

# ISyE MS Research Program (30 credits)

## PROGRAM PLAN / WARRANT REQUEST

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_  
Last, First

CAMPUS ID#: \_\_\_\_\_ EMAIL: \_\_\_\_\_ @wisc.edu

GRADUATION SEMESTER / YEAR (Tentative): Fall \_\_\_ Spring \_\_\_ Smr Year: \_\_\_\_\_

Cont. on for PhD? Yes No (If yes department approval required w addtl PhD application review done)

Please review the ISyE [M.S. HFHSE program requirements](#), [ISyE MS Named Option degree policy](#) information and next page for further details. **PLEASE FILL FORM OUT ELECTRONICALLY**

Dept & Course # (i.e. ISyE 515)	Course Name <a href="#">UW Course Search &amp; Enroll</a>	Term Taken	Grade	# of Credits	50% Grad Level Course Option? X
<b>ISyE COURSE OPTIONS (18 credits REQUIRED)</b>					
<b>Non- ISyE COURSE OPTIONS (Up to 12 credits maximum)</b>					
<b>ISyE 790 MS Research &amp; Thesis Course (REQUIRED): At least 3 (and at most 6) credits of research credits required.</b>					
ISyE 790					
ISyE 790					
<b>TOTAL CREDITS</b>					
<b>TOTAL REQUIRED</b>				30	15

ISyE 601 Special Topics course options must be APPROVED in advance by advisor. At most 3 credits of ISyE 702 Co-op credits may be applied to meet the credit requirements. C or below grades in a course CANNOT count towards the 30-credit requirement. Credit for courses graded S/U (or credit/no credit) will only be permitted for ISyE 790 Research and ISyE 702 Graduate co-op courses.

ADVISOR: \_\_\_\_\_  
Last, First SIGNATURE DATE

OFFICE USE ONLY - DEGREE REQUIREMENTS CONFIRMED

ISyE Graduate Chair \_\_\_\_\_ GSC REV: \_\_\_\_\_

**TRANSFER COURSE INFORMATION:**

Students transferred from other graduate program can transfer up to 9 graduate credits to this program upon the approval of his/her academic advisor and the associate chair for graduate studies. Transfer course approval requests to be done prior to final semester of MS Research Program [ISyE online Transfer Request System](#).

<b>Name of Institution(s):</b>	

Sem/Yr Taken	Course #	Course Title	Credits	Grade	APPROVED BY IE DEPT
<b>TOTAL CREDITS</b>					

**FINAL SEMESTER / EXIT REQUIREMENTS**

**Upon completion of MS program requirements**, please review your program form with MS faculty advisor for signature and save to [ISyE Box Folder](#) or send / bring to ISyE Graduate Coordinator (Pam Peterson – prpeterson@wisc.edu) in COE Graduate Center in 3182 Mechanical Engineering to request final MS degree warrant from the Graduate School for degree posting. An email notification will then be sent to you once your warrant has been processed and a copy of signed final warrant will be put in your ISyE Box folder after final semester.

In order to be eligible for graduation, a Master's student must:

- Review Graduate School Website on [Completing Your Master's Degree](#)
- [Apply for Graduation](#) through your MyUW student center.
- Be enrolled in at least 2 credits the semester of graduation per Grad School policy.
- GPA of 3.0 or higher required per Grad School policy.
- Have all grades entered, except for the current semester. No Incomplete (I's) or No Report (NRs) grades can show on the student's transcript.
- Grades of C or below in a course CANNOT count towards the 30-credit / program requirements.
- Request and have MS degree warrant signed and dated by the [campus degree deadline](#).
- Complete Graduate School and ISyE Department Exit Surveys.
- Review [IT Steps to Take Before Leaving UW](#).
- Registrar's Office: [Diploma Services](#) and [Degree Verification Letter Information](#)

**Engineering Career Services Office**

1150 Engineering Hall  
 1415 Engineering Drive  
 Madison, WI 53706  
 Tel: (608) 262-3471  
**Email:** [ecs@engr.wisc.edu](mailto:ecs@engr.wisc.edu)

**Industrial Engineering Department**

University of Wisconsin-Madison  
 1513 University Avenue, Room 3107  
 Madison, WI 53706  
 Tel: (608) 262-2686  
**Email:** [ie@engr.wisc.edu](mailto:ie@engr.wisc.edu)

# MS RESEARCH PROGRAM COURSE SUGGESTIONS

\*All ISyE 601: Special Topics in Industrial Engineering must be approved by faculty advisor.

## **Decision Science/Operations Research Area (DS/OR)**

ISyE 412 Fundamentals of Industrial Data Analytics  
ISyE 425 Introduction to Combinatorial Optimization  
ISyE 512 Inspection, Quality Control, and Reliability  
ISyE 513 Analysis of Capital Investments  
ISyE 516 Introduction to Decision Analysis  
ISyE 517 Decision Making in Health Care  
ISyE 524 Introduction to Optimization  
ISyE 525 Linear Programming Methods  
ISyE 575\* Introduction to Quality Engineering  
ISyE 620 Simulation Modeling and Analysis  
ISyE 624 Stochastic Modeling Techniques  
ISyE 632 Introduction to Stochastic Modeling  
ISyE 633 Queuing Theory and Stochastic Modeling  
ISyE 643 Performance Analysis of Manufacturing Systems  
ISyE 645 Engineering Models for Supply Chains  
ISyE 719 Stochastic Programming  
ISyE 723 Dynamic Programming and Associated Topics  
ISyE 726 Nonlinear Programming Theory and Applications  
ISyE 727 Convex Analysis  
ISyE 728 Integer Optimization  
ISyE 730 Nonlinear Programming Algorithms  
Stat 424\* Statistical Experimental Design for Engineers

**TECHNICAL ELECTIVE COURSES** (12 credits; six credits must be ISyE courses or cross-listed with ISyE)  
All Electives must be approved by the advisor; must be 400 level or above

\*Only one of ISyE 575 and Stat 424 may count toward the MS degree.

## **Manufacturing & Production Systems Area (MPS)**

ISyE 510 Facilities Planning  
ISyE 512 Inspection, Quality Control, and Reliability  
ISyE 516 Introduction to Decision Analysis  
ISyE 524 Introduction to Optimization  
ISyE 525 Linear Programming Methods  
ISyE 575\* Introduction to Quality Engineering  
ISyE 605 Computer Integrated Manufacturing  
ISyE 615 Production Systems Control  
ISyE 620 Simulation Modeling and Analysis  
ISyE 624 Stochastic Modeling Techniques  
ISyE 632 Introduction to Stochastic Modeling  
ISyE 643 Performance Analysis of Manufacturing Systems  
ISyE 645 Engineering Models for Supply Chains  
STAT 424\* Statistical Experimental Design for Engineers

**TECHNICAL ELECTIVE COURSES** (12 credits; six credits must be ISyE courses or cross-listed with ISyE)  
All Electives must be approved by the advisor; must be 400 level or above

\*Only one of ISyE 575 and Stat 424 may count toward the MS degree.

## Health Systems Engineering Research Area (HSE)

ISyE 513 Capital Investment Analysis  
ISyE 515 Engr Management  
ISyE 516 Introduction to Decision Analysis  
ISyE 517 Decision Making in Health Care  
ISyE 555 Human Performance and Accident Causation  
ISyE 559 Patient Safety and Error Reduction in Healthcare  
ISyE 575\* Introduction to Quality Engineering  
ISyE 601 \*\* Special Topics in ISyE (topics vary by semester)  
ISyE 601 Fundamentals of Industrial Data Analytics  
ISyE 608 Safety and Quality in the Medication Use System  
ISyE 615 Production Systems Control  
ISyE 617 Health Information Systems  
ISyE 620 Discrete Event Simulation  
ISyE 624 Stochastic Modeling  
ISyE 633 Queuing Theory  
ISyE 643 Performance Analysis of Manufacturing Systems  
ISyE 652 Sociotechnical Systems  
ISyE 653 Job and Organizational Design  
ISyE 662 Design and Human Disability and Aging  
ISyE 671 E-Business: Technologies, Strategies and Applications  
ISyE 703 Quality of Health Care: Evaluation and Assurance  
ISyE 723 Dynamic Programming  
ISyE 729 Behavioral Analysis of Management Decision Making  
ISyE 816 Special Topics in Ind Engr (1)  
ISyE 854 Safety Theory (offered occasionally)  
Quality and Safety: ISyE 555 or 559 or 608 or 703  
BMI 576 Introduction to Bioinformatics  
BMI 773 Clinical Research Informatics  
BMI 776 Advanced Bioinformatics  
Ed Psych 711 Hierarchical Linear Modeling  
Ed Psych 862 Multivariate Analysis  
Nurs 761 Health Program Planning, Eval & Quality Improvement  
OTM 753 Health Care Management Operations  
PHS 797 Introduction to Epidemiology  
PHS 875 Assessment of Medical Technologies – MUST BE approved IN ADVANCE by advisor  
Psych 610 Statistical Analysis of Psychological Experiments  
Psych 710 Multiple Regression  
PHS 876 Measuring Health Outcomes  
Stat 333 Applied Regression Analysis  
Stat 424\* Statistical Experimental Design for Engineers  
Stat 571 Statistics for Biosciences  
Stat 641 Statistical methods for clinical trials  
Stat 701 Applied Time Series Analysis, Forecasting & Control I

**ELECTIVES** (6 Credits): Any of the courses in the concentration areas. Other courses MUST be approved (in writing) in advance by the student's advisor

\*Only one of ISyE 575 and Stat 424 may count toward the MS degree.

## **Quality Engineering Research Area (QE)**

ISyE 412 Fundamental Industrial Data Analytics  
ISyE 417 Health Systems Engineering  
ISyE/ME 512 (or ISyE 612) Inspection, Quality Control, and Reliability  
ISyE/ME 513 Analysis of Capital Investments  
ISyE 515 Engineering Mgmt of Cont Process Improvement  
ISyE 520 Quality Assurance Systems  
ISyE 575\* Introduction to Quality Engineering  
ISyE 601\*\* Special Topics in ISYE (Advisor consent required)  
ISyE 610 Design of Program Evaluation Systems  
ISyE 612 Information Sensing & Data Analysis for  
ISyE/OTM 620 Simulation Modeling & Analysis  
ISyE 641 Design & Analysis of Mfg Systems (Double count)  
ISyE/Psych 652 Sociotechnical Systems  
ISyE/Psych 653 Organization and Job Design  
ISyE 658/OTM 758 Managing Technological Change in Mfg Systems  
ISyE 854 Special Topics in Organizational Design  
ED PSYCH 862 Multivariate Analysis  
MHR 700 Organizational Behavior  
OTM 770 Intro to Quality & Prod Improv (Double count)  
STAT 333 Applied Regression Analysis  
STAT 349 Introduction to Time Series  
STAT 411 Introduction to Sample Survey Theory and  
STAT 421 Applied Categorical Data Analysis  
STAT 701 Applied Time Series Analysis - Forecasting and  
STAT 803 Experimental Design I  
STAT 849 Theory and Appl of Regression & Analysis of

### **BUSINESS ELECTIVES (3 cr min)**

#### **ISyE 699 INDEPENDENT STUDY (3 cr required)**

Three independent study credits approved in advance by the student's advisor are required. Independent study or an actual quality improvement project from an industrial, health, or service area is required for the 3 credits.

## **Human Factors Engineering (HFE)**

ISyE 552 Human Factors Design  
ISyE 555 Human Performance & Accident Causation  
ISyE 556 Occupational Safety & Health Engineering  
ISyE/Med Phys 559 Patient Safety & Error Reduction  
ISyE/BME 564 Occupational Ergonomics and Biomechanics  
ISyE 601\*\* Special Topics in ISyE (1)  
ISyE 610 Design of Program Evaluation Systems  
ISyE/Psych 652 Sociotechnical Systems  
ISyE/Psych 653 Organization & Job Design  
ISyE 662 Design for Human Disability & Aging  
ISyE 699 Advanced Independent Study  
ISyE 854/859/961  
CEE 679 Advanced Topics in Transportation Safety Engineering

- ISYE 349 Introduction to Human Factors or equivalent is required. It is a prerequisite for all other Human Factors courses (required, but does not count toward the 30credits).
- 9 credits of foundation courses. Take one course in physical ergonomics (P), cognitive ergonomics (C), and

macroergonomics (M). Courses are listed under multiple areas can be counted toward only one area.

- 9-12 credits of human factors and ergonomic electives beyond those taken as foundation courses.
- 6 credits of Tools and Methods.
- 3-6 credits of MS Project or Thesis.
- At least 15 of the 30 credits must be within the Industrial & Systems Engineering Department.
- You may count multiple IE 816, 854, 859 and 961 graduate seminars toward satisfying the MS Degree Requirements.

Your advisor will determine if a seminar counts toward a human factors/ergonomic elective or Tools/Methods.

### **TOOLS AND METHODS (6 cr)**

On a yearly basis, the HFE faculty group will update the list of Tools and Methods courses. Advisors will decide which set of Tools and Methods courses is appropriate for the students. Following are categories of Tools and Methods courses.

### **MS PROJECT or THESIS (3-6 cr)**

All human factors graduate students are required to satisfactorily complete at least three credit hours devoted to directed research, design, development, or application, and prepare a written report covering this work. Students expecting to continue for the Ph.D. degree are encouraged to write a Master's Thesis. The choice of writing a formal thesis or a research report is made between each student and their advisor.