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**Transfer Course Descriptions**

**INTENDED MAJOR: CHEMICAL ENGINEERING**

### **INSTRUCTIONS (please read carefully—failure to follow instructions may negatively impact your application):**

Match your completed (and any in-progress) coursework to the corresponding Cornell courses listed. Complete the right-hand column with the requested details of each of your corresponding courses. Cut and paste the course descriptions directly from your previous/current institution(s) courses of study. **NOTE: do not list coursework that you are planning to take during the summer.**

* If more than one course fulfills a particular recommended Cornell Engineering course, include the applicable course information for all relevant courses.
* Leave blank any section for which you do not have a corresponding course.
* If you have AP/GCE A-Level/IB exam credit for a course, only the AP/GCE A-Level/IB course name, exam date and score are needed. If one of these exams may be used to satisfy a requirement, it is noted in the left-hand column for each relevant course along with the required exam score. Please note that we will only award credit for test results that are based on Cornell University policy—not that of your current institution.
* We **will not** use SAT or ACT test scores to satisfy any requirements.
* If you have taken a placement test at your current institution for one of the required courses, **DO NOT** list it. We will not accept placement tests offered at other institutions to satisfy any required coursework.
* Please note that we require you upload a copy of your course syllabus for **select courses**. Please read through carefully. You only need to provide a syllabus for the requested classes. See directions below.
* **Questions?** E-mail Cornell Engineering Admissions at [engr\_trans\_adm@cornell.edu](mailto:engr_trans_adm@cornell.edu).

### **SUBMIT YOUR COMPLETED FORM:**

* **Save** completed form as a .pdf (preferred) or .doc/.docx file named ***Last Name, First Name*** *– CD*
* **Upload** to your application using the Cornell Application Status Page
  + **Once you have submitted your application to Cornell, you will receive access to an application status page. Using this page you may upload supplemental material including the course description form and required syllabi. When uploading syllabi, please try to consolidate into one document. Do not embed syllabi in this document.**
  + On the right-hand side, using the drop-down menu, select **TRCD Course Description** for the course description form,andselect **TRCS Transfer Course syllabus** when uploading required syllabi.
  + Click *Choose File*
  + Follow the instructions to attach your file

### PLEASE PROVIDE THE FOLLOWING:

* **Student Name:**
* **Email Address:**
* **Phone Number:**
* **Date of Birth:**
* **Current Institution:**
* **Course Catalog Website:**

**REQUIRED COURSEWORK FOR ALL TRANSFER APPLICANTS**

| **CORNELL COURSEWORK** | **YOUR COLLEGE-LEVEL COURSEWORK** |
| --- | --- |
| **MATH 1910, Calculus for Engineers**  4 credits. Essentially a second course in calculus. Topics include techniques of integration, finding areas and volumes by integration, exponential growth, partial fractions, infinite sequences and series, tests of convergence, and power series.  **Exam(s) and relevant score(s) that will also satisfy this requirement:**  AP Calculus BC exam: 5 | College/University:  Course #:  Course Title:  Semester/Year Taken (e.g. Fall 2018):  Credit Hours:  Laboratory Component? Y N  **COURSE DESCRIPTION:** [paste course description text here]  Textbook information, if available (Name, Author, Edition Number):  **Grade Received (IP=In Progress):**  **Please provide a syllabus for your equivalent course through application status page (do not embed in document).** If you are using AP credit to satisfy this requirement, you do not need to upload a syllabus. |
| **MATH 1920, Multivariable Calculus for Engineers**  4 credits. Introduction to multivariable calculus. Topics include partial derivatives, double and triple integrals, line and surface integrals, vector fields, Green’s theorem, Stokes’ theorem, and the divergence theorem. | College/University:  Course #:  Course Title:  Semester/Year Taken (e.g. Fall 2018):  Credit Hours:  Laboratory Component? Y N  **COURSE DESCRIPTION:** [paste course description text here]  Textbook Information, if available (Name, Author, Edition Number):  **Grade Received (IP=In Progress):**  **Please provide a syllabus for your equivalent course through application status page (do not embed in document).** |
| **PHYS 1112 with PHYS 1110**  **PHYS 1112, Physics I: Mechanics & Heat**  3 credits. First course in a three-semester introductory physics sequence. . This course is taught in a largely "flipped', highly interactive manner, with reading preparation and online reading quizzes required for class. Covers the mechanics of particles with focus on kinematics, dynamics, conservation laws, central force fields, periodic motion. Mechanics of many-particle systems: center of mass, rotational mechanics of a rigid body, translational & rotational equilibrium. Temperature, heat, the laws of thermodynamics. At the level of University Physics, Vol. 1, by Young and Freedman.  **WITH**  **PHYS 1110, Introduction to Experimental Physics**  1 credit. This laboratory course is an introduction to the nature and skills of experimentation in physics. Students will engage in multi-week investigations, creatively design their own experiments, and explore questions of how we develop models in physics through experiments. Students will learn how to design experiments, analyze data, develop interesting research questions, and consider issues of ethics in physics experiments. Students will also develop communication and collaboration skills. The course aims to provide an opportunity for students to consider the nature of measurement and experimentation and evaluate the relationship between physical theories and experimental data.  **Exam(s) and relevant score(s) that will also satisfy this requirement:**  AP Physics C-Mechanics exam score needed: 5  GCE A-Leve exam score needed: A or B  IB Physics HL exam score needed: 6 or 7 | College/University:  Course #:  Course Title:  Semester/Year Taken (e.g. Fall 2018):  Credit Hours:  Laboratory Component? Y N  **COURSE DESCRIPTION:** [paste course description text here]  Textbook Information, if available (Name, Author, Edition Number):  **Grade Received (IP=In Progress):**  **NOTE:** If you took the equivalent of PHYS 1112 and it included a lab component, you will receive credit for both PHYS 1112 and PHYS 1110**.** If the equivalent course taken did not include a lab component, then you will have to PHYS 1110 at Cornell. If you use exam credit to satisfy this requirement, you will need to take PHYS 1110 at Cornell.  **Please provide a syllabus for your equivalent course through application status page (do not embed in document).** If you are using exam credit to satisfy this requirement, you do not need to upload a syllabus. |
| **CHEM 2090, Engineering General Chemistry**  4 credits. Covers basic chemical concepts, such as reactivity and bonding of molecules, introductory quantum mechanics, and intermolecular forces in liquids and solids and gases. Attention will be focused on aspects and applications of chemistry most pertinent to engineering. (Course includes a laboratory component.)  **Exam(s) and relevant score(s) that will also satisfy this requirement:**  AP Chemistry exam score needed: 5  GCE A-Level exam score needed: B  IB Chemistry HL exam score needed: 6 or 7 | College/University:  Course #:  Course Title:  Semester/Year Taken (e.g. Fall 2018):  Credit Hours:  Laboratory Component? Y N  **COURSE DESCRIPTION:** [paste course description text here]  Textbook Information, if available (Name, Author, Edition Number):  **Grade Received (IP=In Progress):**  **Please provide a syllabus for your equivalent course through application status page (do not embed in document).** If you are using exam credit to satisfy this requirement, you do not need to upload a syllabus. |

**STOP:** **If you have not taken the equivalent of all four of the above courses, your application will not be reviewed.**

**RECOMMENDED COURSEWORK FOR SOPHOMORE STANDING**

| **CORNELL COURSEWORK** | **YOUR COLLEGE-LEVEL COURSEWORK** |
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| **CS 1110 or CS 1112**  **CS 1110, Introduction to Computing: A Design and Development Perspective**  4 credits. Programming and problem solving using Python. Emphasizes principles of software development, style, and testing. Topics include procedures and functions, iteration, recursion, arrays and vectors, strings, an operational model of procedure and function calls, algorithms, exceptions, object-oriented programming. Weekly labs provide guided practice on the computer, with staff present to help.  **CS 1112, Introduction to Computing: An Engineering and Science Perspective**  4 credits. Programming and problem solving using Python. Emphasizes the systematic development of algorithms and programs. Topics include iteration, functions, arrays, strings, recursion, object-oriented programming, algorithms, and data handling and visualization. Assignments are designed to build an appreciation for complexity, dimension, randomness, simulation, and the role of approximation in engineering and science. Weekly discussion section provides guided practice on the computer, with staff present to help. NO programming experience is necessary; some knowledge of Calculus is required.  **Exam(s) and relevant score(s) that will also satisfy this requirement:**  AP Computer Science A exam score needed: 5 | College/University:  Course #:  Course Title:  Semester/Year Taken (e.g. Fall 2018):  Credit Hours:  Laboratory Component? Y N  **COURSE DESCRIPTION:** [paste course description text here]  Textbook Information, if available (Name, Author, Edition Number):  **Grade Received (IP=In Progress):** |
| **CHEM 2080, General Chemistry II**  4 credits. Covers fundamental chemical principles, including reaction kinetics, thermodynamics, and equilibrium. These principles are presented quantitatively and explored in the laboratory. Considerable attention is given to the quantitative calculations and techniques important for further work in chemistry. (Course includes a laboratory component.) | College/University:  Course #:  Course Title:  Semester/Year Taken (e.g. Fall 2018):  Credit Hours:  Laboratory Component? Y N  **COURSE DESCRIPTION:** [paste course description text here]  Textbook Information, if available (Name, Author, Edition Number):  **Grade Received (IP=In Progress):** |
| **ENGRI 1120, Feast! Chemical and Biomolecular Processes and Products through Food**  3 credits. Chemical and biomolecular engineering (ChemE) is central to how we produce, store, and consume food. Learn the principles and practices of chemical engineering through a tasty, hands-on approach to process and product design. This course introduces key concepts and tools in ChemE including process flow diagrams, unit operations, materials and energy balances, phase equilibria, and scale-up. These concepts will be applied in design projects that leverage the use of quantitative methods to support design decisions and balance considerations of product quality, economics, safety, and environmental issues in food products. The course will also explore career pathways in ChemE to understand the wide range of what chemical engineers do in practice. | College/University:  Course #:  Course Title:  Semester/Year Taken (e.g. Fall 2018):  Credit Hours:  Laboratory Component? Y N  **COURSE DESCRIPTION:** [paste course description text here]  Textbook Information, if available (Name, Author, Edition Number):  **Grade Received (IP=In Progress):** |
| **Cornell Freshman Writing Seminar #1**  3 credits. Seminars require six to twelve writing assignments on different topics, totaling a minimum of 30 pages. For other courses to be substituted, students must demonstrate that they have done similar writing in a formal course. (It is not sufficient to write, for example, one 30-page paper.) For more information, see: <http://knight.as.cornell.edu/fws-guidelines#ap-&-transfer-credit>  **Exam(s) and relevant score(s) that will also satisfy this requirement:**  AP Literature and Composition exam score needed: 5  AP Language and Composition exam score needed: 5  GCE A-Level English exam score needed: A  IB English Higher Level exam score needed: 7 | College/University:  Course #:  Course Title:  Semester/Year Taken (e.g. Fall 2018):  Credit Hours:  Laboratory Component? Y N  **COURSE DESCRIPTION:** [paste course description text here]  Textbook Information, if available (Name, Author, Edition Number):  **Grade Received (IP=In Progress):** |
| **Cornell Freshman Writing Seminar #2**  See above  **NOTE: you can only receive credit for one of the two first-year writing requirements using exam credit.** | College/University:  Course #:  Course Title:  Semester/Year Taken (e.g. Fall 2018):  Credit Hours:  Laboratory Component? Y N  **COURSE DESCRIPTION:** [paste course description text here]  Textbook Information, if available (Name, Author, Edition Number):  **Grade Received (IP=In Progress):** |

**ADDITIONAL RECOMMENDED COURSEWORK FOR JUNIOR STANDING**

| **CORNELL COURSEWORK** | **YOUR COLLEGE-LEVEL COURSEWORK** |
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| **MATH 2930, Differential Equations for Engineers**  4 credits. Introduction to ordinary and partial differential equations. Topics include: first-order equations (separable, linear, homogeneous, exact); mathematical modeling (e.g., population growth, terminal velocity); qualitative methods (slope fields, phase plots, equilibria, and stability); numerical methods; second-order equations (method of undetermined coefficients, application to oscillations and resonance, boundary-value problems and eigenvalues); and Fourier series. A substantial part of this course involves partial differential equations, such as the heat equation, the wave equation, and Laplace’s equation. (This part must be present in any outside course being considered for transfer credit to Cornell as a substitute for MATH 2930.) | College/University:  Course #:  Course Title:  Semester/Year Taken (e.g. Fall 2018):  Credit Hours:  Laboratory Component? Y N  **COURSE DESCRIPTION:** [paste course description text here]  Textbook Information, if available (Name, Author, Edition Number):  **Grade Received (IP=In Progress):** |
| **MATH 2940, Linear Algebra for Engineers**  4 credits. Linear algebra and its applications. Topics include matrices, determinants, vector spaces, eigenvalues and eigenvectors, orthogonality and inner product spaces; applications include brief introductions to difference equations, Markov chains, and systems of linear ordinary differential equations. May include computer use in solving problems. | College/University:  Course #:  Course Title:  Semester/Year Taken (e.g. Fall 2018):  Credit Hours:  Laboratory Component? Y N  **COURSE DESCRIPTION:** [paste course description text here]  Textbook Information, if available (Name, Author, Edition Number):  **Grade Received (IP=In Progress):** |
| **ENGRD 2190,** **Chemical Process Design and Analysis**  4 credits. Engineering problems involving material and energy balances. Batch and continuous reactive systems in the steady and unsteady states. Introduction to phase equilibria for multicomponent systems. Examples drawn from a variety of chemical and bimolecular processes. | College/University:  Course #:  Course Title:  Semester/Year Taken (e.g. Fall 2018):  Credit Hours:  Laboratory Component? Y N  **COURSE DESCRIPTION:** [paste course description text here]  Textbook Information, if available (Name, Author, Edition Number):  **Grade Received (IP=In Progress):** |
| **CHEM 2900, Introductory Physical Chemistry Laboratory**  2 credits. Survey of the methods basic to the experimental study of physical chemistry, with a focus on the areas of chemical equilibrium, kinetics, thermodynamics, and molecular spectroscopy. | College/University:  Course #:  Course Title:  Semester/Year Taken (e.g. Fall 2018):  Credit Hours:  Laboratory Component? Y N  **COURSE DESCRIPTION:** [paste course description text here]  Textbook Information, if available (Name, Author, Edition Number):  **Grade Received (IP=In Progress):** |
| **CHEM 3890, Honors Physical Chemistry I**  4 credits. CHEM 3890 introduces the use of mathematics and physics to investigate chemical systems. The fundamental principles of quantum mechanics are introduced and applied to understanding the structure and spectra of atoms and molecules. Specific topics include exact and approximate solutions to the Schrödinger equation, angular momentum, bonding and molecules, and spectroscopy. | College/University:  Course #:  Course Title:  Semester/Year Taken (e.g. Fall 2018):  Credit Hours:  Laboratory Component? Y N  **COURSE DESCRIPTION:** [paste course description text here]  Textbook Information, if available (Name, Author, Edition Number):  **Grade Received (IP=In Progress):** |
| **CHEM 3900, Honors Physical Chemistry II**  4 credits. CHEM 3900 is a continuation of CHEM 3890 and discusses the thermodynamic behavior of macroscopic systems in the context of quantum and statistical mechanics. After an introduction to the behavior of ensembles of quantum mechanical particles, the laws of thermodynamics, concepts of equilibrium, and chemical kinetics are covered in detail. | College/University:  Course #:  Course Title:  Semester/Year Taken (e.g. Fall 2018):  Credit Hours:  Laboratory Component? Y N  **COURSE DESCRIPTION:** [paste course description text here]  Textbook Information, if available (Name, Author, Edition Number):  **Grade Received (IP=In Progress):** |
| **CHEME 3230, Fluid Mechanics**  3 credits. Fundamentals of fluid mechanics. Macroscopic and microscopic balances. Applications to problems involving viscous flow. | College/University:  Course #:  Course Title:  Semester/Year Taken (e.g. Fall 2018):  Credit Hours:  Laboratory Component? Y N  **COURSE DESCRIPTION:** [paste course description text here]  Textbook Information, if available (Name, Author, Edition Number):  **Grade Received (IP=In Progress):** |
| **PHYS 2213, Physics II: Electromagnetism**  4 credits. Second course in a three semester introductory physics sequence. The course emphasizes active learning during class. Video lectures are viewed before class; most class time is devoted to problem-solving. Topics include: electric forces and fields, electric energy and potential, circuits, magnetic forces and fields, magnetic induction, and Maxwell’s equations. Taught at a level somewhat higher than University Physics, Vol. 2, by Young and Freedman. The math prerequisite is essential: line, surface, and volume integrals are done routinely and occasional use is made of gradient, divergence, and curl. | College/University:  Course #:  Course Title:  Semester/Year Taken (e.g. Fall 2018):  Credit Hours:  Laboratory Component? Y N  **COURSE DESCRIPTION:** [paste course description text here]  Textbook Information, if available (Name, Author, Edition Number):  **Grade Received (IP=In Progress):** |
| **Biology Elective (Recommended): Examples include BIOG 1500 and BIOG 1440 and BIOMG 1350**  **BIO****G 1500, Investigative Biology Laboratory**  2 credits. Designed for biology sciences majors to provide lab experience with emphasis on processes of scientific investigations and to promote communication, literacy and collaboration in science. Students gain expertise in methods including instrumentation used by biologists to construct new knowledge. Lab topics include genetics, evolution, ecology, biochemistry, and molecular biology.  The course modules follow the “crawl, walk, run” approach to develop a students’ capacity for solving increasingly challenging problems with greater independence. First, the students fill their scientific “tool box” with skills needed to be able to design and carry out experiments. The first module is structured (Antibiotic Resistance), followed by a module that provides more academic freedom (Limiting Nutrient). Lastly, the Human Microsatellite DNA unit emphasizes the importance of accuracy and precision in science.  **BIOG 1440, Introductory Biology: Comparative Physiology**  3 credits. An introductory physiology course intended for freshman and sophomore biology majors and other students majoring in life sciences. The course integrates physiology from the cell to the organism with comparisons among animals, plants and microbes. Emphasis is on understanding of basic physiological concepts, stressing structure-function relationships and underlying physio-chemical mechanisms.  **BIOMG 1350, Introductory Biology: Cell & Developmental Biology**  3 credits. The course introduces molecular mechanisms that underlie the organization, division, and growth of individual cells; how they organize during embryonic development to form functional tissues and organs in multicellular organisms; and how their misbehavior contributes to disease.  **Exam(s) and relevant score(s) that will also satisfy this requirement:**  AP Biology exam score needed: 5  GCE A-Level exam score needed: A or B  IB Biology HL exam score needed: 7 | College/University:  Course #:  Course Title:  Semester/Year Taken (e.g. Fall 2018):  Credit Hours:  Laboratory Component? Y N  **COURSE DESCRIPTION:** [paste course description text here]  Textbook Information, if available (Name, Author, Edition Number):  **Grade Received (IP=In Progress):** |
| **Liberal Studies Course #1**  Courses in humanities, arts and social sciences. Six liberal studies classes/18 credit minimum (not including writing seminars). | College/University:  Course #:  Course Title:  Semester/Year Taken (e.g. Fall 2018):  Credit Hours:  Laboratory Component? Y N  **COURSE DESCRIPTION:** [paste course description text here]  Textbook Information, if available (Name, Author, Edition Number):  **Grade Received (IP=In Progress):** |
| **Liberal Studies Course #2**  See above | College/University:  Course #:  Course Title:  Semester/Year Taken (e.g. Fall 2018):  Credit Hours:  Laboratory Component? Y N  **COURSE DESCRIPTION:** [paste course description text here]  Textbook Information, if available (Name, Author, Edition Number):  **Grade Received (IP=In Progress):** |

| **PLEASE LIST ANY ADDITIONAL COLLEGE-LEVEL COURSEWORK BELOW – Add rows as needed** |
| --- |
| College/University:  Course #:  Course Title:  Semester/Year Taken (e.g. Fall 2018):  Credit Hours:  Laboratory Component? Y N  **COURSE DESCRIPTION:** [paste course description text here]  Textbook Information, if available (Name, Author, Edition Number):  **Grade Received (IP=In Progress):** |
| College/University:  Course #:  Course Title:  Semester/Year Taken (e.g. Fall 2018):  Credit Hours:  Laboratory Component? Y N  **COURSE DESCRIPTION:** [paste course description text here]  Textbook Information, if available (Name, Author, Edition Number):  **Grade Received (IP=In Progress):** |