**Bachelor of Science in Engineering, B.S.E.**

**Requirements**

The Bachelor of Science in Engineering (B.S.E.) requires a minimum of 128 s.h. Students must be enrolled in the UI College of Engineering for the last 30 s.h. of work toward the degree, or 45 of the last 60 s.h., or a total of 90 s.h. They must have a g.p.a. of at least 2.00 on all college work used to satisfy degree requirements as well as on all work undertaken at the University of Iowa.

Engineering students earn the B.S.E. degree in one of eight undergraduate programs of study (majors): biomedical engineering, chemical engineering, civil engineering, computer science and engineering, electrical engineering, environmental engineering, industrial engineering, or mechanical engineering.

All students complete a core of common B.S.E. requirements, usually during their first three semesters; see “Core Requirements” below. They also must complete a curriculum—a set of required and elective courses—designed specifically for their major program. The curriculum prepares students to practice engineering in that program’s field of engineering. It is designed by the program’s faculty members according to guidelines provided by the national accrediting body of ABET.

Each program’s curriculum is divided into four major stems: mathematics and basic sciences, engineering topics, an elective focus area, and the general education component (“Be Creative”, historical perspectives, social sciences, and so on). All of the courses in the curriculum stems are integrated and sequenced to help students understand the interrelationships and importance of each stem. See “Curriculum Stems” below.

Courses below the level of the beginning courses in each program’s curriculum count toward students’ overall grade-point averages and are recorded on their transcripts, but they do not count toward requirements for the B.S.E. degree.

**Core Requirements**

All B.S.E. students must complete a core of courses that constitute approximately one-third of the courses required for the degree. They complete most of the core during their first three semesters, so most students may postpone making a decision about which engineering major to pursue or may change their engineering major during their first three semesters with little or no loss of time or credit.

The core includes RHET:1030 Rhetoric, a first-year course in writing, speaking, and critical reading; ENGR:1100 Introduction to Engineering Problem Solving and ENGR:1300 Introduction to Engineering Computing, which cover a breadth of topics from engineering as a profession to team design projects to engineering computations and computer programming; and courses in chemistry, engineering mathematics and fundamentals, and physics.

Students should complete the core requirements according to the following three-semester plan. Those who do not follow this plan may encounter a delay in graduation because of scheduling problems for courses that must be taken in a specific sequence or that are offered only once a year.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>ENGR:1000</td>
<td>Engineering Success for First-Year Students</td>
<td>1</td>
</tr>
<tr>
<td>ENGR:1100</td>
<td>Introduction to Engineering Problem Solving (biomedical, chemical, civil, environmental, electrical, industrial, and mechanical majors)</td>
<td>3</td>
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<tr>
<td>CHEM:1110</td>
<td>Principles of Chemistry I (all majors)</td>
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</tr>
<tr>
<td>MATH:1550</td>
<td>Engineering Mathematics I: Single Variable Calculus (all majors)</td>
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<tr>
<td>RHET:1030</td>
<td>Rhetoric (all majors)</td>
<td>4</td>
</tr>
<tr>
<td>ENGR:1300</td>
<td>Introduction to Engineering Computing (all majors)</td>
<td>3</td>
</tr>
<tr>
<td>CHEM:1120</td>
<td>Principles of Chemistry II (biomedical, chemical, and environmental majors)</td>
<td>4</td>
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<tr>
<td>MATH:1560</td>
<td>Engineering Mathematics II: Multivariable Calculus (all majors)</td>
<td>4</td>
</tr>
<tr>
<td>MATH:2550</td>
<td>Engineering Mathematics III: Matrix Algebra (all majors)</td>
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</tr>
<tr>
<td>PHYS:1611</td>
<td>Introductory Physics I (all majors)</td>
<td>4</td>
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<tr>
<td>ENGR:2110</td>
<td>Engineering Fundamentals I: Statics (all majors)</td>
<td>2</td>
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<tr>
<td>ENGR:2120</td>
<td>Engineering Fundamentals II: Electrical Circuits (all majors)</td>
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<td>ENGR:2130</td>
<td>Engineering Fundamentals III: Thermodynamics (all majors)</td>
<td>3</td>
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<tr>
<td>MATH:2560</td>
<td>Engineering Mathematics IV: Differential Equations (all majors)</td>
<td>3</td>
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<tr>
<td>PHYS:1612</td>
<td>Introductory Physics II (biomedical, civil, computer science and engineering, electrical, industrial, and mechanical majors)</td>
<td>3-4</td>
</tr>
</tbody>
</table>

**Requirements for Each Engineering Major Program of Study**

The curriculum for each B.S.E. major is described in that program’s departmental Catalog section; see Biomedical Engineering, Chemical and Biochemical Engineering, Civil and Environmental Engineering, Electrical and Computer Engineering, Industrial and Systems Engineering, or Mechanical Engineering.
Curriculum Stems

The curriculum for each B.S.E. program of study is divided into four major stems: mathematics and basic sciences, engineering topics, an elective focus area, and the general education component (humanities and social sciences). All of the courses in the curriculum stems are integrated and sequenced to help students understand the interrelationships and importance of each stem.

Mathematics and Basic Sciences

The mathematics and basic sciences stem provides the foundation upon which the engineering courses for each engineering major are based. It includes a minimum of five courses in mathematics and statistics and one each in chemistry and physics. The faculty of each engineering program has specified at least one additional chemistry or physics course and other additional mathematics or science courses beyond these minimum requirements to provide a base appropriate for the program's major.

Engineering Topics (Science and Design)

The engineering topics stem builds upon the math and science stem, providing a bridge from fundamental principles to applications and creative practice.

The stem's engineering science courses use the underlying principles learned in the mathematics and basic sciences stem to understand and predict the behavior of idealized models of real components or systems encountered in engineering. These courses include fundamentals of statics, thermodynamics, and electrical circuits, as well as other engineering courses relevant to each major.

The stem's engineering design courses focus on the process of devising a system, component, or process to meet a stated objective. Engineering design integrates decision making and the optimal application of basic sciences, mathematics, and engineering sciences to reach a desired outcome. Elements of the design process include the establishment of objectives and criteria, synthesis, analysis, construction, testing, evaluation, and consideration of realistic constraints such as economic factors, safety, reliability, aesthetics, ethics, and social and environmental impact.

Elective Focus Area

The elective focus area stem provides a set amount of credit that students use to build strength in a technical focus area by completing a minor, earning a certificate, or pursuing a tailored program of study.

Students choose elective focus area courses consistent with traditional career goals or nontraditional career goals. Their choice of degree plan and courses may affect the number and type of employment opportunities available to them after graduation. Program advisors help students develop coherent, well-focused plans that fit their goals.

Students who pursue a traditional focus area may replace up to 21 s.h. of traditional technical electives with course work toward a minor or certificate. Students who choose nontraditional focus areas work closely with an advisor to build a rigorous, well-focused program. They must define and justify their career goals; provide a detailed plan of study and obtain their B.S.E. program's approval for the plan before beginning the plan's course work; and complete the plan as approved.

Each B.S.E. program is responsible for approving proposed plans of study, ensuring that the program's ABET accreditation criteria are met, and that students' choices are consistent with their career aspirations and with the college's educational mission.

Guidelines for elective focus areas vary by program. For details, see Programs of Study on the college's website.

General Education Component

The general education component stem promotes understanding of and appreciation for community, culture, and learning through course work. All students are held to the following requirements.

Completion of at least 3 s.h. in courses chosen from approved departments and programs as outlined below.

Completion of at least 3 s.h. from the "Be Creative" course list as follows.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANIM:2125</td>
<td>Introduction to Animation</td>
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<tr>
<td>ARTS:1510</td>
<td>Basic Drawing</td>
<td>3</td>
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<tr>
<td>ARTS:1520</td>
<td>Design Fundamentals</td>
<td>3</td>
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<tr>
<td>CERM:2010</td>
<td>Exploring Forms in Clay I</td>
<td>3</td>
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<tr>
<td>CINE:1100</td>
<td>The Art of Smartphone Filmmaking</td>
<td>3</td>
</tr>
<tr>
<td>CINE:1834/</td>
<td>Modes of Film and Video Production</td>
<td>4</td>
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<td>THTR:1834</td>
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<tr>
<td>CNW:1620</td>
<td>Introduction to Creative Nonfiction</td>
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<td>CNW:2680</td>
<td>The Art and Craft of Creative Nonfiction</td>
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<tr>
<td>CNW:2700</td>
<td>The Art and Craft of Personal Writing</td>
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<tr>
<td>CNW:2720</td>
<td>The Art and Craft of Writing About Culture</td>
<td>3</td>
</tr>
<tr>
<td>CNW:2730</td>
<td>The Art and Craft of Science Writing</td>
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</tr>
<tr>
<td>CNW:2740</td>
<td>The Art and Craft of Writing about the Environment</td>
<td>3</td>
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<tr>
<td>CNW:2770</td>
<td>The Art and Craft of Writing for New Media</td>
<td>3</td>
</tr>
<tr>
<td>CNW:2780</td>
<td>The Art and Craft of Writing About Sports</td>
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<tr>
<td>CNW:2790</td>
<td>The Art and Craft of Humor Writing</td>
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<td>CNW:2830</td>
<td>The Art and Craft of Immersion Journalism</td>
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<td>CNW:2840</td>
<td>The Art and Craft of Travel Writing</td>
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<td>CNW:2850</td>
<td>The Art and Craft of Writing About Politics</td>
<td>3</td>
</tr>
<tr>
<td>CNW:2910</td>
<td>Writing for Applications and Awards</td>
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<tr>
<td>CNW:3632/</td>
<td>Prose Style</td>
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<tr>
<td>WRIT:3632</td>
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<tr>
<td>CNW:3640</td>
<td>Writing for Business and Industry</td>
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<tr>
<td>CNW:4355/</td>
<td>Approaches to Teaching Writing</td>
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<tr>
<td>CW:2100</td>
<td>Creative Writing</td>
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<tr>
<td>CW:2870</td>
<td>Fiction Writing</td>
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CW:2875  Poetry Writing  3
CW:3003  Writing and Reading Science Fiction  3
CW:3005/INTD:3005  Professional and Creative Business Communication  3
CW:3107/INTD:3107  Creative Writing for the Health Professions  3
CW:3210/INTD:3210  Creative Writing and the Natural World  3
CW:3215/INTD:3300  Creative Writing and Popular Culture  3
CW:3218/INTD:3200  Creative Writing for New Media  3
CW:4745/ WRT:4745  The Sentence: Strategies for Writing  3
CW:4751  Creative Writing for the Musician  3
CW:4760/ WRT:4760  The Art of Revision: Rewriting Prose for Clarity and Impact  3
DANC:1055  Creativity in Motion  3
DANC:1150/LAS:1150  Brazilian Culture and Carnival  3
DANC:2060/DPA:2060  Dance and Society in Global Contexts  3
DANC:2090  Lighting Design for Engineers and Dancers  3
DSGN:2500  Graphic Design I  3
MTLS:2910  Introduction to Jewelry and Metal Arts  3
MUS:1007  Garage Band: The Basics  2
MUS:1012  Creativity in Music  3
MUS:3285  New Musical Instruments: From Design to Performance  3
PNTG:2410  Painting I  3
PRNT:2610  Introduction to Printmaking  3
RHET:3250  Persuasive Writing for Science and Health Care Professionals  3
RHET:3260  Persuasive Speaking for Science and Health Care Professionals  3
SCLP:2810  Undergraduate Sculpture I  3
SCLP:3840  Robotic Art Studio  4
SCLP:4835  Electronic Objects and Spaces  4
SCLP:4840  Air, Actuators, and Motors  4
THTR:1140  Basic Acting  3
THTR:2215  Theatre Technology  3
THTR:2220  Production Lab  1-3
THTR:2301  Playwriting I  3
THTR:2610/RHET:2610  Acting for Success  3
THTR:2620  Improvisation for Engineers, Scientists, and the Curious  3
THTR:3202  Graphic Design and Identity  3
THTR:3208  Mask and Puppet Crafts  3
THTR:3210/DPA:3210  Makeup Design for the Stage  3
THTR:3230/ARTS:3230  Scene Design I  3
THTR:3240  Costume Design I  3
THTR:3250  Lighting Design I  3
THTR:3260  Sound Design for the Theatre  3
THTR:3270  Entertainment Design  3
THTR:3876/CINE:3876/DANC:3876  Video for Performance  3
THTR:3880/DANC:3880  Installations and Interactive Performance  3
THTR:3890/DANC:3890  Producing and Directing  3
THTR:4270  Scenic Art  3
UICB:2110/BKAT:2110  Introduction to Book Arts  3
UICB:3280/BKAT:3280  Elements of Book Art  3
UICB:3380/BKAT:3380  Elements of Letterpress  3
UICB:4100/BKAT:4100  Paperworks  3
UICB:4340/ARTS:4340  Digital Design for Artists’ Books  3
UICB:4415  Calligraphy I: Foundational Hands  3

Completion of at least 3 s.h. from one of the following College of Liberal Arts and Sciences GE CLAS Core areas below. Industrial engineering students must complete this requirement with PSY:1001 Elementary Psychology.

- Interpretation of Literature
- World Languages
- Historical Perspectives
- International and Global Issues
- Literary, Visual, and Performing Arts
- Diversity and Inclusion
- Values and Culture
- Social Sciences

Completion of at least 9 s.h. as follows.

The remaining general education component courses can be selected from the “Be Creative” list, from courses in the seven College of Liberal Arts and Sciences GE CLAS Core areas above, or from the College of Engineering approved course subject list. See General Education Component for departments and programs that offer approved courses. Most general education component courses are offered by the College of Liberal Arts and Sciences.

Credit may be earned by examination; see Academic Rules and Procedures in this section of the Catalog.

Students who enter the College of Engineering with a B.A. or B.S. are considered to have satisfied the general education component requirement.

Students who enroll in a combined degree program in the College of Engineering and the College of Liberal Arts and Sciences or the Tippie College of Business are considered to have satisfied the College of Engineering’s general education requirement once they have completed all requirements for the liberal arts and sciences degree or the business degree.

**Second B.S.E. Degree**

Current College of Engineering students and recent graduates may earn a second Bachelor of Science in Engineering
(B.S.E.). The second degree must include all courses required by the second engineering degree program, including the senior-level design course sequence and any specific social science elective requirements. Elective focus area courses selected for the second B.S.E. must be of a variety and level that permit students to meet at least the minimal level of competence usually expected of graduates of that program.

Students must file an academic study plan, which must be approved by the faculty of the second degree program, submitted to the Student Development Center, and placed in a student's permanent file before a student may begin course work in the second B.S.E. The study plan should include a list of the courses to be taken in the second program along with a list of the courses already completed and yet to be completed for the first engineering degree program. Any changes in the plan must be approved by a student's faculty advisor in the second program and by the department chair of that program (the college petition form may be used for this purpose), submitted to the Student Development Center, and placed in a student's permanent file.

**Combined and Dual Degrees**

**B.B.A./B.S.E.**

The College of Engineering and the Tippie College of Business offer a combined degree program in which students earn two University of Iowa bachelor's degrees: a Bachelor of Business Administration (B.B.A.) from the Tippie College of Business and a Bachelor of Science in Engineering (B.S.E.) from the College of Engineering.

Students in the combined program must complete all requirements for both degrees, including all general education requirements. They must enroll in appropriate mathematics and engineering courses early in their course of study in order to complete the program in a timely way. Because courses in natural sciences, mathematics, humanities, and social sciences count toward the B.B.A. and the B.S.E., students may count a single course toward both degrees.

B.B.A./B.S.E. students usually meet the degree requirements of both colleges in about five years; time required depends on a student's choice of major study areas.

Students in the combined B.B.A./B.S.E. program should consult with their advisors about whether the second-grade-only option is available to them.

Students are assigned two advisors, one in the Tippie College of Business Undergraduate Program Office and the other in their College of Engineering major department.

To enter the combined degree program, students must have approval from both colleges and must be admitted to both colleges. Interested students should contact the Student Development Center.

For information about the B.B.A., including requirements for the degree, see Bachelor of Business Administration (Tippie College of Business) in the Catalog.

**B.S.E./Liberal Arts and Sciences Degree**

Students may earn two University of Iowa bachelor's degrees in a combined program in the College of Engineering and the College of Liberal Arts and Sciences. Successful candidates are awarded a B.S.E. (Bachelor of Science in Engineering) by the College of Engineering and a B.A. (Bachelor of Arts), B.S. (Bachelor of Science), B.F.A. (Bachelor of Fine Arts), or B.M. (Bachelor of Music) by the College of Liberal Arts and Sciences.

Students in combined degree programs must complete all requirements for both degrees, including the College of Liberal Arts and Sciences GE CLAS Core and the College of Engineering general education component.

Students in the combined program usually are able to meet the degree requirements of both colleges in about five academic years. The exact length of time necessary to complete the program is determined by the major areas of study selected in each college. Students who enter the combined degree program are assigned two faculty advisors, one in their major department in the College of Engineering and the other in their major department in the College of Liberal Arts and Sciences.

To enter the combined degree program, students must be admitted to both the College of Engineering and the College of Liberal Arts and Sciences and must have College of Engineering approval to enter the combined degree program. Combined degree program applicants must meet the high school course or unit requirements for admission to each of the two colleges.

It is crucial that students enroll in the proper mathematics and engineering courses early in their course of study to expedite the completion of the program. The specific engineering courses taken by each student vary according to one's engineering major. Since courses in natural sciences, mathematics, humanities, and social sciences are accepted for credit by both colleges, students may be able to count a particular course toward both degrees.

Contact the Student Development Center for information about specific requirements. To learn about liberal arts and sciences majors, visit College of Liberal Arts and Sciences in the Catalog and select majors in departments from the college index.

**B.S./B.S.E. Dual Degree with Northern Iowa**

The 3+2 dual degree program leads to a B.S. in applied physics from the University of Northern Iowa (UNI) and a B.S.E. from the University of Iowa. It requires approximately three years of study at UNI followed by approximately two years of study at Iowa. There is no guarantee that students can complete the 3+2 degree in five years.

Students interested in the program are guaranteed admission to the University of Iowa portion of the program if they have a g.p.a. of at least 3.00 (B average) in all course work and in the chemistry, mathematics, and physics courses required by the University of Northern Iowa physics department.

During the first three years of the program, students complete at least 90 s.h. of course work at the University of Northern Iowa. They must successfully complete courses in each of the following areas: chemistry, mathematics through differential equations, physics to satisfy the applied physics major requirements, and courses to satisfy the general education requirements. Credit for courses passed with a grade of C or higher is transferred to the University of Iowa as credit for equivalent course work.

At the University of Iowa, students complete the B.S.E. requirements that were current at the time of their admission to the UI College of Engineering. Course work completed at the University of Iowa is transferred to the University of
Northern Iowa and applied toward the requirements for that institution’s B.S. in applied physics.

When transferring to Iowa from UNI, students must submit applications for admission, housing, and financial aid to the University of Iowa by the University’s established deadlines.

**B.S.E./M.S. Programs in Engineering**

Engineering students may be eligible to enroll in one of the College of Engineering's combined B.S.E./M.S. programs, which allow students to begin working toward a master’s degree in engineering while they are completing the bachelor’s degree. The combined programs, which are offered by each of the college's departments, permit students to count certain courses toward both degrees, completing both programs in less time than they would need to complete them separately. See "Combined Programs" in College of Engineering B.S.E. sections of the Catalog.

**B.S.E./M.A. or M.S. in Urban and Regional Planning**

The College of Engineering and the School of Urban and Regional Planning offer the combined Bachelor of Science in Engineering in civil engineering/Master of Arts or Master of Science program in urban and regional planning. The program, which is completed in five years, is designed for students who wish to pursue a public or private sector career in planning, a field that encompasses the development of alternatives to improve the quality of life in cities and regions.

For additional information on the B.S.E. in Civil Engineering, see that section of the Catalog. For more information about the graduate degrees, see the M.A. in Urban and Regional Planning or the M.S. in Urban and Regional Planning (Graduate College) in the Catalog. Contact Engineering Student Services for information about applying to the combined program.

**Honors in Engineering**

Outstanding undergraduate students who demonstrate exceptional accomplishment through research, directed independent study, teaching internships, or other approved nondegree enrichment activities may graduate with honors in engineering. They must maintain a University of Iowa g.p.a. of at least 3.33, complete an honors project with a faculty member, and participate in a college-wide honors seminar with faculty members and other honors students. Successful completion of the honors requirements leads to a B.S.E. with honors, which is noted on the student’s transcript. See the College of Engineering Honors Program website for details.

**University of Iowa Honors Program**

In addition to honors in engineering, undergraduate students have a variety of opportunities for honors study and activities through membership in the University of Iowa Honors Program; visit Honors at Iowa to learn about the University’s honors program.

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**Career Advancement**

Engineering is a well-respected profession that is used as a foundation for a variety of careers in industry, medicine, law, government, and consulting. Engineering majors hold eight of the top ten spots on the list of top-paid majors for bachelor’s degree graduates, according to the National Association of Colleges and Employers (NACE). On average, 93-98 percent of graduates are employed in their field of study or pursuing advanced education within seven months of graduation.

Engineering Professional Development (EPD) develops and promotes experiential education and professional opportunities for students in the College of Engineering. Professional staff coordinate the college’s co-op and internship program, engage in employer outreach, and provide opportunities for students to network with employers, including an engineering career fair each semester and other programming related to career development.

EPD also offers individual advising and class presentations on résumé and cover letter preparation, job and internship search strategies, interviewing skills, and job offer evaluation.