

Course Schedule - Fall 2007

Chemical and Biomolecular Engineering

101 **Hidden World of Engineering** credit: 3 hours.

Tells the stories of everyday objects: bathtubs, pop cans and screws. These simple objects shape our lives, yet are engineering masterpieces. To unveil this hidden world the course uses a humanistic approach. Designed to appeal to all majors, it uses human stories - filled with failures and triumphs - to reveal the methods of engineers. The course enchants with tales of ancient steel making, today's pop cans, huge stone monuments, and salt. The course will change how a student looks at his or her world. Several sessions focus on women engineers and the environment.

This course satisfies the General Education Criteria for a Physical Sciences course.

CRN	Type	Section	Time	Days	Location	Instructor
50097	lecture-discussion	1	11:00 AM - 12:20 PM	TR	room 165 Noyes Laboratory	Hammack, W
50097: Physical Sciences course.						
50097: This section is reserved for Freshman students in the College of Business. Any exceptions to this must be approved in writing by Professor Hammack (hammack@netbox.com). Any exceptions that are not approved by him, errors in admittance, or overrides that violate the selection criteria for this section will be corrected before the semester starts. Note that all sections of this course meet at the same time.						
50098	lecture-discussion	2	11:00 AM - 12:20 PM	TR	room 165 Noyes Laboratory	Hammack, W
50098: Physical Sciences course.						
50098: This section is reserved for Sophomore students in the College of Business. Any exceptions to this must be approved in writing by Professor Hammack (hammack@netbox.com). Any exceptions that are not approved by him, errors in admittance, or overrides that violate the selection criteria for this section will be corrected before the semester starts. Note that all sections of this course meet at the same time.						
50099	lecture-discussion	3	11:00 AM - 12:20 PM	TR	room 165 Noyes Laboratory	Hammack, W
50099: Physical Sciences course.						
50099: This section is reserved for Freshman students in the College of Liberal Arts and Sciences. Any exceptions to this must be approved in writing by Professor Hammack (hammack@netbox.com). Any exceptions that are not approved by him, errors in admittance, or overrides that violate the selection criteria for this section will be corrected before the semester starts. Note that all sections of this course meet at the same time.						
50100	lecture-discussion	4	11:00 AM - 12:20 PM	TR	room 165 Noyes Laboratory	Hammack, W
50100: Physical Sciences course.						
50100: This section is reserved for Sophomore students in the College of LAS. Any exceptions to this must be approved in writing by Professor Hammack (hammack@netbox.com). Any exceptions that are not approved by him, errors in admittance, or overrides that violate the selection criteria for this section will be corrected before the semester starts. Note that all sections of this course meet at the same time.						
50101	lecture-discussion	5	11:00 AM - 12:20 PM	TR	room 165 Noyes Laboratory	Hammack, W

50101: Physical Sciences course.

50101: This section is reserved for Freshmen students in the College of Fine & Applied Arts. Any exceptions to this must be approved in writing by Professor Hammack (Hammack@netbox.com). Any exceptions that are not approved by him, errors in admittance, or overrides that violate the selection criteria for this section will be corrected before the semester starts. Note that all sections of this course meet at the same time.

50113	lecture-discussion	6	11:00 AM - 12:20 PM	TR	room 165 Noyes Laboratory	Hammack, W
-------	--------------------	---	---------------------	----	---------------------------	------------

50113: Physical Sciences course.

50113: This section is reserved for Sophomore students in the College of Fine & Applied Arts. Any exceptions to this must be approved in writing by Professor Hammack (hammack@netbox.com). Any exceptions that are not approved by him, errors in admittance, or overrides that violate the selection criteria for this section will be corrected before the semester starts. Note that all sections of this course meet at the same time.

201 **Cooperative Education Planning** credit: 0 hours.
Same as CHEM 291. See CHEM 291.

CRN	Type	Section	Time	Days	Location	Instructor
36306	discussion-recitation	1	ARRANGED			Williams, D; Mirarefi, A

202 **Cooperative Education Practice** credit: 0 hours.
Same as CHEM 293. See CHEM 293.

CRN	Type	Section	Time	Days	Location	Instructor
36312	practice	1	ARRANGED			Williams, D

210 **CHBE Internship** credit: 0 hours.

Full-time practice of chemical science in an off-campus industrial setting or research laboratory environment. Summary report required. May be repeated. Approved for S/U grading. Prerequisite: Completion of freshman year or equivalent, or consent of Director of Cooperative Education in Chemical and Biomolecular Engineering.

CRN	Type	Section	Time	Days	Location	Instructor
29898	discussion-recitation	1	ARRANGED			Williams, D

221 **Principles of CHE** credit: 3 hours.

Lectures and problems on material and energy balances. Prerequisite: CHEM 104 or CHEM 204; credit or concurrent registration in CS 101.

Students must register for one lecture-discussion and one quiz section.

CRN	Type	Section	Time	Days	Location	Instructor
31555	lecture-discussion	AE1	02:00 PM - 02:50 PM	MW	room 112 Chemistry Annex	Kong, H
31556	quiz	AQ1	02:00 PM - 02:50 PM	F	room 113 Davenport Hall	Kong, H
31558	quiz	AQ2	02:00 PM - 02:50 PM	F	room 169 Davenport Hall	Kong, H
31559	quiz	AQ3	02:00 PM - 02:50 PM	F	room 165 Noyes Laboratory	Kong, H
31560	quiz	AQ4	02:00 PM - 02:50 PM	F	room 312 Davenport Hall	Kong, H

297 **Individual Study Sophomores** credit: 1 to 3 hours.

Individual study of problems related to Chemical and Biomolecular Engineering. May be repeated to a maximum of 6 hours. Prerequisite: Sophomore standing and consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
50951	independent study		ARRANGED			
50951: Instructor Approval Required						

421 **Momentum and Heat Transfer** credit: 4 hours.

Introduction to fluid statics and dynamics; dimensional analysis; design of flow systems; introduction to heat transfer; conduction, convection, and radiation. Prerequisite: CHBE 221 or consent of instructor.

Students must register for one discussion and one lecture section.

CRN	Type	Section	Time	Days	Location	Instructor
31561	discussion-recitation	AD1	01:00 PM - 01:50 PM	F	room 329 Davenport Hall	Higdon, J
31564	discussion-recitation	AD2	12:00 PM - 12:50 PM	F	room 161 Noyes Laboratory	Higdon, J
41667	discussion-recitation	AD5	01:00 PM - 01:50 PM	F	room 161 Noyes Laboratory	Higdon, J
41708	discussion-recitation	AD6	01:00 PM - 01:50 PM	F	room 229 Natural History Bldg	Higdon, J
31577	lecture	AL1	08:30 AM - 09:50 AM	TR	room 217 Noyes Laboratory	Higdon, J

430 **Unit Operations Laboratory** credit: 4 hours.

Experiments and computation in fluid mechanics, heat transfer, mass transfer, and chemical reaction engineering. Exercises in effective Chemical and Biomolecular Engineering communications. Prerequisite: CHBE 422; credit or concurrent registration in CHBE 424; senior standing in Chemical and Biomolecular Engineering.

This course satisfies the General Education Criteria for a Advanced Composition course.

CHBE 430 and CHBE 431 are approved for General Education credit only as a sequence. Both courses must be completed to receive Advanced Composition credit.

CRN	Type	Section	Time	Days	Location	Instructor
31592	laboratory	AB2	01:00 PM - 05:50 PM	T	room 8 Roger Adams Laboratory	Miletic, M
31592: Advanced Composition course.						
31595	laboratory	AB3	01:00 PM - 05:50 PM	W	room 8 Roger Adams Laboratory	Miletic, M
31595: Advanced Composition course.						
31600	laboratory	AB4	01:00 PM - 05:50 PM	R	room 8 Roger Adams Laboratory	Miletic, M
31600: Advanced Composition course.						
31604	quiz	AQ1	04:00 PM - 04:50 PM	M	room 165 Noyes Laboratory	Miletic, M
31604: Advanced Composition course.						

431 **Process Design** credit: 4 hours.

Capstone design course where students apply principles from previous courses to the design of complete chemical process systems. Topics include: techniques used in the synthesis and analysis of chemical processes, process simulation and optimization, effective communication in a chemical process engineering environment. Prerequisite: CHBE 422; credit or concurrent registration in CHBE 424.

This course satisfies the General Education Criteria for a Advanced Composition course.

Registration limited to Senior Chemical Engineering Majors. CHBE 430 and CHBE 431 are approved for General Education credit only as a sequence. Both courses must be completed to receive Advanced Composition credit.

CRN	Type	Section	Time	Days	Location	Instructor
29899	conference	AC1	ARRANGED			Miletic, M
29899: Advanced Composition course.						
29900	lecture	AL1	09:00 AM - 09:50 AM	MWF	room 106B6 Engineering Hall	Miletic, M
29900: Advanced Composition course.						

440 **Process Control and Dynamics** credit: 3 hours.

Techniques used in the analysis of process dynamics and in the design of process control systems; includes Laplace transforms, stability analysis, and frequency response methods. Laboratory emphasizes on-line data acquisition and control. Prerequisite: CHBE 421 and senior standing in Chemical and Biomolecular Engineering; MATH 385; CS 101.

Students must register for one lab and one lecture section.

CRN	Type	Section	Time	Days	Location	Instructor
36100	lecture	AL1	11:00 AM - 11:50 AM	MWF	room 217 Noyes Laboratory	Braatz, R

451 **Transport Phenomena** credit: 3 hours.

Unifying treatment of physical rate processes with particular emphasis on the formulation and solution of typical boundary value problems associated with heat, mass, and momentum transport. Prerequisite: CHBE 421; MATH 385.

CRN	Type	Section	Time	Days	Location	Instructor
47540	lecture	A	10:30 AM - 11:50 AM	TR	room 163 Noyes Laboratory	Alkire, R

471 **Biochemical Engineering** credit: 3 to 4 hours.

Applications of chemical engineering principles to biological processes. Topics include enzyme mechanisms and kinetics, bioreactor design, cellular growth and metabolism, fermentation, and bioseparations. 3 undergraduate hours. 4 graduate hours. Prerequisite: Junior, senior, or graduate standing, or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
41112	lecture	1	10:00 AM - 10:50 AM	MWF	room 229 Natural History Bldg	Pack, D; Kraft, M
41112: 3 hours						

473 **Biomolecular Engineering** credit: 3 to 4 hours.

Fundamental principles of biomolecular engineering and its applications in pharmaceutical, agriculture, chemical and food industries. Topics include gene discovery, rational design, directed evolution, pathway engineering, and functional genomics and proteomics. 3 undergraduate hours. 4 graduate hours.

CRN	Type	Section	Time	Days	Location	Instructor
29901	lecture	A	09:00 AM - 10:20 AM	TR	room 162 Noyes Laboratory	Zhao, H

494 **Special Topics** credit: 1 to 3 hours.

Study of topics in chemical engineering; content varies from term to term. Typical topics include optimization, chemical kinetics, phase equilibrium, biochemical engineering, kinetic theory, and transport properties. May be repeated. Prerequisite: Senior standing in Chemical and Biomolecular Engineering or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
47542	laboratory	A	01:00 PM - 04:50 PM	R	room 350E Noyes Laboratory	Seebauer, E
	lecture	A	01:00 PM - 01:50 PM	T	room 165 Noyes Laboratory	Seebauer, E
: 3 hoursChemistry and Transport in Semiconductor Materials Synthesis Microelectronics Processing Lab. Junior or senior standing in chemistry, physics, or an engineering discipline.						
49468	lecture	C	01:00 PM - 02:20 PM	MW	room 162 Noyes Laboratory	Kenis, P
49468: 3 hoursMicrochemical Systems						

499 **Senior Thesis** credit: 1 to 6 hours.

Limited in general to seniors in the curriculum in chemical and biomolecular engineering. Any others must have the consent of the head of the department. Each student taking the course must register in a minimum of 5 hours either in one term or divided over two terms. A maximum registration of 10 hours in two terms is permitted. In order to receive credit, a thesis must be presented by each student registered in CHBE 499. No graduate credit.

CRN	Type	Section	Time	Days	Location	Instructor
10482	independent study		ARRANGED			

521 **Applied Mathematics in CHBE** credit: 3 or 4 hours.

Development of mathematical models and a survey of modern mathematical methods currently used in the solution of chemical and biomolecular engineering problems; topics include the application of vectors and matrices, partial differential equations, numerical analysis, and methods of optimization in Chemical and Biomolecular Engineering. Prerequisite: Consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
29905	lecture	A	09:00 AM - 09:50 AM	MWF	room 164 Noyes Laboratory	Rao, C

565 **CHBE Seminar** credit: 1 hours.

Required of all graduate students whose major is Chemical and Biomolecular Engineering. Approved for both letter

and S/U grading. Prerequisite: CHBE 422.

CRN	Type	Section	Time	Days	Location	Instructor
29904	lecture-discussion	A	03:00 PM - 03:50 PM	T	room 116 Roger Adams Laboratory	Hammack, W

571 **Bioinformatics** credit: 4 hours.

Same as ANSC 543, MCB 571, and STAT 530. Prerequisite: MATH 225; MATH 241 (formerly 243) or MATH 242; MATH 461; or consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
40358	lecture	A	10:00 AM - 11:20 AM	MW	room ARR Illini Hall	Ma, P
40358: Will be held in room 113 Illini Hall						

593 **Individual Study** credit: 0 to 4 hours.

Study under the supervision of a staff member in areas not covered in course offerings. Approved for both letter and S/U grading. Prerequisite: Consent of the staff member under whom the study is to be made.

CRN	Type	Section	Time	Days	Location	Instructor
10484	independent study		ARRANGED			

594 **Special Topics** credit: 1 to 4 hours.

Various advanced topics; generally taken during the second year of graduate study. Typical topics include turbulence, hydrodynamic instability, process dynamics, interfacial phenomena, reactor design, cellular bioengineering, properties of matter at high pressure, and phase transitions. May be repeated. Prerequisite: Consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
31609	laboratory	A	01:00 PM - 04:50 PM	R	room 350E Noyes Laboratory	Seebauer, E
	lecture	A	01:00 PM - 01:50 PM	T	room 165 Noyes Laboratory	Seebauer, E
: 4 hours Topic: Chemistry and Transport in Semiconductor Materials Synthesis Microelectronics Processing Lab. Meets with CHBE 494. Junior or senior standing in chemistry, physics, or an engineering discipline.						

31610	lecture	B	09:00 AM - 10:20 AM	TR	room 162 Noyes Laboratory	Zhao, H
31610: 4 hoursTopic: Biomolecular Engineering. Meets with CHBE 473.						
31570	lecture	C	10:00 AM - 10:50 AM	MWF	room 229 Natural History Bldg	Pack, D; Kraft, M
31570: 4 hoursTopic: Biochemical Engineering. Meets with CHBE 471.						
46979	lecture	E	01:00 PM - 02:20 PM	MW	room 162 Noyes Laboratory	Kenis, P
46979: 4 hoursMicrochemical Systems Meets with CHBE 494C.						
47557	lecture	G	10:30 AM - 11:50 AM	TR	room 163 Noyes Laboratory	Alkire, R
47557: 4 hoursMeets with CHBE 451. Includes extra work.						
49475	lecture	M	03:00 PM - 05:50 PM	WF	room 161 Noyes Laboratory	Masel, R
49475: 4 hoursProposal Writing for Scientists and Engineers.						

597 **Special Problems** credit: 2 to 16 hours.

Individual work on problem-oriented projects not included in theses. This could be research, engineering design, or professional work in chemical and biomolecular engineering which has educational values. The work must be done under the supervision of a staff member with the approval of the department head. Approved for both letter and S/U grading.

CRN	Type	Section	Time	Days	Location	Instructor
10498	independent study		ARRANGED			

598 **Research Seminar** credit: 0 to 4 hours.

Discussion of recent developments of importance to different areas of chemical and biomolecular engineering research. The course is divided into a number of sections, and subject matter differs from section to section and from time to time. Approved for both letter and S/U grading. May be repeated. Prerequisite: Consent of instructor.

CRN	Type	Section	Time	Days	Location	Instructor
10501	independent study		ARRANGED			
10501: Instructor Approval Required						

599 **Thesis Research** credit: 0 to 16 hours.

Candidates for the master's degree who elect research are required to write a thesis. A thesis is always required for the Doctor of Philosophy. Not all candidates for thesis work necessarily are accepted. Any student whose major is

in another department must receive permission from the head of the Department of Chemical and Biomolecular Engineering to register in this course. Approved for S/U grading only.

CRN	Type	Section	Time	Days	Location	Instructor
10503	independent study		ARRANGED			
10503: Instructor Approval Required						