Major Course Requirements for
Dept. of School of Computing
(For undergraduate students admitted in 2015 or before)

Please check the common graduation requirements.

▣ **Credit Requirement for Graduation:** Required to complete a total of more than 130 credits

▣ **Elective Basic Courses:** at least 9 credits (including Introduction to Linear Algebra(MAS109))
   ※ Requirements for a double major: at least 3 credits (including Introduction to Linear Algebra(MAS109))
   ※ Elective general course requirements are specified in the elective general course requirements by year of admission

▣ **Major:** at least 43 credits
   - **Mandatory Major Courses:** at least 19 credits
   - Discrete Mathematics, Data Structure, Introduction to Algorithms, Computer Organization, Programming Languages, Operating Systems and Lab. (Discrete Mathematics (CS204) can be substituted by Discrete Mathematics (MAS275, MA260); Computer Organization (CS311) can be substituted by Introduction to Computer Architecture (EE312)).
   - **Elective Major Courses:** at least 24 credits
     - Four credits from individual study courses are counted at maximum.
     - Individual study from other departments and URP495 are recognized for the scope of individual study of Dept. of School of Computing.
     - Among the Elective Major Courses of Dept. of Graduate School of Information Security(IS500 subjects) which are open to both undergraduate and graduate students are recognized as Elective Major Courses of Dept. of School of Computing.
     - Courses(CoE Code) opened by College of Engineering may be used as Electives Major courses up to 6 credits
   * Certificate in AI(Optional)
     If at least four courses on the list below are completed, 'Certificate in AI' is written in the transcript:
     CS270 Intelligent robot design and programming, CS372 Natural Language Processing with Python, CS376 Machine Learning, CS423 Probabilistic Programming, CS454 Artificial Intelligence Based Software Engineering,

CS470 Introduction to Artificial Intelligence, CS471 Graph Machine Learning and Mining, CS474 Text Mining, CS475 Machine Learning for Natural Language Processing, CS479 Machine Learning for 3D Data, CS484 Introduction to Computer Vision

▣ **Minor:** at least 21 credits
- at least 21 credits from major courses, including 15 credits in required major courses.
  ※ The same requirements as stated in Elective Major Courses apply.

▣ **Double Major:** at least 40 credits
- 40 credits including 19 credits in mandatory major courses
  ※ The same requirements as stated in Elective Major Courses apply.

▣ **Research Courses:** at least 3 credits
- Students must take three credits for CS490 Research in Computer Science.
  (CS490 can be substituted with CS408 Computer Science Project.)
- Credits from seminar courses are counted as Research Course credits.
  ※ Students having a double major are exempt.

◎ 21 credits at most from the internship program of 24 weeks, SoC Co-op1 (INT482, INT495) will be recognized as CS490 Research in Computer Science(3 credits), CS408 Computer Science Project(3 credits), CS409 Software Projects for Industrial Collaboration(3 credits) and a free elective(12 credits).
If you have completed CS490, CS408, CS409 before participating in SoC Co-op1, the completed credits will be recognized as free elective. In case of taking Co-op 2(INT492, INT495) additionally, at most 3 credits of a free elective will be recognized as credits to graduate.

□ **Transitional Measures**
- The above requirements are applicable to all enrolled students.
- It applies to all enrolled students that the 24-week internship program <SoC Co-op 1> (INT482, INT495) among these requirements
- It applies to all enrolled students that both individual study of other departments and URP495 are recognized for the scope of individual study of Dept. School of Computing, and among the Elective Major Courses of Dept. of Graduate School of Information Security(IS500 subjects) which are open to both undergraduate and graduate students are recognized as Elective Major Courses of Dept. of School of Computing.
- Students admitted in 2014 or before may choose to be governed by the completion requirements applicable to students admitted in 2016 and

after(or 2023 and after) if desired.
- Students who entered in 2005 or later should fulfill current degree requirements. Students who entered in 2004 or earlier should fulfill previous degree requirements except that they could fulfill the current elective course requirement and elective basic course requirement (undergraduate requirement C and E).
- Current research course requirement (undergraduate requirement F) applies to those who entered in 2001 or later. Students who entered in 2000 or earlier should fulfill previous degree requirements. (Credits from research courses are counted towards major course requirement)
- Substitute courses for
    ○ Discontinued courses
    - Simulation (CS434) has not been offered from Fall 2001. Computer Simulation (IE363) is counted as elective major course from Fall 2001.
    - Introduction to Computer Science (CS200) has not been offered from Spring 2009. IT Programming and Practice (IE362) or Programming for Electrical Engineering (EE209) is counted as elective major course from Spring 2009.
    - Mobile Applications Development (CS446) → Mobile Computing and Applications (CS442) (Retaking class after 2011 Spring)
- The acceptance of Courses (CoE codes) offered by the College of Engineering as Electives Major Courses will be applied to courses taken from Fall 2023 onward, and no additional Elective Major Credits will be accepted for CoE491 through the CS492 code-share in the School of Computing even though more than 6 credits are earned.
- All Students are applied to the expansion of the courses of Certificate in AI.

Major Course Requirements for
Dept. of School of Computing
(For undergraduate students admitted in 2016 and after)

Please check the common graduation requirements.

▣ **Credit Requirement for Graduation:** Required to complete a total of more than 136 credits

※ Required to choose and complete one among Advanced Major, Double Major, Minor, Individually Designed Major, Designated Interdisciplinary Major, and Specially Designated Major.

▣ **(Special Note)** Elective Basic Courses: at least 9 credits (including Introduction to Linear Algebra(MAS109))

   ※ Requirements for a double major: at least 3 credits (including Introduction to Linear Algebra(MAS109))

   ※ Elective general course requirements are specified in the elective general course requirements by year of admission.

▣ **Major:**   at least 49 credits

   - **Mandatory Major Courses:** at least 19 credits

     - Discrete Mathematics, Data Structure, Introduction to Algorithms, Computer Organization, Programming Languages, Operating Systems and Lab. (Discrete Mathematics (CS204) can be substituted by Discrete Mathematics (MAS275, MA260); Computer Organization (CS311) can be substituted by Introduction to Computer Architecture (EE312)).

   - **Elective Major Courses:** at least 30 credits

     - Students must take at least 1 course among below courses which include a capstone team project.(※This requirement is applied for the students who entered in 2020 and thereafter):

       CS350 Introduction to Software Engineering, CS360 Introduction to Database, CS374 Introduction to Human-Computer Interaction, CS408 Computer Science Project, CS409 Software Projects for Industrial Collaboration, CS423 Probabilistic Programming, CS442 Mobile Computing and Applications, CS453 Automated Software Testing, CS454 Artificial Intelligence Based Software Engineering, CS457 Requirements Engineering for Smart Environments, CS459 Introduction to Services Computing, CS473 Introduction to Social Computing, CS474 Text Mining, CS482 Interactive Computer Graphics

- Four credits from individual study courses are counted at maximum.
- Individual study from other departments and URP495 are recognized for the scope of individual study of Dept. of School of Computing.
- Among the Elective Major Courses of Dept. of Graduate School of Information Security(IS500 subjects) which are open to both undergraduate and graduate students are recognized as Elective Major Courses of Dept. of School of Computing.
- Courses(CoE Code) opened by College of Engineering may be used as Electives Major courses up to 6 credits

* Certificate in AI(Optional)

If at least four courses on the list below are completed, 'Certificate in AI' is written in the transcript:

CS270 Intelligent robot design and programming, CS372 Natural Language Processing with Python, CS376 Machine Learning, CS423 Probabilistic Programming, CS454 Artificial Intelligence Based Software Engineering, CS470 Introduction to Artificial Intelligence, CS471 Graph Machine Learning and Mining, CS474 Text Mining, CS475 Machine Learning for Natural Language Processing, CS479 Machine Learning for 3D Data, CS484 Introduction to Computer Vision

▣ **Advanced Major:** at least 12 credits

※ Students must take 12 credits or more of elective major courses from School of Computing, except for 200-level courses.

▣ **Individually Designed Major:** at least 12 credits

- Students must take 12 credits or more of major courses from more than two departments other than School of Computing.

▣ **Minor:** at least 21 credits

- at least 21 credits from major courses, including 15 credits in required major courses.
  ※ No credits from the same course will be doubly counted to satisfy major and minor department requirements.
  ※ The same requirements as stated in Elective Major Courses apply.

▣ **Double Major:** at least 40 credits

- 40 credits including 19 credits in mandatory major courses
  ※ Up-to 6 credits can be doubly counted to satisfy both major department requirements.
  ※ The same requirements as stated in Elective Major Courses apply.

▣ Research Courses: at least 3 credits
  - Students must take three credits for CS490 Research in Computer Science.
    (CS490 can be substituted with CS408 Computer Science Project.)
  - Credits from seminar courses are counted as Research Course credits.
  ※ Students having a double major are exempt.

◎ 21 credits at most from the internship program of 24 weeks, SoC Co-op1
  (INT482, INT495) will be recognized as CS490 Research in Computer Science(3
  credits), CS408 Computer Science Project(3 credits), CS409 Software Projects
  for Industrial Collaboration(3 credits) and a free elective(12 credits).
  If you have completed CS490, CS408, CS409 before participating in SoC
  Co-op1, the completed credits will be recognized as free elective. In case of
  taking Co-op 2(INT492, INT495) additionally, at most 3 credits of a free
  elective will be recognized as credits to graduate.

☐ Transitional Measures
  - The above requirements are applicable to all enrolled students.
  - It applies to all enrolled students that the 24-week internship program <SoC
    Co-op 1> (INT482, INT495) among these requirements
  - It applies to all enrolled students that both individual study of other
    departments and URP495 are recognized for the scope of individual study of
    Dept. School of Computing, and among the Elective Major Courses of Dept.
    of Graduate School of Information Security(IS500 subjects) which are open to
    both undergraduate and graduate students are recognized as Elective Major
    Courses of Dept. of School of Computing.
  - Students admitted in 2015 or before may choose to be governed by the
    completion requirements listed above if desired.
  - The acceptance of Courses (CoE codes) offered by the College of Engineering
    as Electives Major Courses will be applied to courses taken from Fall 2023
    onward, and no additional Elective Major Credits will be accepted for CoE491
    through the CS492 code-share in the School of Computing even though
    more than 6 credits are earned.
  - All Students are applied to the expansion of the courses of Certificate in AI.

Major Course Requirements for
Dept. of School of Computing
(For undergraduate students admitted in 2023 and after)

Please check the common graduation requirements.

▣ **Credit Requirement for Graduation:** Required to complete a total of more than 138 credits

※ Required to choose and complete one among Advanced Major, Double Major, Minor, Individually Designed Major, Designated Interdisciplinary Major, and Specially Designated Major.

▣ **(Special Note)** Elective Basic Courses: at least 9 credits (including Introduction to Linear Algebra(MAS109))

   ※ Requirements for a double major: at least 3 credits (including Introduction to Linear Algebra(MAS109))

   ※ Elective general course requirements are specified in the elective general course requirements by year of admission.

▣ **Major:** at least 49 credits

  - **Mandatory Major Courses:** at least 19 credits

    - Discrete Mathematics, Data Structure, Introduction to Algorithms, Computer Organization, Programming Languages, Operating Systems and Lab. (Discrete Mathematics (CS204) can be substituted by Discrete Mathematics (MAS275, MA260); Computer Organization (CS311) can be substituted by Introduction to Computer Architecture (EE312)).

  - **Elective Major Courses:** at least 30 credits

    - Students must take at least 1 course among below courses which include a capstone team project:
    CS350 Introduction to Software Engineering, CS360 Introduction to Database, CS374 Introduction to Human-Computer Interaction, CS408 Computer Science Project, CS409 Software Projects for Industrial Collaboration, CS423 Probabilistic Programming, CS442 Mobile Computing and Applications, CS453 Automated Software Testing, CS454 Artificial Intelligence Based Software Engineering, CS457 Requirements Engineering for Smart Environments, CS459 Introduction to Services Computing, CS473 Introduction to Social Computing, CS474 Text Mining, CS482 Interactive Computer Graphics

    - Four credits from individual study courses are counted at maximum.

    - Individual study from other departments and URP495 are recognized for

the scope of individual study of Dept. of School of Computing.
- Among the Elective Major Courses of Dept. of Graduate School of Information Security(IS500 subjects) which are open to both undergraduate and graduate students are recognized as Elective Major Courses of Dept. of School of Computing.
- Courses(CoE Code) opened by College of Engineering may be used as Electives Major courses up to 6 credits

 * Certificate in AI(Optional)

   If at least four courses on the list below are completed, 'Certificate in AI' is written in the transcript:

   CS270 Intelligent robot design and programming, CS372 Natural Language Processing with Python, CS376 Machine Learning, CS423 Probabilistic Programming, CS454 Artificial Intelligence Based Software Engineering, CS470 Introduction to Artificial Intelligence, CS471 Graph Machine Learning and Mining, CS474 Text Mining, CS475 Machine Learning for Natural Language Processing, CS479 Machine Learning for 3D Data, CS484 Introduction to Computer Vision

◨ **Advanced Major:** at least 12 credits
   ※ Students must take 12 credits or more of elective major courses from School of Computing, except for 200-level courses.

◨ **Individually Designed Major:** at least 12 credits
   - Students must take 12 credits or more of major courses from more than two departments other than School of Computing.

◨ **Minor:** at least 21 credits
   - at least 21 credits from major courses, including 15 credits in required major courses.
   ※ No credits from the same course will be doubly counted to satisfy major and minor department requirements.
   ※ The same requirements as stated in Elective Major Courses apply.

◨ **Double Major:** at least 40 credits
   - 40 credits including 19 credits in mandatory major courses
   ※ Up-to 6 credits can be doubly counted to satisfy both major department requirements.
   ※ The same requirements as stated in Elective Major Courses apply.

◨ **Research Courses:** at least 3 credits

- Students must take three credits for CS490 Research in Computer Science.
  (CS490 can be substituted with CS408 Computer Science Project.)
- Credits from seminar courses are counted as Research Course credits.
  ※ Students having a double major are exempt.

◎ 21 credits at most from the internship program of 24 weeks, SoC Co-op1 (INT482, INT495) will be recognized as CS490 Research in Computer Science(3 credits), CS408 Computer Science Project(3 credits), CS409 Software Projects for Industrial Collaboration(3 credits) and a free elective(12 credits).
  If you have completed CS490, CS408, CS409 before participating in SoC Co-op1, the completed credits will be recognized as free elective. In case of taking Co-op 2(INT492, INT495) additionally, at most 3 credits of a free elective will be recognized as credits to graduate.

☐ **Transitional Measures**
 - The above requirements are applicable to all enrolled students.
 - It applies to all enrolled students that the 24-week internship program <SoC Co-op 1> (INT482, INT495) among these requirements
 - It applies to all enrolled students that both individual study of other departments and URP495 are recognized for the scope of individual study of Dept. School of Computing, and among the Elective Major Courses of Dept. of Graduate School of Information Security(IS500 subjects) which are open to both undergraduate and graduate students are recognized as Elective Major Courses of Dept. of School of Computing.
 - Students admitted in 2015 or before may choose to be governed by the completion requirements listed above if desired.
 - The acceptance of Courses (CoE codes) offered by the College of Engineering as Electives Major Courses will be applied to courses taken from Fall 2023 onward, and no additional Elective Major Credits will be accepted for CoE491 through the CS492 code-share in the School of Computing even though more than 6 credits are earned.
 - All Students are applied to the expansion of the courses of Certificate in AI.

Major Course Requirements for
Dept. of School of Computing
(For Master's Program)

Thesis Mater's Degree Program

Please check the common graduation requirements.

◉ **Credit Requirement for Graduation:** Required to complete a total of more than 33 credits

◉ **Mandatory General Courses:** 3 credits
- Take 1 course from the following courses: Scientific Writing (CC500), Probability and Statistics (CC511), Introduction to Materials Science and Engineering (CC512), Engineering Economy and Cost Analysis (CC513), Introduction to Instruments (CC522), Entrepreneurship and Business Strategies (CC530), Patent Analysis and Invention Disclosure (CC531), and Collaborative System Design and Engineering (CC532).
- CC010 Special Lecture on Leadership (non-credit, this applies to students entering KAIST in 2002 and thereafter; general scholarship students, foreign students are excluded)
- CC020 Ethics and Safety I

◉ **Mandatory Major Courses:** none

◉ **Elective Courses:** at least 18 credits
- **Essential Courses (at least 9 credits):** Take one course from each of the following three areas.
  Theory: CS500 Design and Analysis of Algorithms, CS520 Theory of Programming Languages, CS522 Theory of Formal Languages and Automata, CS504 Computational Geometry, CS579 Computational Linguistics, CS524 Program Analysis, IS581 Security Proof and Attacks in Cryptography
  Software: CS550 Software Engineering, CS560 Database System, CS562 Database Design (For CS560 Database System and CS562 Database Design, only one of the courses will be accepted to satisfy the course requirements.), CS570 Artificial Intelligence and Machine Learning, CS572 Intelligent Robotics, CS574 Natural Language Processing I, CS576 Computer Vision, CS580 Computer Graphics, CS590 Semantic Web, CS552 Models of Software Systems, CS554 Designs for Software and System, CS564 Data Science Methodology, IS561 Binary Code Analysis and Secure Software

Systems

Computer Systems: CS510 Computer Architecture, CS530 Operating System, CS540 Network Architecture, CS542 Internet Systems Technology, CS548 Advanced Information Security, CS546 Wireless Mobile Internet, CS543 Distributed Systems, CS584 Human-Computer Interaction, CS610 Parallel Processing, CS632 Embedded Operating Systems, IS522 Introduction to Systems Security, IS542 Web Service Security and Privacy

- **Elective Courses (at least 9 credits):** 3 credits must be from the courses offered by the School of Computing (CSXXX). (Mandatory general courses and Other elective courses are not accepted as elective courses.)

■ **Research Courses:** at least 6 credits. (2 credits from seminar courses are required and can be credited towards research credits.)

□ **Transitional Measures**

- The above requirements are applicable to all enrolled students. However, students who entered in 2016 or before can choose to fulfill the above requirements.

  ※ Students who entered in 2016 or before can choose to apply CS520 Theory of Programming Languages to one of the Theory area or Software area.

  ※ The Requirements that "Mandatory General courses and Other elective courses are not accepted as elective courses" will apply to all enrolled students from in the spring of 2023.

- Students who entered in 1998 or earlier can use credits from CS600 Graph Theory towards mandatory major course requirement in theory area.

- From the Fall semester 2001, TE628 Internet Server offered by Cooperative Telecommunication Education Program is counted as an elective major course.

- CS541 Smart Business Application and Development is counted as an elective course from Fall 2012.

Major Course Requirements for
Dept. of School of Computing
(For Doctoral Program)

Please check the common graduation requirements.

▣ **Credit Requirement for Graduation:** Required to complete a total of more than 60 credits

▣ **Mandatory General Courses:** 3 credits (If a student has already fulfilled this requirement for master's program, he or she is considered to have fulfilled this requirement in doctoral program.)
 - Take 1 course from the following courses: Scientific Writing (CC500), Probability and Statistics (CC511), Introduction to Materials Science and Engineering (CC512), Engineering Economy and Cost Analysis (CC513), Introduction to Instruments (CC522), Entrepreneurship and Business Strategies (CC530), Patent Analysis and Invention Disclosure (CC531), and Collaborative System Design and Engineering (CC532).
 - CC020 Ethics and Safety I

▣ **Mandatory Major Courses:** none

▣ **Elective Courses:** at least 27 credits
 - Essential Courses (at least 9 credits): Same as the master's program requirements. If a student has already fulfilled this requirement for master's program, he or she is considered to have fulfilled this requirement in doctoral program.
 - Elective Courses (at least 18 credits): 9 credits must be from the courses offered by the School of Computing (CSXXX). (Mandatory general courses and Other elective courses are not accepted as elective courses.)

▣ **Research Courses:** at least 30 credits. (4 credits from seminar courses are required and can be credited towards research credits.)
 ※ The course credits earned in the Master's course work can be used towards the Doctoral degree (except research credits).

☐ **Transitional Measures**
 - The transitional measures for the master's program are applied to the Doctoral Program.

Major Course Requirements for
Dept. of School of Computing
(For MS-PhD Integrated Program)

Please check the common graduation requirements.

▣ **Credit Requirement for Graduation:** Required to complete a total of more than 60 credits

▣ **Mandatory General Courses:** 3 credits (If a student has already fulfilled this requirement for master's program, he or she is considered to have fulfilled this requirement in doctoral program.)
  - Take 1 course from the following courses: Scientific Writing (CC500), Probability and Statistics (CC511), Introduction to Materials Science and Engineering (CC512), Engineering Economy and Cost Analysis (CC513), Introduction to Instruments (CC522), Entrepreneurship and Business Strategies (CC530), Patent Analysis and Invention Disclosure (CC531), and Collaborative System Design and Engineering (CC532).
  - CC020 Ethics and Safety I

▣ **Mandatory Major Courses:** none

▣ **Elective Courses:** at least 27 credits
  - Essential Courses (at least 9 credits): Same as the master's program requirements. If a student has already fulfilled this requirement for master's program, he or she is considered to have fulfilled this requirement in doctoral program.
  - Elective Courses (at least 18 credits): 9 credits must be from the courses offered by the School of Computing (CSXXX). (Mandatory general courses and Other elective courses are not accepted as elective courses.)

▣ **Research Courses:** at least 30 credits. (4 credits from seminar courses are required and can be credited towards research credits.)
  ※ The course credits earned in the Master's course work can be used towards the Doctoral degree.

□ **Transitional Measures**
  - The transitional measures for the master's program are applied to the MS-PhD Integrated program.