A named option is a formally documented sub-major within an academic major program. Named options serve as a convenient way to distinguish a distinct curriculum or delivery format within a major. A named option is NOT a new degree or major. Authorization by the Board of Regents to deliver an academic program is at the degree/major level.

This form is to be used in concert with the Policy Guidelines for Named Options within Academic Majors. Complete the form and save as a Microsoft Word document.

1. Overview
   1.1. Named Option: Systems Engineering and Analytics
   1.2. Academic Major: Industrial Engineering
   1.3. Home Department: Industrial and Systems Engineering
   1.4. School/college: Engineering, School of
   1.5. Partner department(s)/units/schools/colleges: none
   1.6. Chair of the Major (name, title, email): Jeffrey Linderoth, Chair, linderoth@wisc.edu
   1.7. Primary faculty or staff contact for the proposal (name, title, email): Shiyu Zhou, Associate Chair, shiyuzhou@wisc.edu
   1.8. Primary school/college dean's office contact (name, title, email): James Blanchard, Executive Associate Dean, jake.blanchard@wisc.edu
   1.9. Briefly describe the type and purpose of the named option.
       This will be a non-pooled tuition revenue program for a Master of Science degree in Industrial and Systems Engineering. The option will provide more specificity to the credential and will thus be more attractive to students interested in studying Systems Engineering and Analytics, a sub-discipline of Industrial Engineering. This approach will allow us to recruit from a broader audience interested in terminal Masters degrees and thus increase our graduate enrollment. The program has been designed as a 12-month, course-only, terminal program.
       What prints on the diploma: Master of Science-Industrial Engineering
       What prints on the transcript: Master of Science-Industrial Engineering, Named Option: Systems Engineering and Analytics
       Major: Industrial Engineering, Option: Systems Engineering and Analytics

   1.10. Date form completed: 10/21/2016

2. Approval Implementation and Expectations for Review
   2.1. School/College Approval Date: 10/19/2016
   2.2. GFEC Approval Date (graduate level named options only): Click here to enter a date.
   2.3. UAPC Approval Date: Click here to enter a date.
   2.4. Expected first term of student enrollment (typically the first fall after UAPC approval): Fall 2017
2.5. Year of three year progress report to GFEC (3 years after first student enrollment; graduate level named options only): 2020
2.6. Year of first program review (5 years after first student enrollment): 2022
2.7. Are all academic programs in the home department up to date for program review? Yes
   APIR will provide a list of programs and most recent review date if needed.
   If no, program reviews need to be completed before a new proposal is advanced at campus level (GFEC and UAPC). Please provide and information related to plans for completion of program reviews:

3. **Background/Rationale**
   3.1. How does the named option relate to the major and to other named options in the major, if relevant?
   Systems Engineering and Analytics is one of the emerging sub-disciplines of Industrial and Systems Engineering. Hence, it is complementary to our research-focused programs, but has a more practical focus (given the accelerated timetable and lack of a thesis). The College of Engineering offers a named option in Data Analytics (an MEng). This program is only offered online and is intended for practicing engineers, whereas the proposed program will be residential and the intended audience is for students who have not yet begun their careers. Hence, the programs are not expected to compete for students.

   3.2. What is the purpose of the named option? How does the named option contribute to the mission of the sponsoring unit?
   The purpose of the named option is to provide a master of science – Industrial and Systems Engineering program which is course-based and accelerated (students should finish in one calendar year). The named option contributes significantly to the mission of the Department of Industrial and Systems Engineering in the following aspects by increasing the number of master-level graduate students and enhancing the reputation of the Department and UW internationally.

   3.3. What is the evidence that there is a student demand for the named option?
   MOUs are in progress between Tsinghua University (China) and UW, which will provide additional students for the named options for the Department of Industrial and Systems Engineering. In subsequent years, enrollment across all named options is expected to grow to several hundred students (as compared to our total graduate student population of approximately 1,400). In addition to Tsinghua, we will recruit domestic students interested in 1-year, terminal Masters degrees in Systems Engineering and Analytics.

4. **Curriculum**
   4.1. Delivery modality:
   - Face-to-face

   4.2. Provide a complete list of named option requirements.
   Students are required to complete 30 credits of course works in Systems Engineering and Analytics.
   *Program requirements should provide content that leads to the completion of major learning goals. See section 5 Assessment.*

   4.3. ☒ Attach a full curriculum including all required and elective courses.

   4.4. ☐ For undergraduate named options, attach a four year roadmap.
   *Named options for undergraduate majors will have requirements totaling 120 credits and students should be able to complete the degree/major within four academic years.*

   4.5. ☒ For graduate named options, attach a chart outlining minimum degree requirements and elements for satisfactory progress.
   *Master’s level programs will include at least 30 credits of requirements. Doctoral level programs will include at least 51 credits of requirements.*
Checklist for Verification of Curricular Policy Requirements *
You will have an opportunity to provide explanation and rationale for any Curricular Policy Requirements that have not been affirmed in the text box that follows the check list, below.
☒ Courses are offered on a regular basis.
☒ Courses have enrollment capacity for students in the named option.
☒ All courses required for the named option are fully approved.
☒ Units must maintain Named Option requirements so that they are up-to-date; all curriculum changes must be approved through the appropriate school/college academic planning council (APC) or curriculum committee. The school/college APC or curriculum committee will notify the Office of the Registrar and the Graduate School (graduate level named options only) about approved curricular changes to the named option. Typically, any changes in requirements will be effective no sooner than the fall semester after approval.

*Provide explanation and rationale for any Curricular Policy Requirements that have not been affirmed.
Provide explanation for Curricular Policy Requirements that have not been affirmed here.

5. Assessment
5.1. ☒ Attach a program assessment plan when submitting this proposal.

Assessment plans for a named option should be integrated with the assessment plan for the major. See the Basic Assessment Plan for instruction and accompanying template. The Basic Assessment Plan and Template are minimum expectations for this information. Programs that have developed plans that exceed what is specified in the basic plan may provide that information.

5.2. Provide a summary of the program assessment plan, including learning goals for the major and any additional learning goals that are specific for the named option, key methods and assessment approaches, and how assessment information will be reviewed and acted on.

Student Learning Goals:
1. Articulates, critiques, or elaborates the theories, research methods, and approaches to inquiry or schools of practice in industrial and systems engineering including areas such as decision science and operations research, quality engineering, manufacturing and health systems, and/or human factors.
2. Identifies sources and assembles evidence pertaining to questions or challenges in industrial and systems engineering.
3. Demonstrates understanding of the industrial and systems engineering field of study in a historical, social, or global context.
4. Selects and/or utilizes the most appropriate industrial and systems engineering methodologies and practices.
5. Evaluates or synthesizes information pertaining to questions or challenges in industrial and systems engineering.
6. Communicates clearly in ways appropriate to industrial and systems engineering.
7. Recognizes and applies principles of ethical and professional conduct.

Method for assessing learning:
The faculty advisor will collect their advisees’ course work performance annually and compare
with relationship chart between learning goals and the courses for assessment.
Plan for review of the assessment information:

The associate chair for graduate studies will provide assessment updates, keep track of the assessment timeline, and remind by email the faculty to collect their advisees’ course work
6. Overlap and Related Programs
6.1. Specify any other degree/majors, named options, or certificates that may not be earned in combination with this named option.
Students will not be permitted to earn more than one named option offered by ISyE. Students will also not be allowed to earn this named option and the related MS degree (MS IE) with no option. In addition, students will not be permitted to earn the MEng in Data Analytics, offered by EPD, as discussed above.

7. Admissions & Enrollment
7.1. For graduate programs proposing a named option with admissions requirements that are distinct from the major with no named option, explain the admissions criteria and process. The same admissions criteria will be used for both the named option and the major. To the extent possible, the College of Engineering plans to centralize the admission of all related programs to enhance efficiency of the process. The Industrial and Systems Engineering Department will make the final decision on all admissions to the option.
7.2. What is the projected annual enrollment in the named option? Initially 5 in this option, with the expectation that the option enrollment will grow to approximately 20 students per year.
7.3. What is the maximum enrollment (using existing instructional and student resources)? 20
7.4. What are the contingency plans for supporting enrollments higher than the stated maximum enrollment? The first 10 students can be supported with current capacity (other than the need for additional administrative support) and beyond that additional TA’s will be hired to support the additional students. At some point, we would need to add additional sections to some courses and, at that point, we would support additional faculty associates using revenue from this program. It is difficult to predict the enrollment that might trigger this, but one could imagine it being on the order of 40 students for this option.

Checklist for Verification of Admission Policy Requirements for Undergraduate Named Options*
You will have an opportunity to provide explanation and rationale for any Admission Policy Requirements that have not been affirmed in the text box that follows the checklist.
☐ Named option admission requirements are consistent with admission requirements for the major with no named option, if the major has any admission requirements beyond admission to the University. Admission limits should be related to interest or aptitude for the content and not based solely on a high GPA cutoff
☐ The named option will be declared and canceled using the e-Declaration process in the student information system.
☐ Undergraduates will not be advised to declare or remain enrolled in a named option if it will extend their time to graduation. Undergraduate students are to be discouraged from earning more than one named option that represents an area of curricular emphasis within the major.

*Provide explanation and rationale for any Admission Policy Requirements that have not been affirmed here.
Type explanations for Admission Policy Requirements not affirmed here.

8. Advising
8.1. List name(s) of major and named option advisor(s) with title and departmental affiliation(s).
   Major: Industrial Engineering
8.2. Describe how there will be sufficient advising and academic support for all students in the major (both the existing major’s students and the new students that will be served by the named option).

The Systems Engineering and Analytics Program has 13 faculty and 1 adjunct professor. They will provide advising, along with assistance from two academic staff members to be hired for support of all named options being introduced as part of this process.

8.3. ☒ Confirm that major and named option advisor(s) have been consulted and reviewed this proposal.

9. Governance & Faculty

9.1. ☒ The named option must be governed by the same department or academic unit that oversees the major. Any sub-committee governing the named option must report to the faculty governance committee for the major.

9.1.1. If a sub-committee governs the named option, describe procedures including how faculty are identified and provisions for transitions in the committee.

9.2. List core faculty and staff with title and departmental affiliation(s).

Core faculty: Jeffrey Linderoth, Jingshan Li, Shiyu Zhou
Department of Industrial and Systems Engineering

10. Fiscal Structure and Ongoing Commitment

10.1. Provide an overview of plans for funding the named option including but not limited to program administration, instructional/curricular delivery, technology needs, and program assessment.

All expenses will be covered by program revenue. Since the program is delivered in a face-to-face format, the costs related to delivery and technology are minimal and difficult to quantify. Assessment will be addressed within Industrial and Systems Engineering using the same processes to be employed for existing majors. These processes are being developed now.

10.2. How will the named option impact staffing needs beyond the immediate program? How are those needs being met?

We envision hiring one or two full time staff members to assist with admissions, advising, and administration of this program. These will be shared across several named options, so the costs to each individual program will be minimal. Additional TAs and graders may be required to assist with individual courses. In some cases, new courses will be created and those costs will be born by that program. This will require sufficient enrollment to justify the costs and will not occur within the first year. As staffing needs grow to support enrollment, tuition revenue will be used to fund that staff expansion.

If there is no change in staffing, please describe how the duties of current employees will evolve to support this named option.

10.3. For named options supported using non-pooled tuition, provide a fiscal annual summary including planned enrollment, estimated paid tuition, instructional costs, and estimated excess tuition available for reinvestment in keeping with the separate guidelines for non-pooled programs.

See attached.

10.4. For graduate programs supported using pooled tuition, provide a plan for how new graduate students will be funded.

N/A

Named Option Proposal Form v 5-2-16
**Required attachments**

☑ Cover letter from the Dean of the school/college that will be the home of the named option

When a proposal for a new named option is forwarded for approval, it will have a cover letter to the provost from the supporting dean.

☐ Supporting letters/memos

Proposals must be accompanied by letters or memos submitted by the chair or director of other academic units that have overlapping interest. These notes may comment on shared resources, competition for students or other ways in which the programs will interact surrounding the named option. This will include departments/schools/colleges, share a student audience, represent a closely related area of study, have overlapping faculty, or have program names that are similar.

☑ Full curriculum including all required and elective courses

☐ For undergraduate named options, attach a four year roadmap.

☑ For graduate named options, attach a chart outlining minimum degree requirements and elements for satisfactory progress.

☐ Assessment plan

Named options supported using non-pooled tuition must attach:

☑ Core Criteria Checklist

☑ Additional Requirements Checklist

See the current Non-pooled Program Requirements Process document posted at [https://kb.wisc.edu/vesla/page.php?id=59300](https://kb.wisc.edu/vesla/page.php?id=59300)
Curriculum for UW Master of Science Degree Program

Department of Industrial and Systems Engineering

Credits Requirement: 30

Suggested Course Credit Allocation:

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Semester</td>
<td>12</td>
</tr>
<tr>
<td>Spring Semester</td>
<td>12</td>
</tr>
<tr>
<td>Summer Session</td>
<td>6</td>
</tr>
</tbody>
</table>

Degree/Major: M.S. in Industrial Engineering

Option: System Engineering and Analytics
Proposed Curriculum for Department of Industrial and Systems Engineering

Option: Systems Engineering and Analytics

Of the 30 credits counted towards the degree, at least 15 must be at the graduate level.

Required courses (6 credits):

1. ISyE 601 Topic (3 credits): Summer Independent Study Project Experience
2. ISyE 601 Topic (3 credits): Graduate Seminar (two semesters colloquium plus a report)

1. Selective Fall and Spring (18 credits):
   - ISyE 510 (3 credits): Facilities Planning (Fall)
   - ISyE 605 (3 credits): Computer Integrated Manufacturing (Fall)
   - ISyE 512 (3 credits): Inspection, Quality Control and Reliability (Fall)
   - ISyE 525 (3 credits): Linear Programming Methods (Fall)
   - ISyE 624 (3 credits): Stochastic Modeling Techniques (Fall)
   - ISyE 425 (3 credits): Introduction to Combinatorial Optimization (Fall)
   - ISyE/CS/ECE 524 (3 credits): Introduction to Optimization (not graduate credit, Fall)
   - ISyE 643 (3 credits): Performance Analysis of Manufacturing Systems (Fall)
   - ISyE 612 (3 credits): Information Sensing and Analysis for Manufacturing Processes (Spring)
   - ISyE 641 (3 credits): Design and Analysis of Manufacturing Systems (Spring)
   - ISyE 615 (3 credits): Production Systems Control (Spring)
   - ISyE 620 (3 credits): Simulation Modeling and Analysis (Spring)
   - ISyE 412 (3 credits): Fundamentals of Industrial Data Analytics (Spring)
   - ISyE 517 (3 credits): Decision Making in Health Care (Spring)
   - ISyE 601 (3 credits): Special topics (advisor approval needed) (Spring)

2. Summer (6 Credits from the following)
   - ISyE 313 (3 credits): Engineering Economic Analysis
   - ISyE 575 (3 credits): Introduction to Quality Engineering
   - ISyE 516 (3 credits): Introduction to Decision Analysis

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1 This course could be substituted by an independent study course during regular semesters, if approved by the student’s advisor