



Open Pathway Quality Initiative Report

Institutional Template

The enclosed Quality Initiative Report represents the work that the institution has undertaken to fulfill the Improvement Process of the Open Pathway.

Signature of Institution's President or Chancellor

A handwritten signature in green ink, appearing to read "C. G. Maples".

Date

1/8/18

Dr. Christopher G. Maples, Chancellor

Printed/Typed Name and Title

Missouri University of Science and Technology

Name of Institution

Rolla, Missouri

City and State

The institution uses the template below to complete its Quality Initiative Report. The institution may include a report it has prepared for other purposes if it addresses many of the questions below and replaces portions of the narrative in the template. This template may be used both for reports on initiatives that have been completed and for initiatives that will continue and for which this report serves as a milestone of accomplishments thus far. The complete report should be no more than 6,000 words.

Quality Initiative Reports are to be submitted by August 31 of Year 9. HLC recommends that institutions with comprehensive evaluations in the first half of Year 10 submit their report at least six months prior to their Assurance System lock date. Submit the report as a PDF file to pathways@hlcommission.org with a file name that follows this format: QI Report No Name University MN. The file name must include the institution's name (or an identifiable portion thereof) and state.

Date:

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Report Categories

Overview of the Quality Initiative

1. Provide a one-page executive summary that describes the Quality Initiative, summarizes what was accomplished and explains any changes made to the initiative over the time period.

Missouri University of Science and Technology is a comprehensive technological research university with a strong reputation for return-on-investment based on producing graduates who are able to hit the ground running with exemplary theoretical and foundational knowledge coupled with a tradition of hands-on laboratory, project and experiential activities. Although most graduates from Missouri S&T have participated in some type of experiential learning activity the campus has long recognized that some students were only peripherally involved in smaller experiences and more could be done to insure all of our students were exposed to the myriad of possibilities available for experiential learning. Further, student connection and engagement with the campus, community, state and world (such as through experiential learning activities) has long been recognized as a high-impact factor in promoting student success through greater retention and ultimately through higher graduation rates.

Given these considerations, the faculty, staff and leadership of the university included in the campus Strategic Plan the following as its first strategy: **“Require all undergraduate students to participate in some significant experiential learning activity before they graduate.”** This strategy fits within the context of the first of four goals in the strategic plan; Goal 1 is *“Develop and inspire creative thinkers and leaders for life-long success.”*

The Strategic Plan was adopted in 2013 and at that time discussions began about proposing to the Higher Learning Commission (HLC) that development and implementation of the experiential learning requirement serve as our Quality Initiative. The proposal was submitted to HLC and in July 2014 HLC approved the proposal.

In the roughly four years of work on this initiative much has been accomplished, and much remains to be completed. The administration, faculty, staff, and students worked together to provide input and comment on the implementation of a scheme to require significant experiential learning as a graduation requirement. A draft document on “guidelines and implementation” emerged from these discussions that was debated and edited over the course of many weeks. In its final form the document was submitted to Faculty Senate and referred to the Academic Freedom and Standards committee. In 2014 the Faculty Senate approved the final document. The graduation requirement would go into effect for the Fall 2015 entering cohort of freshmen and transfer students. Based on the spirit of general campus guidelines, each degree program faculty would decide what would and what would not count as a significant experiential learning activity for the purposes of meeting this graduation requirement for that specific degree program. The Office of Undergraduate Studies would be responsible for working with each degree program on a mechanism to monitor, track, and report on completion of this degree requirement so that the Registrar’s Office could insure the degree requirement was met.

A measure of the initial success of the Quality Initiative is the fact that, as of Fall 2017, each of the 30 undergraduate degree programs have developed guidelines and processes for their students to follow in meeting the significant experiential learning requirement. The entering Fall 2015 cohort is beginning its third year at Missouri S&T and in about a year significant numbers of these students will begin graduating with the new experiential learning requirement in place. Some small numbers of transfer students have already graduated with the requirement in place. A mechanism for tracking and reporting completion of the requirement exists, and is being

improved each semester. At this time work is underway to develop a spreadsheet application that will interact with our PeopleSoft student services database management system to self-populate and automate many of the monitoring and reporting activities required by the new graduation requirement. That spreadsheet application should be ready for pilot testing in the summer of 2018.

Scope and Impact of the Initiative

2. Explain in more detail what was accomplished in the Quality Initiative in relation to its purposes and goals. (If applicable, explain the initiative's hypotheses and findings.)

Please note: On July 1, 2017, the Office of the Vice Provost for Undergraduate Studies took on oversight of additional units on campus and was renamed the Office of the Vice Provost for Academic Support. Because most of what is reported herein occurred prior to July 2017, throughout this Quality Initiative report the office will be referred to as the Office of Vice Provost for Undergraduate Studies.

The Missouri S&T Quality Initiative equates to the first strategy in our Strategic Plan which states: **“Require all undergraduate students to participate in some significant experiential learning activity before they graduate.”** This strategy fits within the context of the first of four goals in the strategic plan; Goal 1 is *“Develop and inspire creative thinkers and leaders for life-long success.”* The Office of the Vice Provost for Undergraduate Studies is responsible for monitoring experiential learning activities and maintaining the reporting of those activities.

The Strategic Plan was developed with input from a wide range of stakeholders both within and outside the university, and was implemented in 2013. The guiding principle for developing this strategic plan was to build on Missouri S&T's reputation for providing an excellent return on investment (ROI) for students by expanding our efforts to provide a top ROI for our other key customers, including employers, research partners investors, and donors.

The goal of the Quality Initiative was to work with faculty, staff, students, and alumni to institute a program that would require every undergraduate student to complete a significant experiential learning activity prior to graduation. In summer 2013, the Vice Provost for Undergraduate Studies began a series of meetings and working sessions on campus to solicit input related to the implementation of the experiential learning graduation requirement. These meetings and working sessions included the Academic Affairs Retreat, the Department Chairs Council, the Provost Leadership Cabinet, the Corporate Development Council, the Division of Student Affairs, and Faculty Senate. Additionally, many other units on campus provided input and/or expressed support for and sometimes concerns about the proposed graduation requirement. After compiling all input, a draft document of Guidelines for Implementation was circulated and debated around campus in various venues ranging from the Chancellor and her leadership group to small gatherings of faculty and students. Changes, edits, and further circulation and debate continued. In late fall 2013, the final draft document was submitted to the Faculty Senate for consideration, where it was referred to the Academic Freedom & Standards committee.

In the Spring semester of 2014, the Academic Freedom & Standards committee presented a final version of the document entitled “Missouri S&T Undergraduate Experiential Learning Standard & Operating Procedure” to the entire Faculty Senate and recommended approval. The Faculty Senate then voted to approve at its April 2014 meeting, with the graduation requirement to go into effect for the Fall 2015

cohort of incoming freshmen (and any transfer students who would fall under the Fall 2015 catalog year). A copy of that document is attached as Appendix A. In brief, the activity must be University sponsored or affiliated; a faculty member or advisor will ensure the activity is of significant duration, intensity and rigor; the focus must be on “learning by doing” in a creative and innovative activity that falls outside the realm of a traditional classroom or traditional laboratory experience; and the activity will include a written summary reflection piece that will document the experience from the student’s perspective. It is noteworthy that the Faculty Senate gave examples of activities that *might* qualify, but the Faculty Senate specifically delegated to each academic department (as per the Collected Rules and Regulations) authority over what activities it will accept to meet the campus-wide experiential learning graduation requirement. The Faculty Senate also specified that each department will notify the Office of Undergraduate Studies when a student satisfies the requirement, and the Office of Undergraduate Studies will then notify the Registrar’s Office, at which point the student’s Degree Audit will be updated to indicate completion of that graduation requirement.

The final paragraph of the Faculty Senate document included the following entry for the Undergraduate Catalog effective for the Fall 2015 cohort:

“All students at Missouri S&T are required to participate in appropriate experiential learning activities. Experiential learning refers to learning stimulated by a variety of structured activities that differ significantly from the traditional lecture format. Experiential learning activities are designed to require students to go beyond mastering basic skills and knowledge in the application of that material to problem solving challenges. These activities involve collaboration and reflective learning and allow students to learn in environments that align with their aptitudes.”

Concurrently with the development of the Experiential Learning Standard & Operating Procedure, campus leadership (including Faculty Senate) also discussed the idea of proposing to the Higher Learning Commission (HLC) that the development and implementation of the experiential learning graduation requirement serve as the Missouri University of Science and Technology Quality Initiative. A proposal was submitted and HLC approved this Quality Initiative in July 2014.

Throughout the 2014-15 academic year, the Office of Undergraduate Studies worked with and encouraged each academic department to develop specific statements and guidelines that could be used by students to seek faculty approval of the student’s own significant experiential learning activity. Recall that per the Collected Rules, each department controls its own curriculum and the Faculty Senate specifically delegated authority over what activities will be accepted for the experiential learning graduation requirement to each individual department. One of the HLC reviewers of the Quality Initiative Proposal had noted that “Appropriately, the departments have been given the authority to determine their own degree requirements. However, some standardization of learning outcomes for the experiential learning activity, as well as some standardization of review for the student reflection, would be appropriate ...” Another reviewer encouraged “... the institution to formulate a consistent measure that will indicate the depth of learning that occurs in the activity, as well as a measure of student effort and engagement.” Missouri S&T faculty and administration have been working on the challenge of simultaneously allowing each department to develop its own guidelines while at the same time trying to provide some standardization and consistency across the campus. To that end, a standard approval and reporting form has been developed for use by each department; the use of this form is not required, but it is encouraged, and many of the departments have adopted the form or some version of it. A copy of the standard form is attached as Appendix B. The standard approval and reporting form is also an effective mechanism for students to obtain pre-approval of a significant experiential learning activity; this will help avoid misunderstandings over what will and what will not count for the experiential learning activity in a particular academic program.

A short summary of department statements and guidelines are collected in Appendix C. Some departments chose very structured guidelines and processes (the full Computer Science guidelines are included as an example at the end of Appendix C), while others adopted simpler and more flexible approaches. As of May 2017, every department has submitted a guidelines and process document.

The Office of Undergraduate Studies is tasked with working with departments to monitor, archive and report the completion of the experiential learning graduation requirement for each student (beginning with the Fall 2015 catalog year). The reporting is carried out in collaboration with the Registrar's Office in order to make sure that the graduation requirement is correctly noted as completed on the student's Degree Audit prior to graduation. Although the process is evolving and is improved each semester, a mechanism is in place and follows this general process:

1. Student works with advisor or department coordinator on developing or proposing a significant experiential learning activity that will satisfy that particular department's guidelines).
2. Student completes experiential learning activity and reports completion to advisor or department coordinator (department archives reporting form if used, and archives reflection piece if submitted).
3. The Office of Undergraduate Studies sends a query (in the form of a spreadsheet) to each department at the beginning of each semester, sends reminders throughout the semester (Fall, Spring and Summer terms), and solicits names of those students in each department who have completed the graduation requirement for an experiential learning activity since the last query. Departments are instructed to submit the updated list no later than two weeks prior to the end of each term.
4. The Office of Undergraduate Studies compiles a list of all students who have completed the graduation requirement and reports this to the Office of the Registrar in the form of a "class" roster where the class is "Experiential Learning" and students who have completed the requirement get a passing (Satisfactory) S grade. This class roster then automatically informs the Degree Audit software which officially records the graduation requirement as completed.

As of May 2017, the number of Fall 2015 catalog year students who have graduated with the experiential learning requirement applicable to them is 44. Most of these 44 students are transfer students who entered Missouri S&T during or after Fall 2015 and therefore officially were designated with Fall 2015 as their catalog year. The transfer student issue was anticipated: some of them have met the requirement, some received a waiver, and some simply changed their catalog year to reflect when they started college at another institution (e.g., Fall 2013) and thus the requirement did not apply to them.

3. Evaluate the impact of the initiative, including any changes in processes, policies, technology, curricula, programs, student learning and success that are now in place in consequence of the initiative.

Each department at Missouri S&T went through a process of discussing, evaluating and implementing a procedure to ensure that all undergraduate students in their department would complete a significant experiential learning activity in order to graduate. The faculty in each degree program had to decide how they would evaluate and approve the significant experiential learning activity for each student. The discussions were very fruitful and interesting; the entire range of topics concerning experiential learning were explored: What is experiential learning? How does it differ from service learning (if it does differ)? How can the rigor and learning outcomes associated with an experiential learning activity be evaluated? How can experiential learning best be documented? How does one define "significant" in the experiential learning requirement?

Some departments have changed their curricula in order to explicitly insert significant experiential learning activities into their senior experiences, such as through a capstone design course or a senior research thesis. The Department of Computer Science, for example, went beyond the minimum and now requires their students to complete a senior level course that includes experiential learning (CS 4096 – Software Systems Development I) and an additional experiential learning activity from an approved list of options.

In terms of recruitment, the Enrollment Management staff routinely touts the experiential learning graduation requirement as another reason to consider enrolling at Missouri S&T. Students and family seem to respond very well to this requirement.

4. Explain any tools, data or other information that resulted from the work of the initiative.

Monitoring, approving and registering completion of this degree requirement has required the development of processes and reporting structures (for example, the Experiential Learning approval form – see Appendix B). A standard spreadsheet is used for updating and reporting to Undergraduate Studies those students who have completed the requirement during each term. This spreadsheet system is evolving and there is movement toward developing a shared database that could be updated continuously by every department. An Informational Technology (IT) workgroup is now exploring the possibility of building a spreadsheet application that is automatically populated by our PeopleSoft student services software which should provide a relatively easy mechanism for each department to track its students that are scheduled to graduate in a particular semester and indicate whether they have or have not completed the experiential learning requirement for graduation. The spreadsheet application would be available in real time for all those involved: department chairs, department administrative assistants, advisors, the Registrar and the Office of Undergraduate Studies. The IT workgroup estimates that this spreadsheet application will be ready for a pilot test in the summer of 2018.

The Division of Student Affairs developed a fairly extensive rubric and scoring mechanism to evaluate their experiential learning activities (and offered that rubric to other non-academic units). This rubric allowed Student Affairs to score all of their activities in terms of how extensive each experiential learning activity really was and what sort of learning might occur, for example, if a student was a residential assistant in the Residential Life for a semester or two. Such a rubric is available to academic departments, and could be used to determine if that specific experiential learning activity is “significant” and could thus meet the graduation requirement.

5. Describe the biggest challenges and opportunities encountered in implementing the initiative.

One immediate concern arose from non-academic units (e.g. Student Affairs units such as Residential Life and Student Life) that activities they deemed as solid experiential learning activities would not be valued as highly by academic units and might not be deemed acceptable activities for meeting the graduation requirement. The entire division of Student Affairs created a complete database of activities that were experiential in nature, and then applied a rubric to determine the extent, rigor, and significance of each. This exercise was then taken on by some of the other non-academic units on campus. The result is increased awareness of experiential opportunities and something like an inventory of non-academic experiences that, at the very least, has resulted in a thorough discussion around campus of what should and what should not count as a “significant” experiential learning activity for the graduation requirement. Further,

increased awareness of *all* experiential-type activities, not just those that might qualify for the graduation requirement, is generally agreed to be a positive outcome of these efforts.

Another concern involved resolving “tension” between department faculty who control their degree program curriculum and control what should count as “significant experiential learning activity” for graduation, versus the desire by upper leadership to address the recommendation of HLC reviewers that there be some standardization of learning outcomes, review of the student reflection piece, and formulation of consistent measures indicating the depth of learning and measures of student effort and engagement. In order to address this tension, a standardized reporting form is available which reminds students and faculty of the typical experiential learning activities that might count, the approvals that are required, and the reflection piece that should be submitted, approved by the advisor, and archived. Although the faculty did not want the form to be a prescribed campus requirement, it has been adopted by many of the departments.

At the beginning, there were some challenges getting the academic departments to consistently monitor and report the students who have completed the requirement each semester. Sometimes, multiple reports for the same student were generated. Other times, departments missed the deadline to report and submitted the names of students at the last minute. The monitoring and reporting mechanism must be improved after each iteration, and tweaks have to be made constantly as staff transition and new people must be educated about the process. As mentioned elsewhere in this report, the IT staff are in the process of developing a real-time monitoring system in the form of a spreadsheet application that is populated automatically by our PeopleSoft student services software system. This spreadsheet application will be available sometime near the end of the summer 2018 academic term and it is hoped that this system will be convenient to use, continuously updated by departments, and should streamline the entire monitoring and reporting process.

Commitment to and Engagement in the Quality Initiative

6. Describe the individuals and groups involved at stages throughout the initiative and their perceptions of its worth and impact.

Strategic Planning subcommittees: all stakeholders who reviewed and approved the Strategic Plan, the Strategic Planning Coordinator, the Chancellor, and the Chancellor’s Cabinet.

Missouri S&T Board of Trustees

Academic Affairs: Provost, Vice Provosts, and Department Chairs.

Faculty Senate: specifically the Academic Freedom & Standards committee

Student Affairs: Residential Life, Athletics, Student Life, Career Opportunities

Student Council

Corporate Development Council

There has been almost unanimous support across campus for the experiential learning graduation requirement – at least the concept. In practice, some faculty have expressed concern about monitoring and reporting one additional graduation requirement. In addition, students have occasionally expressed some concern about the ability to find an appropriate experiential learning activity that will count for their particular major. Most individuals and groups, however, have expressed a strong belief in the value to our students of experiential learning outside the traditional classroom setting.

7. Describe the most important points learned by those involved in the initiative.

The value of effective communication and setting timelines proved to be the most important lessons learned from this process. Communication across campus was key to getting the faculty to “buy in” and ultimately to gaining Faculty Senate approval. In the spirit of shared governance, the ideas and concepts about this initiative put forth by campus leadership often had to be tempered through compromise and gentle “tweaks,” because faculty rightly insisted on maintaining their role in any changes to curriculum such as a new graduation requirement.

One valuable result of this initiative also resulted in a particular challenge in terms of the timeline for students. Some academic departments are using experiential learning activities in their senior capstone design course to meet the graduation requirement. Thus, students in those departments will not have completed the graduation requirement until the final grade for that senior capstone design course is submitted. If that course is taken in the final semester, the graduation requirement for a Significant Experiential Learning Activity may not officially be met until sometime after that semester concludes (and the grade is submitted). This time lag needs to be addressed as effectively as possible but, ultimately, will be handled the same as any grade for a class during that final semester is handled.

Resource Provision

8. Explain the human, financial, physical and technological resources that supported the initiative.

Human resources supporting this initiative are the faculty advisors, department chairs, administrative staff, and Experiential Learning coordinator in the Office of Undergraduate Studies. Additionally the staff in the Registrar’s Office work closely with the Experiential Learning Coordinator to monitor and record the completion of this graduation requirement on students’ transcripts. The IT staff is currently working on a spreadsheet application that will interact in real-time with our PeopleSoft student services software and which will self-populate with student data for those students approaching their graduation semester. The spreadsheet application will allow necessary individuals on campus to monitor those students who need to have the experiential learning requirement completed, whether or not the requirement has been completed, and it will be possible to update the spreadsheet at any time to keep records as current as possible for reporting to the Registrar’s office.

No additional financial, physical, or technological resources were required to implement this initiative. However, the creation of a graduation requirement based on experiential learning has alerted the campus to the ongoing need for additional financial resources to support certain experiential learning activities that are especially attractive to students, including Opportunities for Undergraduate Research, student design teams, and student mentoring positions.

Plans for the Future (or Future Milestones of a Continuing Initiative)

9. Describe plans for ongoing work related to or as a result of the initiative.

Departments are now being encouraged to update their degree program catalog entries to reflect their expectations in terms of what students in those degree programs must do, what processes they must follow, and what documentation they must provide in order to meet the Significant Experiential Learning graduation requirement.

As the vast majority of first-time college students from the Fall 2015 cohort begin to approach graduation in 2019 and 2020, there will be a lot of emphasis placed on the monitoring and reporting structures in place for this requirement. No doubt some unexpected challenges will surface, and we need to plan for and be prepared to handle the large numbers of students documenting their experiential learning activities. We expect that in May 2019 (and after) there may be 500 or so students who will graduate with this degree requirement in place at each commencement season. The mechanism for monitoring, tracking, and reporting the completion of this requirement will need to be running smoothly at that point.

There is a recognition across campus of the importance of experiential learning to all of our students, and for the need to develop more opportunities for significant experiential learning activities that might meet the graduation requirement.

10. Describe any practices or artifacts from the initiative that other institutions might find meaningful or useful and please indicate if you would be willing to share this information.

The departmental guidelines developed by faculty to describe appropriate experiential learning activities are broad ranging and tailored, in many cases, to individual disciplinary standards and practices. Other institutions might be interested to see how experiential learning activities are described on our campus, in contexts ranging from engineering departments to science departments to humanities and social sciences departments. In addition, our operating definition of “experiential learning” might be meaningful to other institutions. We discovered that there is not one universally accepted definition of “experiential learning” that has been adopted in higher education. Our approach was to allow each degree program faculty to develop their own definition and guidelines for the graduation requirement.

Our mechanism for monitoring, archiving, and reporting the graduation requirement as completed is still evolving. This involves coordination of department faculty and staff, the Office of Undergraduate Studies, and the Registrar’s Office. The IT staff is developing a spreadsheet application for monitoring and reporting on completion of the experiential learning requirement that might be of interest to other institutions, especially those that use PeopleSoft for the student services data management.

Missouri S&T is certainly willing to share our experiences, processes, and lessons learned with anyone who is interested.

Appendix A

Academic Freedom and Standards Committee

Experiential Learning Standard and Operating Procedure

Academic Freedom & Standards

Missouri S&T Undergraduate Experiential Learning Standard & Operating Procedure

Standard

All undergraduate students graduating from Missouri S&T are required to have an experiential learning activity as part of their degree requirement. There is a long tradition of experiential learning. One of the early proponents was John Dewey, the Progressive era education reformer. Dewey argued that educators should move from teaching abstractions to instruction based upon problem solving and learning by doing. In other words, educators should encourage students to apply what they are learning. As he wrote in 1938, “There is an intimate and necessary relation between the process of actual experience and education.”

Key Elements of Experiential Learning

- Student centered rather than teacher centered
- Active learning rather than passive learning
- Application of learned principles to form realistic solutions to problems, issues and challenges
- Reflection upon the learning experience.

General Definition

Experiential learning at Missouri S&T refers to learning stimulated by a variety of structured activities that differ significantly from the traditional lecture format. Experiential learning activities are designed to require students to go beyond mastering basic skills and knowledge in the application of that material to problem solving challenges. These activities involve collaboration and reflective learning and allow students to learn in environments that align with their aptitudes.

Implementation Guidelines for Missouri S&T

To qualify:

1. The activity must be University sponsored or affiliated and the student must receive written approval of the activity from a faculty member or academic advisor in the student’s degree program. Approval of the initial activity does not automatically imply

approval of the overall experience. Degree programs may develop lists of pre-approved activities that will count as significant experiential learning activities if completed.

2. The faculty member or academic advisor will ensure that the activity is of significant duration, intensity and rigor to demonstrate successful application of learned principles appropriate to the expectations of the degree program faculty (it may be that more than one activity could be combined to create a suite of experiential learning activities for a single student that may be approved in satisfaction of this requirement).
3. The focus must be on “learning by doing” in a creative and innovative activity that generally falls outside the realm of the traditional lecture classroom experience and contributes significantly to professional and personal development.
4. Finally, a significant experiential learning activity will include a written summary reflection piece that will document the experience from the student’s perspective; this written reflection piece should be of a quality suitable for inclusion as an attachment to a co-curricular transcript or in an e-portfolio that might be submitted by the student to potential employers or to graduate school admissions committees.

Examples of activities that might qualify:

- Undergraduate research (OURE projects, NSF Research Experience for Undergraduates, Honors Academy senior research project, etc.)
- Co-Op, summer internship, and externships in industry or at a research center
- Significant participation on a student design team
- Study abroad
- S&T sponsored service learning (e.g., EWB, Bio Sci and Psychology capstone service learning or internship projects, Miner Challenge)
- Significant involvement in national/international competitions such as Chem-E Car, IEEE Robotics, etc.
- Field camp/ field trip experiences of significant duration and intensity
- Practicum or formalized student teaching
- Mentor/coach/tutor over a sustained period in an S&T sponsored mentoring program (Student Success Coaches, Peer Learning Assistant, On-Track Mentor, Opening Week Mentor - which continues through the academic year with programming such as ReConnect1 and 2)
- Paraprofessional, mentoring, peer teaching positions (Resident Assistants, Programming Resident Assistants, Chancellors Leadership Academy Advisors, Peer Involvement Advisors, Miner Mentors, Joe’s P.E.E.R.S., Health Related Careers Mentoring Program, Admissions Ambassadors, PRO Leaders)
- Leadership positions within student governing boards (Student Council, Student Union Board, Inter-fraternity Council, PanHellenic Council, Greek Chapter Executive board, Residence Hall

Association, National Residence Hall Honorary, Residence Hall Executive Board, Cultural Activities Planning Committees, Student Judicial Boards, Student Athlete Advisory Committee)

- Year-long leadership involvement experiences (Global Leaders Institute, Chancellor's Leadership Academy, Student Leadership Conference Chair, Intercollegiate Athletics Team)
- Leadership workshops and retreats (NRHA Leadership Trip, Greek Chapter retreats, Backpack to Briefcase, Student Leadership Conference, Sue Shear Leadership Academy)
- Activities provided in campus residences that are judged as an effective conduit for Missouri S&T to connect students' in-class experiences to their life within the campus community. A variety of activities are provided to support academic success and enhance professionalism, time management, leadership, project management, and interpersonal, and communication skills.

This list is not meant to be all-inclusive or restrictive. The faculty in each degree program must come to consensus on activities they will accept within the structure and expectations of their degree programs; however, activities must embody the spirit and intent of the Missouri S&T definition and implementation guidelines delineated above.

Operating Procedure

Per CRR 300.030.4.1.3, each department is delegated jurisdiction over the curricula of the department. Accordingly, each department shall have authority over what activities it will accept to meet the campus-wide experiential learning requirement for all undergraduate students. When an undergraduate student has satisfied the departmental requirement for experiential learning for a specific degree program, the department will notify the Office of Undergraduate Studies who will keep the records and also notify the Registrar's Office which shall update the student's Degree Audit for that particular degree program, marking a completion check box similar to senior assessment. Note that it is up to departments to decide for a particular degree program whether to accept another degree program's experiential learning requirement, so students taking multiple majors or transferring from one degree program to another may need to satisfy multiple, possibly non-overlapping, experiential learning requirements.

Undergraduate Catalog Entry

All students at Missouri S&T are required to participate in appropriate experiential learning activities. Experiential learning refers to learning stimulated by a variety of structured activities that differ significantly from the traditional lecture format. Experiential learning activities are designed to require students to go beyond mastering basic skills and knowledge in the application of that material to problem solving challenges. These activities involve collaboration and reflective learning and allow students to learn in environments that align with their aptitudes.

Appendix B
Experiential Learning Activity Form

Approval for Experiential Learning Activity

Student Name: _____ Student #: _____

Activity Title: _____

Faculty Advisor and Department: _____

Type of activity: *(recommended durations)*

- | | |
|--|--|
| <input type="checkbox"/> Undergraduate Research (2 Semesters) | <input type="checkbox"/> Co-op (2 Semesters) |
| <input type="checkbox"/> Internship (1 Semester) | <input type="checkbox"/> Leadership Position (2 Semesters) |
| <input type="checkbox"/> Department Student Design Teams (2 Semesters) | <input type="checkbox"/> Mentor/Coach/Tutor (2 Semesters) |
| <input type="checkbox"/> Study Abroad (1 Semester) | <input type="checkbox"/> Service Learning (2 Semesters) |
| <input type="checkbox"/> Student Design Team (2 Semesters) | |
| <input type="checkbox"/> Other _____ | |

The focus must be on “learning by doing” in a creative and innovative activity that generally falls outside the realm of the traditional lecture classroom experience and contributes significantly to professional and personal development.

Specifically define how the selected activity achieves the objective for experiential learning (how does it connect to and satisfy the S&T commitment to the Higher Learning Commission as part of the Quality Initiative – the activity should be significant and the depth of learning should be well documented):

This activity has been approved. An acceptable end-of-activity reflection must be attached for this activity to qualify for experiential learning credit.

Student Signature

Date

Faculty Advisor Signature

Date

Department Signature

Date

The activity was completed satisfactorily and an approved reflection is attached.

Activity Advisor Signature

Date

Department Signature

Date

*Original to be kept in Department

Appendix C

Short Summary of Degree Programs Experiential Learning Requirements

Departmental Experiential Learning Requirements

Aerospace Engineering: The two-semester, aircraft (5 hr) and spacecraft (6 hr) capstone design course.

Arts, Languages, and Philosophy:

- **Bachelor of Science in Philosophy:** Must be approved by student's major advisor and department chair.
- **Bachelor of Arts in Multidisciplinary Studies:** These activities will often be part of the multidisciplinary capstone course but other activities may also be accepted. Must be approved by student's major advisor and department chair.

Biological Sciences: Senior Seminar BIO SCI 4010, a one-semester service learning course with a requirement for a reflective statement, with a grade of "C" or better and an EL activity which could include, undergraduate research, leadership in a student organization, participation in a student design team, co-op, internship, student teaching, miner challenge, peer mentor, tutor, or advisor.

Business and Information Technology: Undergraduate research, service learning, BUS 5980, co-op, internship, externship, design team, study abroad, mentor/coach/tutor, and leadership position.

Ceramic Engineering: Capstone course and an EL activity which could include, co-op, internship, student design team, engineers without borders, leadership position, undergraduate research, campus ambassador, PRO leader, study abroad, academic team competition, or custom.

Chemical and Biochemical Engineering: Undergraduate research, co-op, internship, externship, student design team, engineering without borders, miner challenge, study abroad, paraprofessional, mentoring, peer teaching positions, or leadership positions.

Chemistry:

- **Bachelor of Science and Bachelor of Arts:** Undergraduate research, co-op, internship, externships, student design team, study abroad, service learning, engineering without borders, bio sci and psychology capstone service learning, miner challenge, field camp/field trip experiences, student teaching, mentor, coach, tutor, paraprofessional, or leadership positions.

Civil, Architectural, and Environmental Engineering: Undergraduate research, co-op, internship, externship, student design team, study abroad, service learning, engineers without borders, mentor, coach, or tutor leadership positions.

Computer Science: Comp Sci 4096 and an EL activity which could include, any on campus course not required for the BS in CS degree, cooperative work training, undergraduate research, student design team, leadership position, internship, co-op, externship, service learning, mentor, coach, tutor, paraprofessional, peer teaching, or custom.

Economics: Undergraduate research, co-op, internship, externships, student design team, study abroad, field camp/field trip experiences, or experiential courses taught in the department of economics.

Electrical and Computer Engineering: Senior design course

Engineering Management and Systems Engineering: Capstone course and service learning based project management course and an EL activity which could include, co-op, internship, student design team, engineers without borders, leadership positions, undergraduate research, student ambassador, Pro advisor, study abroad, academic team competition, or custom.

English:

- **BA in English, BA in English Education, and BS in Technical Communication:** Service learning course, study abroad, undergraduate research, student design team, leadership positions, internship, co-op, externship, service learning team, mentor, coach, tutor, student teaching, paraprofessional, or custom.

Geosciences and Geological and Petroleum Engineering: Approved courses, undergraduate studies, study abroad, co-op, internship, externship, leadership positions, service learning.

History and Political Science: History 4097 Senior Thesis or History 4010 Seminar

Mathematics and Statistics: Competitions and Examinations, mentor, coach, tutor, student teaching, undergraduate research, student design team, leadership positions, internship, co-op, externship, service learning, paraprofessional, teaching positions, or custom.

Mechanical Engineering: Departmental design project.

Metallurgical Engineering: Capstone course and co-op, internship, engineers without borders, leadership positions, undergraduate research, campus ambassador, PRO leader, study abroad, academic team competition, or custom.

Mining and Nuclear Engineering: Undergraduate research, service learning, BUS 5980, co-op, internship, externship, design team, study abroad, mentor/coach/tutor, and leadership position.

Physics: Physics 3119 and 3129, undergraduate studies, student design team, internship, co-op, externship, service learning, mentor, coach tutor, paraprofessional, peer teaching positions, leadership positions, or custom.

Psychological Sciences: PSYCH 4310, PSYCH 4590, PSYCH 4990, PHYCH 4099, PSYCH 4700, volunteer research assistant, presenting research at a professional conference, OURE, presenting research at the S&T undergraduate research conference, honors academy senior research project, NSF research experience, co-op, internship, externship, study abroad, service learning, student teaching, or custom.

The following is a list that is consistent with departmental experimental learning requirements.

- ✓ Co-op
- ✓ Department Student Design Team
- ✓ Internship
- ✓ Leadership Position
- ✓ Mentor/Coach/Tutor
- ✓ Service Learning
- ✓ Student Design Team
- ✓ Study Abroad
- ✓ Undergraduate Research
- ✓ Senior Design Capstone Course
- ✓ Other

Computer Science

Experiential Learning in the Bachelor of Science degree in Computer Science

Approved by the Department of Computer Science on March 13th 2015

This document specifies the Department of Computer Science's implementation of the Missouri S&T Undergraduate Experiential Learning Standard & Operating Procedure approved by Faculty Senate on April 17th 2014

(http://facultysenate.mst.edu/media/campusupport/facultysenate/documents/academicfreedomstandards/2013-2014/AFS_Experiential_Learning_document.pdf).

All BS in CS students will meet the following core required experiential learning requirement plus one of the following elective experiential learning requirements:

Core required experiential learning requirement:

- COMP SCI 4096 (this course must require that students write a reflection on the learning experience and count the grade received for it towards the course GPA)

Elective experiential learning requirement:

- Any on campus course, not required for the BS in CS degree, listed on the CS department website as designated by the CS undergraduate committee as an experiential learning course (e.g., COMP SCI 4097, COMP SCI 5001 – Experiential Entrepreneurship for Computer Scientists, COMP SCI 6400, COMP SCI 6401, any courses approved for the soon to be created interdisciplinary minor in entrepreneurship & innovation); these courses must require that students write a reflection on the learning experience and count the grade received for it towards the course GPA.
- COMP SCI 2002 – Cooperative Work Training; must require that students write a satisfactory reflection on the learning experience.
- Undergraduate Research, including but not limited to OURE projects, NSF REU, Honors Academy Senior Research Project, CRA-W CREU/DREU, etc.; the faculty research advisor will have to complete a standardized assessment (similar to our GRA assessment) provided by the CS department and the student will need to rate at least acceptable on said assessment as well as provide a reflection on the learning experience which must be deemed acceptable by said faculty advisor.
- Member of a SDLEC recognized Student Design team for at least one semester; a faculty advisor of the Student Design team will have to complete a standardized assessment (similar to our GRA assessment) provided by the CS department and the student will need to rate at least acceptable on said assessment as well as provide a reflection on the learning experience which must be deemed acceptable by the student's advisor.
- Member of a student team listed on the CS department website as recognized by the CS undergraduate committee (e.g., ACM Programming Competition Team, ACM Cyber Defense Team) for at least a semester; a faculty advisor of the student team will have to complete a standardized assessment (similar to our GRA assessment) provided by the CS department and

the student will need to rate at least acceptable on said assessment as well as provide a reflection on the learning experience which must be deemed acceptable by said faculty advisor.

- Officer in a student organization (e.g., ACM, ACM-W, IEEE-CS, TIES, or UPE) listed on the CS department website as recognized by the CS undergraduate committee, for at least an academic year; a faculty advisor of the student organization will have to complete a standardized assessment (similar to our GRA assessment) provided by the CS department and the student will need to rate at least acceptable on said assessment as well as provide a reflection on the learning experience which must be deemed acceptable by the aforementioned faculty advisor.
- Internship/co-op/externship not done in combination with COMP SCI 2002; supervisor will have to complete a standardized assessment (similar to our GRA assessment) provided by the CS department and the student will need to rate at least acceptable on said assessment as well as provide a reflection on the learning experience which must be deemed acceptable by the student's advisor.
- Service Learning: member of any service learning team/organization listed on the CS department website as designated by the CS undergraduate committee as meeting the criteria for experiential learning (e.g., Engineers without Borders, Habitat for Humanity) for at least a semester; the team/organization's advisor will have to complete a standardized assessment (similar to our GRA assessment) provided by the CS department and the student will need to rate at least acceptable on said assessment as well as provide a reflection on the learning experience which must be deemed acceptable by the student's advisor.
- Mentor/coach/tutor for at least an academic year in an S&T sponsored mentoring program (Student Success Coaches, Peer Learning Assistant, On-Track Mentor, Opening Week Mentor - which continues through the academic year with programming such as ReConnect1 and 2); the student's supervisor will have to complete a standardized assessment (similar to our GRA assessment) provided by the CS department and the student will need to rate at least acceptable on said assessment as well as provide a reflection on the learning experience which must be deemed acceptable by the student's advisor.
- Paraprofessional, mentoring, peer teaching positions (Resident Assistants, Programming Resident Assistants, Chancellors Leadership Academy Advisors, Peer Involvement Advisors, Miner Mentors, Joe's P.E.E.R.S., Health Related Careers Mentoring Program, Admissions Ambassadors, PRO Leaders) for at least an academic year; the student's supervisor will have to complete a standardized assessment (similar to our GRA assessment) provided by the CS department and the student will need to rate at least acceptable on said assessment as well as provide a reflection on the learning experience which must be deemed acceptable by the student's advisor.
- Year-long leadership involvement experiences (Global Leaders Institute, Chancellor's Leadership Academy, Student Leadership Conference Chair, University Innovation Fellow); a faculty or staff member supervising the experience will have to complete a standardized assessment (similar to our GRA assessment) provided by the CS department and the student will need to rate at least acceptable on said assessment as well as provide a reflection on the learning experience which must be deemed acceptable by the student's advisor.

- Custom: if a student wants experiential learning credit for something not on above pre-approved list, then with the student's advisor's endorsement, they can submit via their advisor a proposal to the CS undergraduate committee describing the proposed experiential learning experience and justifying that it meets the elective experiential learning requirement.

The above referenced instructors/advisors/supervisors will submit their assessments electronically to the CS undergraduate secretary who will track them and periodically send S&T's Undergraduate Studies Office a list of BS in CS students who have met all their experiential learning requirements.

The CS undergraduate committee will once a year report to the CS faculty:

- how many students completed each of the above listed experiential learning experiences,
- their assessment of each of the individual experiential learning experiences and the department's overall implementation of the experiential learning requirement,
- and any proposals they may have for revising said implementation.