

Kettering University
Culminating Undergraduate Experience
Co-op Thesis Project
Cooperative Employer Manual

Kettering University
Center for Culminating Undergraduate Experiences
1700 University Avenue
Flint, MI 48504-4898
(810) 762-9947
ccue@kettering.edu
CCUE Director: Dr. Matthew Sanders
Thesis Advisor: Michelle Gebhardt

TABLE OF CONTENTS

OVERVIEW.....	3
Our Mission	3
What is a Thesis?	3
Purpose of the Thesis.....	3
Expectations of the Thesis Student	3
Benefits to the Employer	3
GETTING STARTED.....	4
Required JRII Student Thesis Advisement Meeting	4
Topic Selection Process	4
Identify Employer Advisor	5
Student Submittal of the Proposed Thesis Assignment	5
STEP-BY-STEP RESPONSIBILITIES OF THE EMPLOYER ADVISOR.....	6
FREQUENTLY ASKED QUESTIONS	8
TYPICAL THESIS PROJECT TITLES.....	9
STUDENT PROJECT MANAGEMENT TOOL (KqUest)	10

OVERVIEW

Our mission . . .

To provide the Kettering student with a culminating undergraduate experience, combining curriculum and work experience into a significant REAL WORLD professional project.

What is a Thesis?

Kettering's Culminating Undergraduate Experience program is an opportunity for the student to use his/her learned knowledge to perform a major project for the co-op employer. The student and co-op employer identify a suitable company-oriented problem and a Kettering faculty advisor approves the project. The student then will perform the project during the students first thesis term (work term) followed by writing a comprehensive report describing his/her work during the students second thesis term (work term). The student should be allowed at minimum 50% of their time during his/her thesis terms to work on his/her thesis project. Upon completion, the report which is a thesis is evaluated by both the employer advisor and the faculty advisor.

Purpose of the Thesis . . .

Students perform a comprehensive project from its inception to its conclusion. The focus of this project may be a product or a system. The student must produce a technical document, the Senior Thesis, reporting on the student's performance and project outcomes. The project may be industrial or academic.

Expectations of the Thesis Student . . .

- ④ Work in conjunction with their employing company to identify the problem and the important parameters of the project.
- ④ Plan a solution strategy and map it out with the agreement of the employer and faculty advisor.
- ④ Conduct appropriate research, experimentation, design work and investigation.
- ④ Prepare a major written report describing the project, the solution methodology and the conclusions and recommendations.
- ④ Meet the deadlines associated with the student's graduation term and to complete two thesis terms.

Benefits to the Employer . . .

A number of our co-op employers have contended that the Thesis Project provides them a distinguished opportunity to evaluate the student's performance prior to graduation, which could determine if the student has a future with the company. As well, many thesis students have saved their companies a significant amount of money or have contributed to process improvements and utilizing new techniques or ideas.

GETTING STARTED

The **first** step for a student to start on the thesis, is to attend a group CUE advisement meeting with the Kettering University Thesis Advisor. This is a required meeting for all students while on campus during the end of their junior one term. During this meeting the student will work out a graduation plan, determine his/her thesis terms, determine his/her graduation term, be introduced to the CUE project process and identify what steps of the process need to be accomplished each term to graduate on time. A majority of the students will return to work the following term and determine with his/her employer advisor if the Co-op Thesis is an acceptable option and if so, determine a topic to submit their Proposed Thesis Assignment (PTA) in KqQuest that term or the following work term. Note: If the Co-op Thesis isn't deemed a good fit for the company, then the next academic term (Junior II academic term), student will contact CCUE to find another CUE option to pursue.

The **second** step is the **Topic Selection Process**. The student's thesis topic should be one that is negotiated and agreed upon between the student and the employer. Topic selection is best accomplished when the employer provides the student several topic ideas and allows student to select one or the student is given the responsibility to derive the topic and obtain approval for it from the employer. Many times, topics are initiated by managers in the work area where the student is likely to begin their professional career. In some cases, projects have served as a lead-in to the student's initial work assignment following graduation. **It is highly important that the project be accepted and endorsed by both the student and the employer regardless of who selects the problem on which the Senior Thesis Project is based.** Please note: Kettering University does not identify or select Co-op Thesis Project topics. Kettering University evaluates and approves proposed topics using the criteria below, but the projects are selected by the student and employer.

Thesis Topic Criteria:

- ④ Is the project of value to the co-op employer?
 - Will it solve an existing problem?
 - Will it result in cost savings, improved quality, increased productivity, increased reliability, or improved serviceability?
 - Is it important enough to be made a significant part of the student's workload during the two thesis terms required?
- ④ Will the project provide an opportunity to demonstrate competence in the student's field of study?
 - Does it involve some valid engineering design content (for engineering students)?
 - Does it require an engineering, business and/or science background to perform so that the student can demonstrate his/her ability to apply that background?
 - Is it related to the student's previous cooperative work experiences?

- Will it allow the student to demonstrate creativity, planning skills and independent thinking?
- Will the student's work assignment during the project period be compatible with accomplishing the project's goals?
- ④ Is the problem clearly stated as a present or potential problem, not a goal?
 - Is the problem describable in terms of its current or potential consequence(s)?
 - Is the problem too ambitious or too trivial?
- ④ Is the project manageable within two thesis terms?
 - Can the project goal be accomplished within this time frame?
 - Will the PTA be submitted on time according to the student's graduation term thesis timeline? (Late submission of the PTA may make it difficult to adhere to the required deadlines for graduation; as a result, an extension may be necessary.)

The **third** step is to **identify an Employer Advisor**. A student's employer is asked to assign an advisor within the company who is in the best position to provide technical knowledge and resources in the field of the problem assignment. The Employer Advisor is the key advisor on the project and will work closely with the student on a daily or weekly basis.

The most identifiable Employer Advisor should be one who . . .

- ④ Possesses a strong technical competence in the focus area of the project.
- ④ Is involved with the selection and overall definition of the project.
- ④ Understands the purpose of the project and the commitments necessary for its successful completion.
- ④ Has some familiarity with the student's work and has established a rapport with the student based on past work experiences.
- ④ Does not travel for extended period on a regular basis.
- ④ Have work assignments that make them easily accessible to the student.

The **fourth** step is for the student to fill out the **Proposed Thesis Assignment (PTA)** and submit to Kettering University CCUE via KqUest. Kettering University recommends that students provide approximately two paragraphs of information for each question addressed in the PTA. Upon receipt of the PTA from the student, the employer advisor will receive an e-mail to view and approve the PTA. Once the employer advisor approves the PTA then it will be automatically forwarded to the student's degree department for faculty review. A faculty member reviews the project and a determination is made. The proposal can be accepted, rejected or require revisions. Upon faculty advisor acceptance, a confirmation e-mail is issued and all constituents will receive notification of the approval via e-mail.

STEP-BY-STEP RESPONSIBILITIES OF THE EMPLOYER ADVISOR

Upon approval of the PTA, the Employer Advisor will . . .

- ④ Help the student develop and approve the Plan of Attack prior to the student submitting it to the faculty advisor.
- ④ Participate in the meeting with the student and the faculty advisor at the company or other agreed upon location. This meeting may occur during the Thesis I term at the beginning of the project or during Thesis II at the end of the project.
- ④ If the thesis is to be confidential, sign the Confidential Thesis Agreement located in KqUest and can be printed by the student. The agreement is submitted to CCUE prior to or no later than submission of the preliminary thesis.
- ④ Approve the student's Thesis Abstract when prompted to do so by e-mail.
- ④ Review the preliminary thesis for technical accuracy and recommend necessary changes. Also prepare a Preliminary Company Approval letter on company letterhead to accompany the student's Preliminary Thesis submission to Kettering University. A form letter is available on KqUest and can be printed by the student.
- ④ Complete a Senior Thesis Project Evaluation by Employer Advisor via Kettering Connect upon receiving notification via e-mail. This is sent via e-mail to the Employer Advisor during the students' second thesis term.
- ④ If non-confidential, sign three Final Thesis Title Pages. One bound copy of the thesis will be sent to the employer advisor, and one bound copy will be sent to the student.
- ④ Arrange and attend the student's presentation of the CUE project to an audience of managers and other professionals at the employer location.

ADDITIONAL RESPONSIBILITIES:

- ④ Ensure a work schedule that will allow the student adequate time to complete the thesis project. Kettering University recommends that at least 50% of the students' time is allotted toward their thesis project during their thesis terms.
- ④ Monitor the student's progress with completing the work on the thesis project during the students first thesis term and the completing the writing and preliminary submission during the students second thesis term.
- ④ Advise the student on how to attain the project end results by suggesting sources of information and methods of approach.
- ④ Facilitate the student's access to necessary company resources.
- ④ Act upon requests from the student when such requests relate to the employer's policy.

FREQUENTLY ASKED QUESTIONS

🔒 **How large should the project be?**

The project should fit within two work terms, referred to as Thesis I and Thesis II. During the Thesis I term, students should focus on research, data collection and testing of the project. While on their Thesis II term, students should concentrate on the writing and submission of the preliminary thesis.

🔒 **What are the due dates?**

The deadlines are based on when the student will graduate. Specific dates for each step of the process are indicated on the students' access to KqUest, a project management software tool, under the "Thesis Task List."

🔒 **In general, how long is a thesis?**

The average thesis document is approximately 50 pages.

🔒 **Who owns the thesis project?**

During all stages of the process the co-op employer has total ownership of the thesis.

🔒 **How does Kettering University ensure the quality of a thesis project?**

- a. The faculty reviews and approves the Proposed Thesis Assignment (PTA). If a PTA does not offer the student a quality work experience, it will not receive faculty approval.
- b. Our grading methodology is unique. Thesis projects that lack quality may not receive a passing grade.
- c. The interaction between the faculty advisor and the employer partner. The faculty advisor visits the work site during the thesis project to discuss the project and to ensure that it is on track for completion.

🔒 **What is the current grading system for the thesis project?**

Pass with Distinction (Superb Grade), Pass or Fail

🔒 **Do all thesis projects save the employer money?**

No, not always. However, the thesis project can save the employer in other areas such as continuous improvement, utilizing new techniques or ideas or patents.

PAST THESIS PROJECT TITLES

(This list is provided to help with brainstorming possible thesis topics. Students can view past non-confidential theses through the Thesis Digital Archive available on the following website: <http://www.kettering.edu/offices-administration/library>. Students will need a VPN login to access off-campus.)

- ⑨ DESIGN OF MODULAR SEATING FOR LIGHT RAIL APPLICATIONS
- ⑨ COMPUTERIZATION OF THE WELD PROCESS/PRODUCT CONTROL AUDIT
- ⑨ ANALYSIS AND IMPLEMENTATION OF SHORTER PRODUCTION LOTS AND QUICKER CHANGEOVERS ON A HIGH VOLUME MOLD LINE
- ⑨ IMPLEMENTATION AND UTILIZATION OF A MULTI-COORDINATE MEASURING MACHINE
- ⑨ A PRELIMINARY DESIGN PROPOSAL FOR COMPOSITE REPLACEABLE TREADS FOR TRACKED VEHICLES
- ⑨ THE EFFECTS OF FURNACE PARAMETERS, PRODUCT METALLURGY AND SURFACE ON CONTINUOUS ANNEALED SHEET PRODUCT
- ⑨ IDENTIFICATION OF MARKET FOR VERSAMATE INC. MODULAR INDEXING SYSTEM
- ⑨ IMPROVED HANDLING AND BURNING OF SOLID WASTE
- ⑨ SYNCHRONOUS MANUFACTURING OF SOFT TRIM: THE ROLE OF ENGINEERING AND PRODUCTION SUPERVISION
- ⑨ DEVELOPMENT OF A CRANKCASE FASTENING STRATEGY WHICH OPTIMIZES CRITICAL ENGINE CHARACTERISTICS IN THE ASSEMBLY PROCESS
- ⑨ HEAT TRANSFER ANALYSIS OF A MULTIPLE DISK CLUTCH BRAKE
- ⑨ DEVELOPMENT OF AN INTERNATIONAL SOURCING STRATEGY
- ⑨ COMPUTER AIDED DESIGN AND ANALYSIS OF A PLASTIC WIPER MODULE
- ⑨ DEVELOPMENT OF PARAMETRIC DESIGN PROGRAMS FOR CAD/CAM GEOMETRY INTERFACE
- ⑨ DEVELOPMENT OF MATH MODELS FOR THE ESTIMATION OF TOOL LIFE

STUDENT PROJECT MANAGEMENT TOOL (KQUEST)

Throughout the entire thesis process, students are instructed to use KqUest, a software project management tool. This tool is an all inclusive software, outlining their required Kettering tasks to complete, due dates to help keep the student on track, a description of how to go about completing the required tasks, and access to all required forms. The example KqUest task list/timeline below is based on a Thesis I term in Winter 2012 (January – March), Thesis 2 term in Summer 2012 (July – September) and an expected graduation term of Fall 2012 (October – December).

Thesis Tasks and Events Lists in KqUest (Example)

Title	Starting Due Date	Ending Due Date	Completed	Edit
 PTA Due	07/24/2011	07/30/2011	N/A	
 PTA Approval Due	09/04/2011	09/10/2011	N/A	
 POA Due	10/02/2011	12/24/2011	N/A	
 Meet Faculty Advisor	10/03/2011	12/24/2011	N/A	
 Research	01/08/2012	03/30/2012	N/A	
 Advisor Meeting	01/08/2012	09/29/2012	N/A	
 Thesis Meeting	04/02/2012	06/22/2012	N/A	
 CHP 1 Due	05/11/2012	05/11/2012	N/A	
 Prelim Due to Employer	07/27/2012	07/27/2012	N/A	
 Prelim Due to T/S	08/13/2012	08/13/2012	N/A	
 Prelim Approval Due	09/28/2012	09/28/2012	N/A	
 Employer Eval Due	10/05/2012	10/05/2012	N/A	
 Final Thesis Due to T/S	10/15/2012	10/15/2012	N/A	
 Final Thesis Approved	12/07/2012	12/07/2012	N/A	
 Graduation	12/08/2012	12/08/2012	N/A	