

**McCormick Office of
Career Development**

**THE WALTER P. MURPHY COOPERATIVE ENGINEERING
EDUCATION PROGRAM**

THE PROFESSIONAL ENGINEERING INTERNSHIP PROGRAM

EMPLOYER HANDBOOK

THE MISSION:

To be an acknowledged leader in preparing, placing, and supporting diverse and talented Cooperative Education students in business, industry, and government as an essential part of the engineering education process.

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Dear Employer:

Thank you for your interest in the Walter P. Murphy Cooperative Engineering Education (Co-op) and Professional Engineering Internship Programs. Northwestern University has a rich history of cooperation with industry to educate future engineering leaders in business, industry, and government.

During the 1930's, Walter P. Murphy, a leading Chicago industrialist, gave Northwestern \$36,000,000 to fund a school of engineering and to require cooperative engineering education as a pedagogical experiment. Having collaborated with Dr. Charles Kettering, the premier technologist and inventor of the time as well as Chief Research Engineer for General Motors, and Dr. Herman Schneider, the "Father of Cooperative Education" and one of the most innovative engineering educators of the time as well as the Dean of Engineering at the University of Cincinnati, Mr. Murphy became convinced that cooperative education was a "superior form of engineering education."

Dr. Walter Dill Scott, president of Northwestern University at the time of Mr. Murphy's gift, stated in his biography of Mr. Murphy that "any one of these three [Murphy, Kettering, Schneider] might have been the first to recognize that industry furnishes a training laboratory for engineers which no college can equal. Actually, Herman Schneider was the first to make this idea the basis of engineering education. Charles Kettering was the first to make it respected by the industrial leaders in America. Walter Murphy was the first, and only, individual to be willing and able to subsidize a conclusive experiment in cooperative education.... As a result, the Murphy gift was the largest contribution ever made by any one person in America to a single institution in support of training and research in one field of learning" (Scott, 1952, p. 92).

Since 1939, Northwestern University has continuously maintained a Co-op Program to serve students and employers. Today our alumni are CEO's, presidents, and senior executives in almost every business, industry, and organization.

In September 2007, the office officially started the Professional Engineering Internship Program. The program allows students to work for one quarter (minimum duration of the quarter being 12 weeks), with any qualified employer. This program gives students the opportunity to obtain work experience anytime during the school year.

At Northwestern, Co-op and Internship are educational programs, not "jobs" programs. They allow undergraduate students in engineering to include full-time periods of paid work experience related to their academic and professional goals into their academic curriculum. We are pleased that you are interested in the programs and we invite you to join us in the education of a new generation of engineers.

If you have questions or require further information, please do not hesitate to contact me. We appreciate your time and consideration and look forward to working with you to build a strong, mutually beneficial relationship.

Sincerely,

Helen Oloroso
Assistant Dean and Director of Cooperative Education Program

Professional Engineering Internship Program

The Walter P. Murphy Cooperative Engineering Education Office offers students the opportunity to participate in professional engineering internships with any qualified employer for the duration of one quarter of at least 12 weeks. An internship is defined as a work experience that is planned by the employer to provide students with the responsibilities and challenges of professionals in their field.

All McCormick students are eligible to participate in the Professional Engineering Internship Program. Employment in an internship is at the discretion of the employer.

Students will not earn academic credit for their internship experience and are expected to be compensated fairly for their work. However, if an internship is unpaid, the university accepts no responsibility for any liabilities and risks incurred by the student or the employer.

Internships are widely available through direct application to employers, as well as through the Co-op Office and the Northwestern University Career Services.

Students wishing to participate in the Professional Engineering Internship Program must first complete ONE Career Development Orientation Seminar, given on Saturday mornings throughout the Fall and Winter quarters. The seminar covers the policies and procedures involved in internship program, as well as an introduction to the on-line program management tool, PlacePro.

Once a student has completed the seminar and has created a file in PlacePro, he/she will be eligible to interview for internships and begin the placement process. After the student has accepted an offer of internship employment, he/she will be registered by the office for a non-credit Career Development course covering the internship work term. This registration will allow the student to have the internship recorded on the transcript and remain enrolled at Northwestern University as a fulltime student while at work.

The student is expected to be given real work, and both the student and his/her supervisor will be required to complete the evaluations provided by the office. The supervisor will evaluate the student's performance according to the competencies outlined by the Accreditation Board for Engineering and Technology. The students will evaluate the quality of the opportunity they have been given to learn these competencies in the workplace.

Students may return to the same employer for more than one internship, but if the schedule expands to more than three work terms, and they are not all in the summer, the student might be eligible to convert the internships to co-op and receive the co-op certificate.

NOTE: Undergraduate students wishing to receive the Business Enterprise Certificate MUST complete at least two Professional Engineering Internships and be enrolled in the Program to meet the work requirements of the BEC.

THE VALUE ADDED ASPECTS OF THE CO-OP/INTERNSHIP PROGRAMS

Co-op/Internship offers employers options not found through traditional recruitment efforts:

- * A "recruitment pool" of knowledgeable, highly qualified individuals who perform their jobs with enthusiasm and professionalism;
- * The opportunity to evaluate the potential of students for permanent employment;
- * Improved cost/benefits in recruitment and training;
- * The flexibility to free permanent employees for higher level work by assigning students to pre-professional tasks;
- * Continual contact with the University and access to other programs and recruitment opportunities.

Backed by a Northwestern University education, students are motivated and quick learners. They deliver quality performance and are an asset to the work place.

PARTICIPATING ACADEMIC DEPARTMENTS

ACADEMIC DEPARTMENTS	AREAS OF CONCENTRATION	CHAIRMEN or AREA LEADER
Applied Mathematics	<i>Engineering Applications Pure and Applied Math Computer Science Operations Research</i>	Dr. Vladimir A. Volpert Chairman
Biomedical Engineering	<i>Biomedical Instrumentation Biomechanics Biotransport Processes Biotechnology Biomedical Signals</i>	Dr. Matthew R. Glucksberg Chairman
Chemical & Biological Engineering	<i>Chemical Process Engineering Biomedical Engineering Biotechnology Environmental Engineering Polymer Science and Engineering Process Control and Simulation</i>	Dr. Linda J. Broadbelt Chairman
Civil Engineering	<i>Applied Mechanics Structural Engineering Geotechnical Engineering Environmental Engineering Transportation Systems Construction</i>	Dr. Jianmin Qu Chairman
Computer Engineering	<i>Computer Architecture and Systems Design Distributed and Parallel Computing VLSI and Computer Aided Design Embedded Systems Design</i>	Dr. Alok Choudhary Chairman
Computer Science	<i>Artificial Intelligence Theoretical Computer Science Software Engineering Human Computer Interaction Distributed Interactive Systems</i>	Dr. Alok Choudhary Chairman
Electrical Engineering	<i>Communication Systems Control Systems Electronic Circuits Electromagnetic Waves and Devices Optoelectronics Solid-State Electronics Biomedical Engineering</i>	Dr. Alok Choudhary Chairman

PARTICIPATING ACADEMIC DEPARTMENTS

ACADEMIC DEPARTMENTS	AREAS OF CONCENTRATION	CHAIRMEN or AREA LEADER
Environmental Engineering	<i>Environmental Biology and Chemistry Industrial Hygiene Radiological Health Water and Waste Treatment Construction & Operation of Environmental Processes</i>	Dr. Jianmin Qu Chairman
Industrial Engineering and Management Science	<i>Production Scheduling / Planning Logistics Inventory Control Operations Research Simulation Modeling Experimental Design / Statistics Organizational Behavior</i>	Dr. Barry Nelson Chairman
Manufacturing & Design Engineering	<i>Manufacturing Management Manufacturing Logistics Microelectronic Systems Mechanical Systems Materials Engineering Environmental Issues Automation Systems Chemical Process Systems</i>	Dr. Bruce Ankenman Chairman
Materials Science and Engineering	<i>Biomaterials Electronic Materials Metals and Ceramics Polymeric Materials Surface Science</i>	Dr. Peter Voorhees Chairman
Mechanical Engineering	<i>CAD / CA Manufacturing Systems and Control Robotics Tribology Aerodynamics Combustion Engines Environmental Control Biomedical Engineering Energy Conversion and Management Intelligent Mechanical Systems Manufacturing</i>	Dr. L. Catherine Brinson Chairman

TRADITIONAL NORTHWESTERN UNIVERSITY CO-OP SCHEDULE

	<u>FALL</u>	<u>WINTER</u>	<u>SPRING</u>	<u>SUMMER</u>
	Mid Sept to Mid-End Dec.	Jan 2 to Mid March	Mid March to Mid June	Mid June to Mid Sept.
FRESHMAN YEAR	School	School	School	INTERNSHIP
SOPHOMORE YEAR	School	School	School	CO-OP
JUNIOR YEAR	School	School	CO-OP (TWO-QUARTER TERM) <i>*Evaluations due EACH quarter</i>	
PRE-SENIOR YEAR	School	CO-OP	School	CO-OP
SENIOR YEAR	CO-OP	School	(Graduation)	

*All academic departments have developed courses around the Traditional Co-op Schedule. However, students may develop a unique schedule with the help of their faculty advisor and Co-op employer.

CO-OP SCHEDULE REQUIREMENTS

1. A minimum of 12 months (four quarters) of work with the same employer is expected for each Co-op student.
2. Each Co-op student's schedule should have **at least one SIX MONTH (two quarter) work term**, in order to provide a more in-depth experience for the student and greater productivity for the employer.
Note: evaluations must be completed each quarter of this two-quarter work term.
3. The schedule must alternate terms of work and school in approximately equal intervals.
4. For International Students (F-1 visa status), the Co-op and Internship Programs are recognized at NU as Curricular Practical Training (CPT). This allows students to obtain engineering related work experience while pursuing an undergraduate degree. With CPT, students with F-1 visa status are limited to less than one (1) year of work experience. For Co-op, this means that you must complete four 12 week quarters or five 10 week quarters. Additional paperwork is required by the International Office. For more information, please visit their office or website.

RECRUITING POLICIES

In order to recruit students from Northwestern University's Co-op and Internship programs, the following policies must be observed:

1. For Co-op, employers must be able to sustain a co-op position with assignments that are progressively more challenging and carry greater responsibility over the duration of the twelve to eighteen months of the student's co-op schedule.
2. Each student must have clearly defined job responsibilities for each work term, and must be evaluated by the supervisor according to those responsibilities at the end of each work term.
3. The student's progress (or lack of progress) is to be communicated to the Co-op Office at Northwestern University in a timely way so that the issues can be addressed through the advising process.
4. The person completing the evaluation is to discuss the evaluation with the student and use it as a tool for the student's learning experience.
5. No student should be asked to sign a NON-COMPETE agreement at any time during his/her cooperative education schedule.
6. Students may be expected to sign a confidentiality or non-disclosure agreement. They are not encouraged by our office to sign a non-compete agreement.
7. Employers must comply with Northwestern University's policy of non-discrimination:

“It is the policy of Northwestern University not to discriminate against any individual on the basis of race, color, religion, national origin, sex, sexual orientation, marital status, age, disability, or veteran status in matters of admissions, employment, housing or services or in the educational programs or activities in operates, in accordance with civil rights legislation and University commitment.”
8. Students will be compensated fairly for the work done on their co-op/internship.

RECRUITING PROCEDURES

The Northwestern University Co-op Office uses a secure on-line database management system to connect employers and students for co-op positions. The office will provide you with a confidential access code for using the system from anywhere on the World Wide Web.

In order to recruit Northwestern University students for co-op or internship positions in your organization, please take the following steps:

1. **Contact the Co-op Office** to express your interest in considering candidates for co-op and/or internship.
2. **Send printed literature** and any relevant information that students can use for researching your organization.
3. The Co-op Office will help you **establish an on-line account** for accessing the student resume database.
4. **Reserve an interview date** and location (on campus, at your site, by phone or video conferencing).
5. **Post your job(s)** on our on-line database (PlacePro). Please notify our office for approval.
6. **Review resumes** of qualified students.
7. **Select candidates** for interviewing.
8. Contact the Co-op Office to **create an interview schedule**.
9. The Co-op Office notifies selected candidates for the interview schedule.
10. Students sign up for interview time slots.
11. **View your interview schedule** on-line as it is developing.
12. **Conduct the interviews**.
13. **Extend offers** (via an offer letter, copied to the Co-op Office).
14. Complete the organization's **hiring process**, notifying the Co-op Office of acceptances and declines.
15. **For hiring a co-op student, sign off** on the hired **student's Degree Plan**, which outlines his/her schedule of school and work.
16. Proceed with the scheduled work terms, **evaluating the student's progress** in skill development at the end of each work term.
17. **Notify the Co-op Office** of any problems, changes to the work schedule, or other issues which might affect the organization's ability to maintain the program.

STUDENT INTERVIEW EVALUATION

Please take a moment to provide us with some feedback on the student's interview skills.
 Any information provided will be beneficial to the student. Thank you.

Student Name: _____ Major: _____

PART I:

The student's punctuality was:
 Excellent Very Good Good Average Below Average Poor N/A

The student's dress attire was:
 Excellent Very Good Good Average Below Average Poor N/A

The student's greeting was:
 Excellent Very Good Good Average Below Average Poor N/A

Comments: _____

PART II:

The student's eye contact was:
 Excellent Very Good Good Average Below Average Poor N/A

The student's nonverbal behavior patterns were:
 Excellent Very Good Good Average Below Average Poor N/A

The student's listening skills were:
 Excellent Very Good Good Average Below Average Poor N/A

The student's verbal communication skill was:
 Excellent Very Good Good Average Below Average Poor N/A

The student's knowledge of the company and available position was:
 Excellent Very Good Good Average Below Average Poor N/A

The student's ability to answer questions was:
 Excellent Very Good Good Average Below Average Poor N/A

Comments: _____

PART III:

Was the student prepared with questions to ask the interviewer(s)? Yes No

The quality of the student's questions were:
 Excellent Very Good Good Average Below Average Poor N/A

The quantity of the student's questions were:
 Excellent Very Good Good Average Below Average Poor N/A

Comments: _____

PART IV:

The student's displayed level of interest and enthusiasm was:
 Excellent Very Good Good Average Below Average Poor N/A

Overall, how would you rate the student's interview skills:
 Excellent Very Good Good Average Below Average Poor N/A

Comments: _____

**MCCORMICK OFFICE OF CAREER DEVELOPMENT DEGREE PLAN – BACHELORS DEGREE
WALTER P. MUPRHY COOPERATIVE ENGINEERING EDUCATION PROGRAM
PROFESSIONAL ENGINEERING INTERNSHIP PROGRAM
NORTHWESTERN UNIVERSITY**

<input type="checkbox"/>	Co-op
<input type="checkbox"/>	Internship

Name: _____ Graduation Date: _____

Major: _____ ID # _____ (Print clearly)

This degree plan documents all courses completed/planned in the major, the Cooperative Engineering Education (Co-op) work quarters/Internship quarters, and estimated graduation date. Degree plan should include at least one six-month Co-op experience and a Co-op work quarter in each of the four academic quarters (fall, winter, spring, summer).

Co-op is typed in specific quarters according to the traditional six-quarter schedule. You may cross out 'Co-op' and write in courses in quarters in which you do not plan to Co-op and write 'Co-op' in quarters in which it's not already typed in, if necessary.

Do you have AP/IB Credits? Yes / No If yes, please list them.

<input type="checkbox"/>	Original	<input type="checkbox"/>	Revised
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FRESHMAN YEAR	
Fall Quarter, _____ (September – December)	Winter Quarter, _____ (January – Mid-March)
Course Number & Title	
Spring Quarter, _____ (Late March – Mid June)	Summer Quarter, _____ (Mid-June – Mid-September)
SOPHOMORE YEAR	
Fall Quarter, _____ (September – December)	Winter Quarter, _____ (January – Mid-March)
Course Number & Title	
Spring Quarter, _____ (Late March – Mid June)	Summer Quarter, _____ (Mid-June – Mid-September)
	CO-OP
JUNIOR YEAR	
Fall Quarter, _____ (September – December)	Winter Quarter, _____ (January – Mid-March)
Course Number & Title	

Employer Appraisal of Professional Practice Student

Student Name:

Placement In:

Company Name:

Major Code: TextBox3

Supervisor Name:

Employer Appraisal of Professional Practice Student - General Information

1) Employer:

2) Major:

3) Co-op Graduation Date:

This report will be shared with the student's faculty advisor. Please provide feedback and evaluate each dimension.

4) The ability to apply knowledge of mathematics, science and engineering.

5) The ability to design and conduct experiments.

6) The ability to analyze and interpret data.

7) The ability to design a system, component or process to meet desired needs.

8) The ability to function on multi-disciplinary teams.

9) The ability to identify, formulate and solve engineering/technical problems.

10) The ability to demonstrate an understanding of professional and ethical responsibility.

11) The ability to communicate effectively in writing.

12) The ability to communicate orally.

13) The ability to demonstrate an understanding of the impact of engineering solutions in a global and societal context.

14) A demonstrated recognition of the need for continuous learning.

15) A demonstrated knowledge of contemporary issues.

16) The ability to use techniques, skill and modern tools necessary for engineering/technical practice.

17) The ability to schedule and organize work efficiently.

18) The ability to initiate appropriate, independent action with a minimum of supervision.

19) The ability to work well with people of diverse backgrounds and styles.

20) A demonstrated maturity in judgment and concern for the welfare of others.

21) Overall assessment of the student's performance.

22) Please comment on your overall assessment of the student's performance.

Northwestern certifies a minimum of 12 weeks of Co-op experience for each Co-op quarter, unless the student is an F-1 Visa student. In those cases, the Co-op Office certifies 10 weeks to appropriate licensing agencies.

23) STUDENT'S START DATE FOR THIS QUARTER WAS:

24) END DATE FOR THIS QUARTER IS:

25) Was the student's attendance regular?

26) Was the student punctual?

Key Job Responsibilities: This report will be shared with the student's faculty advisor.

27) Responsibility #1

28) Deliverables #1

29) Performance Feedback #1

30) Responsibility #2

31) Deliverables #2

32) Performance Feedback #2

33) Responsibility #3

34) Deliverables #3

35) Performance Feedback #3

Supervisor Feedback

36) What factors most impress you about this student?

37) What are some specific suggestions for student improvement and growth?

38) To what extent will the student's next work assignment relate to his/her engineering program?

39) If a Senior, is this student being considered for full-time employment?

41) Evaluated By:

42) Title:

43) Date:

STUDENT SALARY OPTIONS

It is recommended that employers pay their Co-op/Intern students a percentage of the entry level salary of a B.S. level engineer. This keeps the students' wages in line with other employees. It is not advisable to overpay or underpay students in relationship to the rest of the employer's work force.

For students doing multiple work terms with the same employer, such as co-op, we recommend that first work period wages be approximately 60 percent of the entry level wage and that the salary be increased to approximately 70 - 75 percent for the second and third work periods. In the final work period, it is recommended that Co-ops be paid approximately 80 - 85 percent of an entry-level salary since they are close to completing their degree requirements.

This plan allows the employer to make a significant increase in salary to the student upon graduation and still be within their existing pay scale. Increasingly, it has been observed that employers are offering signing bonuses to their co-op/intern students at the time of graduation. While this is not mandatory, it may increase the retention rate of students becoming full-time employees.

Information on salaries paid to new college graduates can be obtained from the Co-op Office.

In general, student employee raises are almost always tied to the completion of more education and given at the beginning of each work term. Employers with large student employment programs have an established pay rate for sophomores, for juniors, and for seniors. Raises are not given until enough course work is completed to move the student to the next class standing. In these situations, some NU students must provide transcripts upon return to work before they become eligible for a pay increase.



EMPLOYER AGREEMENT FORM

Northwestern University's Cooperative Education and Professional Engineering Internship Programs follow guidelines set by the Accreditation Board for Engineering and Technology. In order to establish a mutual understanding of what our Programs involves, please read the following guidelines and sign below. By signing this agreement you, the employer, agree to abide by these policies.

1. While admission of students to the Cooperative Education and Professional Engineering Internship Programs is the responsibility of the Walter P. Murphy Cooperative Education Program, the employer agrees to inform the Co-op Office of a student's work arrangements. These include hiring, discharge, evaluations, changes in schedule, etc.
2. *For Co-op, a minimum of four work terms (quarters) with the same employer is required* (assuming suitable performance, availability of budget/relevant work, and student not changing major). This minimum should be fulfilled with a combination of three- and six-month work terms. Since co-op is an academic program, start and end dates of work terms must follow academic quarters.

Co-op work periods are roughly designated as follows:

Fall quarter.....	mid September – mid December
Winter quarter.....	January - mid March
Spring quarter.....	mid March – mid June
Summer quarter.....	mid June – mid September

Changes to the student's schedule must have the consent of the work-place supervisor and the Co-op advisor.

3. For Co-op, the employer agrees to provide a minimum of twelve months of institution-monitored, full-time equivalent employment, based upon suitable student performance and availability of budget and relevant work (and assuming student does not change major).
4. The work provided to and expected from students must be relevant to their academic programs, increasing in complexity and/or breadth as each student progresses through successive work terms.
5. The employer will submit an evaluation of student performance to the Co-op Office at the end of each work period, based on learning objectives established by student and supervisor at the beginning of each work term. Supervisors should discuss with the student their evaluation.
6. Northwestern will recognize the co-op or internship status of only those students whose work experience is monitored by the Co-op Office.
7. No student will be required to sign any agreement that in any way restricts his or her ability to work for any other organization after graduation from Northwestern University.
8. The University acts in accordance with all federal, state, and local regulations regarding provision of equal opportunity in employment and education, insofar as those regulations pertain to Northwestern. Northwestern prohibits and will act to eliminate discrimination and segregation on the basis of race, color, sex, religion, national origin, age, veteran status, handicap or disability, or sexual orientation. The services of the Co-op Office are available only to employers whose employment practices are consistent with this policy and are similarly non-discriminatory.

 Company Name (please print)

 Telephone

 Company Representative Name (please print)

 Company Representative Signature

 Date

The Evaluation Process

At the end of each work term, both the student and his/her supervisor will complete evaluations on-line. Both parties will be considering the same skill categories that are mandated by the accreditation standards of the Accreditation Board for Engineering and Technology.

Employers will be asked to assess the student's performance in each skill area as applicable to his/her job responsibilities.

Each student will be asked to rate the opportunity he or she has been given to develop and enhance these same skills through assignments at the work site.

The skills and learning opportunities to be evaluated are:

1. The ability to demonstrate an understanding of the technical aspects of the job.
2. The ability to schedule and organize work efficiently.
3. The ability to recognize and think through problems, obtain and evaluate relevant facts, generate alternatives, make sound conclusions and timely decisions.
4. The ability to apply knowledge of mathematics, science and engineering.
5. The ability to design and conduct experiments.
6. The ability to analyze and interpret data.
7. The ability to design a system, component or process to meet desired needs.
8. The ability to identify, formulate and solve engineering problems.
9. The ability to use techniques, skills and modern engineering tools necessary for engineering practice.
10. The ability to effectively communicate in writing.
11. The ability to effectively communicate orally.
12. The ability to develop original, workable solutions to problems.

Students are also evaluated in terms of the following items:

1. The quantity and quality of relevant work.
2. The ability to take independent action and to influence events to achieve results.
3. Their awareness of, and concern for others.
4. Their support for the team concept through their participation.
5. Their ability to work well with people of diverse backgrounds and styles.
6. Their diligence and enthusiasm with respect to work.
7. Their dependability and maturity.

FOR FURTHER INFORMATION

Contact:

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