Chemical Engineering
2001 Undergraduate Survey
Summary of Returned Surveys (55 total)

1. Gender: 18 Females (33%); 37 Males (67%)
   27 students graduated in 1995, average year began at UW 1990
   28 students graduated in 1998, average year began at UW 1994

2. 17 (31%) earned a graduate degree
   - 10 MS
   - 5 MBA
   - 2 PhD

   8 (15%) are currently enrolled in a graduate degree program:
   - 6 Business
   - 1 Engineering Management
   - 1 Electrical Engineering

   Institutions Studied at include:
   - Carnegie Mellon University
   - Colorado State University
   - Edgewood
   - Kellogg
   - Marquette
   - Milwaukee School of Engineering
   - Old Dominion
   - Oregon State University
   - Royal Institute of Technology—Sweden
   - Stanford University, 2
   - University of Chicago
   - University of Minnesota, 4
   - University of Natural Medicine
   - University of Texas, 3
   - UW-Oshkosh, 3
   - UW-Madison, 2

   Second Graduate Degree:
   - 1 Bioengineering, MIT, PhD
   - 1 Polymer Technology, KTH, PhD
   - 1 Wood Science, MI Tech Univ

23. Continuing education or industrial short course subjects studied, why

21 responded Yes (38%)

Accounting; didn't have at Madison
Business
Computer aided process design; because it is related to my job and interesting
Computer science; because I don't like chemical engineering
Design of Experiments, project management—job related
DOE, Validation concepts, project management—to enhance my career skills.
Emergency medical training; for plant support
Filtration, project management
Hazmat, 1st Responder; both job related
Kraft pulping superior practices, waste water treatment operations; work
Management classes; to gain basic knowledge of management skills
Mechanical design; job requirement
Microelectronics, Advanced Filtration
Papermaking; industry I work in
Probability and statistics; because I am working as a QA Engineer
Products research, colloids, polymer chemistry, consumer research.
Project management courses for certification; became applicable to my job.
Reducing process variation
Semiconductor manufacturing, computer programming course; for acquiring necessary skills in high-tech industry.
Statistics, DOE, polymer science, leadership, teamwork; needed more skills that college did not provide or need refreshers.
Steam trap design, aspen training; aid in doing engineering work
System specific control system engineering
Water chemistry, water treatment; related to job

4. Not employed: 3
Reason: Immigration status—was a foreign student.
Pursuing additional degree (2)

Currently employed: 29
Company Name:
3M (4)
Air Products and Chemicals, Inc.
Aldrich Chemical Company
American Residential Mtg.
Amitron Corp.
Apta Software, Inc.
Bausch & Lomb
Bigler Trading Co.
Cargill (2)
Capital One Financial
Chem Aqua

Company Name continued

EcoLab, Inc.
Enable Fuel Cell Corp.
Equistar Chemicals
Flowmaster USA
Fluor Daniel
GE Medical Systems
G.W. Eatherton & Co.
Hewlett-Packard
IBM
International Paper (2)
Johnson Polymer
Kimberly-Clark Corporation (2)
Komag, Inc.
Kraft
Mitsubishi Electric
N/A (3)
Natural Path Center
Pechiney Plastic Packaging
Procter & Gamble (6)
Royal Institute of Technology—Sweden (2)
Sasib North America
Thielsch Engineering Inc.
URS Corporation
US Filter
U.S. Navy
USDA Forest Products Lab
Wyeth Lederle Vaccines

Company Employs:	Responses
Fewer than 100	6
100 to 1000	10
Greater than 1000	37

Average years with current employer: 3

Current Title/Position:

Advanced Product Engineer (2)
Advisory Engineer
Chemical Engineer (4)
Commercial Real Estate Agent
Director of Lending
Engineer (2)
Environmental, Health, and Safety Manager
Field Engineer
Fill-in Process Manager
Lead Process Engineer
Lead Web Developer

Current Title/Position continued

Lieutenant (Junior Grade)
Manager of Consumer and Market Knowledge
Manager of Technical Services
Manufacturing Engineer (3)
Owner
PhD Student
Process Engineer (6)
Production Manager
Project Engineer
Project Manager
QA Engineer
Reliability Engineer
Research Assistant
Research Engineer (2)
Sales Engineer
Sales Representative
Scientist (2)
Senior Engineer (2)
Senior Production Engineer
Senior Research Engineer (2)
Team Manager
Technical specialist/support manager
Technician II
Vice President/Doctor of Naturopathy
Vice President of Process Engineering

Job activities in past 2 years:

Types of materials, substances, and products involved"
2 Agricultural or bioprocess high volume materials
14 Consumer products
7 Electronic materials or devices
5 Food products
4 High volume chemicals
2 Metals/minerals
2 Petroleum, fuels, primary petrochemicals
3 Pharmaceuticals/biologicals
17 Polymers
8 Pulp and paper products
9 Specialty/fine chemicals
1 Other: Business
1 Other: Cleaning chemicals
1 Other: Electro Chemical Energy Generation
1 Other: Financial, Information technology
1 Other: Health Services
1 Other: Industrial Gases and Equipment
1 Other: Machinery for Food and Beverages Industry

Job activities in past 2 years continued

1 Other: Magnetic Sputtered Media on aluminum/glass substrates
1 Other: Nuclear
1 Other: Real Estate
2 Other: Software Product Development
2 Other: Water
1 Other: Water treatment
1 Other: Web Development

Main job activities:

5% business planning, 5% laboratory research, 20% marketing and product sales, 30% pilot plant process development, 10% process and equipment design, 10% process operations, 10% product development, 10% other
5% economic evaluation, 10% laboratory research, 40% pilot plant process development, 30% process and equipment design, 15% product development
10% business planning, 10% economic evaluation, 25% laboratory research, 10% marketing and product sales, 45 % product development
10% business planning, 10% plant operations, 10% process and equipment design, 10% process operations, 60% project engineering
10% business planning, 20% plant operations, 10% process and equipment design, 50% process operations, 10% project engineering
10% business planning, 85% process operations, 5% project engineering
10% project engineering, 20% software development, 70% other
20% business planning, 20% lab research, 20% process & equipment design, 30% process operations, 10% project engineering
20% business planning, 20% project engineering, 60% other
20% business planning, 5% economic evaluation, 5% laboratory research, 20% marketing and product sales, 50% product development
20% business planning, 30% laboratory research, 30% pilot plant process development, 20% product development
20%economic evaluation, 20% pilot plant process development, 40% process operations, 20% project engineering
20% laboratory research, 10% process and equipment design, 20% product development, 20% project engineering, 205 software development, 10% other
25% business planning, 75% other
30% business planning, 30% economic evaluation, 40% marketing and product sales
30% business planning, 10% economic evaluation, 50% marketing and product sales, 10% software development
30% business planning, 40% process operations, 30% other
30% laboratory research, 20% product development, 40% project engineering, 10% other: material characterization
40% business planning, 10% economic evaluation, 10% product development, 40% project engineering
40% laboratory research, 30% pilot plant process development, 30% process and equipment design
50% business planning, 50% process operations

Main job activities continued
50% laboratory research, 30% pilot plant process development, 20% product development
50% process operations, 50% project engineering
55% accounting, 15% business development, 15% finance management, 15% sales
75% business planning, 25% process operations
85% process operations, 15% project engineering
100% laboratory research
100% process operations
100% product development
accounting, finance, management, sales, etc
business planning
business planning, economic evaluation, marketing and product sales
business planning, economic evaluation, project engineering
business planning, laboratory research, marketing and product sales, other
business planning, other
laboratory R&D (2)
laboratory research, product development (2)
marketing and product sales
other (2)
pilot plant process development
plant operations, process/equipment design, process operations, project engineering
plant operations, process operations, other
process/equipment design, process operations
process operations (3)
process operations; project engineering
product development (2)
project engineering, other

Years employed in current position:

Under 1 year	13
1 to 4 years	29
5 or more years	6

Brief Description of present position:

Project management/engineering-facilitate and lead project work

Preparing production port approval process, doing metric studies, train operators in filling out process sheets and qualim system, troubleshoot production problems, maintain QS-9000 artification, internal audit

I am a business area leader. I am responsible for managing 35 technicians and 2 converting lines. I am responsible for results in safety, quality, people development, equipment maintenance and improvement.

Brief Description of present position continued
Mortgage finance. I manage several people and am involved in all areas of business development and overall strategic implementation and vision. I have accounting responsibilities as well.

Lead web developer/manager for a small team of outsourced web developers for GE Medical Systems

Research and development of polymer nanocomposites

Work on process optimization to improve efficiencies reducing waste and delay. Developing methods to improve the process. Responsible for 2 converting assets.

Develop new food products for national launch

I manage and oversee the work of 25 mechanical, electrical, and process engineers. Work includes general managerial duties, along with cost accounting, project management, and review of engineering design and practices.

Responsible for five production facilities totaling 400 workers. Coordinate EH+S projects and initiatives. Work with site safety coordinators on local safety improvement.

We manufacture medical devices for urology—sphincters, cuffs, penile implants, for implants.

Currently grad student before working as application engineer implementing MPC

I manage two paper machines which includes over 60 operating employees, 20 maintenance employee, and 1 salaried support staff.

Responsible for daily operation and quality of four polypropylene reactors. Model variables for physical properties, upgrade instrumentation and process piping, install new equipment to keep up with technology and competitors. Mentor co-op.

Take concepts from chemical research and develop processes on pilot and manufacturing scale.

Identify, develop, and implement productivity and efficiency projects for existing Air Separation Unit plants.

Research engineering evaluating new materials and processes for near future product improvements.

I do consumer research on hair care brands, optimize current products, statistics, determine new products for specific brands, claim support, develop technical test methods.

Doctoral studies in microelectronics. Research area of high speed Heterojunction Bipolar Transistors.

Brief Description of present position continued
R&D for wood filled thermoplastic composites. Currently working on photostabilization.

Daily troubleshooting of processes, process improvement conception and implementation, control system upkeep and modification, process evaluation, capital project justification.

Project management and product development in tribology area. Study interaction of texture, magnetics, carbon and lube in magnetic sputtered media for hard disk drive application. Extensive use of analytical instruments and spectroscopy.

Capital project work in the polymer plant, including cost savings and productivity improvement safety and environmental projects; day-to-day plant support engineering including control system troubleshooting and quality data analysis.

Sell water treatment chemicals and service to the middle market.

Product development—R&D. Use consumer reports to help develop product propositions. Work with R&D and marketing/business communities to deliver successful initiatives that meet consumer and business needs.

Oversee piloting opportunities, upgrade and develop new equipment, provide technical support to sales department, bid projects and perform detailed process engineering calculations to support project engineering. Assist with process reviews/optimization of full-scale equipment. Oversee pilot operators. Verify products/processes for R&D.

Develop new consumer products for the Bounty and Charmin brands. Work is a balance of developing new materials, making prototypes, testing those prototypes with consumers, developing a process to make the winning prototype and scaling that process up for national launch of the new product.

Groundwater flow modeling, remediation technologies for environmental consultants.

Failure analysis of pressure vessels and process equipment. Metallurgical evaluation of turbines, gears, pipes, tubes, and boilers.

I am responsible for supervising off-shift operations of our boilerhouse and pulp mill (~25 employees). I am involved with troubleshooting and balancing our operations, as well as providing various management services (personnel, maintenance coordination, etc).

Process improvements, troubleshooting, new equipment implementation.

Sales Representative in the Polyolefins Business for Dow.

Designing mobile phones (plastic parts, cosmetics), Troubleshooting design problem found in mass production, project management.
As a grad student, the surface and interfacial chemistries of various electronic materials on silicon. At IBM, I'll be in process/materials development for advanced memory devices.

Brief Description of present position continued
Technical material owner for chemicals business. Quality upgrades to product—lab research, pilot plant and plant trials, internal/external customer technical service, manufacturing support, business direction.

Consumer and marketing research specialist with internal consulting responsibilities on projects aimed at delivering new products to market as well as building existing brands.

PEM Fuel Cell R&D, manufacturing. Design, construction, evaluation of fuel cells, product development from unit to production, testing software programming (LabVIEW), building fuel cell test systems.

Develop tape-bind products in a lab setting. Work with polymeric films and adhesives.

Work closely with our customers to understand their needs, optimize our products and processes to safety and cost to effectively meet the customers' needs.

I own a chemical marketing company services supply, procurement, inventory management, tech support and waste minimization. I also own a dot com for data management.

Support a fluid dynamics and heat transfer analysis software. Manage the support team on phone and email support. Assist sales engineers with pre-sales support. Do application consultancy system modeling and programming.

I am responsible for developing the maintenance program for a new joint venture (Cargill-Dow Poly Lactic Acid). This includes setting a budget, determining staffing, identifying spare parts, and assigning preventive and predictive maintenance tasks.

Early end product/business development. As such, I am responsible for both business and technical feesibility studies.
Corporate management, resource management, project management, business development.

Develop new flexible packaging structures to meet customer's needs, support manufacturing with materials knowledge, assist sales/marketing with technical knowledge.

Aspen simulations for process development, equipment sizing and specification, procurement, construction support.

Lease and sell commercial real estate.

	College Preparation			Professional Usefulness			
	Very prepared	Adequaqtely prepared	Poorly prepared	Frequently used	Moderately used	Not used	Courses not taken
a. Mathematics (calculus, diff. eq., etc.)	32	19	1	11	27	15	0
b. Statistics (elective, or required since 1999)	5	17	15	15	21	5	11
c. Chemistry	30	21	1	16	28	7	0
23. Physics	12	34	5	9	20	22	0
e. Computer Science (CS 302 or CS 110/310)	5	32	15	9	16	25	1
f. Electric circuits and electronics (ECE 373 or EC376)	4	39	9	7	14	31	0
g. Thermodynamics (ChE 310, or 211,311)	21	30	0	10	27	16	0
h. Engineering Mechanics (EM 214) (now eliminated)	3	34	3	6	11	25	8
i. Process Synthesis, Control, and Design (ChE 250/210, 424, 450,470)	24	25	2	13	23	17	0
j. Transport (ChE 320, 324, 326, and 426)	24	26	2	9	30	14	0
k. Reaction Engineering (ChE 430)	23	26	2	4	16	33	0
l. Materials & Polymers (ChE 540 or 440)	14	28	8	17	23	11	2

6. Additional Comments ChE Undergraduate Education for answers marked very prepared or poorly prepared:

More than enough chemistry for oil/chemical industry that I've used so far; thermo helped a great deal in my refinery position

In the areas I rated "very prepared," the courses were very detailed and rigorous.

I felt the ChE dept was very challenging although my interest dwindled and I left the field. I was somewhat disappointed in the teachers' interest in students' learning vs. research but that's what I expected at a big school. Physics dept was very poor underfunded, poor teaching technique, etc. Comp Sci was old and outdated—waste of time.

Math—I sat in on extra courses, the required courses are adequate if taught properly; statistics—wasn't required, I took ME 424 but it wasn't enough; physics—what I learned through ChE helped, but physics requirements were horribly taught; transport—material was taught well and in a thorough manner

Chemistry—sufficient experience with too much in some areas that was not very useful; Physics—I thought the preparation for physics was extremely adequate and it helps in understanding some of the dynamics of the process; Statistics—In hindsight I wish I would have taken a statistics class, due to the need for it in my current job, lab class gave me a little exposure to stats; Reaction Engineering—Prof Hill was a great prof. And I was very prepared for reaction kinetics, I just wish I could use it more.

Stats were not required and were not pushed as an elective. Circuits was mostly a physics review. Transport is useful and fundamental.

I believe all of the courses except for the few marked prepared me very well for professional work duties.

Very prepared: More of reflection on my memory of professor's ability. These courses provided more real world examples; Poorly prepared: Computer science never ruled me except from a memorization standpoint.

The classes that are marked 'poorly prepared' tried to pack in so much information in so short of a time period that little was retained. Most of the information is not needed in a Chem Eng job—ever. My husband and several friends have Chem Eng jobs and have not used any of this information either. The curriculum is so intense—with no positive uses later. Why?!

No statistic requirement when graduated in 1995. Linear algebra will be useful as well. Wisconsin is very strong and well-prepared in traditional chemical engineering classes, however, more abstract/design type classes and seminar type with a lot of presentation and projects will be more valuable.

I did not have statistics in college. The electronics class was very basic. I rated 6 topics as very prepared because I took a lot of info from these classes.

I never took statistics, but should have as concepts are used daily. I did poorly in process control and am still catching up. Bernoulli equation used regularly. Differential equations used on occasion, mostly differentials.

Many (if not all) of the ChE courses were very well taught and prepared me for any ChE job. Statistics was not required and no electives were taken.

I did not take statistics, nor engineering mechanics. Statistics would definitely be useful in industry. I feel that the chemistry background of ChE undergrads at UW is excellent and above other programs at other universities.

Physics and transport were two subjects that I felt were taught well and the topics I learned were the ones I had to come back to in my daily work.

The classes that were very prepared helped in learning other classes and were very well taught. The poorly prepared classes did not help at all at school and were also poorly taught.
Overall strong program across the board.

Poorly prepared—most of my work is in reinforces polymers and their mechanical properties. I went back to school for a mechanical engineering degree to enhance my knowledge in these areas. Very prepared—In the R&D field, statistics is very important. I would recommend Stat 424 for all engineering students.

Haven't really used, so can't really comment on how prepared I was.

Chemistry—organic chemistry series are very useful. Computer science—FORTRAN/PASCAL option is not useful in industry. ECE—not enough discussion on electronic devices and their application. Mathematics—math background too poor to compete in graduate school, should include more PDE work. Materials and polymers—should cover semiconductor/high-tech industry.

Had multiple c 33: ourses in the topics, which builds form each subsequent course(continuing reinforcement of fundamental principles).

Having focused on water treatment (specifically dealing with membranes and integrated membranes0, I work frequently with various polymers/processes for making hollow fibers. I've required lots of training on DIPS/TIPS polymer processing. I also do extensive work with electronics in the field when working with pilots and my one ECE course did not cover the things I do. Prof. Loh was excellent for stats. I'd suggest requiring this course for ChEs. Prof. Hill did a great job of preparing me for reaction engineering.

No design of experiments instruction. Very little useful statistics or math was taught. Received a broad base of chemistry knowledge which allows me to quickly get up to speed on most any chemistry problem I encounter.

Statistics would have been useful.

Those ratings of "very prepared" indicate I was completely satisfied with the level of education received.

e—I will soon be involved with a project that will have me doing a lot more programming. f—I would have liked to have learned more about power electronics (motors, generators, etc). In general, I feel my education has equipped me better than most of my co-workers, particularly the pulp and paper science grads. The electives I took have also given me an edge in breadth of knowledge (particularly ECE 376, ChE 540).

I took differential equations and not statistics. I believe the fundamentals taught in math, chemistry, physics have helped across the board in the chemical industry.

b) Statistics should be a required course. It shows up again and again in industry and daily life. e) I took ChE 540 but the content was too theoretical to be applicable in industry. In overall, the material that were supposed to be used in the professional life turn out to be not that relevant. But in retrospect, they provide good foundation to learn other things.

As a Ph.D. students of UT-Austin, my chemistry background was as good as or better than my peers. our physics requirements were weak. Few ChEs go into semiconductors (although the number is up) but optics, electrostatics, solid state devices, magnetism, quantum mechanics are all skills needed in grad school and as an engineer in the semiconductor industry.

Chemistry—being a chemical engineer, people/co-workers expect me to have a solid chemistry/electro-chem background. ChE 507 (Prof Langer) was the only electro chem I have , however it provided a good foundation which I am building over myself. Other chemical issues (eg. Different types of plastics, corrosion issues, etc) I felt I was lacking in.

Needed more stats coming out of college. I thought the physics sequence was poor (way too fast, not in-depth enough). CS 302 was a waste of time. ECE 372 is not very necessary for ChE's. A more basic ECE course would suffice. ChE 210 and ChE 320 were good courses, but labs were most valuable.

Statistics—poorly prepared because I didn't take any. All the very prepared—courses were thorough.

Statistics is used so frequently in industry but there is very little emphasis on it during school. I took ChE 470 the only design class offered at the time—too much was jammed into it, so I felt I didn't really learn the basic concepts.

To the extent I needed the "very" categories, I had developed a very strong aptitude for those subjects. The Reaction engineering course by Prof. Hill was the best course I took at UW, both in organization and challenge. I was very disappointed with the Polymers class. A graduate student was the primary teacher, and did not have the experience to introduce such a difficult subject.

Statistics needs to be improved. The school needs to emphasize stats more. This includes both basic analysis and design. The ME 424 (I think) class does a decent job at this but it is an elective that not everyone takes.

Although I do not directly use my ChE degree the skill sets that I developed through the chemical engineering program have prepared me for all the challenges I have faced, so far in my career.

I understand and apply knowledge gained at the UW more effectively than colleagues from other universities.

I feel I am more prepared in these certain categories than my colleagues of equal experience.

7. Additional Comments for answers marked frequently used or not used.

Stats is the way to go these days—much statistical training on the job. Thermo was helpful in the refinery.

I am currently (and have been for the last 3 years) working as a QA engineer in a metal fabrication industry

My job frequently uses statistics, especially control charting and control limits. I took Comp Sci 302 but 310 would have been more helpful (I don't like programming but have had to learn Microsoft access, Microsoft project and some DOS based programs). As for some of the ChE classes, I use more mechanical and electrical skills than ChE courses.

I'm not in the field.

Career change—doesn't need Chem Eng theory

Chemistry—my current job does not utilize this; Computer Science—understanding of programming but no usefulness today; Reaction Engineering—not used in converting industry

430—too specific, not applicable to current job; EM214/ECE 373—not applicable; CS302—I had for tran (at UWMC), which I never even used through the rest of college

In my career I have not had to perform any computer programming, reactor design or engineering mechanics.

Frequently used—job standpoint of production supervision of food products; Not used—Again job did not use the course.
The topics marked 'not used' have not been used at all since I've left these classes. Most of what I learned was how to derive equations, which I will never have to know or use.

I have used or developed due to need the skills marked "frequent" as they are essential to perform my job adequately.

My position deals extensively in polymers and their chemistry and properties. Statistical analysis is used for most laboratory experiments run.

I use thermo, material and energy balances and transport concepts everyday as a process engineer. I need to understand all of these to improve the process. I don't use math above addition, multiplication, etc. I don't do any electrical work, nor strictly physics—everything is applied rather than theoretical.

Statistics, thermodynamics, materials and polymers. Statistics—I use it as part of every analysis of data, I feel that it is one of the "non-engineering" topics that is used the most on the "sidelines."

Working with consumers for formulation doesn't really require ChE or ECE classes.

Computer science is not very applicable since software already exists to aid the engineers. They don't have to write their own programs to do things very much if at all.

I am in a plastics field. I don't use most of the traditional ChE curriculum (thermodynamics, transport, etc).

Not part of job.

Mathematics is not used in my current job as a tribologist.

Thermo and transport frequently used for heat transfer and heat of reaction calculations and emergency pressure relief sizing and air emissions estimates.

Not in a strict engineering setting.

Current job focuses on helping rest of R&D develop technologies that can drive business and consumer objectives. Work closely with business functions.

Because I perform piloting operations in water treatment, Chemistry—water chem calculations. Controls—setting up pilot equipment with PLC's, etc. Polymers—I work exclusively with polymeric membranes. Transport—used in development to determine flow profiles inside modules.

High level math can be given out to experts in that field. Too complicated to spend an engineer's time solving those problems for as little as we come across them. I either buy my materials or use physical means to make new materials. Rxn engineering is not that useful to me now.

My position is outside of my chemical engineering background.

I think statistics course is very important in industry. Computer science (languages) are required for most of the jobs, so I think we should have more courses on this aspect. Process design is useful in industry.

Right now I don't do much detailed engineering which cuts down on a lot of the more "academic" disciplines. I do have to keep an eye on our processes, which forces to touch g, i, and j regularly.

I have no basic for Fortan or Pascal knowledge. Math and Chemistry are fundamental in making business decisions and technically selling plastics.

My career path does not follow the “traditional” ChE (process design, plant management, etc). It is now more toward Mechanical Engineering.

Classes on pumps, plumbing, heat exchangers, bubbles columns, etc are of limited value. I often feel researches with chemistry, physics, EE or MS and E backgrounds are better prepared because they weren’t asked to study pumps.

Frequently use chemistry, math, physics and reaction engineering for current position in PG Chemical development role. Don’t need controls, circuits or CS because other people fill those roles so I don’t have to.

Frequently used—this is stuff I use at work almost everyday (eg. Once every two weeks I have to get out my Transport Phen. textbook and figure stuff out. Love it. Not used—stuff I haven’t used in workfield yet.

A lot of development in project management, hitting timelines and execution. For many BS degrees, there isn’t a high degree of technical work.
Frequently used—chemistry, working in a protein chemistry department. Not used—working in research, not engineering, so many classes are not applicable.

Job description—sales/marketing, new business development.

I work in an operation facility, so the understanding of how process systems interact is very important.

I run a company. The exact topics of my studies are “not used” as often as a normal ChE. However I can fall back on what I learned to move the company forward.

I’m a research engineer in the polymers industry. I develop packaging. My job requires knowledge in polymers, engineering mechanics, thermodynamics, physics, chemistry, and math.

I do a lot of process and chemical plant design and these topics are used daily.

Knowledge of chemistry has been used in ChE and MD work—has led to multiple patents and product breakthroughs at P&G.

8. Supervise work of other Chemical Engineers

Yes: 5
No: 50

9. Comments on deficiencies of entering ChE's to profession.

Stats

May just need to grow up.

People management skills (conflict management, etc), crisis management (high pressure situations), professional skills

Inflexibility of curriculum

Having taught in the ChE program, I would say that many students have deficiencies in their math background.

Lack of statistics, lack of understanding of converting processes

No business knowledge

A lack of process experience, common knowledge of how things should be.

Should have more people skills and real life case studies. Presentation skills were also deficient. Business knowledge and economics.

Communication (written and oral) skills are poor if not absent. Experience in workplace is low. Sense of direction in field is often missing.

Lack of presentation skills and soft skills.

Chem E have little financial analysis skills.

Need stats/SPC, need economics, need advanced spreadsheet and visual basic programming, need CAD familiarity.

Lack of statistical and lack of co-op experience (in my case).

Concept of what is reasonable or practical, what equipment, valves, etc look like, reading flow diagrams (P+ID's).

Entering to the work environment I think that some "soft classes" are missing from our training at school. Classes like: safety in the work/lab environment, presentation skills, decision making, etc.

Field too specific, hard to find a job, especially for foreign students who required by INS to work within the field. E.g. an EE student can easily fill in the job under "EE"," "Computer Eng,", "Comp Sci," etc. ChE: too little programming skills to fill in Computer Eng., too little chemistry to work as a Chemist.

No management skills.

Deficiencies in designing experiments to develop and optimize processes.

Statistics—helps understand data from any experiment. Students entering the work force should be able to design an experiment properly.

No real mechanical aptitude or knowledge of most process equipment.

Lack hands on experience in conducting and designing experiments. Lack DOE skills.

Real world application of theory taught.

Deficiencies are primarily acceptable ones that get quickly learned on the job (business finances, marketing, sales). Also, for consumer products, talking to consumers is a skills most people develop/refine over time.

ChE's from UW entering into the water industry lack a good understanding of water chemistry. ChE's in general seem to have limited knowledge of membranes, and tend to have spent extensive time learning theories and info that is printed in books. They seem to lack the hands on experience and they haven't had the opportunity to brainstorm/troubleshoot/think on their feet.

Problem solving—how to approach any problem with a good plan of action.
Handling multiple priorities—juggling many work tasks and changing your priorities as business changes.

Too much impractical knowledge (academic theory), and not enough applied science knowledge.

Plant and process equipment experience/exposure.

How to apply knowledge learned on work.

Poor project management skills, poor skills in dealing hourly employees (about half of the new engineers at the mill immediately get on the wrong side of the hourly employees, and effectiveness is hampered for years).

Too much of an engineering "ego" (eg. "engineers are the only ones who can work hard"). This can label an engineer as immature in the views of others.

Their knowledge is usually limited to theoretical calculation and tend to follow the textbook approach in solving problems. Thus they tend to overcomplicate simple problems.

Statistics of experiment design, statistics in general.

Weaker in communication (oral presentation) skills and marketing self and new ideas.

UW-ChEs come in with excellent theoretical knowledge but not much working experience (eg. We all know what priming a pump is, but we haven't ever done it). But the good theory does provide for quick learning and competition with MEs.

Understanding of business basics (financial statements, inventory, management, etc).

Lack of understanding of the real responsibilities of ChEs in industry (clearly they are varied).

Need more statistical background.

Money makes the world go round and ChEs have no concept of how their production decisions affect the market place.

Hands on experience with equipment. Greater understanding of values (from a mechanical perspective).

In my career, I found my knowledge from Eng Econ to be helpful, but I could have used more business courses to understand how the plant operates. Also, some basic managerial skill development would have helped.

Not adequately seeing the big picture. Giving up on things too early.

Financial intelligence, a sense of reality versus theory.

Writing in a business atmosphere (non-technical). Working on multi-function teams.

Marketing knowledge.

Statistics, group dynamics, and working in teams.
Their knowledge tends to be very theoretical. There is practical applications training missing.

10. Most Important Qualities or Skills ChE's should have:

Team work, problem solving

Team skills are critical for my current position—many different people to work with and 30 year employees, people with much less education, etc. Communication is also important.

Problem solving, Time management, people skills (in both dealing with peers, bosses and subordinates)

Problem solving—fundamentals are the most important.

Problem solving—important to understand methodology for solving problems on a daily basis; Creative thinking—important to be able to think outside the box

Good communications skills, team player, personable

Technical skills such as problem solving.

Problem solving, computer skills—need to focus more an AutoCad in ChE program, working independently.

Continuous learning and intellectual curiosity; be able to apply chemical engineering to professional field.

Communications skills are extremely important and should be taught before graduating, as they effect everything the engineer will do.

Problem solving skills, all-around knowledge in engineering, team responsibility

Problem solving is the most important quality because it is useful in any field.

Communication is key, but should be prerequisite not taught. Otherwise intellectual curiosity and creativity and initiative should cover most other issues.

Working in a team, intellectual curiosity, creative thinking.

Working in a team is essential because you have to do it all the time.

Communication is important so you are recognized for your work and you can meet the objectives of your organization. Time management is also important so you can take on lots of responsibility and know when to say no to new workloads.

Working independently, balancing working in a team and focusing on making an impact alone and supporting a team, creative thinking.

Being able to manage others, having very good people skills. Time management and communication are important because you need to be able to finish important tasks on time and be able to communicate it effectively to upper management.

Communication is key. Just knowing the answer is not enough. You have to be able to effectively communicate it to others. Working independently is also important because people don't always give you guidance.
Working independently, communication, always asking why, always wanting to learn.

Need good understanding of concepts/theories taught. Common sense and mechanical aptitude are also needed.

Creative thinking and problem solving.

In a plant environment—problem solving, teamwork, and confidence in field.

Use what they learn in a practical manner. Dimensionless numbers don't get a piece of equipment running again.

Communication, efficiency, teamwork, problem solving. To contribute and build a successful business, you need to communicate your points of need and be convincing. The are obvious—you never work alone (and can't be successful in your career in industry if you do).
Problem solving, being part of a team, creativity and the ability to think on their feet, without consulting others. Ability to speak foreign language. Confidence is gained through experience.

Problems solving—that's what engineers do, know where to find answers—develop good network, be curious, have broad knowledge base, time management, communication.

Communication, problem solving.

Problem solving and technical writing.

Creative thinking, problem solving, communication, working on a team.

Problem solving, working with people, managing people (I have had too many engineer bosses that are terrible supervisors/leaders).

Systematic problem solving can be applied to basically any field.

Team skills and communications kills, Lack of economic background/no business or cost analysis classes required.

In the order of importance—time management, creative thinking, problem solving.

Communication and curiosity. Many feel that ChE is undergoing an identity crisis. I agree. Many ChEs do something unrelated or go to grad school to specialize in an area. To adapt, ChEs need to be curious and write and speak and listen.

Problem solving—core of most jobs, time management—need to make project timelines and meet them for critical business needs, communication—you can't get anything done without teamwork and good communication. This is also how you get recognized for your achievements.

Creative thinking and problem solving, communication, teamwork/ethics.

All listed field are important where I work because they make for a well-rounded, responsible ChE.

Competency in technical judgement, problem solver, team player, leadership, communication, project management.

I've never worked as a Che, but I know teamwork, intellectual curiosity and problem solving have all been important for me to use or develop further in research.

Problem solving and creative thinking.

Ethics.

For me, the most important is problem solving and creative thinking. My job requires creative solutions to help my customers.

Problem solving and communication. An engineer's job is to logically break down a problem situation and find a solution. Communication skills are vital to obtain information to identify the problem and to explain the details of the solution.

All of these things are very important. Their weight really depends on the field.

Combination: Good problem solving skills. A genuine curiosity. A sense of urgency when performing work.

Working in a team, communication.

Communication—important when dealing with clients. Confidence in field—portrays your knowledge. Working in a team—done in every aspect of my job.

Creative thinking, problem solving, working on a team, leading a team, make decisions after all the data.

Problem solving, deductive reasoning.

11. Skills the ChE program should encourage or improve on.

Stats

Communication—individual presentations.

Computer applications instead of programming; more overlap with mechanical and electrical engineering classes in a practical (manufacturing environment) way (like understanding mech. and elect. components)

Intellectual curiosity

Encourage building understanding of statistics for data analysis. Encourage building understanding of statistical software.

Stereotypical engineering traits (i.e. nerd—more diverse education including more liberal arts)

Do not water or dilute the program in favor of soft skills. Soft skills are learned on the job, while technical skills usually are not.

Use of AutoCad or design software.

People skills, business knowledge, applied chemical engineering

Technical writing, Practical knowledge—less derivation, more "why do we need to know this"

Working as a team, presentation skills

Real world situations.

Creative thinking, economic analysis abilities.

Practical skills, like what things look like in the field. Also knowledge not only of the main processes, but of auxiliary systems (lube oil for motors, cooling water, power).

Workshops on creativity—there are different types of creative behavior and they should encourage from the beginning, teamwork—sometimes at school a student focuses too much on "A's" that forgets that in industry a team is what matters.

Statistics—design of experiments, business classes—project management, communication.

Communication and designing experiments.

Mechanical related items.

Hands on experience that involves making "gadgets" to encourage creative thinking and problem solving, DOE class, more programming.

Quality control statistical skills.

More classes like summer lab throughout curriculum.

Business finances.

Foreign language, statistics, materials.

Teamwork, Practical problem solving—more examples of how high level, complex ChE curriculum is used in the real world.

Confidence in field.

Provide more intern opportunities.

More inter-disciplinary training. I wish I knew more about materials science and electronics for example.
139: Possibly more emphasis on statistics for industrial operations—Cp, Cpk , run charts, etc.

Presentations, Required business class—I don't know of many not-for-profit chemical or industrial concerns.

More program in creative thinking and communication (writing good/clear reports, graphs, presentations). Also liberal studies (economics, psychology, foreign language, ethics).

Basic science skills. Could be physics or the life sciences. Skills in "oil" chemistry have and will continue to become "commodity."

Teamwork/interdepedent work.

Oral presentation skills.

I think the UW-ChE dept. does a very good job od educating its undergrads. I would have benefited a lot more had I done a co-op or internship. A lot of the aforementioned skills can be reinforced through an internship/co-op.

Communication (presentation, oral), project management, statistics.

Intellectual curiosity and time management.

Creative thinking.

Greater computer skills. Use of programming to solve advanced computational problems.

Creative thinking, curiosity. Communication is always important too.

Financial intelligence, more programming.

Marketing and/or business skills.

More statistical training particularly as it relates to process control.

12. How do you rate the quality of career advising you received in the College of Engineering?

very adequate	12
somewhat adequate	23
somewhat inadequate	11
very inadequate	5
not applicable	3

12. Comments on Improving Career Advising.

Help students to know what to look for on a day visit, like work environment, typical hours, what questions to ask.

More information needs to be given on the types of careers one could expect before one is trapped in the curriculum.

Don't force professors who don't want to be advisors into advising.

Continue to encourage co-ops.

Provide more information on the work engineers perform and possible career paths.

I left college not knowing what my options were or what experience I needed in order to succeed. I think a university such as UW-Madison should spend more time advising students on the many options they have, and less time with deriving equations we will never use. I could almost never see my advisor because of his schedule and when I did see him, he didn't know answers to my questions and could not give me any other suggestions of who to talk to. I think some who knows the field and wants to counsel and is excited about counseling, would be much more effective as an advisor, than a professor with classes, research, and little interest. I paid a lot of money to go this school and was not prepared after I left.

Need advising before students select major in the form of open hour, etc.

I don't recall ever talking one on one with anyone about my career plans.

I don't recall being advised on careers in college (but then again, I don't recall asking). Advisors should initiate more communication.

Consistency with only 1 advisor instead of multiple advisors over course of four years.

ECS was extremely valuable. But for students who may not be as self-directed, it would be helpful to understand the difference between process, project, and production engineers—and to learn this better in some the classes. Maybe spend 2 weeks with assignments typical of a project engineer and then move on to process, etc., so you get a feel for how your own skills and personality fit each job type.

Identifying a mentor or a couple mentors like: a professor, a TA that could provide a little guidance.

It's hard to advise on foreign students NOT to interview for jobs, but with growing numbers of them, have to find a way to accommodate them in career placements.

Have professors provide more examples of where classes could be used in professional careers.

Try to give more exposure to specific jobs for Chem E's in industry. Meeting with Chem E's who are in industry.

I don't remember any advisor.

Offer more—didn't really get any counseling on types of jobs that were out there.

The school provides adequate counseling for engineers to start in industry but lacks advising for grad school candidates.

More counseling on types of jobs available not just grad schools you should apply to.

I believe that it has been improved. It was much better the last two years I was at UW.

My advisors had very little knowledge of the "real, business world."

Professors did not provide an adequate view of industrial environments.

As an international student, I find it very hard to find an internship or permanent job. Career advising should encourage employers to provide more opportunities (interviews) to foreign students.

I would have liked more information on retirement accounts, 401k's, etc right away.

Hard to say. I never really knew what I wanted so it seemed as if I was never presented with all options (i.e. technical sales never was suggested).

More information on how to write good resume, interview strategy, and the do and don't list in professional life.

Help fitting our strength with good career paths.

Greater emphasis on communication/marketing or ideas skills.

I had Lightfoot and he was outstanding.

I don't remember getting career advising.

ChE has so many areas one can go into. When I graduated, I really did not know what areas would be more interesting to me. Improvement would be some discussion about careers in each type of industry.

No ideas. I don't think I took advantage of all services offered.

de Pablo was a bad advisor. In effect, Kathy Myhre was my advisor. She was real nice and helpful. I got by alright.

I received no formal career advising, so I would recommend time be spent, even in a group setting, on this.

It would be helpful for someone to thoroughly explain the options for ChE grads sometime during freshman year.

13. If you have attended or completed graduate school or are currently in graduate school, please rate how well your undergraduate education at UW-Madison prepared you for graduate study.

very adequate	14
somewhat adequate	8
somewhat inadequate	1
very inadequate	0
not applicable	30

Comments on how to improve undergrad education at UW-Madison for Graduate School

It would have been helpful to have economics, statistics or other business prerequisites.

I should have been more focused on getting experience in business undergraduate classes to make it easier to obtain my MBA

I felt like a brain (both smart and organized) in the MBA program—definitely near the top of my class.

I was personally weak in thermodynamics.

The stats and financial tools I use at work, I gained in my MBA not from UW.

Put more emphasis on mathematics and physics.

Opportunity to study plasma physics or cell biology instead of pumps.

I think it's great for those continuing in ChE, I went into biotechnology and hadn't squeezed any microbiology into my schedule.

No comment except that Madison is an exceptional school.

14. How well prepared do you believe you are to compete within your field or current area of employment?

very adequate	36
somewhat adequate	15
somewhat inadequate	1
very inadequate	0
not applicable	2

Comments on preparation to compete within field or area of employment.

UW-Madison made you think and prepare for the difficult challenges that the professional life brings on.

The only area that I feel less trained than my peers on is basic mechanical and electrical component understanding (drive systems, bearings, gearboxes, prox switches, etc). Many of my peers are ECE or ME majors.

UW was a great all around experience. Very challenging. The atmosphere was ideal for personal growth and business contact development. Also the emphasis on Microsoft Excel has been very useful.

My own personal skills.

I feel UW-Madison's preparation was as good if not better than other institutions.

I wish I would have studied harder and applied myself.

Knowledge and education received at UW is irreplaceable.

Little experience in the field—I think a co-op program is a great idea, but companies such as Proctor and Gamble and Kimberley Clark only hire students with very high grade point averages. These students already have an advantage with a high GPA. They don't need the experience as much as someone with a "good" GPA.

I've worked with engineers from many schools and my knowledge was equal or greater.

I don't feel a better education could have been received.

Received very good theoretical background.

I think Wisconsin has a very strong program and whenever someone finds out that I went there, they are very impressed.

My BS degree has given me a “way of thinking” problem solving that I could not have gotten in other fields, that is what is so special about ChE. Our problem solving skills are excellent, our professors were number one at that. Madison has to increase the soft side of topics: creative, etc.

The skills we were taught in school gave us the right problem solving skills to solve work problems. UW students seem to do better at work than students at other schools.

A good, well-rounded education with tough competition creates good employees.

Summer lab is a very good experience in terms of priority/time management. My work involves 24-hr non-stop operations in the U.S. and Malaysia. The heavy work load I received at UW-Madison has prepared me to remain mentally focused and strong for fast-paced high-tech environment.

I have the knowledge and ability to speak with anyone at any level on just about anything.

I’ve had a strong education to build upon, and I’ve spent three year becoming very well trained in the MF/UF industry. My process troubleshooting skills have been the most useful.

UW gave me a strong set of base engineering skills with exposure to a lot of ChE classes. This got me off to a good start at P+G, where I have continued to strengthen my skills and develop many new ones with on the job training.

My courses were always competitive and new material was always a part of my classes. The competition and problem solving of new material allows UW-Madison engineering students to compete in any related engineering field.

The education I received has been top notch. I fear that my personal shortcomings will restrict my opportunities more.

The printed circuit industry lacks well-educated individuals with engineering backgrounds from top engineering programs.

It’s no longer because of the courses that I took but more because of the schools granting my degrees, international working experience, and foreign language.

Solid technical foundation from school combined with excellence on the job prepares me to compete. Now it’s up to how hard I want to work and what time commitment and personal sacrifice I choose.

While my work does not directly pertain to my major, the skills and confidence I received have been critical to my success.

Needed work on leadership, business skills, statistics.
I’ve had some great opportunities to learn new techniques and broaden my knowledge base so I feel confident in my ability to perform well.

Madison ChE program was very rigorous. I seem much better at dealing with different situations and tackling many projects than ChEs from other schools.

I would have been better off learning "C" instead of FORTRAN. UW ChE department was to slow in switching the requirement. Engineering classes all adequate.

I developed problem solving skills as well as some technical aptitude for my career.

Technically very competitive. Improvements in competitiveness could be achieved with improvements in communication.

15. Comparison of Undergrad Education to peers in field from other schools.

Better prepared and skilled engineers

Very well known, respected school and program. Immediately people expect that you will be a good engineer when you say UW-ChE.

The engineering courses in general were better. Other schools have students take more classes in other engineering areas.

No comparison. I am far better prepared.

I seemed to have a better knowledge of transport. Overall my education was above average.

Advantage was having the ability to study abroad in Europe for summer lab.

Far above average

More technical and willing to use technical solutions. Perhaps weaker on the project management and soft skills, initially.

UW—nationally ranked program with the best professors and mentors.

Advantages—UW is considered a prestigious engineering school.

Advantages—more rigorous training in problem solving; Disadvantages—lack of presentation skills

Ok

Exceeds most.

Co-ops/Internships were not required at WI. Some schools do require it. This is a disadvantage because it's such a valuable experience. Advantage—we had a rigorous five-week unit ops lab. I think that's very good.

Madison is number one! The challenges that we encountered during classes were not related to topics encountered in my work, but the steps to take in a problem were the same.

I think the courses in UW are good, very rigorous compared with other schools. Keep up the good work.

Advantage—More rigorous schooling, better programs, better degree, better problem solving skills. Disadvantage—May need more hands on experiments.

Undergraduate education is very good when compared to others. But it could benefit from courses which expose students to areas of work outside the traditional Chem E fields (i.e. petroleum/plastics).

Better education than peers; I could write a lab report better than most coming out of school. Thanks transport lab.

Good, but most people I know went to Madison also—and most have more experience.

Advantages—receives more practical training. Disadvantages—should have taken more math classes and advanced physics and chemistry classes. All Caltech and MIT grads are math machines.

UW-Madison grads are very well-prepared compared to those of other school, namely in the understanding of theoretical background.

More theoretical/analytical thinking but sometimes lacking in correlation (its' practical application).

Fairly similar backgrounds to other Big Ten ChE programs.

Advantages—Hands on experience (summer lab), strong ChE Rxn engineer and transport knowledge compared to peers. Disadvantages—lack materials courses and water chemistry.

My education is as good as any of my peers. Maybe a little too focused on transport phenomena.

Academically superior, but practical experience was lacking in my education.

Advantages—good chemical engineering knowledge.

The pulp and paper grad know more about the specifics of some of our processes, but my education was broader and a bit more theoretical so I am much more flexible.

Some schools (eg Purdue and Georgia Tech) seemed to have a more extensive co-op program).

Advantage—good report writing skills/presentation, actual hands-on experience on industrial process (ChE 424), breadth of non-technical knowledge (from Liberal Arts courses). Disadvantages—lack of strong statistical analysis skills.

Many other schools have lecturers who are not research faculty. These people devote more attention to teaching, may have industrial experience and lighten the load of highly pressured tenure-track researchers.

Similar. No major discrepancies.

Advantages—More rigorous, greater emphasis on creativity in problem solving, stronger team project experiences. Disadvantages—less opportunity than some to get a broader education, eg liberal arts courses.

All my ChE co-workers are Badgers! However, I hear we are way ahead of other Midwest ChE depts (Purdue, Urbana-Champaign, Toledo) in thermo and transport. Don't know anyone from UM.

Advantages—good theoretical understanding of concepts. Disadvantages—poor practical application of concepts.

I haven't encountered many ChEs from other schools. I don't know enough to comment.

I have retained more.

I work with mostly Mechanical Engineers. I generally have equal theoretical understanding of the work, but less on real world. Only because of the field I have chosen.

The summer unit ops lab seems to one great difference form other schools. It allows for a high degree of focus that couldn't be obtained during the year.

Very well. I think that Madison produces very good all-around engineers. My biggest comparison school is the University of Minnesota.

There really is no comparison. The Chem E program develops leaders not followers.

I had more aspen experience as well as computer program knowledge and proficiency. I seem to have had a tougher course of curriculum.

In general, I felt well prepared overall compared with my peers.

16. Subject areas that need more study.

Stats—important in engineering

Business—it gives a more general understanding of how a company is run

History, business/finance—more in tune with my interests

Computers—they are integrated everywhere.

Kinetics…only 1 class offered for undergrads. Also, process control is a good area, but it should be offered earlier or split into 2 courses.

Business.

More liberal arts

Bioengineering and food science. Now it would have been nice to know Chem Eng. Opportunities in electronics and chip manufacturing.

Mechanical engineering courses.

Business—many more in managerial

Polymers—I think the information was valid and useful.

Design, because we only have one class while it is very useful.
Economics—I'm very behind in understanding how to set budgets and financially analyze different scenarios.

Polymers, biochemical engineering, food science, statistics..

Business because it's useful to understand how corporations operate and make decisions. Also, it's good to know how to manage your own finances.

Materials and polymers, statistics, product development.

Anything other the ChE because I can't get a job with my degree

Electronics. This is a very large industry and Chem E's have a good possibility to work in it, especially semiconductors. I was never exposed to this area in undergraduate studies.

More polymer courses; polymers are becoming more important as a material all the time. The flow is unique due to stress relaxation.

Polymers—I think it is interesting and there are opportunities out there.

Environmental engineering, more stats and quality control.

Water chemistry—It would have been excellent for my career. Spanish—I work internationally and like foreign languages. Biochemical Engineering—Something I find interesting.

Polymers.

Material Science—it's my current field.

Materials and solid state physics because I like to continue my career in the semiconductor industry.

Power electronics—I understand the basics of generations, breaker coordination, etc, but not enough to really comprehend the EE's jobs.

Bio-Engineering because it was interesting and cutting edge. Engineering and business as they are ultimately related.

Statistics and Probability—very much used. Project management courses, foreign languages, liberal art courses, physical educations—not necessarily for professional life.

Sold state physics, devices, magnetism, electrostatics, plasma physics, biochemistry, cell biology…these are the "growth" areas of chemical engineering. Students will take other majors that allow them to study these topics.

Statistics—helpful to any career, organic chemistry—helpful to current position.

Economics/econometrics, literature, presentation courses. To help round out my problem solving and communication skills.

Chemistry, electrochemistry. If I were to do it again I'd try to cram in as many ME courses as I could for my electives.

Statistics, communication (oral speaking), project management. All of which are used heavily.

Microbiology, because I went on to a microbial engineering program.

Statistics.

Business. An understanding of finance and business takes you further.

Business and managerial courses.

The balance was just right other than stats. There really is no time to do more and still be exposed to the full discipline.

Financial areas as it relates to business. I just found myself running a company and had to learn fiscal issues on the run.

Communication, business.

Biotechnology—for more marketability in the job place.

Something other than engineering because I had other interests also.

17. The ChE degree requires 15 credits of laboratory courses involving Chemistry and Chemical Engineering. Please rate the value of this laboratory experience to your career and comment on why you rated it this way.

very valuable	26
somewhat valuable	17
of limited value	10
not valuable	1

Comments on rating the value of the 15 credits of laboratory courses involving Chemistry and ChE.

Most because of the team work involved.

Typically this type of work (designing and executing experiments) is done by technicians rather than engineers.

It was challenging and taught discipline which is important.

Did not emphasize the necessary skills needed for the “real world”

470 lab can be improved. 324 and 424 are fine

They gave practical experience that is similar to testing for trials and data analysis.

470—not valuable; Chem labs—good

Life and work is a big laboratory. Lab courses teach you how to interpret data, write reports and communicate to others your thoughts.

Chemistry labs were educational at the time but did not have any relevance to my career.

Early in my career I did some individual food related products.

Labs are practical application of what you learned in class, which is very valuable. My understanding and success in the Lab depended entirely on my TA and how much effort they contributed. Unfortunately, some TAs could barely speak English. Result—learned nothing.

It trained me to be practical in thinking and integrates the field.

I currently do little to no lab work but I have a good understanding of what is required.

The hands on experience in ChE was more valuable than Chem but could have used more breadth as opposed to more in depth.

At UW the labs are really the only way to get hand on experience.

Unit ops is a great course because it forces you to go beyond what you learn form your classes—makes you think like a real engineer where problems aren't easy to solve and there's more than one answer.

I really haven't used much of the experience from classes labs. I just have focused more in other areas.

Too little for a ChE grad to branch out to other fields such as chemistry, biochem, etc. Maybe offer optional labs/course in sciences.

Lab classes were hands on and taught us how to problem solve and how to write lab reports.

Often just cookbook experiments. No experience having to think about how to solve a problem or discover something.
Teaches independent thinking and problem solving. Prepares for writing lab reports efficiently and effectively.

Hands on is very good. Couldn't survive on "classes" alone.

Even though the students may not perform actual lab work in their career, they are still required to demonstrate their lab skills in pilot runs or to communicate with their technicians/associates about running experiments. Lab work also enhances trouble shooting skills.

Exposure to hands-on lab techniques and the ChE discipline of report writing were most valuable.

More of the practical application side. Organic and analytical labs were not very useful to me.

Data analysis is still essential on my job and understanding data and drawing conclusions is a fundamental skill.

I spend time dong various R&D studies, jar tests, etc. The lab courses prepared me for this very well.

Lab reports, in the format I did them in, were of very limited value. Problem statements were poorly defined.

Lab experience helps promote understanding of data obtained from field work.

Summer lab is a valuable experience.

This was our best chance to lay hands on real equipment, not blocks on a flow diagram. I also occasionally need to do analytical work with lab equipment and appreciate the fact that I'm familiar with it.

Writing skills are extremely helpful, especially in writing technical reports.

Provides reality to classroom studies.

The not only train the laboratory skills but other more important items—teamwork, time management, reporting, data analysis. Although some of the materials need some revision to make it closer to industrial situation and not merely a restatement of what you heard in the classroom (the physical chemistry lab materials usually have these useless characteristics).

ChE labs very valuable. Chemistry labs—somewhat valuable, depending on class. P. chem lab not useful. O. chem and analytical somewhat useful.

Helped me be a better problem solver.

Summer lab was excellent. Exposed to real life engineering issues.

Only practical application of concepts that we saw would encourage more.

It teaches you to write up your finding, think critically about your results, and draw conclusions based on your results.

Hands on experiences help you learn (or at least helped me learn) much more than a traditional classroom setting.

They simply reinforced that I had no interest in lab work.

Do not use lab work in my job. Courses were very educational.

The engineering labs were very significant to my understanding of the subject matter. The chemistry labs, significantly less so.

Chemical engineers need to deal with chemists. It is very important that we understand where they are coming from.

Most labs were very hands on. The gave me the confidence to solve problems and challenges that I was doubtful on at the start.

Prepares the student laboratory work in the business environment. Teaches proper techniques.

Especially unit ops lab.

Hands on experiment design—trying to make due with limited resources—very important.

Was used very little in the process engineering field I was in. What would have helped was more training on designing your own experiments

18. Please rate the value of the summer laboratory course in particular and comment on why you rated it this way.

very valuable	34
somewhat valuable	11
of limited value	4
not valuable	3

Comments on value of summer lab course.

I spent 5 weeks in London.

Teaches time management and in-depth understanding of unit ops.

Rushed experiments and beyond stressful time frames—don't encourage quality of work

It's a shame that London lab is so easy. The report writing alone is worth taking the class.

Experience of studying abroad.

Topics not necessarily pertinent but good courses to deal with real job stress, deadline, teamwork…

It encourages time management and learning to work under extreme pressure.

Hands on experience with equipment; independent—working to meet timelines.

Real world application

The challenge is wonderful. The intensity in such short time period is too high.

The experience has been very constructive and team building exercise.

It is a good study of actual work experience.

I may be the only one, but I thoroughly enjoyed it.

It ties together all the concepts learned in the other courses.

Summer lab is too short, we should encourage more of that type of work during regular semesters. Teamwork, creativity, problem solving are all touched in summer lab.

Allowed us freedom to experiment and set up experiments/design. Taught us how to budget time and write lab reports.

Took it in London. It was a great experience.

Introduced process equipment and got hands on experience.

Do not cancel summer lab. It is the ultimate bonding experience.

Although some of the labs were interesting, it was purely an exercise in endurance. I remember little of what I learned because I had so little sleep.

Gives a flavor of "teamwork." However, to truly be a team effort, reports should be "team" reports not individual (this is how it works in industry).

It forces students to operate pilot equipment, troubleshoot any problems, and prepares them for what they'll face in whatever industry they enter (i.e. thinking on their feet, having to work in a group and yet being independent).

Free form lab was great. Individual projects were very good and did a nice job of simulating process development work I do every day.

Too much quick, but good preparations for 80 hour work weeks.

It exposed students to process equipment.

It made me glad to graduate and appreciate only working 10 hours a day.

Writing skills improved, analytic skills may have improved only slightly though.

It seems like boot camp in a way, but it really stressed teamwork, which was valuable.

It teaches a lot of teamwork, time management, reporting, etc under stressful conditions. Definitely useful for professional preparation.

Requires teamwork, independently managing project, timeline, and writing up results.

It really pushed me and helped me realize my capacity to work.

The design of the course is pretty intense and not representative of most people's work experience. I found it to be unnecessarily difficult and a little unrealistic.

Summer lab was hell but my friends that I made in summer lab will be friends for life. You need good friends to be happy and you need to be happy to have a good career.

Again, no lab work in my job. I rated this course higher because I learned a lot of theory in this lab class.

The "informal" labs really helped for future tasks. Starting from nothing but an idea is very much like what I encounter in my current job.

Real world types of problems—real world time crunch. This course really sets Madison apart.

Multi-tasking, urgency of time.

Summer lab builds character/work ethic if nothing else.

Very difficult, high pressure, great exposure to a foreign culture.

London was great, but I didn't learn that much.

19. Did you take an independent study course – ChE 599?

Yes	33
No	21

How do you rate the value of your independent study?

very valuable	13
somewhat valuable	15
of limited value	4
not valuable	0

Why do you rate it this way?

Gives you a favor of real life.

I learned to work independently—presented/wrote reports.

It was interesting but more academically than "real world" applicable.

More realistic experience

I got my masters continuing the research.

11: It provided experience which helped me get a co-op job.

Fun/Interesting but not related to my profession.

I didn't learn anything
Allows a taste of research, however it is not very well directed.

It was educational but not as challenging.

Again, ChE 599 is the closest type of work to summer lab and I learned more in those two 599 than I did in a few of my classes.

Right now I'm not working on an upstream project to allow me to develop my own ideas and projects.

Nice to see some research.

My advisor had strongly advised me to go to grad school. It also provides excellent hands on experience and critical thinking skills.

Creative thinking/problem solving—helped me develop these skills.

It was in water treatment—it's been very useful to my career.

My independent study time was not especially productive.

Provide more opportunities for research work of a graduate student.

Despite the fact that I use little of the research I did at work, I learned a lot about pulping, bleaching, and pulp properties that are useful all the time.

Good experience in managing own project but lack of close contact with faculty or guidance in theoretical aspect of the project.

Both the topic and the thinking processes were valuable.

It was fun, but not directly related to what I do.

Taught me to look at problems from very different angles to solve.

Very practical, hands on knowledge.

Connected with Professor, didn't learn a lot.

It could have been very valuable but I didn't put much work into it.

There was very little development of the project during my turn.

Creative thinking—hands on, problem solving.

Helped to give me some experience in research.

My research has given me the opportunity to compete in presentation contests as well as added my name to bylines of published papers.

Comments on how independent study course could be improved.

By doing more design work than data collecting and analyzing.

More professor interaction. I worked mostly with grad students.

More directions during research will be useful. Undergrad student only seminar is useful.

More structure in requirements.

A little more interaction with my leading professor.

Let the student choose the specifics of the work and the professor be a guide.

Make ChE 599 more easily accessible. Some students had a hard time finding an advisor.

I don't think it could have been Greg Harrington did an excellent job with 599's.

Scope of projects should be better defined.

A required weekly meeting with the advisor when taking independent study-type courses.

Make it more available, if possible.

Help from professor on managing timeline and creating action plans with milestones, etc.

Better equipment or ability to make equipment.

More direction needed. Communication needed.

I picked up in the middle of a project. I would have rather started from the beginning and completed it.

I liked it the way it was structured.

Comments on how independent study experience influenced career choice.

Introduced me to research.

It helped me to determine to go to grad school.

Very significantly—it made me realize I wanted to work in the water treatment industry.

Changed my interests.

I chose the independent study after I accepted the job to learn something about the industry.

I knew I would not want to spend my whole career in research.

Professor became a great mentor.

I realized afterwards that I did not like research.

My work in polymers gave me the experience to apply for a job in this field.

Comments on how graduate school experience was influenced by independent study.

It showed me that I had the skills to further my education.

The area that I studied in grad school is completely different than undergrad research. It allows me to know what field I don't like.

ChE 599 has polished my communications and lab skills. Got me started to research through scientific journals and critique others' work. ChE 599 is good preparation for grad school.

I'm going to start a MS degree in the fall. I'll be in environmental engineering/water chemistry. This is most influenced by my job requirements, but my career choice was heavily influenced by my 599.

I took independent study in biotech area and figured out that I didn't like it at all. Then I took an independent study in semiconductor and I liked it. That changed my interests.

The opportunity to pursue something deeper at your own pace and interest.

Independent study teaches self-reliance and ownership for a project. One learns to work with a team while delivering on specific objectives…what could be more realistic training? Not the centrifugal pump experiment.

20. Please comment on your preparation for and the usefulness of the following factors: [Note that these are distributed throughout classes, and are not necessarily covered intensively in a specific course.]	College Preparation			Professional Usefulness		
	Very prepared	Adequaqtely prepared	Poorly prepared	Frequently used	Moderately used	Not used
a. ability to function on teams	17	32	4	42	11	0
b. ability to communicate effectively	16	32	5	50	3	0
c. knowledge of contemporary issues	5	24	24	18	35	0
d. understanding of professional and ethical responsibility	6	37	10	23	28	2
e. understand impact of engineering solutions in a global and societal context	6	27	20	16	27	10
f. ability to engage in lifelong learning, and recognition of its necessity	18	31	4	31	22	0

21. Comments on ratings of very prepared or poorly prepared answers to question

Never quite felt confident in my ability to communicate effectively.

Practice makes perfect.

Team and communication skills mostly from ChE 450

When working in teams, we typically divided up the work and worked independently rather than really relying on each other's input. We were not graded based on how functional our team was, just the answers/end result.

Good emphasis on team work; non technical issues were not ever really emphasized (societal issues)

Teamwork was encouraged in a number of classes, working on problem sets together encouraged team work. Prof. Wright's Chem 110 encouraged teamwork and was extremely valuable. ChE 450 was a memorable and useful experience in teamwork.

Topics discussed in course included theories developed decades ago.

The labs help to very prepare, as well as the projects in class. I believe lifelong learning is a personal trait, but can be encouraged.

UW was always on the edge of teaching regarding contemporary issues in engineering and the industry. UW prepares you to engage in lifelong learning.

The 'poorly prepared' topics were rarely or never touched on in my classes. This would be the "practical knowledge" that I think would have been very valuable to know before graduation.

Dept was felt to be too academics and lack of practicability.

I feel we did a lot of team work but it was on textbook material. There was little to on ethics/morality study.

I don't recall any education given on non-technical topics including ethics, societal, or other topics.

Communication skills were emphasized in lab classes and in EPD. My technical presentations course was especially beneficial.

Ethical behavior was taught in day one by the behavior of the professors, their experience brought "professional responsibility" as a must in our growth as engineers and people.

The program enables us to promote learning throughout our lives and to keep us curious when working on projects. We don't spend much time in communications classes or on contemporary issues which could hurt us at work.

Think the area of impact of engineering solutions in a global and societal context is not very applicable even though it sounds important. Not an area where a university should put effort into.

Very prepared—lab courses help teach teamwork, as do long problem sets. It would be difficult to make it through with out forming study groups. Poorly prepared—Curriculum is traditional, narrow in scope material. Doesn't relate to society at all.

Didn't cover many "new" issues or ethical topics.

Very prepared—by extracurricular activities and lab work and by ChE 599 and co-op experience. Technical writing class also helped. Poorly prepared—contemporary issues seldom discussed in class.

Students' exposure to the ongoing research and the EPD departments continuing education programs helps stress the importance of lifelong learning.

Understanding impact of engr. Solutions was something I really felt prepared for. This is something I think about with every decision, since part of my job is to minimize technical risks while optimizing processes. Communication—I work for an international company. I'm frequently part of teams with peers in Australia, and the UK. Being able to effectively communicate is crucial for success.

The changing economy both at home and abroad, our current energy crunch and new environmental regulations weigh very heavily on the paper industry, yet I was not aware until I started working. (But how could students learn about the issues facing every industry?) Some of the off the wall things I picked up at school prove useful time and again, so I see the use of learning continually.

Technical writing preparation is very good and is used very often. I don't remember ethical issues being discussed, although I see it almost daily being abused, such as suppliers trying to "buy" people.

Contemporary issues were not stressed much.

b) Plenty of report writing/technical presentations during my ChE undergrad year (ChE 220, 470, 424, Chem labs). c)/d) only slightly touched in ChE 450 (Rudd, better than nothing). e) maybe mentioned slightly in ChE 450 but I mainly learned it myself after graduation. f) no mention of this during ChE undergrad year ever. I learned it from Stanford (grad school life).

We didn't discuss contemporary issues or how it related to potential careers. We didn't discuss the impact of our decisions on society and the world.

Very prepared—a and b thanks to summer lab. Although a co-op position would reinforces the same.

Teamwork was encouraged in school and is highly used in industry. Communication skills can be more emphasized since they are among the most important skills in industry.

Very prepared—we worked on many team projects throughout our classes, we were given examples of the ways engineers have helped the lives of people throughout the world. Poorly prepared—no exposure to problems or issues facing engineers or industries at that time.

I don't remember ever talking about "c" or "e." It seems we focused mainly on theory.

b—My communication skills were not developed in engineering. C—Rarely discussed ethics. E—Did not correlate products and processes to world application. F—Influenced more on a personal level with advisors.

Contemporary issues were never touched on, as far as I can remember. We just dealt with the text. The global/societal context of solutions is also something I didn't hear much about.

As previously stated, the ChemE program at Madison provides its students with more than just a chemical engineering education. Yes, it is somewhat indirect but the resulting skills sets allows ChemE grads to be successful in any area.

UW prepares the student well for lifelong learning.

In my profession these items are used daily and my preparation is reflected in the job place. I seem to be continually rated highly in these areas.

Ability to work with others and ability to communicate are essential in any line of work.

22. Comments on ratings of frequently used or not used answers to question 20.

Communications and teamwork are very important to my job.

Teams—work with people from different departments; Communicate—meetings with people from different departments, train operators; Professional and ethical responsibility—Used everyday, especially when a program manager suggests that I lie in a document to get approval from customer.

It is important to not only know how to communicate well, but also when and how much communication is appropriate.

These topics have been more important than coursework. However, the coursework has been helpful in developing a though process to attack problems.

All of these factors are used a daily basis and are very important to career success.

Again—communication and teams are essential for 'The Real World.'

As a manager, I have to rate every decision I make and what impact it will have on employees and environment.

Effective communication and continuous improvement through learning/education is foundation of success.

In a previous job I gave presentations once a week so those skills are very important.

In industry being efficient and having good interpersonal skills are a MUST, whether you are good at it or not, any engineer will be exposed to teamwork from day one at work.

Most of the factors listed are crucial to succeeding at work, especially when trying to move up the management ladder.

Teamwork and communication are key! Very essential! Impact on global and societal context is just politically correct garbage and not important compared to the others.

Frequently used—Contemporary/applicable issues are best learned after school.

Frequently used—I worked at a multinational company which is based in the U.S and Malaysia. My vendors and customers come from all parts of world—U.S., Canada, Singapore, Taiwan, Japan, S. Korea. It is important to work effectively with "virtual teams" around the globe. Must know and learn contemporary issues to deal with customers in other countries and cultures. I worked at the computer hard-drive industry with rapid production cycles. R&D is at neck-breaking pace. I must continue to learn new technology and new business trends to keep up with my peers and customers.

In a plant setting, communication and teamwork are vital because everything I do has a direct impact on the operation of the plant and on plant personnel. Also an understanding of environmental impact of our process and design decisions helps me make more conscious decisions. Especially with advances in computer and control technology keeping up with these advances is vital to staying on top of my usefulness.

I think that group settings and effective communication are at the cornerstone of a great employee. Those who can communicate their ideas well often do very well in life.

Basic skills used in most industries.

I work with teams of peers from Australia and the UK. This requires excellent communications skills. As a process engineer, I'm required to balance risks associated with new products, sales claims, etc. This requires understanding professional and ethical responsibilities and the impact of the engineering solutions. I'm part of a team that is seen as a "firewall" to protect the company commercially and technically.

The ability to function and communicate as a member of a team and in an office is critically important. The summer lab was the most effective course in promoting these characteristics.

I think the ability to function on teams and communicate effectively are key factors to success as chemical engineers.

I have to be clear when issuing work directions so communication is a must.

All are core skills in a professional environment.

All of them are frequently used once you become part of the educated society. Items a), b), d) are indispensable in professional life but all of them are necessary to have a rich and fulfilling life as an engineer in a global society.

I work on global team all the time. Communication is critical to any job in our organization. Needed to get concurrance, communicate progress, keep teams aligned, and to obtain recognition/promotion.

All of these are important and almost all pertain to area outside, as well as inside engineering.

This is stuff I use at work on an ongoing basis.

I will continue to take course to update skills; ongoing and essential.

Frequently used—you have to interact with people and work on a team no matter where you go, you have to write up or talk about your work no matter where you go, everyone has to know their professional and ethical responsibilities in their job, “h” is especially critical in research settings to stay abreast of the latest advances and find ways to apply new knowledge to your projects. Not used—engineering solutions in a global and societal context, I don’t work with engineers, and I don’t have an engineering job.

Almost every thing is done with a team. To work on a team, you have to communicate. In all jobs, you have to be professional.

b-e—These topics must be understood to make good short and long term business decisions.

Communication is very important in an operations setting. In order to proceed with any projects, a number of people must be convinced that a solution is correct.

Again, all of these areas are used on a daily to weekly basis.

23. Did you participate in a co-op experience?

Yes	34
No	21

How do you rate the value of your co-op experience?

very valuable	30
somewhat valuable	2
of limited value	1
not valuable	0

Comments on how to improve the co-op experience.

Better supervisor; some experience in both R&D and mfg, with exposure to both plant engineering and productions mgmt

I was too inexperienced to be useful. Should have done it later.

Have everyone do it that wants to.

After numerous interviews, I was not selected. I was always told my GPA was not high enough (at 3.3). I was the President of AIChE for 1 year, but even that did not help me.

Make sure the employers give projects similar to what a full time hire would be doing.

No improvement needed, except for maybe make it mandatory.

Could have co-oped in area that I ended up working in. Also, co-op tended to be more of clerical work as opposed to engineering work.

Make it mandatory.

I was disappointed that my coop employer was not hiring when I was interviewing (at least not at my location or field of study).

Co-op requirement.

More meaningful projects assigned.

Offer more ChE classes during the summer so that co-op students don't fall behind.

This should be mandatory.

My first term was basically a lab tech job that a non H.S. degree would be adequate. Waste of time. Second term was valuable. Third term (internship) was very good.

Really, no need to improve. The guidelines are good. That's about as real world as you get.

Comments on how the co-op experience influenced a choice of career.

I found that I really liked the people side of production mgmt through my coo-op

Helped me to see what kind of life I could expect for long time as a Chemical Engineer.

My coop experience helped define my career path—starting in an operations role at a manufacturing facility.

It directed me to my first job in petroleum industry.

I work where co-op'd. It is why I enjoy what I do.

My co-op (actually internship) was in the area of R and D and it showed me that I needed more process/production experience before doing that full time. Also it influenced me to stay in a chemical industry (rather than consumer products, etc).

I knew I wanted to work on consumer products.

It showed me what real engineering was about and confirmed my desire to be one.

I worked in the R&D group of Kimberly-Clark. The post docs and scientists served as great role models. Inspired me to attend graduate school.

It exposed me to a mfg environment, which I prefer.

Wanted to work in industry vs. academia.

Strengthened my career choice.

I learned that I wanted to be in a manufacturing environment.

It eliminated product development as a career option because I didn't like it.

Helped me realize graduate school was necessary for me.

Got me interested in consumer products.

Involved in polymeric product testing and still do this today.

My co-op made me realize that I love working in a plant with operators and that I don't need a PhD to do what I love.

I gained appreciation for the politics within an organization, looked up and picked where I wanted to be.

I knew what not to do from the first term. From my third term I found out what it was like to work for a huge corporation.

It gave me the experience to know what an engineer does in an operations setting.

It really didn't influence my choice. It was a valuable experience.

Helped me decide what I did not want to do as my career.

Gave me a flavor of plant work. Led me to R&D.

That was where I finally got a taste of what chemical engineers do the real world.

Comments on how the co-op experience influenced a graduate school experience.

It provided greater ChE knowledge and made me a better teaching assistant.

Makes me realize a BS degree would not get you very far in your career. It's important to have an advanced degree to compete with other scientists in R&D environment.

I co-op'd at Kraft, which was very business focused. The co-op taught the importance of business focus.

24. Overall, how well did your undergraduate education prepared you for your professional career?

very good	34
good	17
fair	0
poor	2

Comments on rating how well the ChE undergraduate program prepared them for their professional career.

UW has a staff that makes its students think and if you can't handle it, they weed you out.

For the most part I was prepared, but some areas could be improved, especially for people going into manufacturing. I think the degree at Madison is geared more towards academics/grad school or R&D.

As I keep repeating, the UW provided a much more challenging atmosphere than most other schools. It forces students to work harder and prepares them to get ahead in the real world.

The methodology for solving problems and engineering basics were a help, but the most beneficial experiences were building team relationships and having a coop experience.

Engineers are valued in many corporations. At Kraft, it is a good degree to enter with, but provides flexibility to enter other areas.

Because I have changed jobs several times and each time I have done well. I have just completed Graduate School and will move from the petroleum industry to hi-tech.

Excellent professors that cared; taught hard work pays off; excellent knowledge base; prepares individuals for real world experience.

Problem solving and time management skills to succeed in my profession.

The curriculum is very intense. I thought is did little to prepare me for real world knowledge and experience. I think a co-op would have helped me tremendously, but there is an elitist attitude of most of the companies that interview. They want (and got) the 4.0's.

I think there should be a better alternative to co-ops—better than lab work for professors only interested in their research and data collecting.

Because it provides me with basic fundamental problem solving skills, however it is lacking specific and practical applications.

I have successfully accomplished every task presented to me.

Aside from stats/finance I don't feel there was much else UW could have prepared me for.

It gave me a diverse yet unified ChE background.

Even though I lacked practical experience when I first started, my degree taught me skills (communication, problem solving, resourcefulness) that have allowed me to do well. I can learn new jobs and information quickly and can effectively solve problems.

I have my current job position because of my overall education at Madison, that will stay with me until I retire and then my grandchildren will follow. The education at the University is not only about a specific topic; it's about growing a person as a whole.

Maybe I'm one of the 1% of the students who failed to get a job after three years graduating. The last job offered to me was a department store sales person, $7/hour. Definitely won't need any skills that I've learned so far.

It was able to prepare me totally for solving any type of analytical problem, process problem, or formulation problem. It taught me how to work out a problem, think it over and come up with conclusions, and work effectively on a team. What it didn't prepare me for was dealing with the politics at work, but that can't be taught at school anyway.

Very challenging from a material standpoint as well as the competition with others. Some improvement in the labs is needed, not so much cookbook. Also exposure to more broad applications of Chem E material in industry.

Although I didn't end up using much of the traditional ChE curriculum, I learned important skills such as how to effectively work with a diverse group of people.

Good knowledge of theories/concepts, but not much experience in mechanical.

Although we were at time over-loaded with work, it helped to make us capable to multi-task effectively in the real world. My graduating class was a close group of fun-loving engineers. My experience with AIChE and Polygon have helped me to develop great communication skills and team ethics. Prof. Mark Etzel and Sangtae Kim were terrific mentors. They have helped me to define my career goals. My new-hire is also a ChE grad from Madison. Our team is fond of his work ethics and analytical skills. Overall the program is above average when compared to other schools like UC-Berkeley, Stanford.

The strong understanding of theoretical background and the application in courses such as 470, 326 and 426 resulted in a very relevant education.

I feel that my education was broad and thorough. I only wish that I would have had a more practical education, more hands on, working with actual equipment.

Honed key skills (problem solving, creative thinking, communication).

I would have been better prepared if I had taken a water chemistry course, and had I taken more classes related to polymer processing/cleaning polymeric membranes.

It is impossible to teach students everything they will need to know, but the problem solving skills and basic engineering skills I learned at UW-Madison have given me the confidence and engineering proficiency to work in almost any engineering field.

I do think UW has a very good chemical engineering program for undergraduates. It provides all the basic knowledge a chemical engineer should have.

Technically I was well-prepared to enter industry. However, I was not all that well-skilled at supervising which is a much larger part of my job at present.

It was extremely challenging and demanding, and creativity and problem solving skills were developed. To sum it up, the challenging task of earning a ChE degree from the UW makes work seem almost easy.

In general—High expectations were placed upon the students, the student was expected to find his/her strengths/weaknesses. These are real-life expectations.

UW ChE has prepared me to strive in competitive, stressful atmosphere through its series of courses. Technically, I also learned a lot although in the end I only used a few on them (because I don't work as a ChE). Undoubtedly, the department atmosphere, curriculum, quality of students have prepared the graduates to be successful in their chosen career, whatever that may be.

I have a solid foundation of technical skills that enable me to grow into whatever path I choose. Now it's dependent on on-the-job training and my commitment to growth.
I had the confidence that I could solve any problem that should come my way.

I think I've received a very good engineering education (good bang for the buck, inspite of out-of-state tuition). Along with good communication skills, teamwork. AIChE helped me learn a lot too. We have a very active student chapter and they should be encouraged even more.

Thought there could be more practical work in school. And studies in other subjects (mentioned above) would have been helpful. The teaching was very dependent on the professor, but thought overall there could have been more focus by the professors on undergrad teaching. Facilities were largely outdated.

I learned critical thinking and problem solving skills that have proved invaluable to my career as a researcher.

I have been successful at my job and have never felt at a disadvantage because of my education. I could have rated it "very good" if I had had more statistics.

ChemE put everybody on the same playing field. It wasn't whether the answer was right or wrong but the logical process by which you solved an idea or problem. It is this way in the real world. Furthermore one's ability to share this logical process with others.

It is a good program with good professors. I would not trade my education at UW as a ChE for any other school.

Some classes taken, specifically Unit Ops and Polymers, were very poorly taught.

I don't do much pure chemical engineering. I don't know many people that do. What the program taught me was how to take apart and analyze a tough problem without getting too worried about whether I could. This is invaluable and will surely help me as my life/career progresses.

Although not applicable specifically for my job, my undergrad education helped me to develop analytical skills and land a very good job after its completion.
UW has proven to be one of the best programs in the U.S. The skills of the UW alumni versus alumni of other ChE programs demonstrate this frequently.

Interaction with other students prepared me for teamwork.

Overall Madison provided complete and challenging course work. I don't feel anything major was overlooked.

25. General comments on how to improve the ChE undergraduate program.

More exposure to basic mechanical and electrical components, computer applications like access and MS project, some elective on people management (conflict management, motivating and coaching other, listening skills, etc)

Provide more room for a few non-science electives. I would have appreciated some time to study other things.

Less problem sets/exams—more thoughtful projects.

Cut out the useless requirements (Chem 563, Chem 561, Analytic Chem) so you can elaborate more on the ChE curriculum.

Keep the ChE program among the best in the country.

Stress the importance of applied engineering and real-life case studies.

You may want to change the homework assignments and exams more often. Most of the students (I found out later) had copies of the homework and exams from previous years. It was pretty easy to get a 4.0 that way, and very frustrating to have worked so hard for a 3.3 and been 'not good enough.'

Add more classes with seminar/presentation/projects to allow students to develop their presentation skills.

I feel that career placements for foreign students had been inadequate. With growing number of them, it's to ignore that some of the need a good service in career placement. While I understand that INS had a rigid rule regarding employment, a support group would help a great deal for networking, etc. It's a shame that a degree from such a fine institution as UW will be used for working in a department store.

Please keep the summer lab. It's a rite of passage that bonds UW-Madison ChE graduates together. I've met generations of UW-Madison chemical engineers in Silicon Valley and they all agreed that summer lab was a good training camp for entry-level engineers. Please encourage the undergrads to participate in ChE 599 and co-op. Offer advice to students who show interest in graduate school and help them explore their area of interest. Let them know they can go to grad school in other disciplines besides chemical engineering.

Dump first semester P-chem if not already done—waste of time.

Get more hands on with pumps, filters, etc. Integrate PLC programming with 470. More classes like summer lab throughout school.

From a methodology standpoint, you may want to ask questions like #24 first—these are some of the important answers you want (I think). By the end of the survey, I'm exhausted and my answers may not be as crisp. Page one could be at the end. Just a thought.

The EIT (Engineer in Training) Exam was not

Should emphasize industrial uses of the theoretical knowledge.

I'd like to have seen more info on the economics of industry, projects, etc. We did cover cash flow in 450, but not things like what motors, heat exchangers, bailers, etc cost-not even order of magnitude.

Maintain the selectivity of the incoming students to the department.

I know similar questions are being asked at other ChE departments. It is easy to criticize the shortcomings in one's undergraduate education, but I am very sympathetic to tenure track faculty who are evaluated on everything but teaching. The job of a professor is never-ending. I am grateful for my undergraduate ChE degree and wish you well in improving the program.

Maintain high standards, give students greater exposure to faculty and research going on. Labs definitely need to be upgraded. ChE 324 and ChE 470 lab instruments were in real bad shape (back in 96-98). Recruit professor (and strive to keep them) in cutting edge areas—fuel cells and alternative energy being top of the list.

Students were top-notch. The competition in classes was tangible but that is also real-world. Advising and career services were generally good.

More “informal” summer lab type of problems. These are the closest to the real world.

Make it possible for students to apply their business classes to get credit. Elective courses allowed did not include a lot of business classes that I might have otherwise been interested to take.

Add more of a business background. Offer/Encourage the opportunity to take business/professional classes as electives.

This questionnaire is way to long to keep interest and get valuable information from participants.

CHEMICAL ENGINEERING
UNDERGRADUATE SURVEY
May 2001

*Note: We are focusing on our undergraduate program,. Please return by June **15, 2001**.*

1. Please complete the following current information about yourself:
   Gender: Male_____ Female_____

   Year began at UW-Madison 19___ Year received BS degree_____

2. If you are *currently enrolled* or have *earned additional degrees in* a graduate degree program, complete the following:

   a. Field: _____
      Institution: _____
      Degrees earned (circle all that apply):
      MS MA MBA MD JD Ph.D.

   b. Field: _____
      Institution: _____
      Degrees earned (circle all that apply):
      MS MA MBA MD JD Ph.D.

3. Have you taken continuing education or industrial short courses? Yes____ No____
   What subjects have you studied? Why?

4. Are you currently employed? Yes____ No_____ If no, complete a) only.
   If Yes, Please complete b) through e) below.
   a. If you are currently not employed, please describe the reason(s) why.

   a. Name of company or institution _____
      i. Circle the description below that best characterizes your current employer.
         fewer than 100 employees 100 to 1000 employees greater than 1000 employees

      ii. How many years have you been with this employer ?_____years (If less than 1 year, enter 0)

   a. What is your current job title or position? _____

   d. How would you describe your job activities over the past 2 years:

      i. Which kinds of materials, substances, and products does your work involve?
      __ Agricultural or bioprocess high volume materials
      __ Consumer products
      __ Electronic materials or devices
      __ Food products
      __ High volume chemicals
      __ Metals/minerals
      __ Petroleum, fuels, primary petrochemicals
      __ Pharmaceuticals/biologicals
      __ Polymers
      __ Pulp and paper products
      __ Specialty/fine chemicals
      __ Other: _____

      ii. What are your main job activities? (Indicate % of time for each if several apply.)
      ___ Business planning, managerial functions
      ___ Economic evaluation
      ___ Laboratory research & development
      ___ Marketing and product sales
      ___ Plant operations: scheduling and logistics
      ___ Process and equipment design
      ___ Process operations: monitoring, improvement, and troubleshooting
      ___ Product development
      ___ Project engineering/management
      ___ Pilot plant process development
      ___ Software development
      ___ Other (chemical engineering): _____
      ___ Other (not chemical engineering): _____

   e. How long have you been in this position? (circle one)
      Under 1 year 1 to 4 years 5 or more years

f. Please write a short description of the type of work you do in your present position.

5. Rate how well your ChE undergraduate education at UW-Madison prepared you in the following areas and also rate how useful these areas have been in your career.

	College Preparation			Professional Usefulness			
	Very prepared	Adequaqtely prepared	Poorly prepared	Frequently used	Moderately used	Not used	Courses not taken
a. Mathematics (calculus, diff. eq., etc.)							
b. Statistics (elective, or required since 1999)							
c. Chemistry							
d. Physics							
e. Computer Science (CS 302 or CS 110/310)							
f. Electric circuits and electronics (ECE 373 or EC376)							
g. Thermodynamics (ChE 310, or 211,311)							
h. Engineering Mechanics (EM 214) (now eliminated)							
i. Process Synthesis, Control, and Design (ChE 250/210, 424, 450,470)							
j. Transport (ChE 320, 324, 326, and 426)							
k. Reaction Engineering (ChE 430)							
l. Materials & Polymers (ChE 540 or 440)							

6. If you rated your preparation in any of the above topics as “very prepared” or “poorly prepared, please comment on those ratings.

7. If you rated any of the above topics as “frequently used” or “not used,” please comment below on why.

8. Do you supervise the work of other Chemical Engineers? _____Yes _____No

9. In your view, what deficiencies do entering Chemical Engineers have?
(Consider your own start, or other new engineers you have known.)

10. What are the most important qualities or skills that a Chemical Engineer should have? Why?
(For example: working independently, creative thinking, problem solving, time management, communication, working in a team, intellectual curiosity, confidence in field, ethical responsibility, etc.)

11. Which skills would you like to see the ChE program encourage or improve on?

12. How do you rate the quality of career advising you received in the College of Engineering? (Circle one):
very adequate somewhat adequate somewhat inadequate very inadequate not applicable

How could it be improved? Be as specific as you can.

13. If you have attended or completed graduate school or are currently in graduate school, please rate how well your undergraduate education at UW-Madison prepared you for graduate study? (Circle one):
very adequate somewhat adequate somewhat inadequate very inadequate not applicable

How could it be improved? Be as specific as you can.

14. How well prepared do you believe you are to compete within your field or current area of employment?
(Circle one): very adequate somewhat adequate somewhat inadequate very inadequate not applicable

Please comment:

15. How does your undergraduate education compare with that of peers in your field from other schools? (Example: advantages, disadvantages)

16. During your undergraduate study, what subject areas, if any, would you have liked to study more? Why?

17. The ChE degree requires 15 credits of laboratory courses involving Chemistry and Chemical Engineering. Please rate the value of this laboratory experience to your career and comment on why you rated it this way.
(Circle one): very valuable somewhat valuable of limited value not valuable

Comment:

18. Please rate the value of the summer laboratory course in particular and comment on why you rated it this way.
(Circle one): very valuable somewhat valuable of limited value not valuable

19. Did you take an independent study course – ChE 599? Yes_____ No_____ (If No, go ahead to question 20.)

a. How do you rate the value of your independent study? (Circle one):
very valuable somewhat valuable of limited value not valuable

b. Why do you rate it this way?

c. How, if at all, could it have been improved? Be as specific as you can.

d. In what ways, if any, did your independent study experience influence your choice of career?

e. If you went to graduate school, in what ways, if any, was your graduate school experience influenced by the independent study? Mark here if not applicable_____

20. Please comment on your preparation for and the usefulness of the following factors:

[Note that these are distributed throughout classes, and are not necessarily covered intensively in a specific course.]

	College Preparation			Professional Usefulness		
	Very prepared	Adequaqtely prepared	Poorly prepared	Frequently used	Moderately used	Not used
a. ability to function on teams						
b. ability to communicate effectively						
c. knowledge of contemporary issues						
d. understanding of professional and ethical responsibility						
e. understand impact of engineering solutions in a global and societal context						
f. ability to engage in lifelong learning, and recognition of its necessity						

21. If you rated your preparation in any of the above topics as “very prepared” or “poorly prepared,” please comment on those ratings.

22. If you rated any of the above topics as “frequently used” or “not used,” please comment below on why.

23. Did you participate in a co-op experience? Yes_____ No_____ If No, go ahead to Question 24.

   a. How do you rate the value of your co-op experience? (Circle one):
      very valuable somewhat valuable of limited value not valuable

   b. How, if at all, could it have been improved? Be as specific as you can.

   c. In what ways, if any, did your co-op experience influence your choice of career?

   d. If you went to graduate school, in what ways, if any, was your graduate school experience influenced by your co-op experience? Mark here if not applicable____

24. Please give an overall rating about how well your undergraduate education prepared you for your professional career. (Circle one): very good good fair poor

   Why do you rate it this way? Be as specific as possible.

25. Please add any comments you feel would be helpful in improving our undergraduate program:

THANK YOU VERY MUCH FOR YOUR TIME AND EFFORT!
PLEASE RETURN SURVEY BY JUNE 15, 2001