IIT CHEMICAL ENGINEERING (ICE)

ICE 100 | INTRODUCTION TO THE PROFESSION I | 4.5 quarter hours
(Undergraduate)
Introduction to chemical engineering and engineering productivity software. Communication skills development, technical reporting and presentation, engineering ethics, and a variety of topics are discussed.

ICE 104 | INTRODUCTION TO COMPUTER PROGRAMMING FOR ENGINEERS | 3 quarter hours
(Undergraduate)
Introduces the use of high-level programming language as a problem-solving tool in engineering including basic data structures and algorithms, structured programming techniques, and software documentation. Designed for students who have had little or no prior experience with computer programming. (Taught at IIT as CS 104)

ICE 202 | MATERIAL AND ENERGY BALANCES | 4.5 quarter hours
(Undergraduate)
Material and energy balances for engineering systems subjected to chemical and physical transformations. Calculations on industrial processes. CSC 224/225 or equivalent; MAT 149/152/162 and CHE 113 or CHE 131 recommended. (Taught at IIT as CHE 202)

ICE 239 | MATHEMATICAL AND COMPUTATIONAL METHODS | 4.5 quarter hours
(Undergraduate)
Utilization of numeric and analytic methods to find solutions to a variety of chemical engineering problems. Emphasis placed on development of computer code, and interpretation of results. Topics covered include systems of algebraic equations, initial value differential equations, and boundary value differential equations. Taught at the Illinois Institute of Technology as CHE 239.

ICE 296 | INTRODUCTION TO IPRO | 1.5 quarter hours
(Undergraduate)
Introduction to process design. Principles and techniques in effective team work. Performance of selected design tasks in project groups integrated with ICE 496. Practice with process design software. First part of the ICE 296 - ICE 496 project package. Only chemical engineering students should register for this course. ICE 101, ICE 202, or consent recommended. [Taught at IIT as IPRO 296].

ICE 301 | FLUID MECHANICS AND HEAT-TRANSFER OPERATIONS | 4.5 quarter hours
(Undergraduate)
Flow of fluids and heat transfer. Fundamentals of fluid flow and heat transfer design equations as applied to selected unit operations. ICE 202 and ICE 252 recommended. COREQUISITE(S): ICE 343, MAT 260. Taught at IIT as CHE 301.

ICE 302 | MASS-TRANSFER OPERATIONS | 4.5 quarter hours
(Undergraduate)
Mass transfer in stagewise and continuous contacting equipment. Mass transfer design equations as applied to selected unit operations. Unsteady state operations in mass transfer equipment. (Taught at Illinois Institute of Technology as CHE 302) ICE 301 recommended.

ICE 311 | FOUNDATIONS OF BIOLOGICAL SCIENCE FOR ENGINEERING | 4.5 quarter hours
(Undergraduate)
This introductory course will introduce engineering students to basic principles of Biological Sciences, which will enable them to understand more advanced courses on the topic and provide a solid base for further study in all life sciences-related topics required in their individual programs. (Taught at Illinois Institute of Technology as CHE 311)

ICE 317 | CHEMICAL ENGINEERING LABORATORY I | 3 quarter hours
(Undergraduate)
Laboratory work in the unit operations of chemical engineering, fluid flow, heat transfer, and other selected topics. (Taught at Illinois Institute of Technology as CHE 317) ICE 301 recommended.

ICE 320 | TRANSPORTATION PHENOMENA | 4.5 quarter hours
(Undergraduate)
The equations of change in different coordinate systems (mass, momentum, and energy transport). Velocity distribution in laminar and trubulent flow. Formulation and analytical solutions to the problems of viscous flow, molecular diffusion, heat condition and convection. (Taught at Illinois Institute of Technology as CHE 406) ICE 301, ICE 302 & ICE 252 recommended.

ICE 322 | CHEMICAL ENGINEERING LABORATORY II | 3 quarter hours
(Undergraduate)
Laboratory work in distillation, humidification, drying, gas absorption, filtration, and other areas. (Taught at Illinois Institute of Technology as CHE 418)

ICE 324 | CHEMICAL REACTION ENGINEERING | 4.5 quarter hours
(Undergraduate)
Introduction to the fundamentals of chemical kinetics. The design, comparison, and economic evaluation of chemical reactors. Emphasis on homogeneous systems. Taught at Illinois Institute of Technology as CHE 423. ICE 302, ICE 351 and ICE 326 recommended.

ICE 326 | PROCESS MODELING AND SYSTEM THEORY | 4.5 quarter hours
(Undergraduate)
Principles of process modeling. Modeling of non-reactive and reactive dynamic processes. Transfer functions. Modeling of multistage and non-linear processes. Discrete-event processes, Markov processes, and automata theory. (Taught at Illinois Institute of Technology as CHE 433) COREQUISITE(S): ICE 302, ICE 351. ICE 301 recommended.

ICE 328 | PROCESS CONTROL | 4.5 quarter hours
(Undergraduate)
Dynamic process models, stability assessment, feedback and feedforward control strategies, design and tuning of closed-loop controllers, time domain and frequency domain design and performance assessment methods. Multivariable systems, interaction, multi-loop control. Software for process simulation and controller design. (Taught at Illinois Institute of Technology as CHE 435) ICE 302 and ICE 326 recommended.

ICE 330 | NUMERICAL AND DATA ANALYSIS | 4.5 quarter hours
(Undergraduate)
Utilization of numerical methods to find solutions to a variety of chemical engineering problems. Emphasis placed on problem formulation, development of computer code, and interpretation of results. Techniques covered include: systems of algebraic equations, linear regression, and statistics. Numerical differentiation and integration, solution of ordinary and partial differential equations. (Taught at Illinois Institute of Technology as CHE 439)

ICE 332 | CHEMICAL PROCESS THERMODYNAMICS | 3 quarter hours (Undergraduate)
Second law analysis of cooling, separation, combustion, and other chemical processes. Chemical reaction equilibrium and processing applications. ICE 351 recommended.

ICE 334 | CHEMICAL PROCESS DESIGN | 4.5 quarter hours (Undergraduate)
Introduction to design techniques and economic aspects of chemical processes. The technical and economic aspects of equipment selection and design, alternative methods of operation. (Taught at Illinois Institute of Technology as CHE 494) ICE 302, ICE 351 and ICE 326 recommended.

ICE 336 | STATISTICAL TOOLS FOR ENGINEERS | 4.5 quarter hours (Undergraduate)
Descriptive statistics and graphs, probability distributions, random sampling, independence, significance tests, design of experiments, regression, time series analysis, statistical process control, and introduction to multivariate analysis (Taught at IIT as CHE 426).

ICE 338 | PROCESS DESIGN II | 4.5 quarter hours (Undergraduate)
Group project in process design. Integration of technical, safety, environmental, economic, and societal issues in process development and design. Final part of the IPRO project package. Project teams consist of chemical engineering students and students from other disciplines and professions. Students from other academic units should register for designated section of IPRO 497 (three credits) and their contribution to the project tasks will be defined accordingly. (Taught at the Illinois Institute of Technology as CHE 496.) ICE 324, ICE 328 and ICE 334 are required prerequisites.

ICE 351 | CHEMICAL ENGINEERING THERMODYNAMICS | 4.5 quarter hours (Undergraduate)
Laws of thermodynamics and their application to chemical engineering operations.(Taught at IIT as CHE 351) ICE 343 recommended.

ICE 352 | THERMODYNAMICS II | 4.5 quarter hours (Undergraduate)
Second law analysis of cooling, separation, combustion, and other chemical processes. Chemical reaction equilibrium and processing applications (Taught at IIT as CHE 451).

ICE 383 | ELECTRIC AND ELECTRONIC CIRCUITS | 4.5 quarter hours (Undergraduate)
Circuit concepts, Ohm's Law, Kirchoff's Laws, network theorems. Circuit elements, DC and AC network analysis. Diodes, transistors, and electronic amplifiers. Digital electronics circuits and instrumentation. (Taught at IIT as ECE 383) PHY 172 recommended.

ICE 397 | INTERPROFESSIONAL PROJECT | 4.5 quarter hours (Undergraduate)
Interprofessional projects allow students to learn teamwork, leadership and project management skills, while working in multidisciplinary teams on projects involving technical, ethical, environmental, economic, public policy and legal issues. IPRO project teams are typically comprised of 6-10 students from sophomore through graduate level from all disciplines that can broadly contribute to a project effort. While every effort will be made to accommodate students' first choices, it may be necessary to balance students across all projects that will be scheduled for the semester or to consolidate students into fewer projects to meet minimum team requirements. Specific rules about selection of IPRO projects may apply in certain degree programs. Some projects may carry Humanities or Social Sciences credit. Students must consult the lead faculty member for the project and their faculty advisor before registering for a project. (Taught at Illinois Institute of Technology as IPRO 397)