physics I	3-1-3
PHYS302	Quantum Physics II	3-1-3
PHYS304	Thermal Physics	3-1-3
PHYS401	Solid State Physics	3-0-3
CHEM211	Physical Chemistry I	3-0-3
CHEM221	Organic Chemistry I(STC)	3-0-3
CHEM311	Physical Chemistry II	4-0-4
CHEM331	Inorganic Chemistry	4-0-4
CHEM461	Biochemistry	3-0-3
LIFE321	Molecular Biology(STC)	3-0-3
MECH240	Solid Mechanics I(STC)	3-1-3
EECE231	Basic Circuit Theory(STC)	3-0-3
EECE261	Electromagnetics(STC)	3-0-3
CHEB201	Physical Chemistry for Chemical Engineering I(STC)	3-0-3
CHEB202	Physical Chemistry for Chemical Engineering II	3-0-3
CHEB208	Fundamentals in Engineering Biology(STC)	3-0-3
CHEB303	Mathematical Methods in Chemical Engineering	3-0-3

8. Course Descriptions

AMSE 101 Advanced Materials and Future Science and Technology (1-0-1)

The course introduces the roles of materials science toward the development of future technology. It also covers major research areas in materials science such as electronic information materials, aerospace materials, nanomaterials, optical materials, and biomaterials.

AMSE 201 Introduction to Materials Science and Engineering (3-1-3)

The course introduces the properties and applications of various advanced materials through real-world examples. It prepares students for advanced undergraduate courses.

AMSE 204 Fundamentals in Materials Science II (3-0-3)

Quantum mechanical interpretations of atomic and electronic behaviors are studied to understand the physical

properties of materials. This course includes reciprocal lattice, phonons, free electron models, and band theory. In addition, thermal, electrical, semiconducting, dielectric, and magnetic properties are basically covered.

AMSE 208 Crystal Structure..... (3-1-3)

The course presents basic crystal structures and methods for structure determination based on symmetry principles. Defects such as vacancies, diffusion, nucleation, and dislocations and their effects are included.

AMSE 301 Materials Laboratory (1-4-3)

A lab course designed to enhance an understanding of basic concepts covered in major courses. Through experiments on microstructure, electron microscope, and electronic/optical/magnetic properties of materials, students will gain a better understanding of fundamental theories in materials science.

AMSE 311 Mechanical Properties of Materials..... (3-0-3)

A fundamental course on the mechanical properties of materials including metals, biomaterials and polymers. Stress-strain relationships for elastic and plastic behaviors, the plastic deformation of single crystals, a dislocation theory, and strengthening mechanisms are covered in this course. The course also provides theories and experiments on the plastic deformation of metals such as rolling, forging, and molding and test methods for mechanical properties such as tension, fracture, fatigue, and creep.

AMSE 313 Electrical, Magnetic and Optical Properties of Materials (3-0-3)

A study on the electrical, magnetic, and optical properties of materials. This course aims to help students to understand the properties of materials by discussing the following topics: the fundamental principles of electromagnetism, the basics of magnetism, the electrical properties of metals, the properties of dielectric substances, and the magnetic and optical properties of materials.

AMSE 315 Microstructural Evolution (3-0-3)

The course applies the concepts of thermodynamics to phase diagrams, phase transformations and phase equilibrium in various materials and introduces the applications of thermodynamics for the development of new materials. Students will discuss the processes of a phase transformation, which is the most important in microstructural evolution in crystalline materials, in terms of the diffusion processes in solids.

AMSE 317 Changes and Kinetics (3-0-3)

The course focuses on irreversible changes and associated non-equilibrium rate processes. The four underlying principles and theories of study are: (i) irreversible thermodynamics based on entropy production rates and the Onsager's reciprocity; (ii) transition-state theory of rate processes' (iii) linear-response theory and Wiener-Khinchine theorem; (iv) Fermi's golden rule for rapid electronic transitions.

AMSE 321 Introduction to Metallic Materials..... (3-0-3)

A study on physical metallurgy and the relationship between metallic phenomena and metallurgical theories.

Metal fabrication and its examples are also provided. The lectures are organized in the order of structures, dislocation, plastic deformation, phase transformations, strengthening mechanisms, processing, and alloys.

AMSE 326 Lab. for Metallic Materials..... (1-3-2)

Through various experiments provided in this course, students learn the fabrication processes of metals from raw materials to finished products including melting, plastic deformation, and heat treatment, and microscopically observe the physical and chemical changes made in each process. Students also study how to apply the latest analytic and testing methods such as chemical analyses (ICP, XRF, AA, UV, CS, NO), microscopic analyses (EDS, WDS), structure analyses (XRD), and microscopic physical analyses (Microhardness tester, etc).

AMSE 341 Introduction to Ceramics (3-0-3)

The course provides an introduction to ceramic materials. Theoretical concepts on their structures, responses, and sintering are introduced. It also covers basic concepts on the mechanical, thermal, electronic, magnetic, and optical properties of ceramic materials and their applications.

AMSE 344 Ceramics Design and Laboratory (1-3-2)

The course offers fundamental principles and processing techniques for ceramic processing. Thermodynamic aspects of fine ceramic processing and its applications are considered. Students will also acquire practical knowledge through experiments and practices in ceramic processing.

AMSE 361 Introduction to Polymers (3-0-3)

Macromolecular science has had a major impact on our ways of living. It is difficult to find the aspects of our lives that are not affected by polymers. Polymers are currently used for various applications to plastics, packagings, electronics, and biology. This course presents the basic principles of polymer science with respect to the underlying physics and physical chemistry of polymers in solution and solid states. Topics include chain structures and conformation, polymerization reactions, the thermodynamics of polymer solutions, characterization, polymer structures, mechanical properties.

AMSE 388 Semiconductor Devices (3-0-3)

The course aims to understand the characteristics of a semiconductor and the basic working principles and properties of semiconductor devices. Students study semiconductor physics such as carrier mobility, a p-n junction, and a metal-semiconductor junction. The course also includes the basic theories and working principles of semiconductor optical devices such as LEDs and semiconductor electronic devices such as MOSFETs and MESFETs based on semiconductor physics.

AMSE 401 Field Studies..... (0-0-1)

Students learn how to apply their theoretical knowledge on materials to the designing and processing of real-life products.

AMSE 405 Material/Process Design III (0-0-2)

Students in groups develop their capacity to find creative solutions to materials and process problems.

AMSE 406 Material/Process Design IV (0-0-2)

Students in groups develop their capacity to find creative solutions to materials and process problems.

AMSE 414 Environments and Energy Materials (3-0-3)

Students study various energy/environment materials. The course covers the working principles of structural materials in diverse environments and the electrochemical changes of various energy materials such as solar cells, fuel cells, secondary batteries.

AMSE 416 Biomaterials (3-0-3)

A study of fundamental concepts on biomaterials from biological, chemical, physicochemical, and material-technological perspectives. The latest research trends in the Drug Delivery Systems and tissue engineering using biomaterials are introduced.

AMSE 417 Numerical Analysis for Materials (3-0-3)

The course presents numerical approaches to mathematical problems induced in the theoretical research of materials science. It includes fundamental theories in numerical analysis and practical problem-solving exercises.

AMSE 421 Deformation Processing (3-0-3)

The course explores the fundamental theories of plastic deformation occurring during the processes of rolling, extruding, and imprinting. Students also learn about industrial applications of each process by visiting industries.

AMSE 422 Advanced Technology for Steels (3-0-3)

A general introduction to steel processing. Aiming to broaden an understanding of ferrous alloys as advanced materials, this course covers thermodynamics relevant to steel processing, reaction velocity, coagulation, phase transformations, and electrochemical knowledge.

AMSE 441 Energy Ceramics (3-0-3)

An introduction to the various types, properties and applications of electronic ceramics including ceramic semiconductors, capacitor dielectrics, piezoelectric materials, and sensors. The course focuses on how their composition, manufacturing processes, and microstructures affect materials' properties and applications to devices.

AMSE 451 Electronic Materials Device Physics (3-0-3)

The course aims to offer a general introduction to modern electronic device physics, with a particular emphasis on electron transport in various electronic device platforms ranging from conventional semiconductor devices to

modern energy conversion vehicles. Designed for students in their final year of undergraduate study and first year of graduate study, the course covers important topics in the band theory of solids and the related basic electronic processes. Students are required to give a group presentation on a given subject in a group setting.

AMSE 452 Physics of Optoelectronic Materials and Devices..... (3-0-3)

The course covers general topics on optoelectronic devices such as semiconductor light emitters, lasers, solar cells, and photodetectors. Exploring the basic concepts of light and its interaction with materials, students learn how to apply these principles to modern optoelectronic devices.

AMSE 463 Polymer Design and Laboratory (1-3-2)

The course helps understand the fundamental concepts of organic materials and biomaterials by measuring and analyzing components, molecular weight, and the thermal properties of polymers. It includes methods to investigate the nanostructures of crystalline organic materials and block copolymers with analytical instruments such as DSC and AFM.

AMSE 464 Physical Properties of Polymers (3-0-3)

A study on the correlation between the structures and properties of polymers. This course offers the various physical properties of polymer solutions, solid phase polymers, and liquid phase polymers theoretically. Lectures and practices on computer simulations are provided to enhance an understanding of the basic concepts on polymer structures and properties in molecular domains.

AMSE 481 Semiconductor Processing (3-0-3)

The course provides general knowledge on processing technologies related to silicon Integrated Circuit (IC) fabrications. Topics include the basics of unit processes including thin films deposition methods (ALD, CVD and PVD), etching, lithography, ion implantation, metallization and thermal processing. Process simulations are used to study ion implantation and diffusion. The course emphasizes process integration and the scaling issues of MOSFETs for LOGIC and memory applications.

AMSE 483 Semiconductor Laboratory..... (1-3-2)

The course provides basic knowledge on the fabrication and characterization of semiconductor devices. Students study various unit processes such as film deposition, etching and lithography. The course includes laboratory sessions where students will gain hands-on experience in device fabrication and characterization. We fabricate diodes, MOS capacitors and memory devices. This course helps to systematically understand how semiconductor devices and processes work.

AMSE 490 Special Topics in Materials Science (3-0-3)

Depending on the developments of Materials Science and Engineering, the course may be added to the regular curriculum.

Department of Mechanical Engineering



1. Education Aim

The Department of Mechanical Engineering aims to nurture global leaders who set the trends and contribute to the advancement of technology.

2. Program Overview

Mechanical engineering plays a vital role in different industrial applications such as system design, energy-related technology, the development of new materials and manufacturing techniques. POSTECH's Department of Mechanical Engineering is making efforts to meet the societal demands to advance various multidisciplinary industries such as intelligent robotics, biosystems, aircrafts, automobiles, shipbuilding and electronic devices. We are currently involved in the four major categories of graduate research and education to respond to evolving research objectives and international trends.

► Requirements for Double Majors and Minors

Double major policy: 49 credits must be earned from major requirement courses including Differential Equation within the Department of Mechanical Engineering.

Minor policy: A minimum of 21 credits must be earned from major requirement courses including Differential Equation and major elective courses within the Department of Mechanical Engineering.

3. Course Requirements

Category	Course Title	Credit	Remarks
Humanities, Arts, and Social Sciences (HASS) Requirements	Expository Writing	2	2 courses
	English Certification Program	4	
	Physical Education	2	
	Integrated HASS	6	
	Sub Total	14	
HASS Electives	Humanities	15	MUST complete either Principles of Economics or Principles of Business Administration
	Social Sciences		
	Arts		
	Sub Total	15	
Basic Requirements	Calculus	3	
	Calculus Lab.	1	
	Applied Linear Algebra	3	
	Choose 1 among General Physics I, General Physics I(H), Introductory Physics I Choose 1 among General Physics II, General Physics II(H), Introductory Physics II	6	
	General Physics Lab. I, II(Design & Build)	2	
	General Chemistry(H)	4	
	General Chemistry Lab.	2	
	Choose between General Life Science and General Life Science(H)	3	
	Programing and Problem Solving	3	
	Sub Total	27	
Major Requirements		49	
Major Electives		12	
Free Electives		17	
Total		134	
Active Based Curriculum(ABC) Requirements	Planning for college Life and Future	2	
ABC Electives	Humanities	5	
	Culture		
	Leadership Development		
Total		7	

※ HASS requirements (Division of Humanities and Social Sciences)

- Physical Education (2 credits): Physical Fitness (1) plus one out of 14 courses.
- Integrated HASS (6 credits): Arts and Humanities, Crossing boundaries of Science and Society

※ STC course requirements:

Mathematics - Choose two courses including Differential Equations.

Science - Choose three courses including Mechanical Engineering courses (Solid Mechanics I, Thermodynamics).

4. List of Major Courses

Category	Course No.	Course Title	lec-lab.-cr.	Pre-req
Major Requirements	MECH101	Introduction to Mechanical Engineering I	1-0-1	
	MECH202	Computer Aided Drawing and Design	1-2-2	
	MECH211	Dynamics	3-0-3	General Physics I
	MECH240	Solid Mechanics I (STC)	3-1-3	General Physics I
	MECH244	Mechanical Behaviors & Processing of Materials	3-0-3	
	MECH245	Solid Mechanics II	3-1-3	Solid Mechanics I
	MECH250	Thermodynamics (STC)	3-1-3	General Physics I
	MECH280	Sensors and Measurements	2-3-3	
	MECH311	Mechanical Vibrations	3-0-3	Solid Mechanics I
	MECH323	System Control	3-1-3	Recommended Pre-req: Mechanical Vibrations
	MECH330	Materials Processing	3-0-3	
	MECH333	System Design I	3-0-3	Solid Mechanics II
	MECH370	Fluid Mechanics	3-1-3	Differential Equations
	MECH371	Heat Transfer	3-1-3	Fluid Mechanics
	MECH381	Electronics for Mechanical Engineers	2-2-3	
	MECH390	Machine Shop Practice	0-3-1	
	MECH433	System Design II	3-0-3	System Design I
	MATH200	Differential Equations (Mathematics Dept.)	3-1-3	
Major Electives	MECH340	Applied Solid Mechanics	3-1-3	Solid Mechanics II
	MECH351	Mechanical Engineering Internship	0-2-1	
	MECH399	Research Involvement A-D	0-2-1	
	MECH401	Strength of Materials	3-0-3	
	MECH421	Introduction to MEMS	3-1-3	
	MECH439	Introduction to Robotics	3-1-3	
	MECH441	Metal Forming	3-0-3	Materials Processing
	MECH450	Applied Thermal Engineering	3-0-3	
	MECH465	Engineering of Creative Design	3-0-3	
	MECH470	Applied Fluid Mechanics	3-0-3	Fluid Mechanics
	MECH478	Introduction to Turbomachinery	3-0-3	Fluid Mechanics
	MECH490	Special Topics in Mechanical Engineering A-Z	3-0-3	
	MECH496	Combustion and Environment	3-0-3	Thermodynamics, Fluid Mechanics

5. Major Course Plan (Template)

Year/ Semester	Spring Semester			Fall Semester		
	Category	Course No.	Course Title	Category	Course No.	Course Title
1st year				Major requirements	MECH101	Introduction to Mechanical Engineering I
2nd year	Major requirements	MATH200	Differential Equations	Major requirements	MECH211	Dynamics
		MECH202	CAD and Design		MECH244	Mecha. Behav. & Process. of Mat.
		MECH240	Solid Mechanics I		MECH245	Solid Mechanics II
		MECH280	Sensors and Measurements		MECH250	Thermodynamics
3rd year	Major requirements	MECH311	Mechanical Vibrations	Major requirements	MECH323	System Control
		MECH330	Materials Processing		MECH333	System Design I
		MECH370	Fluid Mechanics		MECH371	Heat Transfer
		MECH381	Electronics for Mechanical Engineers		MECH390	Machine Shop Practice
4th year	Major requirements	MECH433	System Design II			

6. Cross-listed Courses (Counted as majors)

Course No.	Course Title	lec-lab.-cr.	Remarks
MATH210	Applied Complex Variables	3-1-3	STC
MATH230	Probability & Statistics	3-1-3	STC
MATH342	Engineering Mathematics	3-1-3	
MATH351	Intro. to Numerical Analysis	3-0-3	
MATH413	Partial Differential Equations	3-0-3	
MATH443	Mathematical Modelling	3-0-3	
MATH451	Applied Numerical Analysis	3-0-3	
PHYS203	Mechanics	3-1-3	
PHYS206	Electromagnetism I	3-1-3	
PHYS209	Math. Methods for Physics	3-1-3	
PHYS301	Quantum Physics I	3-1-3	
PHYS304	Thermal Physics	3-1-3	
PHYS307	Electromagnetism II	3-1-3	

Course No.	Course Title	lec-lab.-cr.	Remarks
PHYS401	Solid State Physics	3-0-3	
PHYS410	Optical Physics	3-0-3	
CHEM243	Chemical Analysis	3-0-3	STC
CHEM245	Analytical Chem. Lab	0-6-3	
LIFE217	Cell Biology	3-0-3	
AMSE201	Introduction to M.S.E.	3-1-3	
AMSE313	Elec. Mag. & Optical Properties of Mat.	3-1-3	
AMSE361	Introduction to Polymers	3-0-3	
AMSE463	Polymer Design & Laboratory	1-3-2	
AMSE416	Biomaterials	3-0-3	
IMEN203	Financial Accounting	3-0-3	
IMEN232	Product Manufacturing Process	3-0-3	
IMEN301	Tech. Management & Strategy	3-0-3	
IMEN303	Marketing	3-0-3	
IMEN371	Quality Engineering	3-0-3	
EECE231	Basic Circuit Theory	3-0-3	STC
EECE233	Signals & Systems	3-0-3	STC
EECE273	Digital System Design	3-2-4	
EECE332	Introductory Experiments on Electronics	0-4-2	
EECE374	Microproc. Architect. & Appl.	3-2-4	
CS222	Object Oriented Programming	3-0-3	STC
CHEB208	Fundamentals in Engineering Biology	3-0-3	STC
CHEB303	Math. Methods in Chemical Eng.	3-0-3	
CHEB405	Intro. to Polymer Sci. & Eng.	3-0-3	
CHEB418	Transport Phenomena II	3-0-3	

※ Only one course from the list is counted as a major elective.

※ STC courses (1 Mathematics and 2 Science courses) from other departments are considered as major electives (1 course only) or free electives.

7. Course Description

MECH 101 Introduction to Mechanical Engineering I (1-0-1)

The course is designed to provide a general introduction to mechanical engineering (ME) such as history, related areas, research areas and future prospects. The ME faculty members offer approximately ten subjects and their own research areas. Students learn the ethical attitudes of engineers and report-preparing skills.

MECH 202 Computer Aided Drawing and Design..... (1-2-2)

The course covers general knowledge required by mechanical engineers. Focuses are on technical writing and reading skills for mechanical drawings which are the language of design and manufacturing. This course introduces a number of widely used computer software packages including CAD software and their application examples.

MECH 211 Dynamics..... (3-0-3)

Prerequisites : General Physics I

By analyzing particle and rigid body motions, students study the principles of kinematics and kinetics which involve the relationships of force, mass, velocity, and acceleration to time, impulse and momentum, and work and energy. The class covers instrumental interpretations about the mechanisms of typical rigid body elements such as cam systems and rotating systems including gears, and rotors.

MECH 240 Solid Mechanics I (3-1-3)

Prerequisites : General Physics I

This fundamental course provides an introduction to solid mechanics. The main topics include statics, equilibrium, a force analysis, friction of rigid bodies, and structures. The course introduces the basic concepts of stress and strain, torsional behavior, the mechanical properties of solids, and fundamental mechanical tests such as tensile and impact tests.

MECH 244 Mechanical Behaviors and Processing of Materials..... (3-0-3)

The course covers the properties and behaviors of materials based on atomic crystal structures. Students study the mechanical behaviors of materials in the elastic and plastic regions and the testing methods of materials. In this course, materials include ferrous, non-ferrous metals, plastics, ceramics, and composite materials.

MECH 245 Solid Mechanics II..... (3-1-3)

Prerequisites : Solid Mechanics I

This intermediate course provides an introduction to the mechanics of deformable bodies. The main topics include the flexure of beams, plane stress, plane strain, the generalized Hooke's law and failure criteria. The course offers mechanical tests such as the flexural test of beams and a torsion test.

MECH 250 Thermodynamics..... (3-1-3)

Prerequisites : General Physics I

The course studies the thermomechanical properties of materials based on a microscopic view, and work and heat transfer with an emphasis on the design of systems and the techniques of efficient conversion.

MECH 280 Sensors and Measurements..... (2-3-3)

The course is designed to learn the various experimental methods and theories of measurements in mechanical engineering, and to master them through practical experiments. In this course, students learn data acquisition,

signal processing, strain gauges and various kinds of sensors: displacement, force, moment, pressure, velocity, and temperature. Experiments are conducted to obtain stress-strain curves and measure fluid flow and sound velocity, and use DC motors. During the semester, students make up teams and carry out a project built upon the knowledge gained in classes and experiments. All projects are presented as a poster at the end of the semester.

MECH 311 Mechanical Vibrations (3-0-3)

Prerequisites : Solid Mechanics I

The course deals with the elements of mechanical vibrations. Students study the free vibrations of single degree of freedom systems and the theories of forced vibrations. The course includes the responses of multi-degree of freedom system, the concepts of natural frequencies, and their corresponding natural modes shapes and characteristics. With the theoretical approaches on mechanical vibrations, the course examines the applications of the mechanical vibration theory, and typical engineering problems with mechanical vibrations.

MECH 323 System Control..... (3-1-3)

Recommended Prerequisites : Mechanical Vibrations

To use control systems in daily life, we need to study the modeling of systems, and the relation between input and output. The course deals with linear systems and analytical methods to design control systems and improve their performance. Topics include a frequency domain analysis using Laplace transform, a time domain state variable analysis, a system stability analysis, a root-locus method, a Nyquist analysis, which make the extensive use of MATLAB. Experiments are also conducted by using an inverted pendulum and spring-mass-damper systems. The course requires a final term project which students apply the control theories covered during the semester.

MECH 330 Materials Processing..... (3-0-3)

The course covers material processes tailored to material properties. Material processes include casting, bulk-deformation, sheet-metal-forming, polymer-processing, machining and finishing, and joining processes. Advanced machining processes such as MEMS and laser machining are also studied. In this course, students can learn what materials and processes to use for the production of a specific product.

MECH 333 System DesignI..... (3-0-3)

Prerequisites : Solid Mechanics II

The course studies design analysis methods for mechanical elements and basic design theory including load design based on material selection, a stress and deformation analysis, a fracture theory, and a fatigue theory. Students will apply major mechanical elements such as joining, welding, shaft, bearing, gear, spring, as well as thermo and fluid elements to a design analysis. The ‘engineering design team’ project is started in this course and completed in the ‘System Design II’ course.

MECH 340 Applied Solid Mechanics (3-1-3)

Prerequisites : Solid Mechanics II

The course deals with some advanced topics in solid mechanics for junior/senior students. The main topics include a two-dimensional analysis, energy methods, stability, fatigue and multi-layered structures. In this course, students will solve practical problems using the finite element method (FEM).

MECH 351 Mechanical Engineering Internship A,B (0-2-1)

The course is designed to offer field applications experience in mechanical engineering. Students will have practical training in the fields of general engineering, manufacturing engineering, and research and development.

MECH 370 Fluid Mechanics (3-1-3)

Prerequisites : Differential Equations

The course provides an introduction to fluid dynamics, the study of fluids (liquids and gasses) at rest or in motion and the effects of fluids on their boundaries (solid surfaces or other liquids). The basic conservation laws of fluid mechanics and their application to various problems will be covered based on the control volume concept. Differential equations which describe fluid motion under external stress will be derived from the conservation laws. Also two sets of pre-designed experiments will be prepared for students.

The goals of this course are to learn: 1) to calculate the hydrostatic force acting on floating and submerged objects in a fluid at rest; 2) to use a control volume analysis to develop basic equations and solve problems; 3) to use a dimensional analysis to design physical or numerical experiments and apply dynamic similarity; 4) to understand and use differential equations to determine pressure and velocity variations in internal and external flows.

MECH 371 Heat Transfer (3-1-3)

Prerequisites : Fluid Mechanics

The course offers an introduction to heat transfer. Topics include steady-state and transient system analyses for conduction, free and forced convection, boiling, condensation and thermal radiations. Students will carry out two pre-designed experiments. The goals of this course are to learn: 1) to derive heat diffusion equations and employ them to solve simple steady and unsteady problems; 2) to develop the models of heat transfer occurring on the outside of solid objects and inside of pipes; 3) to model natural convection, radiation heat transfer, boiling and condensation.

MECH 381 Electronics for Mechanical Engineers (2-2-3)

The course introduces the basic electronics and circuitry for the undergraduate mechanical engineering curriculum. Topics include: Basic physics, Semiconductor, Power sources, Switches, Energy storage elements, Principle of Bipolar Junction Transistor (BJT), Design and analysis of BJT circuitry, Principle of JFET & MOS-FET, and Principle of Operational Amplifier. Lab exercises are also significant components of the course.

MECH 390 Machine Shop Practice (0-3-1)

The course introduces the instructions, mechanism and machining techniques of machine tools. Students carry out basic machining tasks with lathe machine tools and milling machines, and learn how to use a numerical

controlled program.

MECH 399 Research Involvement A-D (0-2-1)

Students will be involved in various topics of research in laboratories.

MECH 401 Strength of Materials..... (3-0-3)

Prerequisites : Materials Processing

The course presents the mechanical strength of materials and the control of microstructures to explain the interconnections between strengthening mechanisms and bulk characteristics.

It covers elasticity, a dislocation theory, fracture and fatigue, elementary plasticity, strengthening mechanisms and creep behaviors at elevated temperatures.

MECH 421 Introduction to MEMS (3-1-3)

Introduction to various microfabrication technologies and microelectromechanical systems (MEMS). The course presents micromachining methods and how to use them to produce a variety of MEMS devices including microstructures, microsensors, and microactuators. Students will design microfabrication processes to make desired MEMS devices in various engineering applications.

MECH 433 System Design II (3-0-3)

Prerequisites : System Design I

The course studies practical design methods based on mechanical system design and analyses in mechanical engineering. Students will complete the project started in the 'System Design I' course.

MECH 439 Introduction to Robotics..... (3-1-3)

The course introduces various actuators and sensors used to construct robots, kinematics, dynamics, and basic robot controls. Forward and Inverse kinematics, Newton-Euler/Lagrangian formulation for robot dynamics are covered. It also presents the localization problems of mobile robots and the basic control theories for robots.

MECH 441 Metal Forming (3-0-3)

Prerequisites : Materials Processing

The course introduces basic theories and approximate solution techniques regarding the analysis and design of various metal forming processes. It also offers finite element-based computer simulation techniques for the precision analyses of metal forming.

MECH 450 Applied Thermal Engineering (3-0-3)

The main topics of this course include the basic theories and applications of thermal engineering systems. The basic theories of thermal fluid mechanics and heat transfer are used to understand the systems. Also, we will discuss how these theories are applied to power plants, refrigerations, air conditioning systems and electronic cooling devices, etc.

MECH 465 Engineering of Creative Design (3-0-3)

The course introduces engineering of creativity. The main topics include TRIZ (theory of inventive problem solving), Taguchi methods and 6 sigma analyses. TRIZ is a highly practical, knowledge-based methodology for innovative problem solving in a structured way. Developed on the basis of 40 years of patent studies, TRIZ offers a unique collection of basic inventive principles for the new design and products development, and accelerates the innovative process by providing tools for building correct problem formulations, the basic principles for solving inventive problems, the generic patterns of inventive solutions, and the scientifically founded theories of system evolution. TRIZ can be applied to mathematics and medical science as well as engineering. The practical examples from the industry will be also given to aid the understanding of TRIZ, Taguchi methods and 6 sigma analyses.

MECH 470 Applied Fluid Mechanics..... (3-0-3)

Prerequisites : Fluid Mechanics

The course is intended for students who wish to enhance the fundamental knowledge on the basic physics of fluid mechanics, and utilize it to practical applications. In the course, students will learn the basic fluid mechanics theories, the recent advances, and how to apply them to various practical flow problems encountered in real life. The course covers the recent advances in hydrodynamics, aerodynamics, compressible flows, turbulent flows, fluid machinery, microfluidics, biofluid flows, etc.

MECH 478 Introduction to Turbomachinery (3-0-3)

Prerequisites : Fluid Mechanics

The course offers an introduction to the configuration and characteristics of turbomachinery as the important industrial machine components and the classification on turbomachinery such as pumps, blowers, compressors and turbines. It also includes detailed analyses on thermo-fluid dynamics in turbomachinery, design methodology, fluid transmissions such as a torque converter and hydraulic machinery.

MECH 490 Special Topics in Mechanical Engineering..... (3-0-3)**MECH 496 Combustion and Environment**..... (3-0-3)

The course covers fundamental thermodynamics, transport principles for combustion phenomena in various energy conversion devices and manufacturing and material processing plants, and energy resources such as renewables and hydrogen. The focus is on the operating characteristics of energy efficiency and pollutant emissions such as NO_x and soot from engineering devices including spark ignition engines, compression ignition engines, reciprocating internal combustion engines, gas turbines, various burners and furnaces.

Department of Industrial and Management Engineering



1. Education Aim

Aiming to induce the improvement in productivity through system integration and optimization, the Department of Industrial & Management Engineering (IME) is dedicated to the mission of enhancing the competitiveness of Korean manufacturing industries and leading engineering technology to help POSTECH become a globally recognized university.

Korea recently focuses on the development of original technology at the stage of “elemental technology” in the gradual contribution stages of “manufacturing, elemental technology and system” which are defined in the paradigm of engineering education and research levels related to manufacturing industries. Most engineering disciplines have been mainly developing elemental technologies in mechanical, electronic and materials areas. The goal of IME is to take the current status of Korean industry to the “system” stage.

The “system” stage requires “Interface Technology” linking elemental technologies, “Human-centered Technology” combining engineering techniques with the human, and “Operations Technology” operating the technologies effectively. From a perspective of industrial development stages of “hardware-software-humanware”, IME plays a role to graft advanced hardware technology onto software and humanware. To this end, we strive to apply integrating technologies, tailored theories and technology transfer to industrial needs.

2. Program Overview

There are five focus areas of study in the Department of Industrial and Management Engineering.

[Management Engineering]

Management engineering includes financial engineering, technology management, and supply chain management. Financial engineering studies methodologies to analyze and develop new financial products such as options and futures while identifying and managing financial risks related to the changes in currency exchange rates and interest rates. Technology management seeks technological approaches for business

innovation and management strategy. Supply chain management covers the nature and characteristics of a supply chain that consists of manufactures, suppliers, distributors and customers. It furthermore looks into integrating approaches to optimize the flow of resources, information, and finance within the supply chain.

[Product Engineering]

It is a crucial issue for green growth to manage the entire lifecycle of a product from a view of eco-friendliness and market competitiveness. Product Engineering introduces fundamental technologies which effectively support the conception, design, development, manufacture, operation, disposal, and recycling of a sustainable product and/or service. It also explores emerging ubiquitous computing technology and system information technology for information acquisition and transaction purposes while conducting research on creating infrastructure.

[Ergonomics and Human Factors Engineering]

Ergonomics and Human-Computer Interaction (HCI) studies user-centered designs that consider physical, physiological, cognitive, and affective aspects of human toward better usability and customer values. Topics of the area include biomechanics, HCI, usability engineering, universal design, affective design, product design and development. Recent research focuses especially on mobile phone user interface design and evaluation, physical UI for consumer electronic products, user experience, and universal design for housing facilities.

[Information Systems Engineering]

The strategic use of information technology grows in importance in the rapidly changing world of information and globalization. Information Systems Engineering studies strategic applications of information technology, manufacturing and/or communication systems integrated with advanced computing and information technology, and new trends in information systems including Management Information System (MIS), Decision Support System (DSS) and Executive Information System (EIS). In particular, interdisciplinary research efforts among industrial engineering, information engineering, and business management has been made.

[Systems Optimization and Management Engineering]

Seeking to optimize productivity and quality, the area analyzes private and public sector systems. It covers production management, supply chain management, scheduling, logistics, quality engineering, systems design, system performance analysis, consumer behavior and market analysis. The methodologies for Systems Optimization and Management Engineering include mathematical programming, simulation, optimal and heuristic search techniques, time series, regression, forecasting, Markov chain and queueing theory. Focusing on the real-world applications of the theories, various research issues have been explored through on-going research projects.

Since the name change of the department in 2005, the Department of Industrial and Management Engineering has been designing a stimulating curriculum with the emphasis on management and business applications toward the integrated programs of the above areas.

■ Requirements for Double Majors and Minors

- Double major policy

Students must earn no fewer than 25 credits from major requirement courses and 12 or more credits from major elective requirement courses within the Department of Industrial and Management Engineering.

- Minor policy

A minimum of 21 credits must be earned from major requirement courses and major elective courses within the Department of Industrial and Management Engineering. Credits from each course will count toward either majors or minors.

Please note the followings:

1. IMEN382 Database Systems is considered equivalent to CSED421 Databases Systems.
2. IMEN272 Probability and Statistics for engineers is considered equivalent to MATH230 Probability and Statistics.

3. Course Requirements

Category	Course Title	Credit	Remarks
Humanities, Arts, and Social Sciences (HASS) Requirements	Expository Writing	2	
	English Certification Program	4	
	Physical Education	2	
	Integrated HASS	6	
	Sub Total	14	
HASS Electives	Humanities	15	Principles of Business Administration (General Education) or Principles of Economics (Social Sciences) are required.
	Social Sciences		
	Arts		
	Sub Total	15	
Basic Requirements	Calculus	3	
	Calculus Lab.	1	
	Applied Linear Algebra	3	
	Choose 1 from the following: General Physics I, General Physics I (H), Introductory Physics I Choose 1 from the following: General Physics II, General Physics II (H), Introductory Physics II	6	
	General Physics Lab. I, II (Design & Build)	2	
	General Chemistry (H)	4	
	General Chemistry Lab.	2	
	Choose either General Life Science or General Life Science (H)	3	
	Programing and Problem Solving	3	
	Sub Total	27	
Major Requirements	Major core requirements: 25/Major elective requirements: 12	37	
Major Electives		18	
Free Electives		23	
Total		134	
Active Based Curriculum (ABC) Requirements	Planning for college Life and Future	2	
ABC Electives	Humanities	5	
	Culture		
	Leadership Development		
Total		7	

※ HASS requirements (Division of Humanities and Social Sciences)

- Physical Education (2 credits): Physical Fitness (1) plus one out of 14 courses.
- Integrated HASS (6 credits): Arts and Humanities, Crossing boundaries of Science and Society

※ STC course requirements: Choose five courses including major courses

4. List of Major Courses

Category	Course No.	Course Title	lec-lab. -cr.	Recommended Pre-req/Prereq
Major Core Requirements (25 credits)	IMEN100	Introduction to Industrial and Management Engineering	1-0-1	Programming and Problem Solving Engineering Design I
	IMEN203	Financial Accounting	3-0-3	
	IMEN232	Product Manufacturing Process	3-0-3	
	IMEN261	Introduction to Operations Research	3-0-3	
	IMEN272	Probability and Statistics for Engineers	3-1-3	
	IMEN281	Information System Technology	3-1-3	
	IMEN343	Ergonomics & Human Factors Engineering	2-2-3	
	IMEN381	Management Information System	3-0-3	
	IMEN390	Engineering Design I	1-1-1	
	IMEN490	Engineering Design II	1-2-2	
Major Elective Requirements (12 credits)	IMEN301	Technology Management & Strategy	3-0-3	Probability and Statistics for Engineers Management Information System Introduction to Operations Research
	IMEN303	Marketing	3-0-3	
	IMEN346	Product Development Engineering	2-2-3	
	IMEN371	Quality Engineering	3-0-3	
	IMEN382	Database Systems	3-0-3	
	IMEN423	Product Lifecycle Engineering	3-0-3	
	IMEN476	Production Planning and Control	3-0-3	
Major Electives (18 credits)	IMEN286	Investment	3-0-3	Probability and Statistics for Engineers Probability and Statistics for Engineers/Financial Accounting Introduction to Operations Research Ergonomics & Human Factors Engineering
	IMEN366	Probability Modeling & Analysis	3-0-3	
	IMEN386	Corporate Finance	3-0-3	
	IMEN399A/D	Research Participation A/D	0-0-1	
	IMEN411	Entrepreneurship	3-0-3	
	IMEN412	Action Learning in Business Planning	3-0-3	
	IMEN422	Logistics Management	3-0-3	
	IMEN443	Design and Evaluation of Man-Machine Systems	3-0-3	

Category	Course No.	Course Title	lec-lab. -cr.	Recommended Pre-req/Prereq
	IMEN461	Mathematical Programming	3-0-3	Introduction to Operations Research
	IMEN472	Applied Statistics in Industrial Engineering	3-0-3	Probability and Statistics for Engineers
	IMEN481	Simulation	3-0-3	Information System Technology
	IMEN482	Introduction to Service Science, Management, and Engineering	3-0-3	Introduction to Operations Research
	IMEN485	Management of Technology	3-0-3	Management Information System
	IMEN486	Introduction to Financial Engineering	3-0-3	Financial Accounting
	IMEN491	Special Topics in Industrial & Management Engineering	Variable Credits(1-3)	

5. Major Course Plan (Template)

Year/ Semester	Category	Spring Semester		Fall Semester	
		Course No.	Course Title	Course No.	Course Title
First Year	Major Requirements			IMEN100	Introduction to Industrial and Management Engineering
Second Year	Major Requirements	IMEN203	Financial Accounting	IMEN232	Product Manufacturing Process
		IMEN272	Probability and Statistics for Engineers	IMEN281	Information System Technology
		IMEN261	Introduction to Operations Research		
	Major Electives			IMEN286	Investment
Third Year	Major Requirements	IMEN343	Ergonomics & Human Factors Engineering	IMEN301	Technology management & Strategy
		IMEN346	Product Development Engineering	IMEN302	Marketing
		IMEN381	Management Information System	IMEN371	Quality Engineering
				IMEN382	Database Ststems
				IMEN390	Engineering Design II
	Major Electives	IMEN386	Corporate Finance	IMEN366	Probability modeling & Analysis
		IMEN399A/D	Research Participation A/D	IMEN399A/D	Research Participation A/D

Year/ Semester	Category	Spring Semester		Fall Semester	
		Course No.	Course Title	Course No.	Course Title
Fourth Year	Major Requirements	IMEN423	Product Lifecycle Engineering		
		IMEN476	Production Planning and Control		
		IMEN490	Engineering Design II		
	Major Electives	IMEN411	Entrepreneurship	IMEN412	Action Learning in Business Planning
		IMEN443	Design and Evaluation of Man-Machine Systems	IMEN422	Logistics Management
		IMEN472	Applied Statistics in Industrial Engineering	IMEN461	Mathematical Programming
		IMEN481	Simulation	IMEN485	Management of Technology
		IMEN482	Introduction to Service Science, Management, and Engineering	IMEN491	Special Topics in Industrial & Management Engineering
		IMEN486	Introduction to Financial Engineering		
		IMEN491	Special Topics in Industrial & Management Engineering		

6. Cross-listed Courses (Counted as major electives)

- The following major requirements courses in other departments are considered as major electives for those admitted in 2011 or after.

Category	Course No.	Course Title	lec-lab.-cr.
Major Electives	MATH261	Discrete Mathematics	3-1-3
	MATH351	Introduction to Numerical Analysis	3-0-3
	MECH211	Dynamics	3-0-3
	MECH240	Solid Mechanics I	3-1-3
	MECH323	Systems Control	3-1-3
	MECH381	Electronics for Mechanical Engineers	2-2-3
	CSED211	Microprocessor Application and Assembly Programming	2-2-3
	CSED232	Object Oriented Programming (STC)	3-0-3
	CSED233	Data Structure (STC)	3-0-3
	CSED321	Programming Languages	3-0-3
	CSED331	Algorithms	3-0-3
	CSED332	Software Design Methods	3-0-3
	CSED341	Automata and Formal Languages	3-0-3
	CSED353	Computer Network	3-0-3

7. Course Description

IMEN 100 Introduction to Industrial and Management Engineering..... (1-0-1)

The historical background and goals of Industrial and Management Engineering are introduced by professors from different research areas to instill the general concepts of industrial engineering to freshmen.

IMEN 203 Financial Accounting (3-0-3)

The objective of this course is to introduce basic accounting principles and their applications in practice. In particular, the course focuses on Korean International Financial Reporting Standards (K-IFRS) set by Korea Accounting Standards Board (KASB, <http://www.kasb.or.kr>).

IMEN 232 Product Manufacturing Process..... (3-0-3)

This course provides the fundamentals of how a product is manufactured from raw materials to a complete product by covering bills of materials, manufacturing processes, process planning, and system engineering. An emphasis will be put on developing technical road maps for how to manufacture a given product via case studies so that they can be applied for product development, product lifecycle engineering, and technology management.

IMEN 261 Introduction to Operations Research (3-0-3)

The course covers quantitative modeling and analysis techniques of operations research such as linear programming, network flows, dynamic programming, integer programming, nonlinear programming and game theory for solving various decision problems in production, logistics, finance and economics.

IMEN 272 Probability and Statistics for Engineers..... (3-1-3)

The basic concepts of probability, probability variables, probability distributions, expectations and variance are studied. The course presents sampling theory and sample distributions from normal distributions, the point estimators, interval estimation and hypothesis analysis along with engineering related examples. Also, correlation analysis and basic regression analysis are learned with examples.

IMEN 281 Information System Technology..... (3-1-3)

Prerequisites: Programming and Problem Solving

This course helps students to solve various problems occurring in the area of Industrial and Management Engineering using computers. The problems include Knapsack, Traveling Salesman Problem, Bin Packing, Shortest Path, Scheduling, and others. To use computers effectively, students will learn an object oriented programming language C++/Java, data structures, and algorithms.

IMEN 286 Investment..... (3-0-3)

The objective of this course is to introduce the recent theories and empirical results of managing financial problems, which may be faced by individual investors or financial/nonfinancial companies. The four main subjects are:

- (1) financial markets and institutions;
- (2) portfolio theory (optimal asset allocation);
- (3) asset pricing theory;
- (4) fixed income securities.

IMEN 301 Technology Management & Strategy..... (3-0-3)

This course provides a strategic framework for managing technology businesses. The emphasis throughout is on the development and application of the ways of thinking that bring clarity to the complex co-evolution of technological innovation, the demand opportunity, business ecosystems, and decision-making and execution within the business.

IMEN 303 Marketing..... (3-0-3)

In this course, students will study marketing environments, marketing information systems, market analysis, consumer behaviors, market segmentation/targeting/positioning (STP) analysis, 4Ps (product, price, promotion, and place), and other marketing related issues.

IMEN 343 Ergonomics & Human Factors Engineering..... (2-2-3)

This course is divided into roughly five modules: the first one represents human information processing and control; the second deals with affective human factors designs that are recently introduced and researched in product design and evaluation; the third introduces the input modalities to human-operator processing systems; the fourth discusses human-computer interaction and psychophysiology; finally anthropometry and workplace design are explained if time allows. Each lab is intended to one of these modules.

IMEN 346 Product Development Engineering..... (2-2-3)

A broad spectrum of product development topics including product development processes, customer needs analysis, technology trend analysis. ideation, concept testing and selection, intellectual property, industrial design, prototyping, project planning and management are introduced. The course offers a product development project conducted in groups to practice the entire process of product development. Students can enhance the skills of team management and communication as well as the capabilities of planning, analysis, and decision making.

IMEN 366 Probability Modeling & Analysis..... (3-0-3)

Prerequisites : Probability and Statistics for Engineers
The basic concepts of stochastic processes and queueing theory are learned by dealing with probabilistic models, poisson processes, and Markov chains. Their applications to the real problems are also included.

IMEN 371 Quality Engineering (3-0-3)

Prerequisites : Probability and Statistics for Engineers
Application of statistical methods to the design and operation of quality control/assurance systems.

IMEN 381 Management Information System (3-0-3)

This course provides various techniques for the strategic utilization of IT, which are required to respond to rapidly progressing information and globalization. The course topics include the definitions of information, the roles of information technology, the strategic deployment methods of IT, innovative management strategies, various information systems such as MIS, DSS, EIS and SIS, and current trends in information technology.

IMEN 382 Database Systems (3-0-3)

Prerequisites : Management Information System

This course covers the basic concepts of database systems, models such as entity relationship diagrams (ERD), normalization theory for database design, Structured Query Language (SQL) based on a relational algebra, a stored procedure, an embedded SQL and Database Application Programming Interface (API) necessary for using databases. Also, this course provides the theory of object-oriented databases, a trigger, transaction management, and practical exercises of database programming.

IMEN 386 Corporate Finance (3-0-3)

The course provides students a basic foundation of corporate financial management. Main topics include the valuation of financial securities and corporate investment projects. Lectures and class discussions focus on the key concepts, applications, and extensions of selected topics.

IMEN 390 Engineering Design I (1-1-1)

The concepts of project life-cycle and its management are discussed. Students are expected to assemble groups to formulate engineering design project proposals.

IMEN 399 A/D Research Participation (0-0-1)

Students will help research under the advisory professor's approval and submit reports. Students can earn a maximum of 4 credits by taking the course repeatedly.

IMEN 411 Entrepreneurship (3-0-3)

The course offers the fundamental knowledge on entrepreneurship such as business models, opportunity finding and other related issues.

IMEN 412 Action Learning in Business Planning (3-0-3)

The course covers theories and methodologies necessary for writing business planning. Students will attend business planning contests and/or Open IR events as the term project of this course.

IMEN 422 Logistics Management (3-0-3)

Prerequisites: Introduction to operations research

The concepts of logistics systems in manufacturing and service industries will be discussed. The course introduces facility locations, layout planning, logistics management, transportation, distribution methods and

their related operations research techniques.

IMEN 423 Product Lifecycle Engineering (3-0-3)

Prerequisites: Product Manufacturing Process

The course overviews state-of-the-art technologies related with product lifecycle engineering including how a product is made, used and recovered. Emphasis will be given to environmental aspects of a product, such as environmental impacts (LCA: Life Cycle Assessment), environment conscious design (Eco-design), environment conscious manufacturing (Sustainable manufacturing), and product recovery management.

IMEN 443 Design and Evaluation of Man-Machine Systems (3-0-3)

Prerequisites: Ergonomics & Human Factors Engineering

The course teaches theories and methodologies for designing, developing and evaluating man-machine systems. Practical applications as well as theoretical aspects are emphasized. Major topics include an introduction of systems engineering, roles of human factors engineering in system design, mental workload, the design and evaluation of controls and displays, workplace layouts, instrument arrangements, information theory, and human reliability.

IMEN 461 Mathematical Programming (3-0-3)

Prerequisites: Introduction to Operations Research

Basic concepts on the nonlinear programming, integer programming, dynamic programming, and discrete optimization are introduced and the methods of application are studied.

IMEN 472 Applied Statistics in Industrial Engineering (3-0-3)

Prerequisites : Probability and Statistics for Engineers

Linear regression modeling and industrial applications are studied as well as major data mining techniques such as classification, clustering and association rules.

IMEN 476 Production Planning and Control (3-0-3)

Prerequisites : Introduction to Operations Research

The course offers the introduction and analysis of quantitative approaches for production and inventory control, and furthermore the methods to improve and control the system. Main topics include the basic concepts and types of production systems, decision making methods, demand forecasts, production scheduling, optimum production quantity, and inventory management.

IMEN 481 Simulation (3-0-3)

Prerequisites : Information System Technology

The course introduces students to the basic simulation methods and tools for modelling and simulation of real-world systems. Discrete-event simulation software, input data analysis, output analysis, verification and validation techniques are discussed.

IMEN 482 Introduction to Service Science, Management, and Engineering (SSME)..... (3-0-3)

Prerequisites : Introduction to Operations Research OR Equivalent

Discussion of fundamental topics in service management with an emphasis on service development, marketing, and operations.

IMEN 485 Management of Technology..... (3-0-3)

Prerequisites : Management Information System

The main objective of this course is to teach the methods to effectively acquire, manage, and utilize technologies considered as the core competency of an organization. The contents of the course include technical innovation, enterprise strategies, the establishment and execution of technical strategies, the development of a company's innovative capability, research management, and the design and operation of an organization.

IMEN 486 Introduction to Financial Engineering (3-0-3)

Prerequisites : Financial Accounting

The course provides students with a sound understanding of the principles, basic concepts, and methodologies of financial engineering, including modern portfolio theory and derivative securities along with demonstrations using EXCEL and VBA.

IMEN 490 Engineering Design II (1-2-2)

Prerequisites: Engineering Design I

Students are expected to assemble groups to select and execute specific engineering design projects.

IMEN 491 Special Topics in Industrial & Management Engineering..... (3-0-3)

The main objective of the course is to learn a deep knowledge of various industrial and management engineering related topics.

Electrical Engineering



1. Education Aim

The undergraduate program of the Department of Electrical Engineering aims to pursue academic excellence and foster science and engineering talents who will contribute to Korea by leading the most advanced electronic technology. To this end, the department offers high-quality basic and advanced courses to help students to obtain broad knowledge and expertise in all major fields of the electronic and electrical engineering. These courses are categorized into the following six areas of study: control and power electronics, communications and signal processing, computer engineering, electromagnetic waves and microwave engineering, semiconductors and quantum electronics, and electronic circuits and VLSI design.

2. Program Overview

The study of electronic and electrical engineering is extensive, which can be seen from the fact that Institute of Electrical and Electronics Engineering (IEEE), the world's largest professional association for the advancement of technology, consists of 33 professional societies and publishes 66 types of leading journals and other publications in electrical engineering. Electronic and Electrical Engineering includes designing and producing systems for the generation, transmission, processing and control of electric energy and electrical signal, and can be divided into the following areas.

[Control and Power Electronics]

In this area, students can learn how to control dynamical systems and power electronics in diverse applications such as factories, robots and rockets.

[Communications and Signal Processing]

This area deals with fundamental knowledge related to the systems that transmit and process signals such as voice, image and data transmitted via wired, wireless or fiber optic mechanisms.

[Computer Engineering]

The computer engineering area focuses on research related to computer hardware, algorithms and applications.

[Electromagnetics and Microwave Engineering]

In this area, students can study the theories of electromagnetic fields and waves. The scattering, radiation, and transmission of electromagnetic waves, and various aspects of microwave engineering including the design of antennas and radars, remote sensing systems and electromagnetic compatibility are dealt with in this area.

[Semiconductor and Physical Electronics Area]

This area covers subjects such as semiconductor nano devices, the design and fabrication of integrated circuits, terahertz electronics, laser and optoelectronics. In particular, efforts are now in progress to apply new applications of semiconductor devices to other engineering disciplines and medical appliances.

[Circuits and VLSI Design Area]

This area covers advanced circuit techniques for low-power and high-speed analog circuits as well as the computer aided design (CAD) of low-power VLSI. The analog circuits are targeted for the applications such as memory circuits, medical devices, brain interface, bio-medical applications and touch sensors. The CAD includes the design methodology, simulations and synthesis techniques of VLSI.

Minor Policy

A minimum of 21 credits must be earned from the following five requirement courses (16 credits in total) and additional 5 credits from elective courses offered by the Department of Electrical Engineering.

*** Requirement Courses**

1) EECE261 (Introduction to Electromagnetism), 2) EECE273 (Digital Systems Design), 3) EECE231 (Circuit Theory), 4) EECE233 (Signal & Systems), 5) MATH200 (Differential Equations)

However, Physics majors may substitute PHYS206 (Electromagnetism I, 3) for EECE261 (Introduction to Electromagnetism, 3) and Computer Science and Engineering majors can replace EECE273 (Digital Systems Design 4), with CSED273 (Digital Systems Design, 4)

(This policy shall apply to students who enter in 2011 academic year or later)

Double Major Policy

A minimum of 46 credits must be earned from the major requirement courses offered by the Department of Electrical Engineering. However, Computer Science and Engineering majors may replace EECE273 (Digital Systems Design, 4) with CSED273 (Digital Systems Design, 4), EECE471 (Computer Design, 4) with CSED311 (Computer Architecture, 4), and EECE374 (Microprocessor Architecture and Applications) with CSED211 (Microprocessor Architecture and Programming), respectively (in this case, total credits are 45).

Physics majors may substitute PHYS206 (Electromagnetism I, 3) for EECE261 (Introduction to Electromagnetism, 3).

(This policy shall apply to students who enter in 2011 academic year or later)

3. Course Requirements

Category	Courses	Credits	Remarks
HASS Requirements	Expository Writing	2	2 courses
	English Certification Program	4	
	Physical Education	2	
	Integrated HASS	6	
	Sub Total	14	
HASS Electives	Humanities	15	
	Social Sciences		
	Arts		
	Sub Total	15	
Basic Requirements	Calculus	3	
	Calculus Lab.	1	
	Applied Linear Algebra	3	
	Choose 1 among General Physics I, General Physics I(H), Introductory Physics I	6	
	Choose 1 among General Physics II, General Physics II(H), Introductory Physics II		
	General Physics Lab. I, II(Design & Build)	2	
	General Chemistry(H)	4	
	General Chemistry Lab.	2	
	Choose between General Life Science and General Life Science(H)	3	
	Programing and Problem Solving	3	
	Sub Total	27	
Major Requirements		46	
Major Electives		23	
Free Electives		9	
Total		134	
ABC Requirements	Planning for College Life and Future	2	
ABC Electives	Humanities	5	
	Culture		
	Leadership Development		
Total		7	

※ HASS Requirements (Div. of Humanities and Social Sciences)

- Physical Education (2 credits): Physical Fitness (1) plus one out of 14 courses
- Integrated HASS (6 credits): Arts and Humanities, Crossing boundaries of Science and Society

※ STC Course Requirements: three courses from the Department of Electrical Engineering, Probability & Statistics and five courses including Differential Equations.

※ STC Course Replacements: Students who complete MATH231(Statistics for Experimental Research) from the Department of Mathematics or IMEN272 (Probability & Statistics for Eng.) from the Department of Industrial and Management Engineering shall be acknowledged as completing MATH230(Probability & Statistics).

4. List of Major Courses

Category	Course No.	Course Title	Lec-Lab -Cr.	Recommended Pre-req/Pre-req
Major Requirements	MATH200	Differential Equations (STC)	3-1-3	
	MATH230	Probability and Statistics (STC)	3-1-3	
	EECE211	Semiconductor Electronics I	3-0-3	
	EECE231	Basic Circuit Theory (STC)	3-0-3	
	EECE233	Signals and Systems (STC)	3-0-3	EECE231, MATH120
	EECE261	Electromagnetics (STC)	3-0-3	MATH110, PHYS102 PHYS102(H), PHYS106(H)
	EECE273	Digital System Design	3-2-4	
	EECE302	Mathematics for Electronic and Electrical Engineers A	3-0-3	EECE233, MATH120, MATH230
	EECE331	Electronic Circuits I	3-0-3	EECE231
	EECE332	Introductory Experiments on Electronics	0-4-2	EECE231
	EECE374	Microprocessor Architecture and Applications	3-2-4	EECE273
	EECE491	Design Project I	0-3-1	
	EECE492	Design Project II	0-5-2	
Major Requirements (choose 3 courses)	EECE303	Physical Electronics	3-0-3	
	EECE322	Introduction to Automatic Control	3-2-4	EECE233
	EECE335	Electronic Circuits II	3-2-4	EECE331
	EECE341	Introduction to Communication Systems	3-0-3	EECE233
	EECE361	Electromagnetic Waves	3-0-3	EECE261
Major Electives	EECE471	Computer Design	3-2-4	EECE273
	EECE131	Introduction to Electrical Engineering	1-0-1	
	EECE333	Introduction to RF circuit and construction of Ham Radio Experiments	2-3-3	
	EECE392	Seminars on Electronics	1-0-1	
	EECE399A~D	Research Participation	0-2-1	
	EECE401	Semiconductor Electronics II	3-0-3	EECE211
	EECE411	Optoelectronics-display Eng.	3-0-3	
	EECE422	Digital Control Engineering	3-0-3	EECE322
	EECE423	Modern Control Theory	3-0-3	EECE322
	EECE424	Introduction to Electrical Machinery	3-0-3	EECE261
	EECE425	AC Power Converter	3-0-3	
	EECE426	Embedded Control System	2-2-3	EECE273, EECE374
	EECE427	EV Power Train	3-0-3	EECE322

Category	Course No.	Course Title	Lec-Lab -Cr.	Recommended Pre-req/Pre-req
	EECE433	Analysis and design of digital IC	3-0-3	EECE331
	EECE441	Introduction to Digital Communication	3-0-3	EECE233,EECE302
	EECE451	Digital Signal Processing	3-0-3	EECE233
	EECE454	PC Interface	2-4-3	
	EECE461	Introduction to Microwave Engineering	1-4-3	EECE361
	EECE465	Introduction to Mobile Robotics	3-0-3	
	EECE472	Introduction to Computer Security	3-0-3	
	EECE490	Special Topics in Electrical Engineering A/Z	Credits can vary	
	EECE495A/C	Field Study A/C	0-2-1	
	EECE5**	EE Graduate-Level Courses	3-0-3	

5. Major Course Plan (Applies to students who enter in 2011 or later)

Year	Spring Semester			Fall Semester		
	Category	Course No.	Course Title	Category	Course No.	Course Title
First Year					EECE131	Introduction to Electrical Engineering
Second Year	Major Requirements	MATH200	Differential Equations	Major Requirements	MATH230	Probability and Statistics
		EECE231 EECE261	Basic Circuit Theory Electromagnetics		EECE211 EECE233 EECE273	Semiconductor Electronics I Signals and Systems Digital System Design
Third Year	Major Requirements	EECE302 EECE331 EECE332 EECE374	Mathematics for Electronic and Electrical Engineers A Electronic Circuits I Introductory Experiments on Electronics Microprocessor Architecture and Applications	Major Requirements	EECE491	Design Project I

Year	Spring Semester			Fall Semester		
	Category	Course No.	Course Title	Category	Course No.	Course Title
	Major Requirements (choose 3 courses)	EECE361	Electromagnetic Waves	Major Requirements (choose 3 courses)	EECE303 EECE322 EECE335 EECE341	Physical Electronics Introduction to Automatic Control Electronic Circuits II Introduction to Communication Systems
	Major Electives	EECE333 EECE411	Introduction to RF Circuit and construction of Ham Radio Experiments Optoelectronics-display Eng.	Major Electives	EECE392	Seminars on Electronics
Fourth Year	Major Requirements (choose 1 course)	EECE491 EECE492	Design Project I Design Project II	Major Requirements	EECE492	Design Project II
	Major Requirements (choose 3 courses)	EECE471	Computer Design	Major Electives	EECE424 EECE425 EECE433	Introduction to Electrical Machinery AC Power Converter Analysis and design of digital IC
	Major Electives	EECE401 EECE422 EECE423 EECE426 EECE427	Semiconductor Electronics II Digital Control Engineering Modern Control Theory Embedded Control System EV Power Train		EECE454 EECE461 EECE465 EECE490	PC Interface Introduction to Microwave Engineering Introduction to Mobile Robotics Special Topics in Electrical Engineering
		EECE441 EECE451 EECE472 EECE490 EECE5**	Introduction to Digital Communication Digital Signal Processing Introduction to Computer Security Special Topics in Electrical Engineering EE Graduate-Level Courses (3 credits)		EECE5**	EE Graduate-Level Courses (3 credits)

※ Note: the opening period for major elective courses for the 4th grade is subject to change.

6. List of Field Courses

Note: consult your academic advisor before taking major elective courses.

7. Cross-listed Courses (Counted as Major Requirements/Electives)

7.1 Cross-listed Courses (Counted as Major Requirements, this shall apply to students admitted in 2011 or thereafter)

Category	Course No.	Course Title	Lec-Lab-Cr.
Major Requirements	MATH200	Differential Equations	3-1-3
	MATH230	Probability and Statistics	3-1-3

7-2. Cross-listed Courses (Counted as Major Electives, this shall apply to all students)

* A maximum of 9 credits from the following courses shall be recognized as major electives credits in the Department of Electrical Engineering

Category	Course No.	Course Title	Lec-Lab-Cr.
Major Electives	CSED232	Object Oriented Programming	3-0-3
	CSED233	Data Structure	3-0-3
	CSED312	Operating Systems	3-2-4
	CSED331	Algorithms	3-0-3
	CSED353	Computer Networks	3-0-3
	CSED421	Databases systems	3-2-4
	CSED423	Design of Compiler	3-1-3
	PHYS201	Introduction to Modern Physics	3-1-3
	PHYS209	Mathematical Methods for Physics	3-1-3
	PHYS301	Quantum Physics I	3-1-3
	PHYS304	Thermal Physics	3-1-3
	PHYS401	Solid State Physics	3-0-3
	PHYS410	Optical Physics	3-0-3
	MATH210	Applied Complex Variables	3-1-3
	MATH261	Discrete Mathematics	3-1-3
	MATH301	Modern Algebra I	3-1-3
	MATH310	Applied Complex Variables	3-1-3
	MATH311	Analysis I	3-1-3

8. Course Description

EECE 131 Introduction to Electrical Engineering..... (1-0-1)

This course is for freshmen who are interested in electrical engineering and discusses the present and the future of electronic and electrical engineering. This course provides an outline and prospects of professors' research, and systematic procedure of curriculum by introducing various fields of electronic engineering in rapid progress.

EECE 211 Semiconductor Electronics I..... (3-0-3)

This course provides a comprehensive introduction to the semiconductor electronics, fabrication technologies, pn junctions, metal-semiconductor junctions, bipolar transistors, junction field-effect transistors, MOS capacitors, and MOS field-effect transistors.

EECE 231 Basic Circuit Theory (3-0-3)

The objective of this course is to develop electrical circuit analysis techniques. This course covers the concepts of charge, current, voltage, resistor, capacitance, inductance, power consumption, energy, impedance, maximum power transfer, Thevenin theorem, Norton theorem, and network analysis using computer.

EECE 233 Signals and Systems..... (3-0-3)

Prerequisites: Basic linear circuit theory, Linear Algebra

This course provides an introduction to the core theory of signals and systems such as sampling, modulation and filtering of signals. Mathematical techniques such as convolution theorem, Fourier transform, Laplace transform, Z-transform and discrete Fourier transform for analyzing linear time-invariant systems are covered in this course.

EECE 261 Electromagnetics (3-0-3)

Prerequisites: Calculus, General Physics II, Introductory Physics II, General Physics II(H)

As the first course in this field, students study various aspects of electromagnetic fields. Coulomb's Law, Faraday's Law, Divergence Theorem, Stoke's Theorem, Poisson's and Laplace's Equations, Ampere's Law and Biot- Savart's Law before learning Maxwell's Equations. In addition, boundary value problems, dielectric and magnetic materials, and magnetization and magnetic circuits are also covered in this course.

EECE 273 Digital System Design (3-2-4)

In this course, students will study various digital logic gates, such as TTL, ECL, and CMOS, and the electronic circuit techniques used to implement them. What they will learn next are Boolean Algebra, logic expressions, number systems and combinational logic design, including logic minimization and hazards. Then, they will study look-up tables and template-based logic devices. In addition, with the understanding of combinational logic design, students will learn how to design sequential systems, including analysis of the behavior of synchronization elements and system timing design. Finally, in this course, students will have hands-on design experiences by carrying out experiments with component-level devices and designing digital systems.

EECE 302 Mathematics for Electronic and Electrical Engineers A (3-0-3)

Prerequisites: Signals and Systems, Linear Algebra, Probability and Statistics

The objective of this course is to learn various mathematical tools necessary to model, analyze, and design electrical signals and systems. The focus is on matrix algebra, probability, random variables, and random processes.

EECE 303 Physical Electronics (3-0-3)

The goal of this course is to develop an understanding of physics and properties of semiconductors. Students will discuss crystal structure, quantum mechanics, quantum-confined structure, energy bands, electrons and holes, statistics, density of states, Fermi level, carrier concentration, carrier transport phenomena and current, carrier generation and recombination, and Hall effect.

EECE 322 Introduction to Automatic Control (3-2-4)

Prerequisites: Signals and Systems

This course is opened to help students cultivate the basic concepts of control theory in both time domain and frequency domain and to study various control system design techniques as well as general industrial applications.

EECE 331 Electronic Circuits I (3-0-3)

Prerequisites: Circuit theory

In this course, students learn the fundamental operating principles and analysis techniques for the electronic circuits composed of semiconductor devices (diode, BJT, MOSFET) and RLC passive devices. The electronic circuits include single-transistor amplifiers, a differential amplifier and switches. The analysis techniques include DC operating point, small-signal equivalent circuits, frequency and transient responses.

EECE 332 Introductory Experiments on Electronics (0-4-2)

Prerequisites: Circuit theory

Students learn basic principles of electronic circuits through experiments by employing both hand-analyses and SPICE simulations. The experiments include how to use electronic equipments such as oscilloscope, function generator, spectrum analyzer and LCR meter, the operating principles of RLC elements, diode, BJT and MOSFET devices, single-transistor amplifiers, OP amp circuits. Also included are the measurements of electrocardiograph (ECG) and heart sounds by using an electronic stethoscope circuit.

EECE 333 Introduction to RF circuit and construction of Ham Radio) (2-3-3)

RF transceiver architecture is introduced in this course. Through Ham Radio circuit, the basic circuit elements of RF circuit, LNA, filter, power amplifier, modulator, et al. will be described. And Ham radio will be constructed using Radio kit and also be tested.

EECE 335 Electronic Circuits II (3-2-4)

Prerequisites: Electronic Circuits I

This course covers analyses of differential amplifiers, multi-stage amplifiers, frequency characteristics, feedback circuits, stability, output stages, filters and signal generators. Students will be also trained with SPICE simulations and Lab. projects.

EECE 341 Introduction to Communication Systems (3-0-3)

Prerequisites: Signals and Systems

Analog and digital communication systems are introduced in this course. Specifically, modulation theory, demodulation theory, spectral analysis, correlation, noise, matched filter, and other basic communication techniques are discussed.

EECE 361 Electromagnetic Waves..... (3-0-3)

Prerequisites: Electromagnetics

This course introduces Faraday's law; Maxwell equations of time-varying electromagnetic fields; wave equations; reflection and refraction of the plane wave at the dielectric boundary; transmission line theory; Smith chart; and impedance matching. In addition, students will learn time-varying electromagnetic theory including basic characteristics of the waveguide, the cavity and the antenna.

EECE 374 Microprocessor Architecture and Applications (3-2-4)

Prerequisites: Digital System Design

This course covers general concepts of microprocessor and microcomputer systems such as addressing, instruction set, I/O devices, interrupt, DMA, processor-to-processor communication, and interfacing schemes with memory and peripheral devices.

EECE 392 Seminars on Electronics (1-0-1)

This course introduces research topics and recent interests in the field of electronic and electrical engineering, and helps students to decide on their major.

EECE 399A~D Research Participation A~D (0-2-1)

In this course, undergraduate students will have graduate-level research experience under the guidance of their academic advisors.

EECE 401 Semiconductor Electronics II..... (3-0-3)

Prerequisites: Semiconductor Electronics I

Advanced semiconductor device physics, one level higher than Semiconductor Electronics I, is covered in this course. What students learn in this course also includes basic semiconductor physics, P/N junction, Heterojunction, Bipolar transistor, HBT, MOSFET and HEMT.

EECE 411 Optoelectronics-display Eng...... (3-0-3)

Prerequisites: Semiconductor Electronics I

In this course, students review optical fiber and study laser principles: induced and spontaneous transitions;

atom-field interactions, F-Perot resonator cavities and Solid/Gas/Liquid state laser media; Semiconductor lasers, PQR and LED, Display light sources and Solar cell

EECE 422 Digital Control Engineering (3-0-3)

Prerequisites: Introduction to Automatic Control

In this course, students study sampled data systems, Z-transforms, and discrete time state space systems and then develop control methods and algorithms based on this framework. Students also learn the design of discrete control systems, stability criterion and discrete time domain analysis.

EECE 423 Modern Control Theory (3-0-3)

Prerequisites: Introduction to Automatic Control

This course focuses on system analysis and design using state variables and introduces modern control methods such as input-output identification techniques, self-tuning control methods of unknown system, optimization method of linear system and linearization technique for analysis of nonlinear system.

EECE 424 Introduction to Electrical Machinery (3-0-3)

Prerequisites: Electromagnetics

This course is designed to provide a basic understanding of magnet system, transformer, DC motor and generator and induction motor. Moreover, the course covers speed control, characteristic between speed and torque, and equivalent model in steady-state of motor.

EECE 425 AC Power Converter (3-0-3)

This course provides an introduction to a basic theory of AC to DC power transformation, switching matrix, existence function, current source converter, voltage source converter, PWM (Pulse-Width Modulation), UFC (Unrestricted Frequency Changer).

EECE 426 Embedded Control System (2-2-3)

Prerequisites: Digital System Design, Microprocessor Architecture and Applications

Design issues of embedded systems are explained and discussed with particular emphasis on the controller for memories (DRAM and cache) and storage (solid state disk based on NAND Flash memory). By carrying out the task of designing solid state disk, students practice system modeling in SystemC with the SSD design project, qualitative and quantitative analyses of memory sub-system consisting of DRAM and cache, and embedded programming on ARM Cortex-A8 board.

EECE 427 EV Power Train (3-0-3)

Prerequisites: Introduction to Automatic Control

Focusing on the motor control issue of the electric vehicle, this course introduces the components of an electric power train such as battery, inverter and motor. Moreover, through this course, students learn hybrid vehicle's architecture and e-power split, and the theory related to EV power train system design. At the same time, students conduct driving simulation in Matlab in this course.

EECE 433 Analysis and design of digital IC..... (3-0-3)

Prerequisites: Electronic Circuits I

The principle and basic of the CMOS digital circuits with the deep submicron process are introduced in this course. CMOS inverter is also covered thoroughly including the gates and the key logic element techniques.

EECE 441 Introduction to Digital Communication..... (3-0-3)

Prerequisites: Introduction to Communication Systems, Mathematics for Electronic and Electrical Engineers A

This course introduces the digital communication process such as sampling, quantizing, multiplexing, coding, modulation, and switching from analog signals or computers.

EECE 451 Digital Signal Processing..... (3-0-3)

Prerequisites: Signals and Systems

This course provides a knowledge of signal processing method and applications using digital system. Relation between continuous and discrete signal, Z-transform, Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT) are covered. Students also learn FIR and IIR digital filter design in this course.

EECE 454 PC Interface (2-4-3)

The electrical engineering industry nowadays asks students for integrated knowledge about digital system design from gates to boards. Also in many areas in EECS, hardware realization is the final goal of their algorithm design. This course is a convergence of all the digital courses including digital system, microprocessors, embedded processors, and computer design. This course is for both undergraduate and graduate students. This course will be greatly helpful to undergraduate students for their hardware design project. To graduate students, this course will be valuable experiences to realize advanced algorithms. After finishing this course, students will be able to design a PCB board that contains FPGA, embedded processors, connected via USB and to demonstrate their applications such as image processing, signal processing, speech processing, and games through the projects.

EECE 461 Microwave Engineering Experiment (1-4-3)

Prerequisites: electromagnetic fields and waves

In this course, students conduct 12 microwave engineering experiments; the topics include microwave Gunn oscillator, frequency measurement, power measurement, precise attenuation, matching tuner, standing wave, guide wavelength, resonator, directional coupler, isolator, horn antenna, and microwave lens.

EECE 465 Introduction to Mobile Robotics..... (3-0-3)

Students learn how to design and construct a fully autonomous mobile robot system by integrating Hardware / Software, Environment Perception, Machine Intelligence, and Motion Control working in full harmony.

Specifically, students learn the following algorithms:

- Operating principles of various sensors for environment perception,
- 2D/3D modeling of the environment using these sensors called map building
- Localization of the robot in this map

- Simultaneous Localization and Mapping [SLAM]
- Path planning and navigation
- Motion control mechanism.

Finally, they will learn how the mobile robot technology is used in service robots and autonomous driving cars.

EECE 471 Computer Design (3-2-4)

Prerequisites: Digital System Design

The purpose of this course is to learn how to design complex digital systems using a hardware description language (VHDL or Verilog) and to learn how to design, construct and test a microcomputer using an FPGA.

EECE 472 Introduction to Computer Security (3-0-3)

This course covers fundamental issues of computer security such as confidentiality, integrity, authentication, identification, authorization, availability, access control and so on, in various environments such as e-commerce, information warfare, smart cards, etc.

EECE 490 Special Topics in Electrical Engineering (Variable credits)

Prerequisites: to be determined depending on the course topics.

In this course, visiting professors (or full time professors) introduce special topics in the field of electrical engineering. Students have a chance to learn new topics that are not indicated in the curriculum.

EECE 491 Design Project I (0-3-1)

The aim of this course is to obtain research experience via design and implementation of a standalone system which includes hardware and software. One team consists of three or four students. Each team chooses a project topic, writes a proposal, makes a research plan and carries out a part of the project exactly as scheduled. Each team must demonstrate the initial result of the project and submit the first report.

EECE 492 Design Project II (0-5-2)

Each team completes their project according to the plan and must demonstrate the final result of the project and submit the final report.

EECE 495A~C Field Study A~C (0-2-1)

In this course, visiting professors or full-time professors introduce special topics in the field of electrical engineering. Students have an opportunity to learn about new emerging topics that may not be sufficiently covered in the standard curriculum of the department.

Department of Computer Science and Engineering



1. Education Aim

The computer science and engineering curriculum is designed to cultivate:

- (1) Creative talents who will lead R&Ds in the advanced IT field with cutting-edge technologies of computer science and engineering.
- (2) Talents who have theoretical expertise, practical capabilities to develop new software, and self driven abilities to establish and achieve goals on their own.

2. Program Overview

Structured in a way that supports an in-depth study of theoretical and practical areas, the undergraduate program for Computer Science and Engineering offers a strong foundation for students moving on to graduate study as well as industrial careers. Scientific and engineering aspects of computers are equally emphasized and covered by core-level courses such as discrete mathematics, data structures, object-oriented programming, programming languages, automata and formal languages, algorithms, microprocessor architectures, computer architectures, operating systems, software design methods, computer networks, and data communications followed by upper-level courses such as compilers, databases, computer graphics, artificial intelligence, etc. Students are encouraged to participate in independent research that is conducted jointly at laboratories in the department. Every senior student is required to undertake a research project under the guidance of a faculty member.

Undergraduate students may select major electives from 500 or above level graduate courses in the Department of Computer Science and Engineering at POSTECH except seminar, and master's thesis & doctoral dissertation research courses. If undergraduate requirements are already completed, credits earned in 500 or above level courses may be applied toward a graduate degree. Students may select free electives from the graduate courses in other departments at POSTECH. However, cross-listed courses may count as major electives. A minimum of 133 credits must be completed to meet graduation requirements, which include 14 units of HASS requirements, 15 units of HASS electives, 27 units of basic requirements, 46 units of major requirements, 13 units of major electives, and 18 units of free electives.

This policy has been effective for students admitted in or after the academic year 2011.

**Thesis requirements**

A bachelor's thesis is substituted by Research Project I and II courses, which are graded based on an academic advisor's evaluation and a final poster presentation.

**Double major policy**

No fewer than 46 credits must be earned from major requirement courses within the Department of Computer Science and Engineering. Credits from each course will count toward both majors and double majors.

Please note the followings:

1. EECE374 Microprocessor Structure and Application (3-2-4) is considered equivalent to CSED211 Microprocessor Application and Assembly Programming (2-2-3).
2. EECE273 Digital System Design (3-2-4) is considered equivalent to CSED273 Digital System Design (3-3-4).
3. EECE471 Computer Design (3-2-4) is considered equivalent to CSED311 Computer Architecture (3-3-4).

**Minor policy**

No fewer than 21 credits must be earned from major requirement courses and major elective courses within the Department of Computer Science and Engineering. Credits from each course will count toward either majors or minors.

3. Course Requirements

Category	Course Title	Credit	Remarks
Humanities, Arts, and Social Sciences (HASS) Requirements	Expository Writing	2	2 courses
	English Certification Program	4	
	Physical Education	2	
	Integrated HASS	6	
	Sub Total	14	
HASS Electives	Humanities	15	
	Social Sciences		
	Arts		
	Sub Total	15	
Basic Requirements	Calculus	3	
	Calculus Lab.	1	
	Applied Linear Algebra	3	
	Choose 1 from the following: General Physics I, General Physics I (H), Introductory Physics I Choose 1 from the following: General Physics II, General Physics II (H), Introductory Physics II	6	
	General Physics Lab. I, II (Design & Build)	2	
	General Chemistry (H)	4	
	General Chemistry Lab.	2	
	Choose either General Life Science or General Life Science (H)	3	
	Programing and Problem Solving	3	
	Sub Total	27	
	Major Requirements		
Major Electives		13	
Free Electives		18	
Total		133	
Active Based Curriculum (ABC) Requirements	Planning for college Life and Future, Freshman Seminar	2	
ABC Electives	Humanities	3	
	Culture		
	Leadership Development		
Total		7	

※ HASS Requirements (Division of Humanities and Social Sciences)

- Physical Education (2 credits): Physical Fitness (1) * Choose one out of 14 courses.
- Integrated HASS (6 credits): Arts and Humanities, Crossing boundaries of Science and Society

※ STC Course Requirements

- Major requirements: Object Oriented Programming, Data Structure, Probability and Statistics, Discrete Mathematics
- Major electives: Differential Equation plus one of the following: Probability and Statistics (MATH230), Statistics for Experimental Research (MATH231), Probability and Statistics for Engineers (IMEN272)

4. List of Major Courses

Category	Course No.	Course Title	lec-lab.-cr.	Recommended Pre-req
Major requirements	CSED211	Microprocessor Application and Assembly Programming	2-2-3	CSED273
	CSED232	Object-Oriented Programming (STC)	3-0-3	CSED101
	CSED233	Data Structure (STC)	3-0-3	CSED101
	CSED273	Digital System Design	3-3-4	
	CSED290	Introduction to Computer Science Study	1-0-1	
	CSED291	Self-Enlightenment for Computer Scientists	0-2-1	
	CSED311	Computer Architecture	3-3-4	CSED211
	CSED312	Operating Systems	3-2-4	CSED232/233
	CSED321	Programming Languages	3-0-3	CSED233
	CSED331	Algorithms	3-0-3	CSED233
	CSED332	Software Design Methods	3-0-3	CSED232
	CSED341	Automata and Formal Languages	3-0-3	
	CSED353	Computer Network	3-0-3	CSED352
	CSED499I	Research Project I	0-2-1	
	CSED499 II	Research Project II	0-2-1	
Major electives	CSED352	Data Communications	3-0-3	CSED101
	CSED399	Research Participation	0-2-1	
	CSED401	Computers and Society	3-0-3	CSED101/290
	CSED415	Computer Security	3-0-3	
	CSED416	Peer-to-peer Networking	3-0-3	CSED353
	CSED417	Wireless Mobile Networks	3-0-3	CSED353
	CSED421	Databases Systems	3-2-4	CSED331
	CSED423	Design of Compilers	3-1-3	CSED233/341
	CSED425	Embedded System Programming	2-2-3	CSED311/312
	CSED433	Logic in Computer Science	3-0-3	CSED321
	CSED436	Graph Theory and Algorithms	3-0-3	CSED331
	CSED441	Introduction to Computer Vision	3-0-3	MATH120
	CSED442	Introduction to Artificial Intelligence	3-0-3	
	CSED451	Computer Graphics	3-0-3	CSED233/MATH120
	CSED490	Special Topics in Computer Science	Variable credit	
	CSED5**	Graduate courses of CSE division		

※ Check a course syllabus for Special Topics in Computer Science (CSED490) since there may be a change to its target year level every semester.

※ 500 or above level CSE graduate courses count as major electives.
(seminar, and master's thesis & doctoral dissertation research courses excluded)

5. Major Course Plan (Template)

Year /Semester	Spring Semester			Fall Semester		
	Category	Course No.	Course Title	Category	Course No.	Course Title
1st Year	Basic requirements	CSED101	Programming and Problem Solving	Basic requirements	CSED101	Programming and Problem Solving
2nd Year	Major requirements	CSED233	Data Structure	Major requirements	CSED211	Microprocessor Application and Assembly Programming
		CSED273	Digital System Design		CSED232	Object Oriented Programming
		CSED291	Self-Enlightenment for Computer Scientists		CSED233	Data Structure
					CSED290	Introduction to Computer Science Study
3rd year	Major requirements	CSED311	Computer Architecture	Major requirements	CSED312	Operating Systems
		CSED321	Programming Languages		CSED331	Algorithms
		CSED341	Automata and Formal Languages		CSED332	Software Design Methods
		CSED353	Computer Network			
	Major electives	CSED399	Research Participation	Major electives	CSED352	Data Communications
4th year	Major requirements	CSED499I	Research Project I	Major requirements	CSED499 II	Research Project II
	Major electives	CSED401	Computers and Society	Major electives	CSED415	Computer Security
		CSED425	Embedded System Programming		CSED416	Peer-to-peer Networking
		CSED441	Introduction to Computer Vision		CSED417	Wireless Mobile Networks
		CSED451	Computer Graphics		CSED421	Databases systems
		CSED490	Special Topics in Computer Science		CSED423	Design of Compilers
		CSED5**	Graduate courses of CSE division		CSED433	Logic in Computer Science
					CSED436	Graph Theory and Algorithms
					CSED442	Introduction to Artificial Intelligence
					CSED490	Special Topics in Computer Science
					CSED5**	Graduate courses of CSE division

※ Check a course syllabus for Special Topics in Computer Science (CSED490) since there may be a change to its target year level every semester.

6. Cross-listed Courses (Counted as Major Electives)

Category	Course No.	Course Title	lec-lab.-cr.
Major requirements (STC)	MATH230	Probability and Statistics	3-1-3
	MATH261	Discrete Mathematics	3-1-3
Major electives (STC) (Choose 1 course out of 18 courses)	MATH200	Differential Equations	3-1-3
	PHYS201	Introduction to Modern Physics	3-1-3
	PHYS203	Mechanics	3-1-3
	CHEM221	Organic Chemistry I	3-0-3
	CHEM243	Chemical Analysis	3-0-3
	LIFE210	Molecular Biology	3-0-3
	LIFE214	Biochemistry I	3-0-3
	AMSE201	An Introduction to Materials Science and Engineering	3-1-3
	AMSE208	Crystal Structure	3-1-3
	MECH240	Solid Mechanics I	3-1-3
	MECH250	Thermodynamics	3-1-3
	IMEN261	Introduction to Operations Research	3-0-3
	IMEN281	Information System Technology	3-1-3
	EECE231	Basic Circuit Theory	3-0-3
	EECE233	Signals and Systems	3-0-3
	EECE261	Electromagnetics	3-0-3
	CHEB201	Physical Chemistry for Chemical EngineeringI	3-0-3
	CHEB208	Fundamentals in Engineering Biology	3-0-3

※ Probability and Statics (MATH230), Statistics for Experimental Research (MATH231), and Probability and Statistics for Engineers (IMEN272) are considered equivalent courses and cannot be taken multiple times for credit.

7. Course Description

CSED 101 Programming and Problem Solving, Basic requirement (3-1-3)

This course introduces the principle of computation. Students learn basic concepts in computation and various forms of computation common in problem solving. The course uses the C programming language for programming exercises.

CSED 211 Microprocessor Application and Assembly Programming, Major

Requirements (2-2-3)

Recommended Prerequisites : CSED 273 (Digital System Design)

This course covers the concept of computer organization and computation through microprocessor. Students will gain familiarity with computer structure at the level of memory, registers, flow of control, etc. The students will also learn how to interface other hardware peripheral devices to the microprocessor system to gain a feel for hybrid systems. Other system-related topics include process creation, process interaction, code optimization and compiling/assembling/linking. Theory is put into practice by studying the Intel x86 and ARM assembly languages which are used for laboratory exercises and programming assignments.

CSED 232 Object-Oriented Programming, Major Requirements (3-0-3)

Recommended Prerequisites : CSED 101 (Programming and Problem Solving)

In this course, students will learn the concepts of object-oriented programming. The concepts will be made concrete by doing programming assignments. Topics include classes, inheritance, polymorphism, operator overloading, and templates. We use C++ as the programming language. Students are required to know the basic programming concepts, C language, and UNIX or Linux operating systems. Qt library will be used as the GUI for C++.

CSED 233 Data Structures, Major Requirements (3-0-3)

Recommended Prerequisites : CSED 101 (Programming and Problem Solving)

A data structure is an essential area of study for computer scientists and for those who will ever undertake serious programming tasks. This course deals with the fundamentals of organizing and manipulating data efficiently using clean conceptual models. Students study many of the important conceptual data types, their implementation, and the analysis of their efficiency. Topics cover algorithm analysis, lists, trees, priority queues, dictionaries (hash tables, balanced search trees), graphs, strings (tries, pattern matching), and sorting.

CSED 273 Digital System Design, Major Requirements (3-3-4)

This course introduces the basic concepts used in the design and the analysis of digital systems. The best known example of a digital system is the general purpose digital computer. This course covers aspects of digital systems including the binary number system, Boolean algebra, logic gates, combinational circuits, sequential circuits, etc.

CSED 290 Introduction to Computer Science Study, Major Requirements (1-0-1)

This class consists of a series of lectures on topics in computer science. Each week a specific area of computer science will be introduced by one of the professors in the CS department. The goal of this class is to introduce research areas, current topics, and future directions of computer science. There are no prerequisites.

CSED 291 Self-Enlightenment for Computer Scientists, Major Requirements (0-2-1)

The goal of this self-development course is to help computer science students to draft their vision, allowing them to think about what to do for the next 20 years and to discuss their role models. The course is mainly based on students' presentations and discussions, as well as seminars by invited speakers.

CSED 311 Computer Architecture, Major Requirements (3-3-4)

Recommended Prerequisites : CSED 211 (Microprocessor Application and Assembly Programming)

This course gives an overview of computer structures and a detailed look at each of a computer's parts. CPUs, memory, I/O, and parallel processing structures and performance analysis are covered in this course. In weekly labs, students will learn how to design CPUs, memory, I/O, and systems.

CSED 312 Operating Systems, Major Requirements (3-2-4)

Recommended Prerequisites : CSED 232 (Object Oriented Programming), CSED 233 (Data Structure)

This courses covers operating system structures including process management, memory management, file management, and security and protection. In addition, students will design and implement an experimental operating system from scratch through a series of programming projects.

CSED 321 Programming Languages, Major Requirements (3-0-3)

Recommended Prerequisites : CSED 233 (Data Structure)

This course covers the basics of the theory of programming languages. We begin with an introduction to functional programming and the mathematical foundation for programming language theory, and then proceed to the techniques for formally defining a programming language such as abstract syntax, type system, and operational semantics. We study important features found in modern programming languages and their implementation issues. This course places a strong emphasis on the role of a type theory in modern programming languages. In order to complement the theoretical study with practical programming, students learn a higher-order functional language called ML.

CSED 331 Algorithms, Major Requirements (3-0-3)

Recommended Prerequisites : CSED 233 (Data Structure)

Algorithms are procedures or methods that solve problems arising across the full range of computing applications. The goal of this course is to understand how to formulate problems, and how to design efficient algorithms for the resulting problems. The course starts with an introduction to algorithms, followed by algorithms with numbers. Then we study four essential algorithm design techniques: greedy algorithms, divide and conquer, dynamic programming, and a network flow. We will also spend a few weeks on computational intractability and approximation algorithms, a technique for dealing with intractable computational problems.

CSED 332 Software Design Methods, Major Requirements (3-0-3)

Recommended Prerequisites : CSED 232 (Object Oriented Programming)

This course demonstrates how to create software artifacts in software engineering. Software development processes, design principles, design notations, and design methods will be covered.

CSED 341 Automata and Formal Languages, Major Requirements (3-0-3)

This course introduces fundamental ideas and models which can answer some core questions in computer science: (1) what is an algorithm?; (2) what can and what cannot be computed?; (3) when should an algorithm be considered practically feasible? Topics that we discuss in this course include finite automata, regular languages, context-free languages, pushdown automata, and Turing machines. Intractability and undecidability are also briefly introduced. This course sets a foundation for theoretical computer science, AI, PL, and compiler.

CSED 352 Data Communications, Major Electives (3-0-3)

Recommended Prerequisites : CSED101 (Programming and Problem Solving)

This course deals with the first part of computer networking, the subject of which is highlighted by the Internet. We will discuss basic principles and fundamental concepts concerning the technology and architecture of the Internet. Topics include Data Communications and Wide/Local Area Networks.

CSED 353 Computer Networks, Major Requirements (3-0-3)

Recommended Prerequisites : CSED352 (Data Communications)

This course deals with the second part of computer networking, the subject of which is highlighted by the Internet. We will discuss basic principles and fundamental concepts concerning the technology and architecture of the Internet. Topics include IP, TCP/UDP, and Internet applications.

CSED 399 A/D Research Participation, Major Electives (0-2-1)

Under a research advisor's supervision, students participate in research projects to learn how to conduct a research project, how to organize and analyze research results, and how to give a research presentation. This course targets junior and senior students only.

CSED 401 Computers and Society, Major Electives (3-0-3)

Recommended Prerequisites : CSED 101 (Programming and Problem Solving),
CSED 290 (Introduction to Computer Science Study)

In this course, students look at the benefits associated with the emergence of computers. Students then explore issues such as privacy invasion, digital rights infringement, computer-based crime, etc. caused by abusing computers. Students discuss many delicate issues which are not crimes but very controversial. They also study what rules and responsibilities society has with regard to computer technology, what people need to do in order to prevent the abuse of computer technology, and what methods we need to construct a healthy information society.

CSED 415 Computer Security, Major Electives (3-0-3)

As a digitally connected and processed civilization evolves, we are required to handle and exchange more information. The importance of information security is growing in the information-based society. This course covers some methods of computer security, especially password systems, authentication methods, software protection, e-mail security, safe e-commerce, invasion-detection systems and firewalls.

CSED 416 Peer-to-Peer Networking, Major Electives (3-0-3)

Recommended Prerequisites : CSED 353 (Computer Networks)

In recent years, peer-centric data communication technology has gained a large amount of interest. In this class, we study the basic concept of peer-to-peer networking technology, general system architectures, peer-to-peer structures, peer-to-peer discovery, peer-to-peer content delivery, and peer-to-peer applications. We also study ad hoc networks in terms of peer-to-peer networking over wireless networks.

CSED 417 Wireless Mobile Networks, Major Electives (3-0-3)

Recommended Prerequisites : CSED 353 (Computer Networks)

This course is an introductory course on wireless mobile networks in which we study the fundamental problems and techniques related to wireless mobile networks. We examine how the mobility of devices or end-users affects the protocol layers of communications. We also investigate emerging applications enabled by deploying mobile networks. The networks we study include infrastructure wireless networks in which an underlying infrastructure is required as well as ad hoc networks in which mobile nodes form their own network infrastructure on the move.

CSED 421 Database Systems, Major Electives (3-2-4)

Recommended Prerequisites : CSED 331 (Algorithms)

This course covers large-scale data management including access methods, index structures, and relational database optimization. Students work with actual database systems in class projects.

CSED 423 Design of Compilers, Major Electives (3-1-3)

Recommended Prerequisites : CSED 233 (Data Structure), CSED 341 (Automata and Formal Languages)

This course introduces the basic techniques for compiler construction, including lexical analysis, syntax parsing, semantic analysis, intermediate code generation, code optimization, and code generation. Students design and implement their own compilers for a small subset of the standard C languages using lex (java lex) and yacc (java cup).

CSED 425 Embedded System Programming, Major Electives (2-2-3)

Recommended Prerequisites : CSED 311 (Computer Architecture), CSED 312 (Operating Systems)

This course covers how to program an embedded system in various levels. First, students learn the basic architecture of contemporary embedded systems and how to develop low-level device drivers. Secondly, they learn how to develop applications according to POSIX standards as well as embedded Linux kernel system call

specifications. Programming projects are given to students in order to sharpen their programming skills in embedded environments.

CSED 433 Logic in Computer Science, Major Electives (3-0-3)

Recommended Prerequisites : CSED 321 (Programming Languages)

This course covers the basics of logic in computer science. The main focus lies on a proof-theoretic study of constructive logic, as opposed to a model-theoretic study of classical logic. A proof-theoretic formalization of constructive logic serves as a foundation for a type theory for programming languages. We also learn to program in a proof assistant Coq which enables us to formally write proofs in a logical language.

CSED 436 Graph Theory and Algorithms, Major Electives (3-0-3)

This course covers the basis of graphs and algorithms. Topics include trees, seams, net flows, bipartite graphs, coloring, Euler and Hamilton graphs and planes.

CSED 441 Introduction to Computer Vision, Major Electives (3-0-3)

Recommended Prerequisites : MATH 120 (Applied Linear Algebra)

Vision is the most important sensing mechanism for humans. Computer vision is related to the extraction of high level information through the analysis of an image or a sequence of images. The goal of this course is to introduce the inherent problems of computer vision and some possible solutions to those problems. Students will have opportunities to use vision techniques in a set of programming assignments. Since this is an introductory course, more emphasis will be placed on practical solutions rather than theoretical ones.

CSED 442 Introduction to Artificial Intelligence, Major Electives (3-0-3)

This course introduces the basic techniques of artificial intelligence: problem solving, heuristic searches, knowledge representation, logic systems and inference, as well as applications and advanced techniques such as planning, probabilistic reasoning, machine learning, speech and language processing and intelligent agent systems. Students survey and design practical and innovative artificial intelligence applications in different information system domains.

CSED 451 Computer Graphics, Major Electives (3-0-3)

Recommended Prerequisites: CSED 233 (Data Structure), MATH 120 (Applied Linear Algebra)

This introductory course for graphics covers the fundamental principles of 2D and 3D graphics. After introducing the basic concepts, such as geometric transformations, hierarchical modeling, viewing, and scan conversion, this course covers issues and techniques in three main areas of graphics, i.e., modeling, rendering, and animation. The specific topics include polygonal meshes and curves/surfaces in modeling, hidden surface removal, shading, and texture mapping in rendering, and a key-frame animation. Programmable shaders on GPU are also briefly covered. Programming assignments using OpenGL facilitate better understanding of the concepts for the course.

CSED 490 Special Topics in Computer Science, Major Electives..... (Var.)

This course covers new topics, trends, and methodologies in areas of computer science.

CSED 499 I Research Project I, Major Requirements..... (0-2-1)

Each students is required to select a research advisor at the beginning of the class.

Under the research advisor’s supervision, students will determine a research topic, and conduct their research.

After conducting their research, students write a research report and deliver a research presentation.

CSED 499 II Research Project II, Major Requirements (0-2-1)

Under the research advisor’s supervision, students determine a research topic, and conduct their research. After

conducting their research, students write a research report and deliver a research presentation.

Department of Chemical Engineering



1. Education Aim

The study of chemical engineering embraces the fundamental and latest knowledge of physics, chemistry, and biology addressing our society's needs for the solutions to today's problems. The Department of Chemical Engineering aims to foster creative and progressive chemical engineers with a profound understanding of nature and society.

2. Program Overview

Chemical engineering is a discipline that encompasses nearly every field involving chemical changes. The study spans from petrochemistry, energy, polymer to the new fields such as biotechnology, environmental engineering, semiconductors, and advanced materials.

The undergraduate program of the Department of Chemical Engineering focuses on the diversity and flexibility of chemical engineering by offering a cross-disciplinary curriculum. First year students build a firm foundation in basic science including mathematics, physics, chemistry, and life science. The second year of study offers fundamental knowledge of chemical engineering such as physical chemistry and organic chemistry. The third- and fourth-year curriculum introduces four major tracks including IT, BT, EET, and computational systems, which help students to take on double majors or minors, and furthermore, to design various career paths. Students can also apply theoretical knowledge to their practice in experimental courses. Those wishing to continue to graduate school may select research participation and undergraduate research to prepare for advanced studies.



Requirements for Double Majors and Minors

* Double major policy

Students must earn no fewer than 32 credits from major requirement courses and 3 or more credits from major elective courses within the Department of Chemical Engineering.

*** Minor policy**

Students must earn 9 credits of Thermodynamics (CHEB 204), Reaction Engineering (CHEB 305) and Transport Phenomena I (CHEB 417), and additional 12 credits of 300 or above level courses offered by the Department of Chemical Engineering.

[Undergraduate Thesis Requirements]

- 1) Students may register for undergraduate research I and II of two credits each in the fourth year of undergraduate study.
- 2) Chemical engineering majors pursuing a second major or a minor outside the department must submit an undergraduate thesis.
- 3) An undergraduate thesis in chemical engineering is not a requirement for non-chemical engineering majors pursuing a second major or a minor in the Department of Chemical Engineering.

3. Course Requirements

Category	Course Title	Credit	Remarks
Humanities, Arts, and Social Sciences (HASS) Requirements	Expository Writing	2	
	English Certification Program	4	
	Physical Education	2	
	Integrated HASS	6	
	Subtotal	14	
HASS Electives	Humanities	15	
	Social Sciences		
	Art		
	Subtotal	15	
Basic Requirements	Calculus	3	
	Calculus Lab	1	
	Applied Linear Algebra	3	
	General Physics I, I(H), or Introductory Physics I	6	
	General Physics II, II(H) or Introductory Physics II		
	General Physics Laboratory. I and II	2	
	General Chemistry or General Chemistry(H)	4	
	General Chemistry Laboratory	2	
	General Life Science or General Life Science(H)	3	
	Programming and Problem Solving	3	
	Subtotal	27	
Major Requirements		32	
Major Electives		21	
Free Electives		22	
Total Credits		131	
Active Based Curriculum (ABC) Requirements	Planning for College Life and Future	2	
ABC Electives	Humanities	5	
	Culture		
	Leadership Development		
Total Credits		7	

※ HASS requirements (Division of Humanities and Social Sciences)

- Physical Education (2 credits): Physical Fitness (1 credit) plus one out of 14 courses.
- Integrated HASS (6 credits): Arts and Humanities, Crossing boundaries of Science and Society

※ STC course requirements: Choose five courses including Physical Chemistry for Chemical Engineering I, Fundamentals in Engineering Biology and Differential Equations.

4. List of Major Courses

Category	Couse No.	Course Title	Credit	Recommended Pre-req
Major Requirements	CHEB201	Physical Chemistry for Chemical Engineering I (STC)	3-0-3	
	CHEB202	Physical Chemistry for Chemical Engineering II	3-0-3	Physical Chemistry I (Recommended)
	CHEB204	Chemical Engineering Thermodynamics	3-0-3	Physical Chemistry I (Recommended)
	CHEB206	Organic Chemistry I	3-0-3	
	CHEB207	Organic Chemistry II	3-0-3	Organic Chemistry I (Prerequisite)
	CHEB208	Fundamentals in Engineering Biology (STC)	3-0-3	
	CHEB211	Organic Chemistry Laboratory	0-4-2	
	CHEB212	Physical Chemistry Laboratory	0-4-2	
	CHEB213	Engineering Biology Laboratory	0-4-2	
	CHEB305	Reaction Engineering	3-0-3	
	CHEB312	Chemical Engineering Measurement Laboratory	0-4-2	Physical Chemistry Laboratory (Recommended)
	CHEB417	Transport Phenomena I	3-0-3	
Major Electives	CHEB110	Introduction to Chemical Engineering	1-0-1	
	CHEB301	Computer Applications in Chemical Engineering	3-0-3	Introduction to Computing (Prerequisite)
	CHEB303	Mathematical Methods in Chemical Engineering	3-0-3	
	CHEB306	Catalytic Reaction Engineering	3-0-3	
	CHEB307	Introduction to Molecular Biotechnology	3-0-3	
	CHEB308	Introduction to Biotechnology	3-0-3	
	CHEB309A/B	On-the-job Training at Chemical Plants A/B	0-2-1	
	CHEB360	Solid State Chemical Engineering	3-0-3	
	CHEB399A-D	Research Participation A-D	0-2-1	
	CHEB401	Chemical Process Control	3-0-3	
	CHEB402	Process Analysis and Design	3-0-3	
	CHEB403	Separation Processes	3-0-3	
	CHEB404	Environmental Engineering	3-0-3	
	CHEB405	Introduction to Polymer Science and Engineering	3-0-3	
	CHEB406	Biochemical Engineering I	3-0-3	
	CHEB407	New and Renewable Energy	3-0-3	
	CHEB408	Biochemical Engineering II	3-0-3	

Category	Couse No.	Course Title	Credit	Recommended Pre-req
Major Electives	CHEB410	Chemical Materials Analysis for Engineers	3-0-3	
	CHEB411	Chemical Engineering Applied Inorganic Chemistry	3-0-3	
	CHEB418	Transport Phenomena II	3-0-3	Transport Phenomena I (Recommended)
	CHEB421	Clean Process Engineering	3-0-3	
	CHEB422	Chemical Product Design	3-0-3	
	CHEB423	Introduction to Systems Bioengineering	3-0-3	
	CHEB424	Phase and Chemical Equilibria	3-0-3	
	CHEB425	Undergraduate Research I	0-4-2	
	CHEB426	Undergraduate Research II	0-4-2	Undergraduate Research I (Recommended)
	CHEB460	Energy and Electronic Device Engineering	3-0-3	
	CHEB461	Nano Chemical Engineering	3-0-3	
	CHEB462	Modern Electrochemistry I : Ionics	3-0-3	
	CHEB465	Structure and Properties of Polymers	3-0-3	
	CHEB469A-Z	Special Topics in ChE Systems A-Z	Variable Credit	
	CHEB471	Chemical Engineering Seminar I	1-0-1	

5. Major Course Plan (Template)

Year/ Semester	Spring Semester			Fall Semester		
	Category	Couse No.	Course Title	Category	Couse No.	Course Title
1st-year				Major Electives	CHEB110	Introduction to Chemical Engineering
2nd-year	Major Requirements	CHEB201 CHEB206 CHEB208 CHEB213	Physical Chemistry for Chemical Engineering I Organic Chemistry I Fundamentals in Engineering Biology Engineering Biology Laboratory	Major Requirements	CHEB204 CHEB207 CHEB211	Chemical Engineering Thermodynamics Organic Chemistry II Organic Chemistry Laboratory
3rd-year	Major Requirements	CHEB202 CHEB305 CHEB417	Physical Chemistry II Reaction Engineering Transport Phenomena I	Major Requirements	CHEB212	Physical Chemical Laboratory
4th-year	Major Requirements Major Electives	CHEB312 CHEB425	Chemical Engineering Measurement Laboratory Undergraduate Research I	Major Electives	CHEB426	Undergraduate Research II

6. List of Track Courses

Track	Major Electives	Cross-listed Electives
IT	CHEB360 Solid State Chemical Engineering CHEB405 Introduction to Polymer Science and Engineering CHEB460 Energy and Electronic Device Engineering CHEB461 Nano Chemical Engineering CHEB462 Modern Electrochemistry I: Ionics CHEB465 Structure and Properties of Polymers	PHYS201 Introduction to Modern Physics PHYS401 Solid State Physics EECE211 Semiconductor Electronics I EECE401 Semiconductor Electronics II AMSE388 Semiconductor Devices AMSE313 Electrical, Magnetic and Optical Properties of Materials
BT	CHEB307 Introduction to Molecular Biotechnology CHEB308 Introduction to Biotechnology CHEB406 Biochemical Engineering I CHEB408 Biochemical Engineering II	LIFE319 Biochemistry I LIFE321 Molecular Biology LIFE420 Immunology LIFE217 Cell Biology CHEM342 Instrumental Analysis CHEM461 Biochemistry PHYS413 Biological Physics
EET	CHEB306 Catalytic Reaction Engineering CHEB403 Separation Processes CHEB404 Environmental Engineering CHEB407 New and Renewable Energy CHEB410 Solid State Chemical Engineering CHEB411 Chemical Engineering Applied Inorganic Chemistry	EVSE520 Air Pollution EVSE525 Water Pollution
Computation & Systems	CHEB301 Computer Applications in Chemical Engineering CHEB303 Mathematical Methods in Chemical Engineering CHEB401 Chemical Process Control CHEB402 Process Analysis and Design CHEB418 Transport Phenomena II	IMEN472 Applied Statistics in Industrial Engineering

* Students are recommended to consult with their academic advisors for track selection and registration.

7. Cross-listed Courses (Counted as majors)

Category	Couse No.	Course Title	lec-lab.-cr.
Major Requirement	CHEM211 (CHEB202)	Physical Chemistry I (Physical Chemistry for Chemical Engineering II)	3-0-3
	CHEM221 (CHEB206)	Organic Chemistry I (Organic Chemistry I)	3-0-3
	CHEM222 (CHEB207)	Organic Chemistry II (Organic Chemistry II)	3-0-3
	CHEM226 (CHEB211)	Chemical Reaction Laboratory (Organic Chemistry Laboratory)	0-6-3
	CHEM311 (CHEB201)	Physical Chemistry II (Physical Chemistry I)	3-0-3
	CHEM314 (CHEB212)	Physical Chemistry Laboratory	0-8-4
	MECH250 (CHEM204)	Thermodynamics (Chemical Engineering Thermodynamics)	3-0-3
Major Elective	AMSE201	Contemporary Issues in Materials Science and Engineering	3-1-3
	AMSE385	Semiconductor Devices	3-2-4
	AMSE313	Electrical, Magnetic and Optical Properties of Materials	3-1-3
	CHEM331	Inorganic Chemistry	4-0-4
	CHEM342	Instrumental Analysis and Laboratory	3-0-3
	CHEM461	Biochemistry	3-0-3
	EECE212	Physical Electronics	3-0-3
	EECE231	Basic Circuit Theory	3-0-3
	EECE211	Semiconductor Electronics I	3-2-4
	EECE401	Semiconductor Electronics II	3-0-3
	EVSE520	Air Pollution	3-0-3
	EVSE525	Water Pollution	3-0-3
	IMEN472	Applied Statistics in Industrial Engineering	3-0-3
	LIFE210	Cell Bilology	3-0-3
	LIFE214	Biochemistry I	3-0-3
	LIFE310	Immunology	3-0-3
	LIFE312	Immunology	3-0-3
	PHYS201	Introduction to Modern Physics	3-1-3
	PHYS304	Thermal Physics	3-1-3
	PHYS401	Solid State Physics	3-0-3
	PHYS413	Biological Physics	3-0-3

8. Course Description

CHEB 110 Introduction to Chemical Engineering..... (1-0-1)

Introduction to the past, present, and future of chemical engineering in general, and various research fields.

CHEB 201 Physical Chemistry for Chemical Engineering I (3-0-3)

Gas properties, classical thermodynamics principles, phase equilibrium, chemical reaction equilibrium, molecular motion, reaction kinetics, and reaction models.

CHEB 202 Physical Chemistry for Chemical Engineering II..... (3-0-3)

Elementary quantum mechanics, atomic and molecular structures, principles and applications of spectroscopy, and symmetry.

CHEB 204 Chemical Engineering Thermodynamics (3-0-3)

Engineering concepts and applications of basic thermodynamics principles, thermodynamic properties of gases and liquids, free energy, activity, and heat of reaction.

CHEB 206 Organic Chemistry I (3-0-3)

The structure and reaction of organic compounds, structure determination and the synthesis of organic compounds such as alkanes, alkenes, alkynes, alcohols, and their derivatives.

CHEB 207 Organic Chemistry II..... (3-0-3)

The synthesis and properties of organic compounds, aromatic compounds and their derivatives. Topics include aldehydes, ketones, carboxylic acids, and carbonyl compounds.

CHEB 208 Fundamentals in Engineering Biology (3-0-3)

The course covers elementary biochemistry, elementary molecular biology, elementary cell biology, elementary immunology, basic principles and applications of genetic engineering.

CHEB 211 Organic Chemistry Laboratory (0-4-2)

Synthesis and analysis of various organic compounds in the laboratory.

CHEB 212 Physical Chemical Laboratory..... (0-4-2)

The course deals with vapor pressure, heat of combustion, calorimeter, vapor-liquid equilibrium, optical interferometry, conductance of electrolytes, surface tension, osmotic pressure, sputtering, viscosity measurement, and adsorption isotherm.

CHEB 213 Engineering Biology Laboratory (0-4-2)

This laboratory course involves PCR, restriction enzyme digestion, transformation, preparation of plasmid DNA,

SDS-PAGE, cell culture, protein purification, enzyme reaction and kinetics, and carbohydrate analysis.

CHEB 301 Computer Applications in Chemical Engineering (3-0-3)

The course focuses on numerical differentiation/integration, function approximation, solution methods for linear and nonlinear equations, and differential equations.

CHEB 303 Mathematical Methods in Chemical Engineering..... (3-0-3)

The course covers linear space, linear operator, self-adjoint operator, eigenvalue problem, Fourier series, special functions, and partial differential equations.

CHEB 305 Reaction Engineering (3-0-3)

The course focuses on chemical reaction and reactor phenomena. Topics include reaction kinetics, elementary chemical reactors and their design/operation, heat and mass transfer in chemical reactors, and ideal reactors.

CHEB 306 Catalytic Reaction Engineering (3-0-3)

The course involves catalyst structure, electronic properties of catalytic material, adsorption and desorption phenomena, catalytic reactor analysis and design, and furthermore, industrial applications.

CHEB 307 Introduction to Molecular Biotechnolgy (3-0-3)

Introduction and applications of molecular biotechnology, design and production of important biomolecules.

CHEB 308 Introduction to Biotechnology..... (3-0-3)

The course presents basic principles in biotechnology, industrial applications of biotechnology, connections to chemical engineering and life science, and recent advances in biotechnology.

CHEB 309A/B On-the-job Training at Chemical Plants A/B..... (0-2-1)

Experiencing actual research, development, and operation activities in various chemical industries.

CHEB 312 Chemical Engineering Measurement Laboratory (0-4-2)

This laboratory course involves fluid flow, thermal conductivity, diffusion coefficient, mass transfer coefficient, chromatography, CSTR and tubular reactor, enzyme kinetics, fuel cell, and AFM.

CHEB 360 Solid State Chemical Engineering..... (3-0-3)

The course covers atomic structure and chemical bonding, the structure and properties of solid, the electrical and optical properties of solids, the thermal and mechanical properties of solids, and the chemical synthesis of solid state materials.

CHEB 399A-D Reserch Participation A-D (0-2-1)

Independent research on assigned topics.

CHEB 401 Chemical Process Control (3-0-3)

The course involves dynamic analysis and control of chemical processes, control theory, theory and applications of stability, optimal control theory, and multi-variable control.

CHEB 402 Process Analysis and Design (3-0-3)

The course deals with design methods for chemical plants, chemical process design, flowsheet analysis, process optimization, and process economic analysis.

CHEB 403 Separation Processes (3-0-3)

The course includes basic separation principles in chemical engineering processes, mass and energy balance, design and optimization of separation processes.

CHEB 404 Environmental Engineering (3-0-3)

The course focuses on the causes, effects and treatment of air/water pollution. Topics include the sampling of pollutants, the analysis and treatment for major pollutants.

CHEB 405 Introduction to Polymer Science and Engineering (3-0-3)

Polymer thermodynamics, polymer properties, and polymer synthesis.

CHEB 406 Biochemical Engineering I (3-0-3)

The course presents the basics of biochemical engineering. Topics include the production and treatment of biochemical compounds, and the design and optimization of biochemical processes.

CHEB 407 New and Renewable Energy (3-0-3)

The course introduces the basic principles and process for renewable energy, solar energy, wind energy, biomass, hydrogen, and fuel cells.

CHEB 408 Biochemical Engineering II (3-0-3)

Continuation of Biochemical Engineering I, biochemical reactors and their control, biochemical separation, biochemical process analysis and economics.

CHEB 410 Solid State Chemical Engineering (3-0-3)**CHEB 411 Chemical Engineering Applied Inorganic Chemistry** (3-0-3)

The course presents the basic theories for catalysis in molecular level, adsorption and desorption, the preparation and analysis of catalyst, surface properties, and catalytic reaction kinetics.

CHEB 417 Transport Phenomena I (3-0-3)

The course involves force and stress, momentum equations, Newtonian fluid, Navier-Stokes equation,

dimensional analysis, laminar and turbulent flows, boundary layer theory, and friction factors.

CHEB 418 Transport Phenomena II (3-0-3)

The course includes Fourier's law for heat conduction, Fick's law for diffusion, convective and diffusive fluxes, convective diffusion equation, dimensional analysis, boundary layer theory, heat and mass transfer coefficients.

CHEB 421 Clean Process Engineering (3-0-3)

The course focuses on the design and synthesis of clean process engineering, pollution abatement and control, economic analysis.

CHEB 422 Chemical Product Design (3-0-3)

The course covers basic chemical engineering processes, the design of chemical products, manufacturing process design, fine chemical product design and manufacturing.

CHEB 423 Introduction to Systems Bioengineering (3-0-3)

The course gives an undergraduate-level introduction to systems bioengineering.

CHEB 424 Phase and Reaction Equilibria (3-0-3)

The course introduces the basic thermodynamic principles and applications for separation and chemical reaction in multiphase systems.

CHEB 425 Undergraduate Research I (0-4-2)

Independent research for the senior thesis.

CHEB 426 Undergraduate Research II (0-4-2)

Independent research for the senior thesis.

CHEB 460 Energy and Electronic Device Engineering (3-0-3)

The course covers conductors, semi-conductors, dielectrics, IC, battery, solar cells, and the basic principles and materials for silicon devices, sensor devices, nano devices and energy devices.

CHEB 461 Nano Chemical Engineering (3-0-3)

The course involves the nano-structure synthesis of solid materials, chemical reactions in gas/liquid/solid phases, surface and interface phenomena, applications to IT materials manufacturing, and recent trends in nano chemical engineering.

CHEB 462 Modern Electrochemistry I : Ionics (3-0-3)

Basic ionics with a view to applications for batteries and fuel cells.

CHEB 465 Structure and Properties of Polymers..... (3-0-3)

The course deals with the relation between polymer structure and polymer properties, the behavior of polymer solutions, rubber elasticity, viscoelasticity, the mechanical properties of polymers, polymer crystal and morphology.

CHEB 469 Special Topics in ChE Systems A-Z..... (Credits varies)

Special subjects selected by instructors.

CHEB 471 Chemical Engineering Seminar I (1-0-1)

The course introduces the recent research advances in chemical engineering.

Department of Creative IT Engineering



1. Education Aim

The educational mission of the Department of Creative IT Engineering (CiTE) is to become a great place for learning where passionate students learn from inspiring educators. As information technology keeps advancing at a dizzying speed, at the heart of global competitiveness is an education program that integrates and collaborates across disciplines. To this end, CiTE is dedicated to growing its students into trailblazers equipped with technological knowledge and competencies, an innovative spirit, an understanding of the arts and humanities, an interest in multidisciplinary fields, and an entrepreneurial streak.

2. Program Overview

“Creativity” and “Interdisciplinarity” form the foundation of learning in the CiTE.

The essence of a person’s “creativity” lies in his/her endeavor to view humans and surrounding environments from a new and critical perspective: “new” by moving away from the routine patterns of thinking and behavior, and “critical” by being engaged in productive and constructive dialogues rather than rhetorical criticisms. We take “creativity” not as a skill to be taught, but as an innate potential that can be cultivated in a flexible learning context where students are encouraged to think and act outside the box without the fear of failure. We emphasize the importance of “productive failure” for a more holistic and deeper understanding of the issues on hand. The CiTE faculty carefully (shapes/drives) students’ thinking process and inquiry approaches to help grow their innovative ideas rather than provide prescribed approaches and fixed solutions.

“Interdisciplinarity” forms another important axis of CiTE’s identity and clearly reflects our goal to create synergistic effects through the integration of IT and related fields including the arts, humanities, and social sciences. Interdisciplinary education goes beyond a superficial add-on approach where multiple fields are taught as separate layers. The CiTE has taken the notion to a broader pedagogical level where students are exposed to multiple philosophical, theoretical, and technical perspectives. A pedagogical integration helps students realize that a full understanding of a specific field or problem requires a holistic approach based on the understanding of other related fields and that a learning activity ultimately is a continuous knowledge-building process.

We have placed a unique structure called Personal Growth Statements (PGS) to help students articulate and plan their learning paths. The faculty guides students in early years of study to develop intellectual interests in

different topics of convergent IT fields and at the same time stimulates them to find an area of study and research which they are passionate about. Students in later years of study or advanced programs can participate in more research-oriented activities to further hone their expertise in a specific field of research. Eventually, our pedagogical goal is to fully support students to become a self-directed learner with adaptive expertise (and creative problem-solving skills) who can flexibly respond to complex problems in a fast changing world.

Another unique feature of our pedagogical innovation is embodied in a series of design-oriented learning activities (Creative IT Design & Creative Studio) offered as part of the CiTE curriculum. We encourage students to develop a disposition to appreciate and understand multiple aspects of technological innovations and have their eyes open to the surroundings with intellectual curiosity. In order for students to gain a deeper understanding of design and making, we have designed a comprehensive curriculum that encompasses the entire process of research, analysis, ideation and development, and evaluation and design communication. This curriculum moves away from a traditional technical-skill centered approach to an integrated and comprehensive approach to help students better understand the complexity of the entire process of design as well as develop a competency for dealing with multiple aspects of design.

3. Course Requirements

Category	Course Title	Credit	Remarks
Humanities, Arts, and Social Sciences (HASS) Requirements	Expository Writing	2	
	English Certificate Program	4	
	Physical Education	2	
	Integrated HASS	6	
	Subtotal	14	
HASS Electives	Humanities	15	
	Social Sciences		
	Arts		
	Subtotal	15	
Basic Requirements	Calculus	3	
	Calculus Lab	1	
	Applied Linear Algebra	3	
	General Physics I or General Physics(H)	6	
	General Physics II or General Physics II (H)		
	General Physics Lab I, II	2	
	General Chemistry(H)	4	
	General Chemistry Laboratory	2	
	General Life Science or General LifeScience(H)	3	
	Programming and Problem Solving	3	
	Subtotal	27	
Major Requirements		31	
Major Electives		33	
Total		120	
Activity-Based Curriculum (ABC) Electives	Humanities	5	
	Culture		
	Leadership Development		
Total		5	

※ HASS requirements (Division of Humanities and Social Sciences)

- Physical Education (2 credits): Physical Fitness (1) plus one out of 14 courses.

- Integrated HASS (6 credits): Arts and Humanities (3), Crossing boundaries of Science and Society (3)

※ STC Requirements: Students must choose and complete 3 courses among all STC courses.

※ Students may take HASS electives from foreign universities.

※ Credit requirements for General Physics II, General Physics Lab II, and Applied Linear Algebra may be fulfilled by completion of equivalent courses from foreign universities.

4. List of Major Courses

Category	Course No.	Course Title	lec-lab.-cr.	Pre-req
Major Requirements	CITE101	Personal Growth Statement Design	2-0-2	CITE101 CITE201 CITE202 CITE301 CITE202 CITE301
	CITE102	Interplays of Humanities and Technology	2-0-2	
	CITE201	Creative IT Design: Fundamentals	1-4-3	
	CITE202	Creative IT Design II : Basic Design	2-8-6	
	CITE301	Creative IT Design III: Advanced Design	2-8-6	
	CITE302	Creative IT Design IV: System Integration	2-8-6	
	CITE203	Interaction Design	2-2-3	
	CITE303	Life Sensibility & Transhuman Contents	2-2-3	
	CITE304	Play and Game	2-2-3	
		※ Choose 2 courses from CITE 203, 303, and 304		
Major Electives	CITE211	Human Resources Theory	2-0-2	
	CITE212	Technology Financing	2-0-2	
	CITE213	Technology Marketing	2-0-2	
	CITE221	Introduction to Digital Systems and Microprocessor Design	3-2-4	
	CITE311	Technology Innovation and Industrialization	2-0-2	
	CITE312	Entrepreneurship	2-0-2	
	CITE241	Introduction to Biomedical Engineering	3-0-3	
	CITE242	Principles of Medical Imaging	3-0-3	
	CITE390A~Z	Special Topics in Creative A~Z	Variable credits	
	CITE399A~D	Research Participation A~D	0-2-1	
	CITE399M	Special Undergraduate Research	0-6-3	

5. Major Course Plan (Template)

Grade/ Semester	Spring Semester			Fall Semester		
	Category	Course No.	Course Title	Category	Course No.	Course title
1st year	Major Requirements	CITE101	Personal Growth Statement Design(PGS)			
	Major Requirements	CITE102	Interplays of Humanities and Technology			
2nd year	Major Requirements	CITE201	Creative IT Design I	Major Requirements	CITE202	Creative IT Design II
	Major Electives		IT disciplinary course	Major Requirements		IT disciplinary
	Major Electives		Major Elective	Major Electives		course
3rd year	Major Requirements	CITE301	Creative IT Design III	Major Requirements	CITE302	Creative IT Design IV
	Major Electives		IT disciplinary course	Major Electives		IT disciplinary course
	Major Electives		Major Elective	Major Electives		Major Elective
2nd/3rd year	Major Requirements	Students must complete 2 out of the 3 Creative Studio courses listed below: CITE203 Interaction Design CITE303 Life Sensibility& Transhuman Contents CITE304 Play and Game				

6. Cross-listed Courses (Counted as major electives)

- Any major/graduate courses of all departments at POSTECH in accordance with a student's PGS are recognized as CITE's major electives.

7. English Certificate Program

- CiTE has its own English Certificate Program to educate and verify qualified students and provide them with an opportunity to study abroad for 6 months.

※ Level 4 courses are not shown on the transcript.

Level	Course Title	Requirements /Electives		Grade Report	
				Entering Class of 2012	Entering Class of 2013 and after
Level 5	English I , II	Waived	-	-	-
Level 4	Online lecture +English IV	Two courses required	-	-	
Level 3	Campus Everyday English, Intermediate English Conversation, Intermediate Speech, Intermediate Audiovisual English	one elective	Spring Semester during Freshman year	G	S/U
Level 2	- Writing: Intermediate Writing, Intermediate Reading, Grammar -Speaking : Advanced English Conversation, Advanced Speech, Advanced Audiovisual English,	one elective		S/U	
Level 1	Advanced Writing, Advanced Reading, Thesis	one elective		G	

8. Course Description

CITE 101 Personal Growth Statement Design..... (2-0-2)

The main goal of this course is to guide students to develop their own personal growth statements and plan for concrete actions about their coursework as well as future career paths. Students gain the knowledge and capabilities necessary to plan and develop their own Personal Growth Statement (PGS). The course includes various activities such as students' in-depth interaction with academic advisors and outside mentors from diverse fields, self-reflection, coursework planning, and PGS portfolio designing.

CITE 102 Interplays of Humanities and Technology (2-0-2)

By integrating humanities, arts, and imagination with engineering, students come to understand how closely science and technology are related to humanities, social sciences, arts, and design. Throughout this course, students are stimulated to ask questions such as, "In which areas can I pioneer a new convergence path in the future?" and "What kind of vision and knowledge do I need to become a convergence leader in this generation?"

CITE 201 Creative IT Design I: Fundamentals..... (3-6-6)

In this course, students learn basic HW/SW tools and components and have a chance to work on a semester-long group project.

CITE 202 Creative IT Design II : Basic Design (2-8-6)

Students finalize their research goals and start building basic components necessary for the research.

CITE 203 Interaction Design..... (2-2-3)

Interaction design tackles big social challenges through design thinking. Design is a transformative and collective process that engenders both aesthetic artifacts and their accompanying social networks, human behaviors, and services. It is also a collective process in which humans, technologies, environment, and social institutions interact. During this course, students learn a broad range of design practices such as participatory design, public design, and social design. They also have an opportunity to practice how to connect and apply concepts and insights learned from social sciences and humanities to design processes.

CITE 211 Human Resources Theory..... (2-0-2)

This course provides opportunities to learn how to manage human resources and achievement of professional organizations, R&D-centered organizations, and technology transfer/transaction professional organizations in an ever changing world. In this course, students learn the advantages and disadvantages of a technology-oriented organization and a function-oriented organization. Additionally, students come to have a better understanding of human resource management which is crucial in promoting swift advances in technology and commercialization. Students not only learn about theories but also get to apply their learning into everyday practice.

CITE 212 Technology Financing..... (2-0-2)

This course prepares students with the necessary accounting knowledge and skills required at a managerial level. Students learn principles and concepts of accounting procedures and how to use accounting information for decision making. They also learn how to make a financial statement and to analyze critical information, incorporating sound financial decision making at the corporate level. Students become familiar with procedures involved in raising and managing funds and study capital structure theories.

CITE 213 Technology Marketing (2-0-2)

This course covers a wide range from management of marketing resources and activities to theories of marketing tools that enable students to use the knowledge in practical application. In this course, students learn marketing strategies and tactics necessary to create customers in a technology-based market. Students also learn how to analyze factors and obstacles that influence marketing of new products and how to overcome them.

CITE 221 Introduction to Digital Systems and Microprocessor Design..... (3-2-4)

This course provides the basic knowledge and lab experience on digital circuits, logic, and microprocessor organization to help students prepare better for their Creative IT design projects. The main goal of this course is to stimulate students' curiosity on digital system designs and impart them strong motivation to explore further in detail when the course ends.

CITE 241 Introduction to Biomedical Engineering..... (3-0-3)

By the end of this course, the successful student will: (1) apply knowledge of biological and physical sciences, mathematics, and engineering to solve problems at the forefront of engineering and biology; (2) design a Biomedical Engineering system, and ethical issues; (3) function on multi-disciplinary teams; (4) communicate effectively in verbal, written, and graphical formats; and (5) identify, formulate, and solve Biomedical Engineering problems that address contemporary issues within a global, societal, and economic context.

CITE 242 Principles of Medical Imaging (3-0-3)

The Medical Imaging track is one of the essential majors in the biomedical engineering department. Medical imaging plays an important role in diagnostics and therapeutics of diseases. Understanding the fundamental concepts of standard medical imaging is crucial to biomedical professionals.

CITE 301 Creative IT Design III : Advanced Design..... (2-8-6)

In this course, students are expected to improve their design from the Creative IT Design II and build a working prototype.

CITE 302 Creative IT Design IV : System Integration..... (2-8-6)

CITE 302 is the final part of the Creative IT Design course series. Students are expected to demonstrate a fully functioning final product.

CITE 303 Life Sensibility & Transhuman Contents..... (2-2-3)

Future-leading, integrated IT-based humanities/art technology should effectively respond to life and human identified in a new environment and inspire new cultural flows. This course enables students to broaden their imagination of life and sensibility and to understand the definition of transhuman in an ever-changing world. Furthermore, students are encouraged to come up with ideas targeting new markets.

CITE 304 Play and Game..... (2-2-3)

Amusement and experience play an integral role in the age of cultural technology. One of the most influential outcomes resulting from an integration of humanities and industry is Game Play. This course covers the fundamental principles in the nature of virtual reality, ludology, and cultural industry that make up today’s game culture. Students also experience and practice designing games themselves.

CITE 311 Technology Innovation and Industrialization (2-0-2)

One of the biggest challenges and the core of global competitiveness for businesses is strategic management of technology innovation and new growth power that comes with commercialization of technology. In this course, students study various models, techniques, and cases of technology-based innovation; in particular, students look into ways to achieve competitiveness through strategic commercialization and innovation of business models. Students become equipped with capabilities and skills necessary for practical application by conducting team projects and group discussions, and participating in seminars by outside experts.

CITE312 Entrepreneurship (2-0-2)

In this course, students obtain a broad understanding of theories and practical skills required when starting up a new high-tech company or launching a new project for existing business. Students learn the fundamentals of creating and managing new business including how to set strategies, conduct market analysis, organize management, develop technology and merchandise, write a business plan, promote investment, and open markets. Students become equipped with the necessary tools for practical application through participation in start-up projects, seminars, and discussions with outside experts in entrepreneurship.

CITE 390A-Z Special Topics in Creative IT A-Z..... (Variable Credits)

CITE 399A-D Research Participation A-D..... (0-2-1)

CITE 399M Special Research Participation M..... (0-6-3)

Activity-Based General Education Curriculum (ABC)



1. Education Aim

The goal of Activity-Based General Education Curriculum (ABC) is to contribute to the holistic education by enhancing students' practical competence in the aspects of humanities/social sciences, culture/arts, sports, and leadership development.

2. List of ABC Courses

Category	Area	Course No.	Course Title	lec-lab.-cr.	Remarks
ABC Requirements (3 units)		ABCR101	Planning for College Life and Future	1-2-2	
		ABCR102	Freshman Seminar	0-2-1	
ABC Electives (4 units)	Humanities/ Social Sciences	ABCH211	Self-designed Seminar	0-2-1	
		ABCH212	Reading	0-2-1	
		ABCH213	Special Topics	1-0-1	A course opened for multiple semesters
		ABCH214	Regional Convergency Studies	0-2-1	
		ABCH215	Domestic Journey	0-2-1	
		ABCH216	Learning Skills	1-1-1	
		ABCC201	Culture Colloquium	1-1-1	
	Culture/Arts	ABCC211	Creative Writing	0-2-1	
		ABCC221	Orchestra	0-2-1	
		ABCC222	Chamber Music	0-2-1	
		ABCC223	Samulnori	0-2-1	
		ABCC241	Sculpture	0-2-1	
		ABCC242	Engraving	0-2-1	
		ABCC251	Documentary	0-2-1	
		ABCC252	Nanta	1-1-1	
		ABCC253	Conducting	1-1-1	

Category	Area		Course No.	Course Title	lec-lab.-cr.	Remarks
	Sports	Basic	ABCC261	Bowling	0-2-1	
			ABCC262	Windsurfing	0-2-1	
			ABCC263	Rock Climbing	0-2-1	
			ABCC264	Water Ski	0-2-1	
			ABCC265	Snowboard	0-2-1	
			ABCC266	Aerobics Dance	0-1-1	
			ABCC267	Core Training	0-1-1	
			ABCC268	Modern Dance	0-1-1	
			ABCC269	Self Defence Technique	0-1-1	
		Intermediate	ABCC271	Intermediary Ski	0-2-1	
		Advanced	ABCC281	Advanced Table Tennis	0-2-1	
			ABCC282	Advanced Bowling	0-2-1	
			ABCC283	Advanced Badminton	0-2-1	
			ABCC284	Advanced Tennis	0-2-1	
			ABCC285	Advanced Swimming	0-2-1	
			ABCC286	Advanced Kumdo	0-2-1	
			ABCC287	Advanced Dance	0-2-1	
			ABCC288	Advanced Golf	0-2-1	
			ABCC289	Advanced Racket Ball	0-2-1	
			ABCC291	Advanced Ski	0-2-1	
	Leadership Development		ABCL210	Social Service1	0-2-1	
			ABCL211	Social Service2	0-2-1	
			ABCL212	Writing for Science and Technology	1-0-1	A course opened for multiple semesters
			ABCL213	Group Activity	0-4-2	
			ABCL214	Exploring Careers	0-2-1	
			ABCL215	Human Relations and Leadership	0-2-1	
			ABCL216	Executive Leadership	0-2-1	
			ABCL217	Internship	0-4-1	
			ABCL218	My leadership style	1-1-1	
			ABCL219	Mentorship Program	0-2-1	
			ABCL220	First Aid and Emergency Management	1-1-1	
			ABCL221	Teamwork leadership Activity	1-3-1	

- ① ABC courses are graded with “S” (satisfactory) or “U” (unsatisfactory).
- ② When a course is repeated, credits will not be awarded more than once for the same course except for the Culture Colloquium course that awards credits each time up to the second time it is taken.
- ③ When a course is repeated, the most recent grade will replace the previously earned grade on the transcript. However, if a student repeats the Culture Colloquium course twice, he/she may choose which grade to be replaced.
- ④ The Article 31 (Credits per Semester) of Statutes of Pohang University of Science and Technology does not apply to ABC Courses.
- ⑤ All ABC courses are offered in Korean

3. Course Description

ABC Requirements

ABCR101 Planning for College Life and Future..... (1-2-2)

This course offers various freshmen programs that help students successfully adjust to college life and design their lives. Students learn and practice how to set specific goals, manage time, master self-control, deal with interpersonal relationships and stress through team discussion, conversation with alumni, and the use of scheduler.

ABCR102 Freshman Seminar (0-2-1)

First-Year Seminar (FYS) is a course that enables faculty and first-year students to engage in extensive inquiry about a issue or problem of interest. This course is designed for inspiring students' academical and intellectual curiosity.

ABC Electives

■ Humanities/Social Sciences

ABCH211 Self-designed Seminar (0-2-1)

This course aims to provide students with research opportunities in the areas that are not directly related to their field of study such as humanities, social sciences, arts, etc. Small group seminars in which three to five students form a team run for a semester and are held on a regular basis.

ABCH212 Reading (0-2-1)

This course is designed to help students to realize the pleasure, necessity and value of reading and build a life-long reading habit. Students can choose three books from the recommended book list and are required to submit a book review.

ABCH213 Special Topics (1-0-1)

This course runs for multiple semesters. A student must attend and submit a report each time; when the student receives eight or more Pass reviews for his/her report, he/she will earn one credit. Lectures approved and recognized by the University are provided by institutions within the University, departments, RC (Residential College), etc.

ABCH214 Regional Convergence Studies..... (0-2-1)

In this course, students can raise a sense of citizenship by acquiring comprehensive and integrated knowledge through field studies. Students learn the history, culture, arts, traditional science of Pohang and Gyeongju.

ABCH215 Domestic Journey (0-2-1)

This course encourages students to enlarge their experiences through domestic travels. Students can broaden their horizons and develop the spirit of challenge by communicating with people from different backgrounds.

ABCH216 Learning Skills (1-1-1)

This course is designed to help students set an academic goal and stay motivated to study, and obtain good learning attitude and habits based on pedagogical theories. Students also learn a variety of strategies for improving their learning efficiency.

■ **Culture/Arts**

ABCC201 Culture Colloquium (1-1-1)

In this course, students can cultivate cultural knowledge by watching cultural performances and attending invited lectures.

ABCC211 Creative Writing (0-2-1)

This course is to develop students' creativity by helping them produce creative writings such as science fiction, short stories and poems.

ABCC221 Orchestra (0-2-1)

This course is opened only to those who have been involved in the POSTECH orchestra as its member for a minimum of one year. A student earns one credit if he/she attends practice sessions for a subscription concert and/or performs in the concert.

ABCC222 Chamber Music (0-2-1)

Students earn one credit if he/she attends practice sessions and/or participates in a chamber music concert twice.

ABCC223 Samulnori (0-2-1)

This course is designed to foster the spirit of teamwork and sociality by learning Samulnori performances with four Korean traditional instruments such as drums, janggu, jings and kkwaenggwari.

ABCC252 Nanta (1-1-1)

In this course, students are provided with opportunities to release stress and express their ideas and feelings by playing instruments and moving with the rhythm. Students also accumulate knowledge of traditional cultures and then they will take pride in Korean cultures.

ABCC253 Conducting (1-1-1)

This course aims to enlighten students about the importance of communication and cooperation through music. Conducting helps to cultivate students' persuasion and leadership skills and artistic sensitivity.

ABCC241 Sculpture (0-2-1)

This sculpture course educates students on sculpture theories and provides them with opportunities to produce and display their sculpture works.

ABCC242 Engraving (0-2-1)

In the course, students learn the concept of engraving and cultivate creativity and artistic sensitivity through engraving practices.

ABCC251 Documentary (0-2-1)

This course educates students on documentary theories and provides them with opportunities to produce videos for themselves and to make public presentations.

[Sports]

► Basic Courses

The Basic Courses consist of a variety of sports courses that are relatively easy to learn in a short period of time. The courses introduce newly created sports and the ones that are not on the list of basic requirements offered by the Division of Humanities and Social Sciences.

ABCC261 Bowling (0-2-1)

This course introduces basic bowling techniques such as pitching and picking up a spare through on-site practices, thereby helping them to enjoy bowling.

ABCC262 Windsurfing (0-2-1)

In this course, students can build up their physical and mental strength. Intensive practices for windsurfing are conducted for four days during the summer session when the weather condition is fine.

ABCC263 Rock Climbing (0-2-1)

Rock Climbing is an extreme sport which requires advance preparations and quick judgement when getting close to difficult terrain. It helps students to provide against danger and pass through difficulties.

ABCC264 Water Ski (0-2-1)

Water Ski is a surface water sport in which an individual is pulled behind a boat or cable ski installation over a body of water. This course helps students to overcome fear of water, and they can feel thrilled by waterskiing with one or two skis and rope connected to power equipment which moves rapidly on the water with great speed.

ABCC265 Snowboard (0-2-1)

Snowboard is one of the most popular and useful winter sports. It requires the whole body workout and develops cardiovascular endurance, agility, etc.

ABCC266 Aerobics Dance (0-1-1)

Aerobics Dance consists of a variety of movements that strengthen all of the body muscles and enhance the cardio pulmonary function.

ABCC267 Core Training..... (0-1-1)

Core Training is a sport that does not need any sporting equipment. It enhances physical strength, muscular endurance, cardio pulmonary function, flexibility and agility and improves mental and physical health.

ABCC268 Modern Dance (0-1-1)

Modern Dance is an aerobic exercise which involves mixed body movements and enhances cardio pulmonary function. Students can pleasantly do whole body exercises through this course.

ABCC269 Self Defence Technique..... (0-1-1)

Students learn self-defensive and self-control skills to protect themselves from assaulters when in danger. Self-protection tool instructions and manual techniques such as pressing down, choking, punching and knuckle cracking are taught in this course.

►Advanced Courses

More advanced courses of the basic requirements offered by the Division of Humanities and Social Sciences are provided. Any student who has not taken the basic courses is required to obtain an approval from his/her academic advisor before taking advanced courses.

ABCC281 Advanced Table Tennis (0-2-1)

Table Tennis is a simple and easy sport that people of all ages can enjoy anytime and anywhere.

ABCC283 Advanced Badminton (0-2-1)

Badminton requires quick and agile movements. This Advanced Badminton course aims to help students master the game rules, body motions and skills in a short period of time.

ABCC284 Advanced Tennis..... (0-2-1)

The Advanced Tennis course aims to help students master not only the fundamental techniques of tennis such as grip, stance, step, back swing, forward swing, and stroke but also the attitude and manner of tennis matches.

ABCC285 Advanced Swimming (0-2-1)

Swimming is one of the basic physical activities including walking, running, and jumping and exercises the whole body. People of all ages can enjoy, and the sport holds great recreational value.

ABCC286 Advanced Kumdo (0-2-1)

Kumdo, one of the traditional martial arts, is a lifetime exercise. This course is provided to practice fundamental skills of Kumdo and to train students' body and mind.

ABCC287 Advanced Dance..... (0-2-1)

Dance is an indoor sport which is a greatly artistic and wholesome social activity of upper classes in western society. This course introduces dance techniques, and students learn social skills through dancing.

ABCC288 Advanced Golf..... (0-2-1)

Golf requires a great control of dynamic, psychological and physiological factors to take swing and throw a ball at a target.

ABCC289 Advanced Racket Ball (0-2-1)

Racket Ball requires agility, flexibility, endurance, and quick judgment. This course aims to help students master fundamental techniques of racket ball such as forehand and backhand, and learn the attitude and manners in playing racket ball.

ABCC291 Advanced Ski (0-2-1)

Ski is one of the popular winter sports and cultivates boldness and physical strength. Students learn advanced techniques such as parallel long turn, short turn and carving in this course. The course is conducted for four days during the winter session if the weather condition is favorable.

■ Leadership Development**ABCL210 Social Service (0-2-1)**

This course is designed to provide students with a variety of opportunities for volunteer activities and talent donation.

ABCL213 Group Activity (0-4-2)

This course is an one-week summer program dedicated to developing leadership skills through the challenging and meaningful adventure camp held in the Republic of Korea Air Force Academy or the Republic of Korea Naval Academy.

ABCL214 Exploring Careers..... (0-2-1)

In this course, students are provided with opportunities to explore personal attributes that influence future academic and professional decisions and to consider the factors that create a meaningful and fulfilling life after graduation. This course covers the three components of the career planning process: (1) personal assessment of work-related values, interests and skills; (2) exploration of career options; and (3) resume writing.

ABCL215 Human Relations and Leadership..... (0-2-1)

Students will gain appropriate skills and knowledge to be able to effectively manage human relations as a good leader through this course. Students, as future leaders, will learn how to use their knowledge of the concepts of human relations, handle performance problems, and plan and direct followers' needs assessments.

ABCL216 Executive Leadership..... (0-2-1)

Students who build meaningful relationships and carry out various responsibilities such as serving as an executive member in student organizations may earn one credit with the approval of the ABC steering committee.

ABCL217 Internship..... (0-4-1)

This course provides students with internship opportunities and awards one credit. Through this course, students can acquire work experiences and transferable skills, experience prospective career paths, and network with professionals in the future career fields.

ABCL218 My leadership style..... (1-1-1)

This course is designed to help students define their leadership styles. Self-awareness is the first step to effective leadership. Students will discover and clarify the strengths of their leadership styles, learn practical tools and gain confidence to put them into practice.

ABCL219 Mentorship Program..... (0-2-1)

This course is to provide students (mentee) with mentorship opportunities that allow them to connect with alumni (mentor). Both students and alumni will build mutually rewarding relationships through this course.

ABCL220 First Aid and Emergency Management (1-1-1)

General First Aid Course and CPR course are provided in order to teach the effective ways to save one's valuable life in case of emergency.

ABCL221 Teamwork leadership Activity..... (1-2-1)

This course focuses on developing students' knowledge and skills for teamwork and leadership. The course enables students to have an intense immersion experience designed for improving communication skills and understanding the concepts of leadership and followership.

Requirements for Double Majors and Minors

1. Double Major Policy

Students must obtain a minimum of 35 credits by a) completing major required courses only when the department offers 35 or more credits from major required courses, or by b) completing additional major elective courses in addition to all major required courses when the department offers fewer than 35 credits from major required courses.

2. Minor Policy

Students must obtain a minimum of 21 credits from a minor in accordance with the minor requirements of each department. Credits from each course will count toward either majors or minors.

Dept.	Double Major	Minor
Mathematics	Students who wish to double major in mathematics and another department have to take all the major requirements in mathematics (33credits) plus major electives and attain no fewer than 35 credits in total. Furthermore, it is required to submit a bachelor's thesis in order to complete a double major. However, a graduation comprehensive test may substitute for a thesis to fulfill the bachelor's degree requirement.	Students who wish to minor in mathematics have to earn a minimum of 21 credits within the department, and complete 4 courses out of the 6 courses listed below: MATH301 Modern Algebra, MATH302 Modern Algebra II, MATH311 Analysis, MATH312 Analysis II, MATH351 Introduction to Numerical Analysis, MATH426 Introduction to Differential Geometry.
Physics	Students must obtain at least 41 credits in total from all of the major requirements (39 credits) and additional credits from major electives. A thesis is exempt from degree requirements.	Students must obtain at least 24 credits in total from a) Major Requirements: 9 credits 【PHYS203 Mechanics, PHYS206 Electromagnetism I PHYS301 Quantum Physics I】 b) Major Electives: 3 credits Choose one of the following: 【PHYS201 Introduction to Modern Physics, PHYS302 Quantum Physics II, PHYS304 Thermal Physics, PHYS307 Electromagnetism II】, and c) Additional 12 or more credits must be earned from major requirements or major electives within the department.

Dept.	Double Major	Minor
Chem	Students must obtain all 40 credits of major requirements offered by the Department of Chemistry.	Students must obtain a minimum of 21 credits from major requirements and/or electives offered by the Department of Chemistry.
LIFE	Students who wish to double major in life sciences and another department must obtain 43 credits of major requirements.	Students who wish to minor in life sciences must obtain a) 9 credits of major requirements including LIFE217/Cell Biology, LIFE319/Biochemistry I, LIFE321/Molecular Biology, and b) additional 12 credits from major requirements or major electives offered by the Department of Life Sciences.
MSE	Students who intend to double major in Materials Science & Engineering must complete at least 37 credits including 24 credits of major requirements except Material/Process Design III and IV, and 13 credits of major elective requirements.	Students who intend to minor in Materials Science & Engineering must complete at least 28 credits from major requirements and/or major electives offered by the Department of Materials Science and Engineering.
ME	Students must complete all 49 credits of major requirements including Differential Equation.	Students must complete at least 21 credits from major requirements and/or major electives including Differential Equation.
IMEN	Students must complete 37 credits in total including 25 credits of major core requirements and 12 credits of major elective requirements. IMEN382 (Database Systems) and IMEN272 (Probability and Statistics for Engineers) may be replaced by CSED421 (Databases Systems) and MATH230 (Probability and Statistics), respectively. -IMEN382 Database Systems : CSED421 Databases Systems -IMEN272 Probability and Statistics for engineers : MATH230 Probability and Statistics	Students must complete a minimum of 21 credits from major requirements and/or major electives. IMEN382 (Database Systems) and IMEN272 (Probability and Statistics for Engineers) may be replaced by CSED421 (Databases Systems) and MATH230 (Probability and Statistics), respectively. -IMEN382 Database Systems : CSED421 Databases Systems -IMEN272 Probability and Statistics for engineers : MATH230 Probability and Statistics
EE	Students must complete all 46 credits of major requirements. However, those who major in Computer Science can replace: * ECE273 (Digital Systems Design, 4) with CSED273 (Digital Systems Design) * EECE471 (Computer Design, 4) with CSED311 (Computer Architecture, 4), and * EECE374 (Microprocessor Architecture and Applications) with CSED211 (Microprocessor Architecture and Programing), in which case the completed credits are 45 in total. Those who major in Physics can substitute PHYS206 (Electromagnetism I, 3) for EECE261 (Introduction to Electromagnetism, 3); however, this only applies to students who entered the program in 2011 or later.	Students must complete the following 5 major requirement courses and obtain 16 credits: 【EECE261 (Introduction to Electromagnetism, 3), EECE273 (Digital Systems Design), EECE231 (Circuit Theory), EECE233 (Signal & Systems, 3) and MATH200 (Differential Equations, 3)】 • Students must complete 5 credits from major requirements or major electives that are offered by the Department of Electrical Engineering. Those who major in Physics can substitute PHYS206 (Electromagnetism I, 3) for EECE261 (Introduction to Electromagnetism, 3). Those who major in Computer Science can replace EECE273 (Digital Systems Design, 4) with CSED273 (Digital Systems Design, 4); however, this only applies to students who entered the program in 2011 or later.

Dept.	Double Major	Minor
CSE	Students who wish to double major in Computer Science & Engineering and another department must complete all 46 credits of major requirements. 1. "EECE374 Microprocessor structure and application (3-2-4)" is considered equivalent to "CSED211 Microprocessor Architecture and programming (2-2-3)". 2. "EECE273 Digital System Design (3-2-4)" is considered equivalent to "CSED273 Digital System Design (3-3-4)". 3. "EECE471 Computer Design (3-2-4)" is considered equivalent to "CSED311 Computer Architecture (3-3-4)".	Students who wish to minor in Computer Science & Engineering must complete a minimum of 21 credits from major requirements.
Chemical Engineering	Students must complete a minimum of 35 credits in total including all 32 credits of major requirements and additional 3 credits or more of major electives. A thesis is exempt from degree requirements.	• Major requirements: 9 credits [CHEB204 Chemical Engineering Thermodynamics, CHEB305 Reaction Engineering, CHEB417 Transport Phenomena] • A minimum of 12 credits earned from 300 or above level courses that are offered by the Department of Chemical Engineering.
Creative IT Engineering	Students must complete all 31 credits of major requirements.	Students must complete a minimum of 26 credits from the courses including the following: • Personal Growth Statement Design: 2 credits (completed as a pre-requisite) • Creative IT Design Level 1-4: 21 credits • Students must take 3 credits or more from Creative Studio courses



POSTECH

77 Cheongam-Ro, Nam-Gu, Pohang, Gyeongbuk, Korea 790-784

Tel : 054-279-2442~7, **Fax** : 054-279-2430

Email: registrar-all@postech.ac.kr

Homepage : <http://www.postech.ac.kr>