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WSU Registrar

Washington State University
MAJOR CHANGE FORM - - REQUIREMENTS
(Submit original signed form and TEN copies to the Registrar's Office, zip 1035.)
See https://www.ronet.wsu.edu/ROPubs/Apps/HomePage.ASP *for this form.*

*Submit an additional copy to the Faculty Senate Office, French Administration 338, zip 1038.

Department Name Engineering and Technology Management

1. CHECK PROPOSED CHANGES.

*☐ Change department/program name *from* _____ *to* _____
*☐ New degree or program *in* _____
*☐ Change name of degree *from* _____ *to* _____
*☐ Drop degree or program *in* _____
*☐ Extend existing degree or program *to* _____ campus

☐ New Major *in* _____
☐ Change name of Major *from* _____ *to* _____
☑ Revise Major requirements *in* Graduate Certificates: General ETM; Systems Engineering; Project Management; Constraints Management, Manufacturing Leadership; Six Sigma Quality Management
☐ Drop Major *in* _____
☐ Revise certification requirements for the Major *in* _____

☐ New Option *in* _____
☐ Revise requirements for the Option *in* _____
☐ Drop Option *in* _____

☐ New Minor *in* _____
☐ Revise Minor requirements *in* _____
☐ Drop Minor *in* _____

☐ New Undergraduate Certificate *in* _____
☐ Revise Undergraduate Certificate requirements *in* _____
☐ Drop Undergraduate Certificate *in* _____

☐ Other _____

Effective term/year _____

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Contact Person	**Contact Phone No.**	**Contact email**

2. GIVE REASONS FOR EACH REQUEST MARKED ABOVE. *(Attach additional paper if necessary; see reverse side.)* See attached:

4. SIGN AND DATE APPROVALS:

J A Ringo 4/19/11 — Chair Signature/date
4/20/11 — Dean Signature/date
_____ — General Education Com/date

_____ Catalog Subcom/date
_____ Academic Affairs Com/date
_____ Graduate Studies Com/date
_____ Senate/Date

Changes to Certificates expected to be in effect January 2012

Project Management * 094a

Old Requirements	New Requirements
E M 501	E M 501 or E M 522
E M 508	E M 508
E M 564	E M 564
E M 520 or E M 565	E M 520 or E M 530

Construction Project Management * 094b

Old Requirements	New Requirements
E M 508	E M 508
E M 520	E M 520
E M 522	E M 522
E M 564	E M 564

*New: (only one certificate in either Project Management or Construction Project Management will be awarded)

Constraints Management * 094c

Old Requirements	New Requirements
E M 501	E M 501 or E M 522
E M 526	E M 526
E M 530	E M 530
E M 590, E M 565, E M 534 or E M 555	E M 534 or E M 555

Manufacturing Leadership 094d

Old Requirements	New Requirements
E M 526	E M 526
E M 560	E M 560
E M 575	E M 538
E M 590	E M 590

Six Sigma Quality Management 094e

Old Requirements	New Requirements
4 of the following:	
E M 570	E M 570
E M 580	E M 580
E M 585	E M 585
E M 590	E M 538 or E M 590
E M 560	
Stat 430	

Supply Chain Management (no changes)

Old Requirements	New Requirements
E M 530	E M 530
E M 555	E M 555
E M 560	E M 560
E M 570 or E M 590	E M 570 or E M 590

Systems Engineering Management 094f

Old Requirements	New Requirements
E M 564	E M 564
E M 565	E M 565
E M 566	E M 566
E M 505, E M 526, E M 545, E M 590	E M 530 or E M 590

General Engineering Management 094g

Old Requirements	New Requirements
4 of the following	
E M 501	E M 501 or E M 522
	3 of the following
E M 505	E M 505
E M 540	E M 540
E M 564	E M 564
E M 591	E M 591
Stat 430	

*This document is for planning purposes; final approved changes will be announced in Fall 2011.

Project Management Certificate

It is necessary for project managers to update their skills in modern project management techniques, to effectively contribute to the continuing growth of the industry. The increasing complexity of project management requires the one in charge to understand the many facets in order to become/remain proficient in the field. The PM certificate provides the recipients with the skills to manage any type of project. It is a fact that all technology managers will have to also manage projects. It is necessary that these projects be managed professionally Many professionals have reported that this certificate has allowed them advance in their Careers as a Project Manager and as a Technology Manager.

Project Management *

Old Requirements	New Requirements
E M 501	E M 501 or E M 522
E M 508	E M 508
E M 564	E M 564
E M 520 or E M 565	E M 520 or E M 530

Justification for changes

The changes are needed to update the Project Management Certificate to current required needs. E M 522 Supervision and Leadership for Engineering and Technology Managers includes more specific detail and focuses on the typical organizational staffing, training and motivation approaches needed in managing projects. E M 530 Applications of Constraints Management brings in the emerging field of Critical Chain project Management which replaces EM 565 Systems Engineering. The reason for these changes is to improve the systemic view taken by the Project Management Certificate. E M 565 Systems Engineering took a systems view via design integration, where EM530 Constraints Management takes a Systemic view from a resource utilization view. The latter approach is more in line with contemporary Project Management. The addition of EM522 Supervision and Leadership in addition to EM501 Organizational Management adds the behavioral view to the organizational system. This also is more in line with contemporary Project Management.

Only one certificate in either Project Management or Construction Project Management will be awarded without special permission. The Construction Project Managements courses are a unique subset of the more generalized Project Management Certificate. The problem foreseen was that a person could get a certificate in Construction Project Management and also request one in Project Management with no additional courses being required. The special permission would be that the person would be required to take the balance of the missed courses (EM501, EM530).

Construction Project Management

It is necessary for construction project managers to update their skills in modern project management techniques, to effectively contribute to the continuing growth of the industry. The increasing complexity of construction projects requires the manager to know and understand many different facets in order to become/remain proficient in the field. The CPM certificate provides the recipients with the skills to manage any type of project (not only construction) involving contractors and subcontractors. Many professionals have reported that this certificate has allowed them to advance in their careers as a project manager and as a technology manager.

Old Requirements	New Requirements
E M 508	E M 508
E M 520	E M 520
E M 522	E M 522
E M 564	E M 564

There will be no changes in the requirements for the certificate but the change is that only one certificate in either Project Management or Construction Project Management will be awarded. Justification is found with Project Management write-up.

Constraints Management Certificate

The Theory of Constraints (TOC) focuses all management attention on the few limiting factors of any system. By providing specific methods of managing variability, TOC creates exceptional performance very quickly and then encourages a process on on-going improvement through the focused use of LEAN and Six Sigma tools. The TOC methods apply to every level of the organization and a every level of maturity. As a result, using TOC over time results in a stable and ever improving organization. This certificate teaches the TOC proven solutions and the TOC thinking process for new solutions. It includes managing people, processes, projects, finances and strategy for a company.

Old Requirements	New Requirements
E M 501	E M 501 or E M 522
E M 526	E M 526
E M 530	E M 530
E M 590, E M 565, E M 534 or E M 555	E M 534 or E M 555

Justification for the change:

Addition of EM 522. An essential part of the management of technical systems is the organizational and human assets. EM 501 Management of Organizations is a mainstay where engineers study individual and group behavior. The new course EM 522 Supervision and Leadership for Engineering and Technology Managers includes more specific detail and focuses on the typical organizational staffing, training and motivation approaches needed in managing complex systems.

The revised Constraints Management Certificate allows either EM 501 or EM 522 as alternative requirements for the Constraints Management Certificate.

EM 526 Constraints Management is the TOC thinking process used to find an unknown constraint, eliminate its cause and create a plan for an excellent future.

EM 530 Applications in Constraints Management is the course in proven solutions (Drum-Buffer-Rope, Critical Chain Project Management, TOC Replenishment) that are the fundamental methods for stabilizing and improving systems flow.

Removal of EM 590 and EM 565. EM 555 Enterprise Resource Management broadens the supply chain system view to the Constraints Management for large, complex organizations. EM 534 Contemporary Topics in Constraints Management brings the latest TOC technology to the students. Either of these courses is an excellent choice to polish TOC knowledge. In the past, we included EM 590 Design for Product and Service Realization, it is not as good a fit for the Constraints Management Certificate as EM 555. This is similar with the EM 565 Systems Engineering and Practice. This is a good course, but the new course EM 555 is a better treatment. So, we are removing EM 590 and EM 565 to provide a more focused Constraints Management Certificate.

Certificate in Manufacturing Leadership

Manufacturing and technical managers in today's manufacturing environments must demonstrate multifaceted leadership combined with a high level of technical expertise in order to compete in a world-class manufacturing arena. The four courses in this certificate provide a unique but essential foundation for understanding and optimizing a manufacturing organization. While many courses in manufacturing focus on the mechanical operations and processes, this certificate focuses on maximizing the performance of the entire system. Achieving the highest levels of performance includes design of products and systems, integrating the contributions of a complex network of suppliers, and coordinating production according to key constraints throughout the supply chain. Finally, the most effective route to achieving continuous improvement in this environment is the integrated application of Lean, Six Sigma, and Theory of Constraints.

Manufacturing Leadership

Old Requirements	New Requirements
E M 526	E M 526
E M 560	E M 560
E M 575	E M 538
E M 590	E M 590

We have substituted E M 538 Lean Agility **for** E M 575 Performance Management in Technical Organizations because the former course embodies our program philosophy of an integrated approach to achieving continuous quality improvement in manufacturing organizations. This integration requires a coordinated implementation of the principles of LEAN organizations, Six Sigma Quality Management, and Theory of Constraints. While we believe that the principles taught in EM575 are important for organizations, we think that E M 538 is more foundational to manufacturing excellence.

Certificate in Six Sigma Quality Management

A concentration of quality improvement courses can be taken as a part of the engineering management masters degree or as a part of the Quality Management Certificate. The certificate provides training in Six Sigma principles relevant to strategic and operational decisions using state-of the art knowledge, tools, and skills in improving quality. This certificate is for engineers and non-engineering professionals in technology management holding a bachelor's degree in engineering, technical, or management areas.

Six Sigma Quality Management

Old Requirements	New Requirements
4 of the following:	
E M 570	E M 570
E M 580	E M 580
E M 585	E M 585
E M 590	E M 538 or E M 590
E M 560	
Stat 430	

Justification for changes:

The heart of six sigma quality lies in the management and minimization of uncontrolled variability in processes and outputs. All of the previous courses focused on managing and understanding variability, but the key elements of the body of knowledge are found in the first three courses. The revised certificate requires students to take all three of these key courses, rather than a mere selection of topics related to variability and design in general. While E M 560 is a good course covering Integrated Supply Chain Management, the faculty believe that our new course E M 538 Lean Agility will be a better elective.

Supply Chain Management Certificate

Every organization has internal supply chains, and links to external suppliers and customers. Interlinking organizations span the spectrum from raw materials to finished products and services in the hands of the consumer. The supply chain extends even to final disposition of the commodities we consume from concept to grave. The structured dependency of such chains, the uncertainty of forecasts and systemic delays are amplified as individual links in the supply chain try to optimize their performance. Even minor changes in the market can cause wild swings in economic performance. Modern design for manufacturability, six sigma quality, operation theories, information systems, such as ERP systems, and theory of constraints hold the promise of stabilizing some of the variability by providing visibility along the whole supply chain. Additional control and operational performance factors are needed to provide a complete solution. This course examines the strategy and tactics of supply chain management to include "how to" techniques to implement, measure and reward the individual links in the supply chain.

No Changes were made

Supply Chain Management (no changes)

Old Requirements	New Requirements
E M 530	E M 530
E M 555	E M 555
E M 560	E M 560
E M 570 or E M 590	E M 570 or E M 590

Certificate in Systems Engineering Management

The complexity of modern systems and projects has demonstrated that it is no longer possible to rely on design evolution and associated tools to improve and develop a system. To address this complexity, system engineering has evolved along with new methods and modeling techniques to better comprehend engineering systems as they grow more complex. System engineering is a holistic, robust approach to the design, creation and operation of systems. It consists of identification and quantification of system goals, creation of alternative system design concepts, performance of trade studies, selection and identification of the best design, verification that the design is properly built and integrated, and post implementation assessment of how well the system meets the customer goals and needs. The system engineering method deals with systems as an integrated whole comprised of diverse subsystems and functions and works to optimize overall system functions and achieve maximum compatibility of its elements. This course focuses on how complex engineering projects should be managed over the life cycle of the project. It deals with the work processes and tools to handle large scale complex engineering projects in a sustainable environment and overlaps with the technical and human disciplines characteristic of these projects.

Systems Engineering Management

Old Requirements	New Requirements
E M 564	E M 564
E M 565	E M 565
E M 566	E M 566
E M 505, E M 526, E M 545, E M 590	E M 530 or E M 590

Justification for Adding E M 530 to the requirements and removing E M 505, 526, 545:

The list of courses comprising this certificate has been reduced to focus more on subjects directly applicable to systems engineering. The deleted courses treat subjects which can certainly contribute to effective systems engineering, but do not directly engage the subject of how to manage large-scale systems. E M 530 comprises a set of proven Theory of Constraints concepts and tools which are directly applicable to large manufacturing systems, including broad logistics concepts such as supply chain integration, inventory management and control, manufacturing systems configuration, and distribution systems.

General Engineering Management Certificate

Students whose graduate studies include the management of organizations, finances, optimization, projects, statistics and strategy have covered the breadth of the basic core topics needed for Engineering & Technology Managements. The General Management Certificate acknowledges a partial achievement of that goal Students who complete a course in the management of organizations and three of the other five specific courses can receive a certificate in General Management.

General Engineering Management

Old Requirements	New Requirements
4 of the following	
E M 501	E M 501 or E M 522
	3 of the following
E M 505	E M 505
E M 540	E M 540
E M 564	E M 564
E M 591	E M 591
Stat 430	

Justification for the changes:

Addition of EM 522. An essential part of the management of technical systems is the organizational and human assets. EM 501 Management of Organizations is a mainstay where engineers study individual and group behavior. The new course EM 522 Supervision and Leadership for Engineering and Technology Managers includes more specific detail and focuses on the typical organizational staffing, training and motivation approaches needed in managing complex systems.

The Engineering & Technology Staff feel strongly that the management of organizations should be required for the General Management Certificate. Either one of EM 501 or EM 522 can satisfy this requirement.

Stat 430 was removed from the requirements as it is an undergraduate course.