Engineering 100: Professional Development

Introduction

Engineering 100: Professional Development is a one-credit course designed to help prepare students for their participation in the Distant Engineering Degree Program (DEDP). In addition to providing information relative to degree areas (i.e. electrical engineering, mechanical engineering, civil engineering, or chemical engineering), the program will provide an opportunity for students to develop experience-based portfolios. The program is based on the assumption that students entering UND with job-related experience may already have extensive knowledge in various areas of their field of study. This experience, in many cases, may be equivalent to what is being taught in some of the engineering courses or general education classes. Documentation of work experience through portfolio development may qualify students for an exemption from courses normally required to receive an engineering degree. At the end of the semester, the student and academic advisor will assess the contents of the portfolio and develop an individualized curriculum plan (ICP) based on the students demonstration of knowledge and experience in the field of engineering.

Student portfolios will also serve as a basis of documentation for program accreditation. Therefore, it is in the vital interest of students, faculty, and DEDP that the material contained in the portfolios reflects the academic integrity of the School of Engineering and Mines.

The only prerequisite to the Professional Development Course is that you have work experience or have achieved a certain level of competency in the areas listed below and that you have completed Chemistry I, Physics I and II, and Calculus I, II, and III.

Course Goals

By completing Engineering 100: Professional Development:

students will better understand themselves as learners through the learning styles inventory and the implication learning styles have on academic achievement;

students will prepare documentation that will reflect their knowledge, skills, and abilities through portfolio development; and

with the aid of their advisors, students will determine an individualized curriculum plan (ICP) based on the contents of their portfolios.

Course Grading

Professional Development will use a S/U grading system

Recommended texts:

Landis, R.B. (2000). Studying Engineering: A Road Map to a Rewarding Career, Burbank CA: Discovery Press. ISBN#: 0-964-69695-9.

Joseph, Albert (1998). Put it in Writing, McGraw-Hill. ISBN#: 0-07-039308-7.

To complete written correspondence that meets the standards of the program, using a handbook on writing and grammar is recommended.

Student Portfolios

Overview of Process

The student portfolio is an assembly of documents that will provide the basis for assessing your experiential and technical background in the field of engineering. Nine entries have been developed to facilitate your efforts to assemble a portfolio. Since careful documentation and preparation of materials may reduce the number of hours required to complete a degree, it is to your advantage to submit portfolio materials that are not only complete and accurate, but clear, concise, and well written (we recommend that you have someone proof-read your materials for clarity or mechanics when possible). Please submit written documents in either Microsoft Word or Corel Word Perfect format. If the information received is either vague or incomplete, your advisor will return the work with recommendations for improvement. The entries will be added to your portfolio once your advisor is satisfied that they meet the standards and criteria of the department.

At the end of the semester, the completed portfolio will be reviewed. Once you and your academic advisor have had an opportunity to discuss and assess the contents of the portfolio, an ICP will be developed. It is recognized that an exact match between your background of work experience and courses offered at UND is unlikely. In this event, your experience will be assessed with respect to "equivalency in learning;" any discrepancies between what you have learned as a result of your work experience and what is taught in courses at UND will be taken into consideration when evaluating your portfolio. It will also be possible for you to submit documentation of work experience at a later date that may affect the original ICP (e.g. opportunities for growth in the field of engineering that occurred after Engineering 100: Professional Development was taken). Flexibility and an ongoing commitment to meet your needs are key features of DEDP.

Student Self-Assessments

All portfolio materials submitted during the semester will help determine the ICP, however special consideration will be given to "Student Self-Assessments and Documentation of Work Experience" (Portfolio Entry 4). To ensure that you have the background knowledge needed to successfully complete your degree program, student self-assessments have been designed with regard to the content offered in selected classes or general areas of knowledge. In addition to providing your advisor with useful information regarding your experiential background, the documentation will also provide an opportunity to discuss experiences or skills that extend beyond the items covered on the self-assessment sheets.

Early in the semester you should become familiar with courses being considered for exemption in your field of study (see appendix A). After identifying the courses that qualify for an exemption, read the course descriptions, review the self-assessment sheets, and begin the process of gathering documentation (see appendix B).

Submitting Entries

Portfolio entries should be typed, double-spaced, and mailed to your academic advisor or coordinator. For organizational purposes it will be necessary to include a cover page for each assignment submitted. The information on the cover page should include your name, the date, the specific assignment and assignment number being submitted (e.g. Personal Biography, Entry 2), the name of your DEDP advisor, and your field of study (i.e. EE, ChE, CE, or ME). Please retain a copy of all materials submitted to your advisor.

Once the work has been evaluated it will be placed in your portfolio along with a copy of the advisor's evaluation form. Your advisor will inform you that the work has been received and approved (e.g. FAX, email, telephone or mail). If your advisor determines that additional information is needed or that the assignment needs improvement, the original assignment will be mailed back to you with recommendations for improvement. In this event, review the work, read the comments carefully, and resubmit the assignment within two weeks.

Addresses for individual program advisors, Fax, email and phone numbers can be found in Appendix C of this manual. If an Engr.100 coordinator is assigned to your course, an information sheet will be mailed to you separately. Confidentiality cannot be guaranteed when you correspond with your academic advisor through email or by FAX, however, if you do not perceive this as problematic, these forms of communication are convenient.

Three forms found in Appendix D will need to be copied, signed, and dated. You should be aware that the contents of your portfolios may be viewed by your advisor, the department chair, accreditation team members, and UND personnel involved with course assessment and development. Therefore, students enrolled in Engineering 100:

Professional Development will be required to sign a "Release of Information" form in regard to portfolio materials. Due to the weight given to the portfolio when determining the ICP, you will need to sign the "Statement of Academic Integrity." The "Correspondence Release Form," will allow advisors and coordinators more flexibility in notifying you when your materials are received and/or approved.

Schedule for Portfolio Development

The following two pages describe the entries required to complete the portfolio. Entries one and two should be submitted early in the semester. Once these entries are completed, you may submit the remaining portfolio entries (3-9) in any order that is convenient. In order to finish the class on schedule, you will need to submit two or three entries per month. Plan to spend a considerable amount of time preparing your entries. If you are unable to submit your entries in a timely fashion, please contact your academic advisor. Thoroughly review program materials, conceptualize assignments, and pose questions regarding the materials to your DEDP advisor early in the semester.

Portfolio Entries

Portfolio Entry I – Preparation and Submission of Forms

Submit any information you want us to consider regarding your formal education that we don't already have. If it's on your UND transcript, you don't need to duplicate it. If it's not on your UND transcript and you want us to know about it, then send documentation as you deem appropriate, including catalog course descriptions or course syllabi for non-UND courses.

Copy, sign, date, and return the following forms (see Appendix D):

1) Release of Information
2) Correspondence Release Form
3) Statement of Academic Integrity

Portfolio Entry 2 – Personal Biography

Prepare and submit a personal biography organized under the following headings; general information, educational background, work experience, computer and math abilities, and professional goals. The paper should be approximately five pages in length.

Portfolio Entry 3 – Project Involvement

Describe a specific engineering project in which you had a significant role and discuss your involvement in the project (e.g., project leader, testing or design team member, individual or group project). The paper should be clear and concise. Attach diagrams and references as appendices. Receive prior approval from a supervisor before submitting company documents to UND.

Portfolio Entry 4 – Self-Assessment and Documentation of Work Experience

Copy and complete the self-assessments for each area addressed in your field of study (see Appendices A and B). You should contact your advisor if you have questions regarding content, context, or terminology used on the assessments.

For each of the courses or areas addressed, you will need to qualify or document your responses on separate pages. Documentation may include narrative statements that reflect professional training, references to specific work experience, or samples of work when appropriate (e.g., set of drawings, computer programs, logic diagrams). Some items on the self-assessment sheets may be identified as requiring specific examples of your work. The information submitted should be pertinent to the situation and support your case.

Portfolio 5 – Issues and Industry

Describe the training you have received through your experiences in each of the following areas: environment issues, social considerations, economic concerns, safety issues, multicultural working environment, ethics, and quality (statistical quality control and statistical process control). Try to authenticate the experience, seminar, or course. A short memo from a supervisor will suffice if a certificate or other documentation describing the experience is not available. One or two well developed paragraphs for each area will be sufficient.

Portfolio 6 – Ethics

Describe the kinds of ethical issues that could arise in your work and how your company would deal with them (this may include direct references to company policies or training sessions that have dealt with ethical issues). This entry should be regarded as hypothetical; it would be "unethical" to refer to specific instances.

Read Winrich's "The Virtual Staff" and submit a paper (two page maximum) that addresses the ethical issues raised in the article (see Appendix E).

Portfolio Entry 7 – Information Infrastructure

Describe the resources available at your job site or within your community that would provide access to current information needed to research an industrial problem. Then identify a topic or problem related to the field of engineering that you would be interested in investigating. Locate at least three different informational resources that address the topic or problem under investigation (this may include various library resources, professional journals, technical reports, computing facilities, etc.). Finally, submit a list of references that reflects a variety of ways in which we access information and conduct scholarly work in a technology society. (Note: You do not have to read the reference materials or write a report – just identify and document the resources)

Portfolio Entry 8 – Learning Styles Exercise and Analysis

View the learning styles video contained in your packet. Complete the learning styles exercise and analyze the results in relation to your education and career. The analysis paper should be a maximum of two pages in length. Submit the results of the exercise and analysis to your DEDP advisor. (This entry is not required for Civil Engineering)

Portfolio Entry 9 – Oral Presentations

Generate two 10-15 minute video presentations on a technical topic related to engineering. Take into consideration that your first audience is a group of corporate engineers having a great deal of knowledge on the subject being presented. Then, using the same topic, present your information in a format that would be appropriate for a group of high school students.

The video should reflect your ability to organize and deliver oral presentations to audiences having different levels of knowledge or expertise. After reviewing both presentations, submit a written critique from your perspectives of your audience that considers the strengths and weaknesses of your presentation with regard to contact and form (please resist reading a report as the basis of your presentation). (This entry is not required for Civil Engineering)

Appendices

Appendix A: Course Exemptions

Appendix B: Students Self-Assessment and Documentation of Work Experience

Chemical Engineering
Electrical Engineering
Mechanical Engineering
Civil Engineering

Appendix C: DEDP Advisors

Appendix D: Release of Information
Correspondence Release Form
Statement of Academic Integrity

Appendix E: The Virtual Staff (Ethics Topic)

Appendix A:

Course Exemptions

ENGINEERING 100: Professional Assessment & Evaluation
(Portfolio Course) - 1 Credit (S/U grading only)

Many of the classes currently taught at UND are designed for students who have not had the opportunity to work in the field of engineering. The purpose of the DEDP program is to offer an equivalent degree program based on the assumption that many of the students presently involved in the "real" world of engineering have satisfied these requirements. Depending upon your background experiences, you may qualify for an exemption from one or more of the following courses.

Part I: Engineering Courses

Chemical Engineering Courses:

ChE 102	Introduction to Chemical Engineering (2 credits)
ChE 397	Technical Electives (6 credits)
ChE 333	Basic Experimental Strategies (1 credit)

Electrical Engineering Courses:

Engr 101	Graphical Communications (3 credits)
EE 101	Introduction to Electrical Engineering (1 credit)
EE 201	Introduction to Digital Electronics (2 credit)
EE 202	Electrical Engineering Lab (1 credit)
EE 304	Computer Aided Measurements and Controls (3 credits)
OR	
Engr 200	Computer Applications in Engineering (2 credits)
EE 397	Technical Electives (6 credits)

Mechanical Engineering Courses:

ME 101	Intro to Mechanical Engineering (3 credits)
Engr. 200	Computer Applications in Engineering (2 credits)
ME 201	Student Design (1 credit)
ME 480*	Mechanical Engineering Seminar (3 credits)
ME 397	Technical Electives (3 credits)

Civil Engineering Courses:

Engr. 101 Graphical Communications (3 credits)
Engr. 200 Computer Applications in Engineering (2 credits)
CiEn 101 Intro to Civil Engineering (1 credit)
CiEn 201 Intro to AutoCAD for Civil Engineering (1 credit)
CiEn 301* Civil Engineering Lab 1 (2 credits)
CiEn 302* Civil Engineering Lab 2 (2 credits)
CiEn 313/313L General Surveying lecture (2 credits) / General Surveying lab (1 credit)
CiEn 397 Technical Electives (up to 6 credits, with a maximum of 3 credits based on Experiential/Cooperation Education Documentation and Remainder Based on Transcripts)

Part II: Non-Engineering Courses (contact your academic advisor)

Phil 370* Ethics in Engineering and Science (3 credits)

*If students are exempt from Phil 370, ME 480, CiEn 301, CiEn 302 they must still fulfill the required General Education total number of credits. A minimum of 125 semester hours of credit is required for a baccalaureate degree. Even though students may be exempt from specific courses through Engineering 100, they must comply with UND requirements (e.g. minimum of 125 credit hours).

Part III: Challenge and CLEP Exams (contact your academic advisor)

Appendix B

Student Self-Assessment/Documentation of Work Experience

General Information

To ensure that you have the background knowledge needed to successfully complete your degree programs, students self-assessments have been developed with regard to the content offered in selected classes or general areas of knowledge. In addition to providing your advisor with useful information regarding your experiential background, the documentation will provide you with an opportunity to discuss experiences or skills that extend beyond the items covered on the self-assessment sheets. You will need to qualify or document your responses, in some cases, on separate pages. Documentation may include narrative statements that reflect formal training, work experience, or samples of work when appropriate (e.g., set of drawings, computer programs, logic diagrams). Some items on the self-assessment sheets may require specific examples of your work. The information submitted should be pertinent to the situation and support your case.

Copy and complete the self-assessments for each area addressed in your field of study (ChE, EE, ME or CiEn). Be sure to contact your advisor if you have questions regarding content, context, or terminology used on the assessment sheets.

Note: Research suggests that when students engage in self-assessments, they tend to minimize their knowledge. In this case, it will be to your advantage to make every effort to reflect, as accurately as possible, your strengths and abilities in each area.

Appendix C:

INSTRUCTORS: According to major:

Professor Edward Kolodka, Chemical Engineering (701-777-3798)
E-mail: edwardkolodka@mail.und.edu

Professor Art Miles, Electrical Engineering (701-777-4446)
E-mail: artmiles@mail.und.edu

Professor Manohar Kulkarni, Mechanical Engineering (701-777-4700)
E-mail: manoharkulkarni@mail.und.edu

Professor Harvey Gullicks, Civil Engineering (701-777-3563)
Email: harveygullicks@mail.und.edu

Self-Assessment (ChE)
Student: _____

ChE 102 – Introduction to Chemical Engineering (2 credits)

The major goal of this course is to introduce students to some of the various aspects of the chemical engineering profession. By the end of the course students will have been given enough information and experiences to make an educated decision on the applicability of chemical engineering to long-term goals and aspirations.

Describe two manufacturing processes that you are familiar with that involve some chemical/physical transformation of material.

Self-Assessment (ChE)
Student: _____

ChE 333 – Basic Experimental Strategies (1 credit)

Basic experimental strategies introduces statistical methods to efficiently determine the empirical relationships between variables. This course emphasizes the design of experiments and the analysis of the resulting data to find the significance of effects.

The evaluation of this credit will be based on your industrial work experience and training as documented in the portfolio entries. Please review these entries and add any information that may be pertinent (i.e. statistics training, Six Sigma sessions, etc.).

Portfolios 1 – 5 will be part of the evaluation.

Self-Assessment (ChE)
Student: _____

ChE 397 - Technical Electives (6 credits)

Technical electives are used by students to broaden their experience with engineering topics. Often students earn these credits by working in industry for two or three semesters.

The evaluation of this credit will be based on your industrial work experience as documented in the portfolio entries. Please review these entries and add any information that may be pertinent (i.e. individual project, group project, written/oral reports).

Portfolios 1 – 9 will be part of the evaluation.

Self Assessment (EE)
Student _____

Engr. 101 – Graphical Communication (3 credits)

This class is designed to introduce graphical communications and design. Within this context, visualization skills, computer-based 3D parametric modeling techniques, and design methodologies will be reviewed and developed. Additionally, students will be introduced to conventional practices and standards commonly employed in engineering graphics as a communication medium used extensively in our technological society.

How experienced, knowledgeable, or skilled are you in the following areas? Circle the most representative level: "1" for low/none, "2" for medium, and "3" for high.

1)	1	2	3	3-D visualization/spatial perception
2)	1	2	3	Sketching
3)	1	2	3	Orthographic (multiview) drawing and sketching of principal views (top, front, right side, etc).
4)	1	2	3	Drawing or sketching auxiliary views
5)	1	2	3	Drawing or sketching isometric pictorials
6)	1	2	3	Dimensioning using running, chained, ordinate, etc.
7)	1	2	3	Specifying tolerances
8)	1	2	3	Layout of assembly drawings as a means of documentation and specification
9)	1	2	3	Design project work
10)	1	2	3	Graphical user interface use (Windows or similar)
11)	1	2	3	Computer aided design (CAD) applications for two dimensional geometric solutions
12)	1	2	3	CAD applications for three-dimensional wireframe, surface, and parametric
13)	1	2	3	Computer-aided manufacturing (CAM) applications.
14)	1	2	3	Computer based analysis of a model using one of the following:

finite element analysis applications
kinematic analysis applications
circuit analysis applications
reaction analysis applications
critical path analysis applications

If responses for items 3-7, 10, 13, and 14 are rated 2 or 3, submit one or two documents which will provide documentation of appropriate and/or similar work conducted.

Reminder: Provide Documentation

Self-Assessment (EE)
Student: _____

EE 101 – Introduction of Electrical Engineering (1 credit)

Course Description

This course introduces the student to the general field of engineering and specifically to Electrical Engineering (e.g., basics, op amps, and logic). The student will be participating in laboratories that examine robotics, electronics, logic, motors/controls, image processing, laboratory techniques, and engineering applications through project demos.

Exemption Criteria

Portfolios entries 1 – 9 will be evaluated to determine an exemption in this area.

Self-Assessment (EE)
Student: _____

EE 201/202 – Introduction to Digital Electronics/Electrical Engineering Laboratory (EE 201 – 2 credits/EE 202 – 1 credit)

EE 201: This course offers an introduction to design and implementation of digital electronic circuits. Upon completion of this class students will have a conceptual understanding of logic gates, Boolean algebra, Karnough maps, mathematical operations, flip flops, and counters.

EE 202: This class is a laboratory experience that offers students hands-on implementation of digital circuits design.

How experienced, knowledgeable, or skilled are you in the following areas? Circle the most representative level: "1" for low/none, "2" for medium, and "3" for high.

1)	1	2	3	Number systems
2)	1	2	2	Boolean Algebra (theorems, simplifications, etc)
3)	1	2	3	Midterm, maxterm expansions
4)	1	2	3	Truth tables
5)	1	2	3	Karnough maps
6)	1	2	3	Prime Implicants
7)	1	2	3	Types of gates
8)	1	2	3	Multiplexers, decoders, ROM's, PLD's
9)	1	2	3	Flip-Flops (RS, JK, TD)
10)	1	2	3	Counters
11)	1	2	3	State tables and graphs
12)	1	2	3	Sequential Networks
13)	1	2	3	Designing with logic

Reminder: Provide Documentation

Self-Assessment (EE)
Student: _____

Evaluation of High-Level Programming Language Knowledge (EE 304, 3 credits, or Engr. 200, 2 credits)

Engineers within all disciplines use computers to automatically acquire data and control various processes. Students must be proficient in at least one high-level programming language, such as C/C++, Pascal, Modula-2, or FORTRAN. High-level languages use *if* statements and *for* and *while* loops to make programs simple to create and read, while low-level microprocessor assembly languages use more limited instruction sets which require the construction of higher-level commands. Two high-level programming language courses are offered within the engineering curriculum—Engr. 200 Computer Applications in Engineering and EE 304, which covers computer graphics, data acquisitions, digital control, and object-oriented programming with C++.

How experience, knowledgeable, or skilled are you in the following areas? Circle the most representative level: "1" for none/low, "2" for medium, and "3" for high.

1)	1	2	3	Binary and hexadecimal number system
2)	1	2	3	Mathematical operations and precedence
3)	1	2	3	Logical operations (if statements)
4)	1	2	3	Looping constructions (for and while loops)
5)	1	2	3	Formatting program input and output (I/O)
6)	1	2	3	Writing modular functions
7)	1	2	3	Passing parameters to functions (by value and address)
8)	1	2	3	String manipulation
9)	1	2	3	One-dimensional arrays
10)	1	2	3	Multidimensional arrays and matrices
11)	1	2	3	Pointers and memory addressing
12)	1	2	3	Dynamic memory allocation and release
13)	1	2	3	Structures and data records
14)	1	2	3	File I/O (reading and writing files)
15)	1	2	3	Computer graphics
16)	1	2	3	Data acquisition—analog-to-digital (A/D) conversion
17)	1	2	3	Digital control – digital to analog (D/A) conversion
18)	1	2	3	Object-oriented programming (reference types, operator overloading, classes and objects, inheritance)
19)	1	2	3	Data Structures (linked lists, stacks, queues, trees, heaps)
20)	1	2	3	Recursion
21)	1	2	3	Sorting Algorithms (selection sort, bubble sort, quick sort)

Reminder: Provide Documentation

Self-Assessment (EE)
Student: _____

EE 397 – Technical Electives (6 credits)

Technical electives are used by students to broaden their experience with engineering topics. Often students earn these credits by working in industry for two or three semesters.

The evaluation of this credit will be based on your industrial work experience as documented in the portfolios entries. Please review these entries and add any information that may be pertinent (i.e. individual project, group project, written/oral reports).

Self Assessment (ME)
Student _____

ME 101 – Introduction to Mechanical Engineering (3 credits)

This class will introduce graphical communications and design. Within this context, visualization skills, computer-based 3D parametric modeling techniques, and design methodologies will be developed. Additionally, students will be introduced to conventional practices and standards commonly employed in engineering. Basic design and analysis of a machine or system will be employed along with team problem solving. Students will develop an academic curriculum plan to be used for future advisement.

How experienced, knowledgeable, or skilled are you in the following areas? Circle the most representative level: "1" for low/none, "2" for medium, and "3" for high.

1)	1	2	3	3-D visualization/spatial perception
2)	1	2	3	Sketching
3)	1	2	3	Orthographic (multiview) drawing and sketching of principal views (top, front, right side, etc).
4)	1	2	3	Drawing or sketching auxiliary views
5)	1	2	3	Drawing or sketching isometric pictorials
6)	1	2	3	Dimensioning using running, chained, ordinate, etc.
7)	1	2	3	Specifying tolerances
8)	1	2	3	Layout of assembly drawings as a means of documentation and specification
9)	1	2	3	Design project work
10)	1	2	3	Graphical user interface use (Windows or similar)
11)	1	2	3	Computer aided design (CAD) applications for two dimensional geometric solutions
12)	1	2	3	CAD applications for three-dimensional wireframe, surface, and parametric
13)	1	2	3	Computer-aided manufacturing (CAM) applications.
14)	1	2	3	Computer based analysis of a model using one of the following: finite element analysis applications kinematic analysis applications circuit analysis applications reaction analysis applications critical path analysis applications

If responses for items 3-7, 10, 13, and 14 are rated 2 or 3, submit one or two documents which will provide documentation of appropriate and/or similar work conducted.

Reminder: Provide Documentation

Self-Assessment (ME)
Student: _____

Engr. 200 – Computer Applications in Engineering (2 credits)

The purpose of this course is to introduce the student to common computer applications such as spread sheets, graphing and mathcad, as well as conventional and structured programming concepts. By completing this course students should have a working knowledge or understanding of Windows (or other operating systems), local area network, common computer applications, and typical high level programming languages and their structures.

How experiences, knowledgeable, or skilled are you in the following areas? Circle the most representative level: "1" for low/none, "2" for medium, "3" for high.

1)	1	2	3	Graphical user interface (GUI) usage (windows types of environment).
2)	1	2	3	Network usage for such things as e-mail, file transfer, data/information searches, and hard copy output.
3)	1	2	3	Common computer applications (graphing programming languages)
4)	1	2	3	Differences between high-level programming languages and mid to low level programming languages
5)	1	2	3	Usage of various data types (integer, real, double precision, character, etc).
6)	1	2	3	Arithmetic operations and their evaluation (order of operations).
7)	1	2	3	Potential effects of mixed-mode operations
8)	1	2	3	Usage of intrinsic (built-in) functions
9)	1	2	3	Simple input and output such as reading values from a keyboard or data file and printing/writing values to a monitor, file, or printer
10)	1	2	3	Decision making control structures (IF is commonly used).
11)	1	2	3	Repetition control structures (DO loops are commonly used).
12)	1	2	3	Conditional repetition control structure (WHILE) is commonly used)
13)	1	2	3	Implementation of arrays
14)	1	2	3	Subprogram usage (modularity of subprogram object code and potential reusage in other programs).

Reminder: Provide Documentation

Self-Assessment (ME)
Student: _____

ME 201 – Student Design (1 credit)
Prerequisites: ME 101 (Introduction to Mechanical Engineering)
Corequisites: Phys 251 (University Physics I) or Engr 201 (Statics)

Course Description: Team problem solving with design and build of a machine or mechanism, typically ASME Design Contest project. Machine shop safety and introduction to fabrication processes. Special topic lectures on contemporary Mechanical Engineering issues and research activities.

To assess your level of exposure to this material please rank your experience, skill, and knowledge (at a fundamental level) as: "1" for low/none, "2" for medium, and "3" for high. You must provide appropriate documentation for the rankings given.

1)	1	2	3	Have you had shop safety training?
2)	1	2	3	What level of shop (wood and metal) experience have you had?
3)	1	2	3	Have you had experience in design concept development?
4)	1	2	3	Have you performed trade studies and worked with product vendors?
5)	1	2	3	Have you applied fundamental engineering analysis on a design concept in development?
6)	1	2	3	Have you participated in Preliminary Design Reviews or equivalent peer evaluations of proposed designs?
7)	1	2	3	Have you participated in Critical Design Reviews or equivalent peer evaluation of proposed designs?
8)	1	2	3	Have you built a device or mechanism to perform a specific task?
9)	1	2	3	Have you worked in a team environment?
10)	1	2	3	Have you attended seminars on technical and/or research topics on contemporary mechanical engineering topics?

Reminder: Provide Documentation

Self-Assessment (ME)
Student: _____

ME 480 – Mechanical Engineering Seminar (3 credits)

This class is designed to help students develop the poise, self confidence, and techniques to make oral and written presentations of technical materials. In addition, students learn to become critical listeners and to contribute to the technical knowledge of the class.

How experienced, knowledgeable, or skills are you in the following areas? Circle the most representative level: "1" for low/none, "2" for medium, and "3" for high.

1)	1	2	3	Organizing and presenting a technical talk on a subject within your area of expertise
2)	1	2	3	Researching an assigned technical topic which is new to you, then making an oral presentation
3)	1	2	3	Giving a talk promoting your company, group, or project to an outside audience (e.g., customer, manager).
4)	1	2	3	Preparing a written technical paper that forms the basis of an oral conference presentation.
5)	1	2	3	Using "conventional" visual aids, (.e.g. overhead projector, 35mm silks, flip charts, video tapes)
6)	1	2	3	Using computer driven visual aids such as PowerPoint, computer graphic packages, or computer animation packages
7)	1	2	3	Responding to questions from an audience of peers
8)	1	2	3	Responding to questions from an outside audience

Reminder: Provide Documentation

Self-Assessment (ME)
Student: _____

ME 397 – Technical Electives (3 credits)

Technical electives are used by students to broaden their experience with engineering topics. Often students earn these credits by working in industry for two or three semesters.

The evaluation of this credit will be based on your industrial work experience as documented in the portfolios entries. Please review these entries and add any information that may be pertinent (i.e. individual project, group project, written/oral reports).

Self Assessment (CiEn)
Student _____

Engr. 101 – Graphical Communication (3 credits)

This class is designed to introduce graphical communications and design. Within this context, visualization skills, computer-based 3D parametric modeling techniques, and design methodologies will be reviewed and developed. Additionally, students will be introduced to conventional practices and standards commonly employed in engineering graphics as a communication medium used extensively in our technological society.

How experienced, knowledgeable, or skilled are you in the following areas? Circle the most representative level: "1" for low/none, "2" for medium, and "3" for high.

1)	1	2	3	3-D visualization/spatial perception
2)	1	2	3	Sketching
3)	1	2	3	Orthographic (multiview) drawing and sketching of principal views (top, front, right side, etc).
4)	1	2	3	Drawing or sketching auxiliary views
5)	1	2	3	Drawing or sketching isometric pictorials
6)	1	2	3	Dimensioning using running, chained, ordinate, etc.
7)	1	2	3	Specifying tolerances
8)	1	2	3	Layout of assembly drawings as a means of documentation and specification
9)	1	2	3	Design project work
10)	1	2	3	Graphical user interface use (Windows or similar)
11)	1	2	3	Computer aided design (CAD) applications for two dimensional geometric solutions
12)	1	2	3	CAD applications for three-dimensional wireframe, surface, and parametric
13)	1	2	3	Computer based analysis of a model using one of the following: finite element analysis applications kinematic analysis applications circuit analysis applications reaction analysis applications critical path analysis applications

If responses for items 3-7, 10, and 13 are rated 2 or 3, submit one or two documents which will provide documentation of appropriate and/or similar work conducted.

Reminder: Provide Documentation

Self-Assessment (CiEn)
Student: _____

Engr. 200 – Computer Applications in Engineering (2 credits)

The purpose of this course is to introduce the student to common computer applications such as spread sheets, graphing and MathCAD, as well as conventional and structured programming concepts. By completing this course students should have a working knowledge or understanding of Windows (or other operating systems), local area network, common computer applications, and typical high level programming languages and their structures.

How experiences, knowledgeable, or skilled are you in the following areas? Circle the most representative level: "1" for low/none, "2" for medium, "3" for high.

1)	1	2	3	Graphical user interface (GUI) usage (windows types of environment).
2)	1	2	3	Network usage for such things as e-mail, file transfer, data/information searches, and hard copy output.
3)	1	2	3	Common computer applications (graphing programming languages)
4)	1	2	3	Differences between high-level programming languages and mid to low level programming languages
5)	1	2	3	Usage of various data types (integer, real, double precision, character, etc).
6)	1	2	3	Arithmetic operations and their evaluation (order of operations).
7)	1	2	3	Potential effects of mixed-mode operations
8)	1	2	3	Usage of intrinsic (built-in) functions
9)	1	2	3	Simple input and output such as reading values from a keyboard or data file and printing/writing values to a monitor, file, or printer
10)	1	2	3	Decision making control structures (IF is commonly used).
11)	1	2	3	Repetition control structures (DO loops are commonly used).
12)	1	2	3	Conditional repetition control structure (WHILE) is commonly used)
13)	1	2	3	Implementation of arrays
14)	1	2	3	Subprogram usage (modularity of subprogram object code and potential reusage in other programs).

Provide appropriate documentation of training and/or employer's statement verifying work-related use/application.

Self-Assessment (CiEn)
Student: _____

CiEn 101 Introduction to Civil Engineering (1 credit)

This course is used to familiarize traditional freshman students with the practice of civil engineering, scope of civil engineering services, professional practice issues, ethics, communication, team work and career opportunities/planning. Evaluation of this credit for waiver will be based on your documented industrial work and special training experience. The experience and/or training must be fully detailed and documented in your transcripts and/or portfolios. Documentation of courses, certifications, and supporting letter from work supervisors should be included in appropriate portfolios to demonstrate an understanding of the civil engineering profession.

Self-Assessment (CiEn)
Student: _____

CiEn 201 – Introduction to AutoCAD for Civil Engineers (1 credit)

This course is used by students to transition from the Pro-E CAD software used in Engr 101 to the AutoCAD platform, which is more commonly associated with Civil Engineering design software applications. Evaluation of this credit for waiver will be based on your documented industrial work/laboratory/special training experience or relevant CAD course completion. The experience and/or course work must be fully detailed and documented in you transcripts and/or portfolios. Documentation of short courses, certifications, and supporting letters from work supervisors should be included in appropriate portfolios.

Self-Assessment (CiEn)
Student: _____

CiEn 301 – Civil Engineering Lab I (2 credits)

This laboratory is used by students to broaden their hands-on experience with engineering and construction materials and soils. The evaluation of this credit for waiver will be based on your documented industrial work/laboratory/special training experience and/or relevant engineering science college laboratory courses. The experience and/or coursework must be fully detailed and documented in your transcripts and/or portfolios. Documentation of short courses, certifications, and supporting letters from work supervisors should be included in the appropriate portfolios.

To receive the waiver of 1 full credit hour for the engineering and construction materials portion of the laboratory, the student must demonstrate expertise in the areas related to granular material sieve analyses, concrete mix design, concrete testing, bituminous pavement design, bituminous pavement testing, steel specimen testing, and advanced composite testing. Demonstration of only specific aspects of materials competency may reduce the time commitment for the laboratory, but will not result in a waiver for aspects where proficiency is lacking.

To receive the waiver of 1 full credit hour for the soils portion of the laboratory, the student must demonstrate expertise in the areas related to soil index properties testing, grain size distribution analyses, permeability, moisture density relationships, shear strength, and consolidation of soils. Demonstration of only specific aspects of soil testing competency may reduce the time commitment for the laboratory, but will not result in a waiver for aspects where proficiency is lacking.

Waiver of part or all of this course credit does not relieve the student of the need to satisfy the full 9 credit hours of University of North Dakota Communication General Education Requirements.

Self-Assessment (CiEn)
Student: _____

CiEn 302 – Civil Engineering Lab II (2 credits)

This laboratory is used by students to broaden their hands-on experience with hydraulics and environmental engineering data collection and evaluation. The evaluation of this credit for waiver will be based on your documented industrial work/laboratory/special training experience and/or relevant engineering science college laboratory courses. The experience and/or coursework must be fully detailed and documented in your transcripts and/or portfolios. Documentation of short courses, certifications, and supporting letters from work supervisors should be included in the appropriate portfolios.

To receive the waiver of 1 full credit hour for the hydraulics portion of the laboratory, the student must demonstrate expertise in the areas of fluid properties, flow measurement, head loss measurement, open channel flow, pipe flow, and hydraulic machinery (pumps and turbines) testing. Demonstration of only specific aspects of hydraulic engineering competency may reduce the time commitment for the laboratory, but will not result in a waiver for aspects where proficiency is lacking.

To receive the waiver of 1 full credit hour for the environmental engineering portion of the laboratory, the student must demonstrate expertise in the areas of water and wastewater treatment topics and testing including: pH, BOD, total and suspended solids, hardness, alkalinity, chlorination, coagulation, jar testing. Demonstration of only specific aspects of water and wastewater treatment/testing competency may reduce the time commitment for the laboratory, but will not result in a waiver for aspects where proficiency is lacking.

Waiver of part or all of this course credit does not relieve the student of the need to satisfy the full 9 credit hours of University of North Dakota Communication General Education Requirements.

Self-Assessment (CiEn)
Student: _____

CiEn 313 General Surveying (2 credits) & General Surveying Lab (1 credit)

This lecture and laboratory is used by students to experience measurements, location of engineered project components on land, and construction controls. The evaluation of this credit for waiver will be based on your documented industrial work/laboratory/special training experience and/or relevant engineering technology college laboratory courses. The experience and/or coursework must be fully detailed and documented in your transcripts and/or portfolios. Documentation of short courses, certifications, and supporting letters from work supervisors should be included in the appropriate portfolios.

To receive the waiver of 3 full credit hours for General Surveying, the student must demonstrate expertise in the areas related to: measurement of distances and angles, electronic distance measurement, satellite and inertial systems, triangulation, differential leveling, horizontal curves, vertical curves, traverse surveys, U.S. public lands surveys, earthwork, boundary surveys, and construction surveys. In order to waive the laboratory, the documented experience must include field work and surveying instrument operation experience using EDM, total stations, automatic levels, and GPS in construction control, topographic/earthwork surveys, curve layout, and traversing. Demonstration of only specific aspects of surveying competency may reduce the time commitment for the laboratory, but will not result in a waiver for aspects where proficiency is lacking.

Self-Assessment (CiEn)
Student: _____

CiEn 397 – Technical Electives (6 credits)

Technical electives are used by students to broaden their experience with engineering topics. Often students earn three to six credits by working in industry for two or three summers or semesters.

The evaluation of this credit will be based on your industrial work experience and/or relevant engineering science college courses completed as documented in the portfolio entries and college transcripts. Please review these entries and add any information that may be pertinent (i.e. individual project, group project, written/oral reports).

Appendix C

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Appendix D

Release of Information

To facilitate efforts to provide an ongoing assessment of student learning in Engineering 100: Professional Development, it may be necessary to review student portfolios periodically. Therefore, by signing this consent form, students should be aware that the contents of their portfolios may be viewed by their advisor, faculty department members, the department chair, accreditation team members, and UND personnel involved with course assessment and development.

I, _____, give permission to have my portfolio reviewed for the purposes of assessment, course development, and accreditation. If my portfolio is considered for review for other purposes, I will receive an advance notice and the opportunity to withhold consent.

Signed _____
Dates _____

Correspondence Release Form

I, _____, give my academic advisor permission to contact me by FAX, email, telephone, or mail when my portfolio entries are received and/or approved. If my advisor has recommendations for improvement of my work, I will be contacted by mail to ensure confidentiality.

Signed _____
Dated: _____

Statement of Academic Integrity

To the best of my knowledge, the information that I supply for my portfolio will be an accurate and honest reflection of my knowledge, ability, and experience

Signed _____
Dated: _____

Appendix E

The Virtual Staff (Ethics Topic)

Case Study: The Virtual Staff
Developed by: Lonny B. Winrich, PhD
University of North Dakota

Carl Hoover is the computer center director for a small liberal arts college in the Midwest. He came to this position after several years in industry and thoroughly enjoys the relatively peaceful life of an idyllic college town. He also works very hard to provide high quality service from the academic and administrative computer systems of the college. In fact, he is the first director in more than 10 years who has been able to keep both the administrative and academic users reasonably happy. He has regularly received excellent performance reviews but not the increases in his staff budget that he insists would be necessary to support a professional computer center on campus. Still, Carl has managed to run a reasonably tight ship. Since he has minimal support staff, he is always on the look out for the brightest computer science students and practically shanghais them into working for the center as student employees.

To a certain extent he has been lucky. For the past several years Carl has always found six or seven upper division computer science students who were willing, even eager, to work as systems programmers. In most cases the students involved would have volunteered their time because of the experience they gained by working in the center. Carl consistently insisted that the students be paid because he thought it would be improper for the college to take advantage of them in this way and because of the discipline that paying them brings to the management of their work schedules. The Vice President for Finance always comes up with the necessary funds to hire Carl's students (at minimum wage, of course). The biggest problem is a college policy that restricts student-help employees to 10 hours per week. Still, the students have effectively doubled his programming staff and put little pressure on the sparse budget. The scheme allows Carl to maintain a level of service that keeps the campus more or less satisfied. This year, things have not gone as well: Carl has only found three students who meet his standards for employment in the center.

The students love the idea that they are working as "real programmers" and each is quite willing to spend more than the standard 10 hours a week in the center. Carl decides to test the policy and schedule more hours for each of these student workers. With each of his students putting in 18 to 20 hours per week, the center runs smoothly and there are no complaints from the users. This scheme works for about three weeks. Then the Director of Financial Aid calls to remind Carl that students cannot work more than 10 hours each week. Carl pleads for an exception. He argues that his situation is unique, that he cannot hire just any student, that special skills and training are requisite for his student employees. But to no avail: The policy is upheld. Carl is told that he can hire more students but the hours of each student are limited to 10 hour rule.

Carl knows that he already has the best computer science students and that it was highly unlikely that new employees could learn the systems thoroughly enough to work at the same level. In his opinion, the operation of the center was in jeopardy. Carl calls his three students together and enlists them in a plot to continue their current work schedules.

A separate identity would be created for each student and each would be hired under two names. Since each of the identities could work 10 hours, each student's work schedule would be unchanged. The students would receive two paychecks instead of one but the pay would be the same . . . The computer center had complete control of the administrative files of the college so it was relatively easy for Carl to make the necessary entries to cover up the scam. Of course, everyone agreed to keep it all secret.

Carl took no money himself and the students still worked the hours they got paid for, they just worked more than what was allowed under college policy. The 10 hour rule was a policy of the college and did not involve legal sanctions at either the state or federal level.

Assume that the scheme is eventually discovered and that the college administration moves to fire Carl and to expel the students involved. They naturally appeal this action. You are a member of the campus governance structure (e.g., grievance committee or student court) that hears their appeal. What do you consider to be the strongest argument in Carl's favor (i.e., that he shouldn't be fired)? What is the strongest point against him? What are the strongest arguments for and against the students involved? What is your recommendation for the administrative action in the case?

Winrich, L.B. (1995) The virtual staff. Computers and Society, 25 (4).