

From: noreply@wsu.edu
To: [curriculum.submit](#)
Subject: 612625 Engineering and Technology Management Requirements Revise - Revise or Drop Graduate Plan
Date: Thursday, October 1, 2020 12:02:57 PM
Attachments: [2020.10.01.11.59.54.05.FormData.html](#)
[2020.10.01.11.59.53.49.currentCatalogFile_Justification for ETM MS Nonthesis Changes 1.docx](#)
[2020.10.01.11.59.53.49.currentCatalogFile1_Engineering and Tech Mgmt MS nonthesis 002 .docx](#)

Patricia Elshafei has submitted a request for a major curricular change. His/her email address is: pelshafei@wsu.edu.

Requested change: Revise or Drop Graduate Plan

Degree: Master of Engineering and Technology Management

Title: Non-thesis

Requested Effective Date: Fall 2021

Revise plan requirement: Yes

Dean: Field, David - Assoc Dean - VCEA - Grad,

Chair: Squires, Alice – Chair – Engineering and Technology Management,

Catalog Subcommittee
Approval Date

AAC, PHSC, or GSC
Approval Date

Faculty Senate
Approval Date

From: [Squires, Alice](#)
To: [curriculum.submit](#)
Cc: [Field, Dave](#); [Squires, Alice](#); [Elshafei, Patti](#)
Subject: 211 Re: 612625 Engineering and Technology Management Requirements Revise - Revise or Drop Graduate Plan
Date: Thursday, October 1, 2020 1:33:48 PM
Attachments: [2020.10.01.11.59.53.49.currentCatalogFile_Justification_for_ETM_MS_Nonthesis_Changes_1.docx](#)
[2020.10.01.11.59.53.49.currentCatalogFile1_Engineering_and_Tech_Mgmt_MS_nonthesis_002_revision.docx](#)

2. I approve this proposal with revisions. Revisions are attached.

From: "curriculum.submit@wsu.edu" <curriculum.submit@wsu.edu>
Date: Thursday, October 1, 2020 at 3:02 PM
To: WSU - Alice Squires <alice.squires@wsu.edu>
Cc: "Field, Dave" <dfield@wsu.edu>
Subject: 612625 Engineering and Technology Management Requirements Revise - Revise or Drop Graduate Plan

Squires, Alice – Chair – Engineering and Technology Management,

Field, David - Assoc Dean - VCEA - Grad,

Patricia Elshafei has submitted a request for a major curricular change.

Requested change: Revise or Drop Graduate Plan

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Requested Effective Date: Fall 2021

Revise plan requirement: Yes

Both Chair and Dean approval is required to complete the submission process. Please indicate that you have reviewed the proposal by highlighting one of the statements below and **reply all** to this email. (curriculum.submit@wsu.edu.) [Details of major change requested can be found in the attached supplemental documentation]

1. I approve this proposal in its current form.
2. I approve this proposal with revisions. Revisions are attached.
3. I do not approve this proposal. Please return to submitter.

If you do not respond within one week, you will be sent a reminder email. If no

From: [Field, Dave](#)
To: [Squires, Alice](#); [curriculum.submit](#)
Cc: [Elshafei, Patti](#)
Subject: Re: 612625 Engineering and Technology Management Requirements Revise - Revise or Drop Graduate Plan
Date: Thursday, October 1, 2020 2:12:53 PM

I approve of these as revised by Prof. Squires.

Dave

From: Squires, Alice <alice.squires@wsu.edu>
Sent: Thursday, October 1, 2020 1:33 PM
To: [curriculum.submit](#) <curriculum.submit@wsu.edu>
Cc: Field, Dave <dfield@wsu.edu>; Squires, Alice <alice.squires@wsu.edu>; Elshafei, Patti <pelshafei@wsu.edu>
Subject: Re: 612625 Engineering and Technology Management Requirements Revise - Revise or Drop Graduate Plan

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To: WSU - Alice Squires <alice.squires@wsu.edu>
Cc: "Field, Dave" <dfield@wsu.edu>
Subject: 612625 Engineering and Technology Management Requirements Revise - Revise or Drop Graduate Plan

Squires, Alice – Chair – Engineering and Technology Management,
Field, David - Assoc Dean - VCEA - Grad,
Patricia Elshafei has submitted a request for a major curricular change.
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Justification for Engineering and Technology Management METM (Non-Thesis) Changes

Current METM:

- Managing Organizations and People: one course minimum:
 - E_M 501 Management of Organizations
 - E_M 522 Leadership, Supervision, and Management
- Managing Financial Resources: one course minimum:
 - E_M 505 Finance for Technical Systems
 - E_M 545 Technical Decision Analysis
- Managing with Analytical Methods: one course minimum:
 - E_M 560 Integrated Supply Chain Management
 - E_M 540 Operations Research and Analytics for Managers
- Managing Projects: one course minimum:
 - E_M 564 Project Management
 - E_M 565 Introduction to Systems Management
- Managing Variability: one course minimum:
 - E_M 503 Managing Variability Using Statistics
 - E_M 580 Quality Control and Reliability
 - E_M 585 Design of Experiments
- Managing Strategy: one course minimum:
 - E_M 526 Constraints Management
 - E_M 575 Performance Management in Technical Organizations
 - E_M 591 Strategic Management of Technology and Innovation in Engineering
- Electives: three courses chosen from the following, and not already used to satisfy the above core requirements:
 - E_M 501 Management of Organizations
 - E_M 503 Managing Variability Using Statistics
 - E_M 505 Finance for Technical Systems
 - E_M 508 Legal Concepts for Engineering and Technology Managers
 - E_M 520 Contract Project Management
 - E_M 522 Leadership, Supervision, and Management
 - E_M 524 Program and Facilities Management
 - E_M 526 Constraints Management
 - E_M 530 Applications in Constraints Management
 - E_M 534 Contemporary Topics in Constraints Management
 - E_M 538 Lean Tools for Systems Improvement
 - E_M 540 Operations Research and Analytics for Managers
 - E_M 545 Technical Decision Analysis
 - E_M 555 Enterprise Resource Management
 - E_M 560 Integrated Supply Chain Management
 - E_M 564 Project Management
 - E_M 565 Introduction to Systems Management
 - E_M 566 Systems Analysis and Practice
 - E_M 567 System Supportability and Logistics Management
 - E_M 568 Risk Assessment and Management
 - E_M 569 System Architecting
 - E_M 570 Systems Improvement: Integrating TOC, Lean, and Six Sigma

- E_M 575 Performance Management in Technical Organizations
- E_M 580 Quality Control and Reliability
- E_M 585 Design of Experiments
- E_M 587 Managing Human Factors for Safety and Productivity
- E_M 590 Leading Design and Innovation
- E_M 591 Strategic Management of Technology and Innovation in Engineering
- E_M 595
- E_M 596
- Capstone: 3 credits minimum:
 - E_M 701
- Total Graded Credits: 27 credits minimum
- Total Credits: 30 credits minimum

METM with Marked Changes:

- Managing Organizations and People: one course minimum:
 - ~~E_M 501 Management of Organizations (2)~~
 - E_M 522 Leadership, Supervision, and Management Leading People and Organizations (1)
- Managing Financial (3) Resources: one course minimum:
 - E_M 505 Finance for Technical Systems
 - ~~E_M 545 Technical Decision Analysis~~
 - E_M 566 Trade-off Analytics: Exploring the System Tradespace (5)
- Managing with Analytical Methods: one course minimum:
 - E_M 560 Integrated Supply Chain Management
 - E_M 540 Operations Research and Analytics for Managers
- Managing Projects: one course minimum:
 - E_M 564 Project Management
 - E_M 565 Introduction to Systems Management
- Managing Variability: one course minimum:
 - ~~E_M 503 Managing Variability Using Statistics (6)~~
 - E_M 580 Quality Control and Reliability – Add E_M 503 or Statistics as a pre-requisite (7)
 - E_M 585 Design of Experiments– Add E_M 503 or Statistics as a pre-requisite (7)
- Managing Strategy: one course minimum:
 - E_M 526 Constraints Management
 - E_M 575 Performance Management in Technical Organizations Managing Innovation: Strategy and Performance (8)
 - ~~E_M 591 Strategic Management of Technology and Innovation in Engineering (9)~~
- Electives: three courses chosen from the following, and not already used to satisfy the above core requirements:
 - ~~E_M 501 Management of Organizations (2)~~
 - E_M 503 Managing Variability Using Statistics
 - E_M 505 Finance for Technical Systems
 - E_M 508 Legal Concepts for Engineering and Technology Managers
 - ~~E_M 520 Contract Project Management (10)~~
 - ~~E_M 522 Leadership, Supervision, and Management (1)~~
 - E_M 524 Program and Facilities Management (11)
 - E_M 526 Constraints Management
 - E_M 530 Applications in Constraints Management

- ~~E_M 534 Contemporary Topics in Constraints Management (12)~~
- E_M 538 Lean Tools for Systems Improvement
- E_M 540 Operations Research and Analytics for Managers
- ~~E_M 545 Technical Decision Analysis (5)~~
- E_M 555 Enterprise Resource Management
- E_M 560 Integrated Supply Chain Management
- E_M 564 Project Management
- E_M 565 Introduction to Systems Management
- E_M 566 ~~Systems Analysis and Practice~~ Trade-off Analytics: Exploring the System Tradespace (4)
- E_M 567 System Supportability and Logistics Management
- E_M 568 Risk Assessment and Management
- ~~E_M 569 System Architecting (13)~~
- E_M 570 Systems Improvement: Integrating TOC, Lean, and Six Sigma
- E_M 575 ~~Performance Management in Technical Organizations~~ Managing Innovation: Strategy and Performance (8)
- E_M 580 Quality Control and Reliability – Add E_M 503 or Statistics as a pre-requisite (7)
- E_M 585 Design of Experiments– Add E_M 503 or Statistics as a pre-requisite (7)
- E_M 587 Managing Human Factors for Safety and Productivity
- E_M 590 Leading Design and Innovation
- ~~E_M 591 Strategic Management of Technology and Innovation in Engineering (9)~~
- E_M 595
- E_M 596
- Capstone: 3 credits minimum:
 - E_M 701 Master's Independent Capstone
- Total Graded Credits: 27 credits minimum
- Total Credits: 30 credits minimum

Proposed METM:

- Managing Organizations and People: one course minimum:
 - E_M 522 Leading People and Organizations
- Managing Resources: one course minimum:
 - E_M 505 Finance for Technical Systems
 - E_M 566 Trade-off Analytics: Exploring the System Tradespace
- Managing with Analytical Methods: one course minimum:
 - E_M 560 Integrated Supply Chain Management
 - E_M 540 Operations Research and Analytics for Managers
- Managing Projects: one course minimum:
 - E_M 564 Project Management
 - E_M 565 Introduction to Systems Management
- Managing Variability: one course minimum:
 - E_M 580 Quality Control and Reliability – Add E_M 503 or Statistics as a pre-requisite
 - E_M 585 Design of Experiments– Add E_M 503 or Statistics as a pre-requisite
- Managing Strategy: one course minimum:
 - E_M 526 Constraints Management

- E_M 575 Managing Innovation: Strategy and Performance
- Electives: three courses chosen from the following, and not already used to satisfy the above core requirements:
 - E_M 503 Managing Variability Using Statistics
 - E_M 505 Finance for Technical Systems
 - E_M 508 Legal Concepts for Engineering and Technology Managers
 - E_M 526 Constraints Management
 - E_M 530 Applications in Constraints Management
 - E_M 538 Lean Tools for Systems Improvement
 - E_M 540 Operations Research and Analytics for Managers
 - E_M 555 Enterprise Resource Management
 - E_M 560 Integrated Supply Chain Management
 - E_M 564 Project Management
 - E_M 565 Introduction to Systems Management
 - E_M 566 Trade-off Analytics: Exploring the System Tradespace
 - E_M 567 System Supportability and Logistics Management
 - E_M 568 Risk Assessment and Management
 - E_M 570 Systems Improvement: Integrating TOC, Lean, and Six Sigma
 - E_M 575 Managing Innovation: Strategy and Performance
 - E_M 580 Quality Control and Reliability – Add E_M 503 or Statistics as a pre-requisite
 - E_M 585 Design of Experiments– Add E_M 503 or Statistics as a pre-requisite
 - E_M 587 Managing Human Factors for Safety and Productivity
 - E_M 590 Leading Design and Innovation
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- Capstone: 3 credits minimum:
 - E_M 701 Master’s Independent Capstone
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Proposed Changes with Program and “By Change” Rationale:

The Engineering and Technology Management Master’s (METM) program is undergoing a multi-phase effort to both simplify and provide greater flexibility in the METM program course structure to better meet industry and student needs in engineering and technology management now and in the foreseeable future. This process addresses a current need to reduce the overall number of courses currently being offered in the program which exceeds the current student demand for courses and consequently the student enrollment goals for the program. The process also addresses the need to simplify the core course structure which currently includes fourteen core courses (and at times an additional EM595 course as an exception towards satisfaction of a core area) from which a student is required to select at least six core courses from six core areas, not including the capstone course required for the program. A goal of the process is to better align the program with a typical graduate program that offers a smaller set of core courses that meet the overall program learning outcomes and allows the student to tailor their remaining course selections by choosing electives in those areas that best support their industry needs and career aspirations. To support this effort, however, we are cognizant of our current student set and program requirements, and therefore we are addressing the overall strategy to transition the current program to the future program with a multi-phased approach.

In this initial phase, we focused on the following steps:

1. Identify low student enrollment courses in the program.
 - Drop those courses from the program that are not uniquely required to meet the overall program learning outcomes.
 - Otherwise move to the next step.
2. Identify courses in the program with sufficient content overlap that the content can be merged from two courses into one course offering that meets the relevant learning objectives
3. Make any additional updates or corrections as needed.

In some cases, we identified courses in the core area that could either be dropped from the program or merged with another course. In other cases, we identified courses that were electives that could be dropped from the program or merged with another course. When eliminating a course, we reviewed whether or not that course was part of a graduate certificate and if so, the required certificate updates are addressed in a separate graduate certificate specific justification. In addition to these changes, there were a few other changes made to correct or modernize core areas or course titles to better reflect today's industry terminology. The final result was a reduction in core courses from fourteen to eleven core courses across the six core areas; and a reduction in overall courses in the program from thirty courses to twenty-three courses. Updating the Engineering and Technology Management Master's (METM) program for each change as described below was approved by unanimous vote of department faculty at the March 2020 and April 2020 faculty meetings and through a September 2020 addendum vote performed by email.

Each program level change with the relevant justification is as follows:

1. Rename E_M 522 from *Leadership, Supervision, and Management* to *Leading People and Organizations*.
Justification: The new title reflects the importance of leading at all levels of the organization both formally (manager and supervisor positions), and informally, with an emphasis on leading "people" first. The course continues to support the learning outcomes for the *Managing Organizations and People* core area.
2. Change: Remove E_M 501 Management of Organizations course from the Master's program: remove from the *Managing Organizations and People* core area and from the electives.
Justification: The alternate E_M 522 Leading People and Organizations course in the *Managing Organizations and People* core area covers the learning outcomes for the *Managing Organizations and People* core area.
3. Change the *Managing Financial Resources* core area name to *Managing Resources*.
Justification: *Managing Financial Resources* is too restrictive. In this core area, we address the management of resources more broadly to include people, facilities, equipment, knowledge, time, and money.

4. Rename E_M 566 from *Systems Analysis and Practice* to *Trade-off Analytics: Exploring the System Tradespace*.
Justification: The new title reflects modern practice in systems engineering and trade-off analysis combined with an increasing emphasis on descriptive, predictive, and prescriptive analytics practices in the decision management process applied across the system life cycle. The course reviews a) foundations of decision management incorporating the commitment of resources including people, facilities and equipment, intellectual property, data, time, and money across the system life cycle - based on decisions made early in the project; b) decision management methods, principles, and techniques, and c) applications of decision management and trade-off analysis in the context of risk and uncertainty throughout the system life cycle.
5. Replace the E_M 545 Technical Decision Analysis course with the E_M 566 Trade-off Analytics: Exploring the System Tradespace course in the Managing Resources core area and remove E_M 545 Technical Decision Analysis from the Master's program: remove from the Managing Resources core area and from the electives.
Justification: The E_M 566 Trade-off Analytics: Exploring the System Tradespace course covers the Managing Resources core area learning outcomes of the E_M 545 Technical Decision Analysis course in addition to applying decision analysis and decision management concepts to system level trade-offs across the system life cycle.
6. Remove the E_M 503 Managing Variability Using Statistics course from the Managing Variability core area but keep in the Master's program as an elective.
Justification: The E_M 503 course covers basic statistical techniques that represent pre-requisite knowledge for the Managing Variability core area – the E_M 580 Quality Control and Reliability course and the E_M 585 Design of Experiments course – for those students who lack the appropriate statistical background or need a refresher before completing a core course in the Managing Variability core area.
7. Add “EM503 or Statistics” as a pre-requisite to the E_M 580 Quality Control and Reliability course and the E_M 585 Design of Experiments course, that represent the Managing Variability core area.
Justification: The E_M 503 course covers basic statistical techniques that represent pre-requisite knowledge for the Managing Variability core area – the E_M 580 Quality Control and Reliability course and the E_M 585 Design of Experiments course – for those students who lack the appropriate statistical background or need a refresher before completing a core course in the Managing Variability core area.
8. Rename E_M 575 from *Performance Management in Technical Organizations* to *Managing Innovation: Strategy and Performance*.
Justification: The new title for the E_M 575 Managing Innovation: Strategy and Performance course aligns with the course content and learning objectives which address strategic management and performance management in a context of managing innovation in today's environment.

9. Change: Remove the E_M 591 Strategic Management of Technology and Innovation in Engineering course from the Master's program: remove from the *Managing Strategy* core area and from the electives.
Justification: The E_M 575 Managing Innovation: Strategy and Performance course in the *Managing Strategy* core area sufficiently covers the intended learning outcomes for the E_M 591 Strategic Management of Technology and Innovation in Engineering course.
10. Remove the E_M 520 Contract Project Management course from the Master's program: remove from the electives.
Justification: The E_M 520 Contract Project Management course is being removed for repeated low student enrollment.
11. Remove the E_M 524 Program and Facilities Management course from the Master's program: remove from the electives.
Justification: The E_M 524 Program and Facilities Management course was part of a previously planned program update that was never implemented. The course is not part of the set of ETM Master's courses offered by the program.
12. Remove the E_M 534 Contemporary Topics in Constraints Management course from the Master's program: remove from the electives.
Justification: The E_M 570 Systems Improvement: Integrating TOC, Lean, and Six Sigma course provides coverage of the same learning objectives and contemporary topics related to Theory of Constraints, Lean, and Six Sigma, replacing the E_M 534 Contemporary Topics in Constraints Management course.
13. Remove the E_M 569 System Architecting course from the Master's program: remove from the electives.
Justification: The E_M 569 System Architecting course is being removed for repeated low student enrollment.

Contact Information:

Patricia Elshafei, Graduate Academic Coordinator
Pullman, WA 99164-2785
509-335-0125
etm@wsu.edu

Engineering and Technology Management METM (Non-Thesis):

- Managing Organizations and People: one course minimum:
 - ~~E_M 501~~
 - E_M 522
- Managing ~~Financial~~ Resources: one course minimum:
 - E_M 505
 - ~~E_M 545~~
 - E_M 566
- Managing with Analytical Methods: one course minimum:
 - E_M 560
 - E_M 540
- Managing Projects: one course minimum:
 - E_M 564
 - E_M 565
- Managing Variability: one course minimum:
 - ~~E_M 503~~
 - E_M 580 new prereq E_M 503
 - E_M 585 new Prereq E_M 503
- Managing Strategy: one course minimum:
 - E_M 526
 - E_M 575
 - ~~E_M 591~~
- Electives: three courses chosen from the following, and not already used to satisfy the above core requirements:
 - ~~E_M 501~~, E_M 503, E_M 505, E_M 508, ~~E_M 520~~, ~~E_M 522~~, ~~E_M 524~~, E_M 526, E_M 530, ~~E_M 534~~, E_M 538, E_M 540, ~~E_M 545~~, E_M 555, E_M 560, E_M 564, E_M 565, E_M 566, E_M 567, E_M 568, ~~E_M 569~~, E_M 570, E_M 575, E_M 580, E_M 585, ~~E_M 587~~, E_M 590, ~~E_M 591~~, E_M 595, E_M 596
- Capstone: 3 credits minimum:
 - E_M 701
- Total Graded Credits: 27 credits minimum
- Total Credits: 30 credits minimum

Applicable Graduate School Requirements:

- Graded Credits: 27 credits minimum
 - Students may use a maximum of 9 credits of undergraduate coursework (300-400) with program approval
- Capstone: 3 credits minimum
 - E_M 701
- Total Credits: 30 minimum