

Routing for On-Campus Approval of Degree Program Actions

Type of Action: Enter "X" for Action Type(s) and list Title and Prefix(s) as indicated

_____ New Degree Program	Proposed Program Title <u>Engineering Management</u> (SubPlan)
_____ New Certificate Program	Proposed Certificate Program Title _____
_____ New Minor Program	Proposed Minor Program Title _____
_____ Change in Degree Program Title	Current Degree Program Title <u>Master of Engineering</u>
_____ Change in Certificate Program Title	Current Certificate Program Title _____
_____ Change in Minor Program Title	Proposed Certificate Program Title _____
_____ Change in Course Prefix	Current Minor Program Title _____
_____ Program Discontinuation	Proposed Minor Program Title _____
	Current Course Prefix _____ Proposed Course Prefix _____
Proposed Effective Date <u>Spring 17</u>	Program Contact: Mohamed Bourham _____
Proposed CIP Code (see https://nces.ed.gov/ipeds/cipcode/default.aspx?y=55):	_____

Routing of Action: Indicate date when the following occurs

Completed Appendix A and 1-page Concept Paper

_____ Council of Dean's- Approval to Plan

Completed Proposal

7.7.16 Department Head endorses*

9.9.16 College Curriculum Committee (undergraduate or graduate) recommends*

_____ College Dean endorses*

Proposal moves to Undergraduate or Graduate office for routing

_____ Recommended by Vice Provost, DELTA, if applies*

_____ Substantive Change Review Team (SCRT) informed

_____ If SACS notification is required, SCRT prepares letter for Chancellor to send to SACS

_____ University Courses & Curriculum Committee **or** Administrative Board of the Graduate School recommends

_____ Associate Deans Council **or** Graduate Operations Council informed

_____ Dean (Graduate School or DASA) approves*

Proposal move to the Provost's office for routing

_____ Vice-Provosts informed

_____ Deans' Council recommends*

_____ Provost approves*

_____ Chancellor's Executive Officer's (EOM) recommend

_____ University Council informed

_____ Board of Trustees subcommittees recommend

_____ Chancellor approves*

_____ Accreditation Liaison notifies SACS, if applicable

_____ Submitted to UNC-General Administration by Provost's Office

* Signature is required on the signature page for the action

<https://www.ncsu.edu/grad/program-development/docs/On-Campus-Routing-Form.doc>

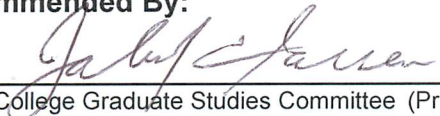
{Insert Descriptive Title Here}
North Carolina State University

This request has been reviewed and approved by the appropriate campus committees and authorities.

Endorsed By:

 9/9/2016
Head, Department/Director of Graduate Program (Printed Name and Signature) Date

Recommended By:

 9/9/2016
Chair, College Graduate Studies Committee (Printed Name and Signature) Date

Endorsed By:

  9/9/2016
College Dean (Printed Name and Signature) Date

Recommended By:

Vice Provost, DELTA (if DE degree) (Printed Name and Signature) Date

Approved By:

Dean of the Graduate School (Printed Name and Signature) Date

Recommended By:

Dean's Council (Printed Name and Signature) Date

Approved By:

Provost (Printed Name and Signature) Date

Approved By:

Chancellor (Printed Name)

Engineering Management

Date: Draft 1: August 25, 2016 Draft 2: 10.6.16

College: Engineering

Justification:

The College of Engineering graduate program office offers an exclusive online program tailored to the needs of today's working engineers with a vision to help further educate engineering leaders. The Master of Engineering program was established in 1975 to recognize the needs of practicing engineers who were not being served by the existing College of Engineering traditional (on-campus) degree programs. This stand alone on-line degree program has grown to include online Masters degrees in all engineering disciplines except Biomedical Engineering and Operations Research. Concentrations in Aerospace Engineering, Chemical Engineering, Computer Engineering, Computer Science, Electrical Engineering, Industrial Engineering, Mechanical Engineering, Materials Science and Engineering, Nuclear Engineering, and Engineering (undesigned) can be earned through the successful completion of the Master of Engineering degree requirements. The changing needs of the now global engineering workforce has created a need to offer students the technical engineering background but also to educate students in the field of engineering management, which will make students more attractive to today's employer both in the United States and abroad.

The Master of Engineering program would like to add the Engineering Management Concentration to its list of options to Master of Engineering students. The demographic of today's engineers and employers demands a demonstrated expertise in Engineering Management that didn't exist years ago. We expect that the demand for engineers with advanced leadership skills will only increase in the future. A concentration in engineering management will complement their traditional engineering studies with the leadership specialization that employer's seek.

The proposed degree concentration will be optional. We are proposing the engineering management concentration in order to adequately recognize the changing needs of our student population and the need for this specialization for employers while maintaining the multidisciplinary nature of the program and adding even more flexibility to our student's graduate experience.

Description:

At present there is no recognized concentration within the College of Engineering being offered to graduate students in the field of engineering management.

Objectives:

This concentration is to provide engineering management skills to working engineering professionals in correlation with their engineering industrial employer requirements.

Master of Engineering students with a concentration in engineering management will have a degree with enhanced skills that are more attractive to future employers or for advancement opportunities within current employment.

Students who complete this concentration will have expertise in the area of leadership and engineering management that other engineers may or may not have.

Enrollment History:

The Master of Engineering program started in 1975 as a multidisciplinary engineering program for professionals, fully delivered online via NCSU Engineering Online.

In 1998-1999 the enrollment for the Master of Engineering program peaked at 120 graduate students. This was prior to each engineering discipline within the college of engineering developing their own online master degree program. Since that time the Master of Engineering program has had a steady enrollment of 60 to 80 students over the last 10 years.

Classification

	DR	MR	CT	All
Academic Year				
2006-2007	0	64	0	64
2007-2008	0	74	0	74
2008-2009	0	87	0	87
2009-2010	0	82	0	82
2010-2011	0	77	0	77
2011-2012	0	74	0	74
2012-2013	0	76	0	76
2013-2014	0	65	0	65
2014-2015	0	71	0	71
2015-2016	0	80	0	80

Current Enrollment:

Today the Master of Engineering program has increased its enrollments to 82 students with the introduction of the Engineering management courses. The official development of the

Engineering management concentration will contribute to the growing Master of Engineering enrollment numbers and maintain continued success with and around 100 students.

We anticipate that being the only engineering graduate program at the University offering a concentration in engineering management will stimulate an enrollment increase. A gain of 5-10 graduate students in the program within the first year and an overall increase of about 20 graduate students upon completion of the fourth year.

Other Programs

There are currently no programs of this kind offered at NC State. The Engineering management Concentration is uniquely, and only, for engineering students within the Master of Engineering Program.

Concentration Requirements: *(total hours required courses by title and number, description of any proposed new courses (submission of Course Action Forms for any new courses desired), description of any consultation that has occurred for any required courses in other programs.):*

Total Credit Hours: 15 Credit hours for concentration to appear on transcript

Core Curriculum:

EGR 501 Engineering management and Strategic Change (3 credit hours)

EGR 503 Statistical Engineering using Six Sigma DMAIC Process (3 credit hours)

EGR 505 Managerial Finance for Engineers (3 credit hours)

EGR 506 Managing New Hi Tech Product Launches (3 credit hours)

EGR 507 Product Life Cycle Management (3 credit hours)

Description of any new Courses

EGR XXX Sustainable Lean Manufacturing (3 Credit hours)

The course will cover generic and specific lean manufacturing concepts and tools focused on sustainability. All these basic concepts will be employed to discuss industry strategy and global competitiveness. People responsible for continuously improving operational performance must develop systems that are fast, flexible, focused and friendly for their companies, customers and production associates. The course will provide the student with an introduction to lean manufacturing describing the background behind its development and how evaluations and assessments of production systems are performed. Lean manufacturing tools and techniques will be described and in some cases demonstrated in simulation exercises. Issues relating to employee involvement, improvement teams, training and culture will be presented. Planning for lean process implementation and the necessity of sustain *improvements will be discussed. Finally, sustainability concept will be discussed and integrated with Lean Manufacturing.*

Course Objectives

1. You will learn a brief history of manufacturing approaches employed and the

background and philosophy of lean production. You will also learn the concept of waste and that the quest for truly lean production is a journey and not a destination.

2. The need for strategy, alignment with other corporate or plant objectives, and preparation for lean manufacturing will be presented.
3. You will learn some evaluation techniques that one can use in preparation for and use in lean manufacturing activities.
4. You will learn a set of approaches used in implementing lean manufacturing in production operations. While these tools are often useful, they are not an end on themselves and they are not necessarily the essence of lean manufacturing either.
5. Concepts such as workplace organization, pull production, cellular arrangement and layout improvement, visual management, quick change, mistake reduction, employee involvement, need for employee creativity and motivation for lean implementation will be discussed and examples will be given.
6. Methods for promoting success in implementing lean transformations will be discussed.
7. The importance of sustainability in this competitive world and how Lean manufacturing is aligned with it.

Consultation

All listed courses (EGR 501, 503, 505, 506 and 507) were approved by the Administrative Board of Graduate School after satisfactory consultation with respective programs (Poole College of Management, College of Sciences, College of Textiles)

Faculty:

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Budget:

No additional costs required to implement the concentration into the Master of Engineering program. Courses are already being taught and they are part of the current curriculum.

Administration:

The proposed degree concentration will be administered the same as the existing degree program.

Approvals/Signatures: *See attached.*