UNDERGRADUATE CURRICULUM CHANGE MEMO

Date: Feb. 4, 2020

From: Dr. Eric Smith, Undergraduate Program Director, Industrial, Manufacturing & Systems Engineering

Through: Dr. Bill Tseng, Chair, Industrial, Manufacturing & Systems Engineering

Through: Dr. Louis Everett, Chair, Curriculum Committee, College of Engineering

Through: Dr. Norman Love, Associate Dean for Academic Affairs and Undergraduate Studies, College of Engineering

Through: Dr. Theresa Maldonado, Dean, College of Engineering

Theresa A Maldonado 2/17/2020

To: Dr. Carla Ellis, Chair Undergraduate Curriculum Committee

Proposal Title: IMSE Dept. curriculum changes for the Fall 2020 catalog

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The IMSE Dept. proposes the following changes to the Undergraduate Curriculum and to the Bachelor of Science in ISE: Industrial & Systems Engineering B.S. degree plan:

Rationale: The changes are necessary to address modern trends towards the computational handling of large data sets in support of industrial decision making.

1. ADD courses:
IE 1333 Computational Methods (3 sch)
IE 2333 Decision Support Systems (3 sch)

Pre-Requisite order:
IE 13xx Computational Methods → IE 23xx Decision Support Systems
→ IE 3373 Eng. Probability & Statistics

Rationale: Computational Methods in the first semester provides computer programming groundwork for industrial & systems engineering.
Decision support systems are now necessary to understand Big Data.

2. Consolidate the following courses:

ADD:
IE 3377 Intro to Work Design (3 sch = 2 lecture hours + 3 lab hours)
IE 4332 Work Design - Productivity & Safety (3 sch = 2 lecture hours + 3 lab hours)
IE 4266 Senior Design (2 sch = 6 lab hours)

Rationale: The material from 3 courses will be consolidated into 2 courses, both to streamline the teaching of this material, and also to make room in the curricular plan for the new courses, IE 1333 and IE 2333.
Additionally, in order for senior students to develop better Senior Design projects with industrial partner companies, it is necessary for students to have an understanding of project costs, hence the prerequisite addition of CE 2326 Engineering Economy, and also of systems engineering, hence the prerequisite addition of IE 3331 Systems Engineering.

The new prerequisites for IE 4266 will be:

a. CE 2326 Engineering Economy
b. IE 3331 Systems Engineering

3. COURSE CHANGES:

Name Changes:

a) IE 3390 Operation Research I → IE 3390 Operations Research I: Deterministic Models
b) IE 4390 Probabilistic Operations Research → IE 4390 Operations Research II: Stochastic Models
c) IE 4391 Production & Inventory Control → IE 4391 Production Planning & Inventory Control Systems

Rationale: With the IMSE Department's change from an IE: Industrial Engineering program to an ISE: Industrial & Systems Engineering program, the content and titles of courses must change.

CURRICULUM CHANGE PROPOSAL

APPROVAL PAGE

Proposal Title: IMSE Dept. curriculum changes for the Fall 2020 catalog

College: Engineering **Department: Industrial, Manufacturing & Systems Engineering**

DEPARTMENT CHAIR

I have read the enclosed proposal and approve this proposal on behalf of the department.

2/5/2020

Signature **Date**

COLLEGE CURRICULUM COMMITTEE CHAIR

I have read the enclosed documents and approve the proposal on behalf of the college curriculum committee.

2/17/20

Signature **Date**

COLLEGE DEAN

I have read the enclosed documents and approve the proposal on behalf of the college. I certify that the necessary funds will be allocated by the college in support of this proposal.

Theresa A Maldonado Feb 17, 2020

Signature **Date**

COURSE ADD

All fields below are required

College : Engineering **Department :** Industrial, Manufacturing & Systems Engineering

Rationale for adding the course:
This course is necessary to teach computational methods which apply algoriths for large data set analysis in support of automated decision making.

All fields below are required

Subject Prefix and # IE 1333

Title (29 characters or fewer): Computational Methods

Dept. Administrative Code : 1637

CIP Code 14.3501.00

Departmental Approval Required ☒Yes ☐No

Course Level ☒UG ☐GR ☐DR ☐SP

Course will be taught: ☒ Face-to-Face ☒ Online ☒ Hybrid

How many times may the course be taken for credit? (Please indicate 1-9 times): 1

Should the course be exempt from the "Three Repeat Rule?" ☐Yes ☒No

Grading Mode: ☒Standard ☐Pass/Fail ☐Audit

Description (600 characters maximum):
Computational methods and algorithms for industrial, manufacturing and systems engineering applications.

Contact Hours (per week): 3 Lecture Hours Lab Hours Other

Types of Instruction (Schedule Type): Select all that apply

☒ A	Lecture	☐ H	Thesis
☐ B	Laboratory	☐ I	Dissertation
☐ C	Practicum	☐ K	Lecture/Lab Combined
☐ D	Seminar	☐ O	Discussion or Review (Study Skills)
☒ E	Independent Study	☐ P	Specialized Instruction
☐ F	Private Lesson	☐ Q	Student Teaching

Fields below if applicable

If course is taught during a part of term in addition to a full 16-week term please indicate the length of the course (ex., 8 weeks): 8 weeks; 4 weeks

TCCN (Use for lower division courses) :

Prerequisite(s):		
Course Number/ Placement Test	Minimum Grade Required/ Test Scores	Concurrent Enrollment Permitted? (Y/N)

Corequisite Course(s):	Equivalent Course(s):

Restrictions:	
Classification	
Major	

THE UNIVERSITY OF TEXAS AT EL PASO

College of Engineering

Industrial, Manufacturing, and Systems Engineering Department

Course #	IE 1333
Course Title:	**Computational Methods**
Credit Hrs:	3 Credits
Course Location:	TBA
Instructor	TBA
Office Location	TBA
Office Hrs	TBA
Course Assignments:	**Homework**: There will be approximately 8-12 homework assignments during the course. Assignments will be posted on the course website. **Final Project:** Groups of 3-4 persons. • Apply local search and/or meta-heuristic algorithms to solve common industrial problems • Model production processes using MATLAB
Evaluation	There will be two midterm exams and one final exam No books, notes, will be allowed. No make-up/alternate exam will be given.
Policies	No late homework will be accepted. Your homework should show all necessary work you used to solve problems. Absences or tardiness for exams will result in automatic failure of that exam, except in the case of documented medical or family emergencies. Exams are held during regular schedule.
Collaboration policies	For homework problem sets, you may collaborate with up to 2 other students. Collaboration means you discuss the problems, but you must write up your own code/solutions.
Course Contents:	Computational methods and algorithms for Industrial, Manufacturing & Systems Engineering applications.

Chapter 1: The role of algorithms in Engineering

Introduction to algorithms

Analyzing algorithms
Algorithm thinking
Algorithm design process
Algorithm flowcharts

Chapter 2: MATLAB variables & basic data types

MATLAB environment
Variables, basic data types.
Matrices and cells
Relational and logical operators

Chapter 3: Conditional Operators

If statement
If else statement
Switch statement
Manipulation of matrices

Chapter 4: Loop cycles

For loop
While loop
Counters, break, flags

Chapter 5: Functions

Introduction to functions
Divide and conquer
Dynamic programming

Chapter 6: Programming applications

Scheduling problems
Layout optimization problems
Production and Logistic problems
Probabilistic analysis & random processes
Monte Carlo simulation
Other applications

Chapter 7: Heuristic Methods

Genetic Algorithms
Tabu Search
Simulated Annealing

Chapter 8: Graphic Interface

GUI development
Data visualization (2D & 3D)

COURSE ADD

All fields below are required

College : Engineering **Department :** Industrial, Manufacturing & Systems Engineering

Rationale for adding the course:
This course is necessary to teach the subject of modern decision support systems which are capable of handling large data sets as collected in modern industrial and manufacturing operations.

All fields below are required

Subject Prefix and # IE 2333

Title (29 characters or fewer): Decision Support Systems

Dept. Administrative Code : 1637

CIP Code 14.3501.00

Departmental Approval Required ☒Yes ☐No

Course Level ☒UG ☐GR ☐DR ☐SP

Course will be taught: ☒ Face-to-Face ☒ Online ☒ Hybrid

How many times may the course be taken for credit? (Please indicate 1-9 times): 1

Should the course be exempt from the "Three Repeat Rule?" ☐Yes ☒No

Grading Mode: ☒Standard ☐Pass/Fail ☐Audit

Description (600 characters maximum):
Decision support systems for industrial, manufacturing and systems engineering applications.

Contact Hours (per week): 3 Lecture Hours Lab Hours Other

Types of Instruction (Schedule Type): Select all that apply

☒ A	Lecture	☐ H	Thesis
☐ B	Laboratory	☐ I	Dissertation
☐ C	Practicum	☐ K	Lecture/Lab Combined
☐ D	Seminar	☐ O	Discussion or Review (Study Skills)
☒ E	Independent Study	☐ P	Specialized Instruction
☐ F	Private Lesson	☐ Q	Student Teaching

Fields below if applicable

If course is taught during a part of term in addition to a full 16-week term please indicate the length of the course (ex., 8 weeks): 8 weeks; 4 weeks

TCCN (Use for lower division courses) :

Prerequisite(s):		
Course Number/ Placement Test	Minimum Grade Required/ Test Scores	Concurrent Enrollment Permitted? (Y/N)
IE 1333	C	N

Corequisite Course(s):	Equivalent Course(s):

Restrictions:	
Classification	
Major	

IE 2333: Decision Support Systems **Fall 2020**

Location Time

Course Description

Study of design of decision support systems for production and service systems based on operations research models. Includes use of spreadsheets, databases, and integrated software development environments to implement decision support systems.

Prerequisite

Required Course Texts

1. Albright, Christian, *VBA for Modelers: Developing Decision Support Systems*, Cengage Learning. Editions 2-5 are acceptable.
2. Farrell, Joyce, *Programming Logic and Design, Comprehensive*, Cengage Learning, Editions 5-8 are acceptable (NOT 9 – we need the chapter on Databases).

Laptop Information

This course has been designated as a laptop course. Most class activities will be conducted using laptops. You will need to bring your laptop ***every class*** unless otherwise noted explicitly. In general, I assume that each student has a laptop with the appropriate software.

Required Software and Computing Resources

You will need to have / install Excel, Access, Word and PowerPoint Professional 2013 or 2016. You must have this installed, even if you have a Mac, by the first Monday class of the semester. If you have a Mac, you must use a version of Excel for Mac that has VBA capability. You may want to use the WINDOWS version of Office.

Office 365 will not be useful for Excel in this course.

Course Topics

Spreadsheet development
Enhancing spreadsheet functionality using VBA
Database usage (not design!) and VBA integration

Course Objectives

After completion of this course, students will be able to:

- Design useful and usable OR-based DSSs for decision makers and operators in your (future) company
- Develop DSSs with appropriately sophisticated core technologies that are integrated with MS office tools that are readily available in most organizations and familiar to many.

Class Attendance

Class attendance ***will*** be explicitly tracked. If a student misses more than 4 MW classes in the first 3 weeks of the course, the student will be dropped.

Most days will require something to be turned in, which will be part of the graded work of the course. Moreover, excessive absence will hurt your grade in a general way. However, each student is responsible for all announcements made in class and sent to your University e-mail account, including scheduling of projects and homework assignments.

Notification will be given in advance if the instructor, TAs or a substitute instructor is unable to attend class. In some cases, you may be given an activity for this class period that may be performed during this time period. If no prior arrangement has been made and no instructor has arrived by 15 minutes after the scheduled start of class, the students may leave.

Class Attendance is tracked through the completion of In-Class Activities. Sometimes these require work to be completed before class that will be evaluated at the beginning of class, but most of the time, these will be completed during class and submitted before leaving class. These will require your presence during the entire class session, until the entire class is dismissed. In-Class Activities cannot be made up.

Any exam that was scheduled at the time of a class cancellation due to inclement weather will be given at the next class meeting unless contacted by the instructor. Any assignments due at the time of a class cancellation due to inclement weather will be due at the next class meeting unless contacted by the instructor. Any extension or postponement of assignments or exams must be granted by the instructor via email or Blackboard within 24 hours of the weather related cancellation

Grading Policy

Grading will be carried out using **learning contracts** (contract grading). In other words the grading is based on a contract scheme, where the student performs a **certain amount of work at a certain level in order to receive a fixed grade.**

Your final grade will be assigned based on your performance on the Projects and the Evidence of Learning Activities.

Evidence of Learning is accumulated through three activities: In-Class Activities, Homeworks and Quizzes. Each assignment in these categories will have a point value associated with it. The total Evidence of Learning Activities score is the sum of all points earned divided by the sum of points available.

Four projects are required for all students to earn a passing grade; two projects are used to differentiate the As and Bs from the Cs and Ds.

Project	Topic	Status
1.	Excel project	
2.	VBA project 1	REQUIRED
3.	VBA project 2	REQUIRED
4.	Database project (no VBA)	REQUIRED
5.	Integrated project (VBA and database)	REQUIRED
6.	Advanced VBA project (take home final)	

	Grade D	Grade C	Grade B	Grade A
Evidence of Learning Activities	Earn at least 70%	Earn at least 70%	Earn at least 70%	Earn at least 70%
Projects	Earn at least **60%** on each of the following projects: 2 3 4 5	Earn an average of **80%** on the following projects and no grade less than 60% 2 3 4 5	Earn an average of **80%** on the following projects and no grade less than 60% 2 3 4 5 (1 or 6)	Earn an average of **80%** on all of the projects and no grade less than 60%

Some examples for you to think about…..

- Ann wanted to get an A in this class, so she turned in all the projects (1-6) and scored an average of 88%. She got 41% for the Evidence of Learning Activities, because she never came to class. She got an F in class and she is so unhappy!
- Betty turned in Projects 2, 3, 4 & 5 and scored at least 80% on each of those. She scored 79% on the Evidence of Learning Activities. She got a B in class!
- Chuck thought he'd be happy with a C. So he turned in Projects 2 and 3 and got a score of 80% on each. He also got 71% on the Evidence of Learning Activities. At the end he got an F and he's not happy!
- Dylan missed so many classes. He barely got 70% on his the Evidence of Learning Activities. He only turned in Projects 2 and 6 and scored only 51%. He got an F.

Tokens

Tokens allow you to turn in Projects 1-5 late or resubmit them after instructor feedback. Each student begins the course with 2 tokens. For each Project completed on time and earning at least 90%, one additional token will be awarded.

Projects 1-5 will be returned within 7 calendar days of its submission. Late submissions must be submitted within 7 calendar days of the original due date. Resubmissions, whether for on-time or late submissions, must be submitted within 14 calendar days of being returned. Each resubmission uses a token and you must have a token to resubmit. All work for Projects 1-5 must be submitted by the last day of class (not the last day of finals).

Some examples for you to think about…..

- Ann turned in Project 1 on time, but earned 55%. She resubmitted it 13 days after getting it back and earned 75%. This uses one token.
- Betty turned in Project 1 on time, but earned 55%. She resubmitted it 23 days after getting it back. This will not be graded, but doesn't use a token. The best grade she can get is a B.
- Chuck turned in Project 2 six days late and received a 71%. This uses one token.
- Dylan turned in Project 3 one day late and received a 25%. He resubmitted it 10 days after getting it back, and earned a 65%. Then, he resubmitted it again, 5 days after the second return, and earned a 72%. This uses three tokens! The only way this can work is if Dylan earned an extra token on Project 1 or 2!

Academic Integrity

Academic Integrity is a commitment to fundamental values: honesty, trust, fairness, respect, and responsibility. From these values flow principles of behavior that enable academic communities to translate ideals into action." We will assume that all students are familiar with this policy.

It is expected that all work for this course will be generated by the student in response to the assignments given in this course.

Students suspected of academic dishonesty will be brought to the OSCCR. Please be advised that your work will be examined for plagiarism, potentially using software such as Turn-it-in.

Accessibility Statement

COURSE CHANGE FORM

All fields below are required

College : Engineering **Department :** Industrial, Manufacturing & Systems Eng

Rationale for changing the course:
New prerequisites added.

All fields below are required

Subject Prefix and number IE 3373

Course Title Engineering Probability & Statistics

Change	From	To
Ex. Prerequisite	**Ex. POLS 2310**	**Ex. POLS 2312**
Prerequisite	MATH 2313 or MATH 2326	(MATH 2313 or MATH 2326) AND IE 2333

These changes will be reflected in Banner, Goldmine, and the catalog

COURSE ADD

All fields below are required

College : Engineering **Department :** Industrial, Manufacturing & Systems Engineering

Rationale for adding the course:
This course presents restructured material already present in the Industrial & Systems Engineering B.S. curriculum.

All fields below are required

Subject Prefix and # IE 3377

Title (29 characters or fewer): Intro to Work Design

Dept. Administrative Code : 1637

CIP Code 14.3501.00

Departmental Approval Required ☐Yes ☒No

Course Level ☒UG ☐GR ☐DR ☐SP

Course will be taught: ☒ Face-to-Face ☒ Online ☒ Hybrid

How many times may the course be taken for credit? (Please indicate 1-9 times): 1

Should the course be exempt from the "Three Repeat Rule?" ☐Yes ☒No

Grading Mode: ☒Standard ☐Pass/Fail ☐Audit

Description (600 characters maximum):
Work design and measurement, applied to manufacturing and service industries, so as to improve worker performance, health, safety, and maintain productivity

Contact Hours (per week): 2 Lecture Hours 3 Lab Hours Other

Types of Instruction (Schedule Type): Select all that apply

☒ A	Lecture	☐ H	Thesis
☒ B	Laboratory	☐ I	Dissertation
☐ C	Practicum	☐ K	Lecture/Lab Combined
☐ D	Seminar	☐ O	Discussion or Review (Study Skills)
☒ E	Independent Study	☐ P	Specialized Instruction
☐ F	Private Lesson	☐ Q	Student Teaching

Fields below if applicable

If course is taught during a part of term in addition to a full 16-week term please indicate the length of the course (ex., 8 weeks): 8 weeks; 4 weeks

TCCN (Use for lower division courses) :

Prerequisite(s):		
Course Number/ Placement Test	**Minimum Grade Required/ Test Scores**	**Concurrent Enrollment Permitted? (Y/N)**
IE 3373	C	N
CE 2315 or MECH 1321	C	N

Corequisite Course(s):

Equivalent Course(s):
IE 3477

Restrictions:	
Classification	
Major	

IE 3377 - Introduction to Work Design

COURSE SYLLABUS

Catalog Description:

IE 3377 – Introduction to Work Design (2-3)

Work design and measurement, applied to manufacturing and service industries, so as to improve worker performance, health, safety, and maintain productivity

Textbook: Niebel's Methods, Standards & Work Design, by Freivalds, A., McGraw-Hill, 2014.

References: Work Systems and the Methods, Measurement, and Management of Work, by Groover, M., Pearson-Prentice Hall, 2007.
Work Design: Industrial Ergonomics, by Konz, Stephan & Johnson, Steven; Holcomb Hathaway Publishers, 2008.

Required equipment: Laptop with mouse. Your computer must have capability for wireless connection.

Approved calculators for exams:
Hewlett Packard: HP 33s and HP 35s
Casio: All fx-115 models
Texas Instruments: All TX-30X and TI-36-36X

Class/laboratory schedule:
Class: Two 80-minutes lecture sessions per week
Laboratory: One 170-minutes session per week
MW 13:30 – 14:50 (lecture)
Thursday 14:00 – 16:50 (lab)

Instructor:
Dr. Luis Rene Contreras (lrcontreras@utep.edu)
Phone: (915) 747-7098
Office: A 130 (Engineering Annex)
Office Hours (A-239): **MW 12:00-13:00, TR 9:00 - 10:30**
So that I can better serve you, please come by only at the designated office

CONTRIBUTION OF COURSE TO INDUSTRIAL AND SYSTEMS ENGINEERING PROGRAM STUDENT OUTCOMES:

(1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
(2) an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

CONTRIBUTION OF COURSE TO MEETING CURRICULUM REQUIREMENTS
This course contributes with four credit-hours for the engineering education component.

Topic Outline
- Introduction, History
- Ethics
- Job Analysis
- Musculo Principles
- Manual Work, Low back
- NIOSH lifting
- CTD Risk, Tools
- Workplace
- Illumination
- Noise
- Heat stress
- Info Processing
- Decision Making
- Pass back
- Coding of Information
- Visual Displays
- Auditory Displays, Speech
- HCI in Office Environment
- Implement Method
- Time Study
- Rating
- Allowances
- Standard data and Costing
- Wage Incentives
- Training, Learning Curves
- Learning Curves
- Macroergonomics
- PA Industry, Review

Required Work and Grading Policy
Midterm 25%
Final 25%
Case Studies (6 Reports @5% + 5 Forms @2%) 40%
Homework (10 @ 1%) 10%
Total 100%

Exams:

Fractions of scores will not be rounded up. I do not negotiate grades with students. I will answer any question concerning your tests, homework, case studies, etc., but do not come by to ask why I took off so many points for this or that, that other students got more or less points for "the same thing," if I don't graduate I will "die," "I have other classes," "I work," etc. Any request for a grade elevation that is NOT based on a mistake is considered harassment and will be reported immediately.

Case Study Topics
- Intro, Groups, #1 -Gilbane Gold Ethics
- Job Analysis & FlowProcess
- Biomech Analyses of Lifting

- CTD and Screwdriver Design
- Sensory/Environental Analyses
- ATM Design - Info processing
- Visual Inspection - Signal Detection
- Ultrasound Transducer Design
- CPOE, Productivity, Delays, Errors
- Introduction to Time Study
- Elements and Rating
- Time Study Test
- Learning Curves

Note:
All case studies require either a full report (5%) or only the filling out of a form (2%) to be handed in at the end of the lab. The full reports will be due as indicated in the course schedule. The time study test will be an in-lab test performed individually with the value of one full report (i.e. 5%)

GRADING SCALE:

A:	91-100
B:	81-90
C:	71-80
D:	61-70
F:	≤ 60

ABSENCE FROM EXAMINATIONS:

A student absent from a test during the semester is graded zero (0). **Make-ups exams will not be provided.**

LATE WORK:

Late reports/assignments will not be accepted, will be graded zero (0). If you are unable to attend the class at which the report/assignment is due, it is your responsibility to submit it earlier.

ABOUT WORKING IN GROUPS:

Industry has indicated to engineering schools that graduates must possess teamwork abilities and interpersonal skills, as well as be technically proficient. In addition to learning the principles of facilities layout concepts and techniques, and how to apply them, you will also develop your teamwork abilities through various group activities, as well as project management skills.

ADMINISTRATIVE DROPS:

At the discretion of the instructor, a student may be dropped from a course because of excessive absences, neglect or lack of effort. A grade of "W" will be assigned before the course drop deadline and a grade of "F" after the course drop deadline. A grade of "F" received due to disciplinary action imposed by the University overrides a grade of "W" received through a student-initiated or faculty drop.

CLASS ATTENDANCE:

The student is expected to attend all classes and laboratory sessions. It is the responsibility of the student to inform each instructor of extended absences. **When, in the judgment of the instructor**, a student has

been absent to such a degree as to impair his or her status relative to credit for the course. A drop for not attending will count toward the State Allowed Six Drop Limit. If you are failing the class at the time of the drop you may also be given a WF designation. Be advised that a drop could adversely impact visa status, financial aid and other programs. As per UTEP rules, you may be asked to show a UTEP ID at any time during class.

EXCUSED ABSENCES FOR UNIVERSITY-RECOGNIZED ACTIVITIES:

Students who will be absent while representing the University in officially recognized University activities (sports, band, professional conferences, etc.) **must notify the Dean of Students not less than ten (10) days prior to the absence**. The Dean of Students will provide the student with a letter of excuse for the professors. It is the student's responsibility to give the letter to the professors prior to the official recognized activity. Students following these procedures will be permitted to make up both assignments and examinations in consultation with faculty.

HARASSMENT POLICY:

The department has a zero-tolerance policy for harassment. Engagement in any behavior considered harassment will be reported to the proper authorities. In addition to generally understood forms of harassment, the department also treats the following behavior as harassment:

- Repeated emails and/or calls regarding subjects that have already been addressed. Once a decision has been made or a question answered, a student who continues to ask the same question will be given a warning by the recipient of the email/call. If the student continues, the behavior will be reported. Questions that seek understanding of course material are not harassment; but repeated questions about a grade or an administrative decision are.
- Grades are NOT negotiable, ever. If you believe a grading mistake has be made, you must follow the process described in the UTEP catalog. Any request for a grade elevation that is NOT based on a mistake is considered harassment and will be reported immediately.
- Remaining in an office after the occupant requests you leave is considered harassment and potentially threatening. You will be reported immediately without warning and depending on the severity, may be reported to law enforcement.
- Similar behavior towards department staff, and student advisors will also be treated as harassment, including persistent phone calls, emails, and badgering. Department staff and student advisors are there to help students, and should be treated with due respect.

STUDENTS WITH DISABILITIES:

If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at https://www.utep.edu/student-affairs/cass/.

ACADEMIC INTEGRITY:

The University of Texas at El Paso prides itself on its standards of academic excellence. In all matters of intellectual pursuit, UTEP faculty and students must strive to achieve excellence based on the quality of

work produced by the individual. In the classroom and in all other academic activities, students are expected to uphold the highest standards of academic integrity. Any form of academic dishonesty is an affront to the pursuit of knowledge and jeopardizes the quality of the degree awarded to all graduates of UTEP.

Any student who commits an act of academic dishonesty is subject to discipline. Academic dishonesty includes, and is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, and any act designed to give unfair advantage to a student or the attempt to commit such acts. Proven violations of the detailed regulations, as printed in the *Handbook of Operating Procedures (HOP)*, and available in the Office of Student Life and on the homepage of the Office of Student Life at www.utep.edu/dos, can result in sanctions ranging from disciplinary probation, to a failing grade on the work in question, to a failing grade in the course, to suspension or dismissal, among others.

Engineers are educated professionals, and every engineer is expected to subscribe to a professional canon of ethics. Paramount among these is the canon that engineers shall not affix their signatures to documents that are not their own work. This is also expected of engineering students, whether or not the work is being graded individually or as a group! *Cheaters and slackers will not be tolerated in this course*. Prosecution will be carried out to the fullest extent. **If academic dishonesty is suspected or observed, please report it to the instructor -- this will be kept in the strictest confidence.**

Addendum Academic Integrity

- During exams and quizzes, you are not allowed to use any form of Wi-Fi enabled electronic device, including cell phones or other electronic communication devices or methods (calculators, wrist watches, earbuds, etc.). No wrist watch or other electronic device may be worn.

- During exams and quizzes, you are allowed to use only instructor approved calculators. Check your syllabus for the list of approved calculators.

- No electronic version of the book, loose paper print-outs of the book or extra sheets of paper of any kind are allowed unless explicitly mentioned in writing by the instructor. As a part of the zero-tolerance policy, if you have a cellphone or other electronic device capable of communication on your person; or if any proctor sees or hears any electronic device during the exam or if you share your work with someone else, you will be reported to the proper authorities and you may receive a zero on the exam and an F in the class. Other actions including suspension may also be perused.

- If you have a disability that requires the use of an electronic device during exams you must have a letter of accommodation from the Center for Accommodations and Support Services (CASS). This accommodation must be coordinated in advance with the instructor.

- During exams, you will not be allowed to leave the examination room until you complete the exam. This includes restroom breaks. Students with disabilities must have a letter of accommodation and coordinate this in advance with the instructor.

- Instructors and/or proctors may record and/or use their personal cell phones to document activity during the exam. Recording devices may also be located at various locations in the room and may be out of sight of the students. These recordings will be managed according to the UTEP approved regulations for such media.

- If you are suspected of scholastic dishonesty you may not be directly confronted about your conduct by the instructor or proctor. You will however, be reported to the Office of Student Conduct and Conflict Resolution (OSCCR) and your exam will not be admissible. Your grade in the class may not be available until OSCCR makes a final ruling, this may adversely impact your ability to enroll in other classes or graduation.

- **If you arrive more than 15 minutes late to an exam, you will not be allowed to enter the examination room.**

- There will be no makeup exams administered. If you have a university approved excuse, your **instructor will have a process for determining how to handle the missing grade outlined in the syllabus. However, no makeup exams will be given.**

- **If you miss more than one exam, the instructor may choose to administratively drop you from the class. This may adversely impact a visa and financial aid.**

- No food or drinks will be allowed in the examination room.

- Departmental policy allows for the use of assigned seats. All students must present their UTEP issued ID prior to and during every exam and may be required to sign in. Not having a UTEP issued ID when asked will result in forfeiture of the exam.

- Scholastic dishonesty on homework, lab assignments and all other class assignments will be held to the same standards and requirements of academic honesty as quizzes and exams.

NOTE:
The above schedule and procedures are subject to change in the event of extenuating circumstances. Any student with difficulty in meeting these requirements should contact the instructor as soon as possible for an attempt to resolve the difficulty.

DATE OF PREPARATION: Thursday, February 06, 2020

COURSE ADD

All fields below are required

College : Engineering **Department :** Industrial, Manufacturing & Systems Engineering

Rationale for adding the course:
This course presents restructured material already present in the Industrial & Systems Engineering B.S. curriculum.

All fields below are required

Subject Prefix and # IE 4332

Title (29 characters or fewer): Work Design - Prod. & Safety

Dept. Administrative Code : 1637

CIP Code 14.3501.00

Departmental Approval Required ☐Yes ☒No

Course Level ☒UG ☐GR ☐DR ☐SP

Course will be taught: ☒ Face-to-Face ☒ Online ☒ Hybrid

How many times may the course be taken for credit? (Please indicate 1-9 times): 1

Should the course be exempt from the "Three Repeat Rule?" ☐Yes ☒No

Grading Mode: ☒Standard ☐Pass/Fail ☐Audit

Description (600 characters maximum):
Methods improvement, work measurement, and work design, applied to manufacturing and service industries, so as to increase productivity and improve worker health and safety.

Contact Hours (per week): 2 Lecture Hours 3 Lab Hours Other

Types of Instruction (Schedule Type): Select all that apply

☒A	Lecture	☐ H	Thesis
☒ B	Laboratory	☐ I	Dissertation
☐ C	Practicum	☐ K	Lecture/Lab Combined
☐ D	Seminar	☐ O	Discussion or Review (Study Skills)
☒ E	Independent Study	☐ P	Specialized Instruction
☐ F	Private Lesson	☐ Q	Student Teaching

Fields below if applicable

If course is taught during a part of term in addition to a full 16-week term please indicate the length of the course (ex., 8 weeks): 8 weeks; 4 weeks

TCCN (Use for lower division courses) :

Prerequisite(s):		
Course Number/ Placement Test	**Minimum Grade Required/ Test Scores**	**Concurrent Enrollment Permitted? (Y/N)**
IE 3373	C	N
CE 2315 or MECH 1321	C	N

Corequisite Course(s):

Equivalent Course(s):
IE 3332

Restrictions:	
Classification	
Major	

IE 4332-Work Design - Productivity and Safety

COURSE SYLLABUS

CATALOG DESCRIPTION: IE 4332 **Work Design - Productivity and Safety** (2-3).
Methods improvement, work measurement, and work design, applied to manufacturing and service industries, so as to increase productivity and improve worker health and safety

PREREQUISITE(S):

(BE 3373 w/C or better AND CE 2315 w/C or better) OR (BE 2434 w/C or better AND IE 2315 w/C or better AND IE 3373 w/C or better AND MECH 1321 w/C or better)

CONTRIBUTION OF COURSE TO INDUSTRIAL AND SYSTEMS ENGINEERING PROGRAM STUDENT OUTCOMES:

(1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
(4) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

CONTRIBUTION OF COURSE TO MEETING CURRICULUM REQUIREMENTS
This course contributes with three credit-hours for the engineering education component.

CLASS SCHEDULE:
Class: Two 80-minutes lecture sessions per week
TR 12:00 pm – 1:20 pm

INSTRUCTOR:
Dr. Luis Rene Contreras (lrcontreras@utep.edu)
Phone: (915) 747-7098
Office: A 130 (Engineering Annex)

REQUIRED TEXTBOOK AND MATERIALS:

1. *Niebel's Methods, Standards and Work Design*, by A. Freivalds, 13th ed., McGraw-Hill, 2014.

REFERENCES:

1. Industrial Safety and Health Management, Asfahl, C. Ray, 2019, 7th Edition, Prentice Hall.
2. Occupational Safety and Engineering, Willie Hammer and Dennis Price, Prentice Hall
3. Occupational Safety and Health for Technologists, Engineers, and Managers, David L. Goetsch. Prentice Hall
4. Safety and Health for Engineers, Roger L. Brauer, Wiley.

WEB REFERENCES:

1. Occupational Safety and Health Adminstration: www.osha.gov
2. National Institute of Occupational Safety and Health: http://www.cdc.gov/niosh/
3. Occupational Safety and Health Magazine: http://ohsonline.com

Topic Outline:

- Methods
- PERT/CPM
- Worker Machine Relationships
- Line Balancing
- Operation Analysis/Lean Manufacturing
- Plant Layout - Muthers SLP/SPIRAL
- Motion Study
- MTM-2
- Work Sampling
- Ethics
- Accident Prevention Theory
- Probability/Reliability
- Fault Tree Analysis Brown
- Cost-Benefit Analysis
- Workers Comp
- OSHA
- Hazard Control
- Falling Hazards
- Mechanical Hazards
- Pressure/Hazards
- Electrical Hazards
- Heat Hazards
- Fire Hazards
- Explosion Hazards
- Toxic Materials Hazards
- Confined Space Hazards
- Radiation Hazards
- Product Liability

REQUIRED WORK AND GRADING POLICY:

Midterm	28%
Final (per finals schedule)	28%
Case Studies (3 Reports at 8% each)	24%
Homework (10 @ 2%)	20%
Total	100%

GRADING SCALE:

A:	91-100
B:	81-90
C:	71-80
D:	61-70
F:	≤ 60

ABSENCE FROM EXAMINATIONS:

A student absent from a test during the semester is graded zero (0). **Make-ups exams will not be provided.**

LATE WORK:
Late reports/assignments will not be accepted, will be graded zero (0). If you are unable to attend the class at which the report/assignment is due, it is your responsibility to submit it earlier.

ABOUT WORKING IN GROUPS:
Industry has indicated to engineering schools that graduates must possess teamwork abilities and interpersonal skills, as well as be technically proficient. In addition to learning the principles of facilities layout concepts and techniques, and how to apply them, you will also develop your teamwork abilities through various group activities, as well as project management skills.

ADMINISTRATIVE DROPS:
At the discretion of the instructor, a student may be dropped from a course because of excessive absences, neglect or lack of effort. A grade of "W" will be assigned before the course drop deadline and a grade of "F" after the course drop deadline. A grade of "F" received due to disciplinary action imposed by the University overrides a grade of "W" received through a student-initiated or faculty drop.

CLASS ATTENDANCE:
The student is expected to attend all classes and laboratory sessions. It is the responsibility of the student to inform each instructor of extended absences. **When, in the judgment of the instructor**, a student has been absent to such a degree as to impair his or her status relative to credit for the course. A drop for not attending will count toward the State Allowed Six Drop Limit. If you are failing the class at the time of the drop you may also be given a WF designation. Be advised that a drop could adversely impact visa status, financial aid and other programs. As per UTEP rules, you may be asked to show a UTEP ID at any time during class.

EXCUSED ABSENCES FOR UNIVERSITY-RECOGNIZED ACTIVITIES:
Students who will be absent while representing the University in officially recognized University activities (sports, band, professional conferences, etc.) **must notify the Dean of Students not less than ten (10) days prior to the absence**. The Dean of Students will provide the student with a letter of excuse for the professors. It is the student's responsibility to give the letter to the professors prior to the official recognized activity. Students following these procedures will be permitted to make up both assignments and examinations in consultation with faculty.

HARASSMENT POLICY:
The department has a zero-tolerance policy for harassment. Engagement in any behavior considered harassment will be reported to the proper authorities. In addition to generally understood forms of harassment, the department also treats the following behavior as harassment:

- Repeated emails and/or calls regarding subjects that have already been addressed. Once a decision has been made or a question answered, a student who continues to ask the same question will be given a warning by the recipient of the email/call. If the student continues, the behavior will be reported. Questions that seek understanding of course material are not harassment; but repeated questions about a grade or an administrative decision are.
- Grades are NOT negotiable, ever. If you believe a grading mistake has be made, you must follow the process described in the UTEP catalog. Any request for a grade elevation that is NOT based on a mistake is considered harassment and will be reported immediately.

- Remaining in an office after the occupant requests you leave is considered harassment and potentially threatening. You will be reported immediately without warning and depending on the severity, may be reported to law enforcement.

- Similar behavior towards department staff, and student advisors will also be treated as harassment, including persistent phone calls, emails, and badgering. Department staff and student advisors are there to help students, and should be treated with due respect.

STUDENTS WITH DISABILITIES:

If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at https://www.utep.edu/student-affairs/cass/.

ACADEMIC INTEGRITY:

The University of Texas at El Paso prides itself on its standards of academic excellence. In all matters of intellectual pursuit, UTEP faculty and students must strive to achieve excellence based on the quality of work produced by the individual. In the classroom and in all other academic activities, students are expected to uphold the highest standards of academic integrity. Any form of academic dishonesty is an affront to the pursuit of knowledge and jeopardizes the quality of the degree awarded to all graduates of UTEP.

Any student who commits an act of academic dishonesty is subject to discipline. Academic dishonesty includes, and is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, and any act designed to give unfair advantage to a student or the attempt to commit such acts. Proven violations of the detailed regulations, as printed in the *Handbook of Operating Procedures (HOP)*, and available in the Office of Student Life and on the homepage of the Office of Student Life at www.utep.edu/dos, can result in sanctions ranging from disciplinary probation, to a failing grade on the work in question, to a failing grade in the course, to suspension or dismissal, among others.

Engineers are educated professionals, and every engineer is expected to subscribe to a professional canon of ethics. Paramount among these is the canon that engineers shall not affix their signatures to documents that are not their own work. This is also expected of engineering students, whether or not the work is being graded individually or as a group! *Cheaters and slackers will not be tolerated in this course*. Prosecution will be carried out to the fullest extent. **If academic dishonesty is suspected or observed, please report it to the instructor -- this will be kept in the strictest confidence.**

Addendum Academic Integrity

- During exams and quizzes, you are not allowed to use any form of Wi-Fi enabled electronic device, including cell phones or other electronic communication devices or methods (calculators, wrist watches, earbuds, etc.). No wrist watch or other electronic device may be worn.

- During exams and quizzes, you are allowed to use only instructor approved calculators. Check your syllabus for the list of approved calculators.

- No electronic version of the book, loose paper print-outs of the book or extra sheets of paper of any kind are allowed unless explicitly mentioned in writing by the instructor. As a part of the zero-tolerance policy, if you have a cellphone or other electronic device capable of communication on your person; or if any proctor sees or hears any electronic device during the exam or if you share your work with someone else, you will be reported to the proper authorities and you may receive a zero on the exam and an F in the class. Other actions including suspension may also be perused.

- If you have a disability that requires the use of an electronic device during exams you must have a letter of accommodation from the Center for Accommodations and Support Services (CASS). This accommodation must be coordinated in advance with the instructor.

- During exams, you will not be allowed to leave the examination room until you complete the exam. This includes restroom breaks. Students with disabilities must have a letter of accommodation and coordinate this in advance with the instructor.

- Instructors and/or proctors may record and/or use their personal cell phones to document activity during the exam. Recording devices may also be located at various locations in the room and may be out of sight of the students. These recordings will be managed according to the UTEP approved regulations for such media.

- If you are suspected of scholastic dishonesty you may not be directly confronted about your conduct by the instructor or proctor. You will however, be reported to the Office of Student Conduct and Conflict Resolution (OSCCR) and your exam will not be admissible. Your grade in the class may not be available until OSCCR makes a final ruling, this may adversely impact your ability to enroll in other classes or graduation.

- **If you arrive more than 15 minutes late to an exam, you will not be allowed to enter the examination room.**

- There will be no makeup exams administered. If you have a university approved excuse, your **instructor will have a process for determining how to handle the missing grade outlined in the syllabus. However, no makeup exams will be given.**

- **If you miss more than one exam, the instructor may choose to administratively drop you from the class. This may adversely impact a visa and financial aid.**

- No food or drinks will be allowed in the examination room.

- Departmental policy allows for the use of assigned seats. All students must present their UTEP issued ID prior to and during every exam and may be required to sign in. Not having a UTEP issued ID when asked will result in forfeiture of the exam.

- Scholastic dishonesty on homework, lab assignments and all other class assignments will be held to the same standards and requirements of academic honesty as quizzes and exams.

NOTE:
The above schedule and procedures are subject to change in the event of extenuating circumstances. Any student with difficulty in meeting these requirements should contact the instructor as soon as possible for an attempt to resolve the difficulty.

DATE OF PREPARATION: Thursday, February 06, 2020

COURSE ADD

All fields below are required

College : Engineering Department : Industrial, Manufacturing & Systems Engineering

Rationale for adding the course:
Senior Design course is necessary for capstone project for graduating seniors.

All fields below are required

Subject Prefix and # IE 4266

Title (29 characters or fewer): Senior Design

Dept. Administrative Code : 1637

CIP Code 14.3501.00

Departmental Approval Required ☒Yes ☐No

Course Level ☒UG ☐GR ☐DR ☐SP

Course will be taught: ☒ Face-to-Face ☒ Online ☒ Hybrid

How many times may the course be taken for credit? (Please indicate 1-9 times): 1

Should the course be exempt from the "Three Repeat Rule?" ☐Yes ☒No

Grading Mode: ☒Standard ☐Pass/Fail ☐Audit

Description (600 characters maximum):
Conceptual, preliminary, and final design solutions to engineering problems by students in teams.

Contact Hours (per week): Lecture Hours 6 Lab Hours 4 Other

Types of Instruction (Schedule Type): Select all that apply

☐ A	Lecture	☐ H	Thesis
☒ B	Laboratory	☐ I	Dissertation
☒ C	Practicum	☐ K	Lecture/Lab Combined
☐ D	Seminar	☐ O	Discussion or Review (Study Skills)
☐ E	Independent Study	☐ P	Specialized Instruction
☐ F	Private Lesson	☐ Q	Student Teaching

Fields below if applicable

If course is taught during a part of term in addition to a full 16-week term please indicate the length of the course (ex., 8 weeks): 8 weeks.

TCCN (Use for lower division courses) :

Prerequisite(s):		
Course Number/ Placement Test	**Minimum Grade Required/ Test Scores**	**Concurrent Enrollment Permitted? (Y/N)**
IE 3331 Systems Engineering	C	N
CE 2326 Econ. for Engr. & Scient	C	N

Corequisite Course(s):	Equivalent Course(s):

Restrictions:	
Classification	
Major	

COURSE SYLLABUS

Department of Industrial, Manufacturing & Systems Engineering

IE 4266 - Senior Design (Required Course)

Catalog Description: Conceptual, preliminary, and final design solutions to engineering problems by students in teams.

Prerequisites: Students must be in their last full semester (semester of graduation) and must have a 2.0 GPA or better overall and in their major.

Required Textbook: None.

Reference Books:

- Beer, David and David McMurrey (2009) *A Guide to Writing as An Engineer, Third Edition* (New York: John Wiley and Sons, Inc.)
- All previously used textbooks

Time Requirement for the project: You will be working all semester long in a real industry project. Each member of the team is expected to spend approximately 10 hours per week working on the project – 20 to 30 hrs. per week per team depending on the number of members per team. Out of those individual 10 hours, at least 5 hours per week – (10 to 15 per team) **must be spent at the industrial facility** collecting data, analyzing the problem, proposing and validating potential solutions, implementing the recommended solution, and presenting your results to your industrial partner. **If you do not meet these requirements you could be dropped from the class at any time.**

Class Times:

Example: Tuesday 1:30 pm - 5:50 pm & Thursday 4:30 pm - 5:50 pm

Course & Student Outcomes:

The overall educational goal of the course is to provide an engineering experience in a professional environment before entering the work force.

- Students must be prepared for engineering practice by means of a **major engineering design experience** that: 1) incorporates appropriate engineering standards and multiple constraints (i.e. cost, usability, codes, constructability, accessibility, aesthetics, etc.); and 2) is based on the knowledge and skills acquired in earlier course work. (Criterion 5 ABET-EAC).
- Students will put into practice their ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science and mathematics (Criterion 3-1 ABET-EAC).

- Students will put into practice their ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. (Criterion 3-2 ABET-EAC).
- Students will put into practice their ability to communicate effectively with a range of audiences by means of writing reports, memoranda, letters, and making oral presentations. (Criterion 3-3 ABET-EAC)
- Students will put into practice their ability to function effectively on a team whose members **together** provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives. (Criterion 3-5 ABET-EAC).

Topics Covered:
Teaming and Project Approach/Technical Guidelines

Contribution of Course to Meeting Curriculum Requirements:

This course contributes with four credits of engineering topics to fulfill the curriculum requirement and the requirement of having a culminating major engineering design that: 1) incorporates appropriate engineering standards and multiple constraints; and 2) is based on the knowledge and skills acquired in earlier course work.

Relationship of Course to Program Outcomes:

ABET Student Outcomes	Description
1	*An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science and mathematics.*
2	*An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.*
3	*An ability to communicate effectively with a range of audiences*
5	*An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives*

Instructor

TBA

COURSE CHANGE FORM

All fields below are required

College : Engineering **Department :** Industrial, Manufacturing & Systems Eng

Rationale for changing the course:
Course content updating requires a change in course title

All fields below are required

Subject Prefix and number IE 3390

Course Title Operations Research I: Deterministic Models

Change	From	To
Ex. Prerequisite	**Ex. POLS 2310**	**Ex. POLS 2312**
Title	Operations Research I	Operations Research I: Deterministic Models

These changes will be reflected in Banner, Goldmine, and the catalog

COURSE CHANGE FORM

All fields below are required

College : Engineering **Department :** Industrial, Manufacturing & Systems Eng

Rationale for changing the course:
Course content updating requires a change in course title

All fields below are required

Subject Prefix and number IE 4390

Course Title Operations Research II: Stochastic Models

Change	From	To
Ex. Prerequisite	**Ex. POLS 2310**	**Ex. POLS 2312**
Title	Probabilistic Operations Research	Operations Research II: Stochastic Models

These changes will be reflected in Banner, Goldmine, and the catalog

COURSE CHANGE FORM

All fields below are required

College : Engineering **Department :** Industrial, Manufacturing & Systems Eng

Rationale for changing the course:
Course content updating requires a change in course title

All fields below are required

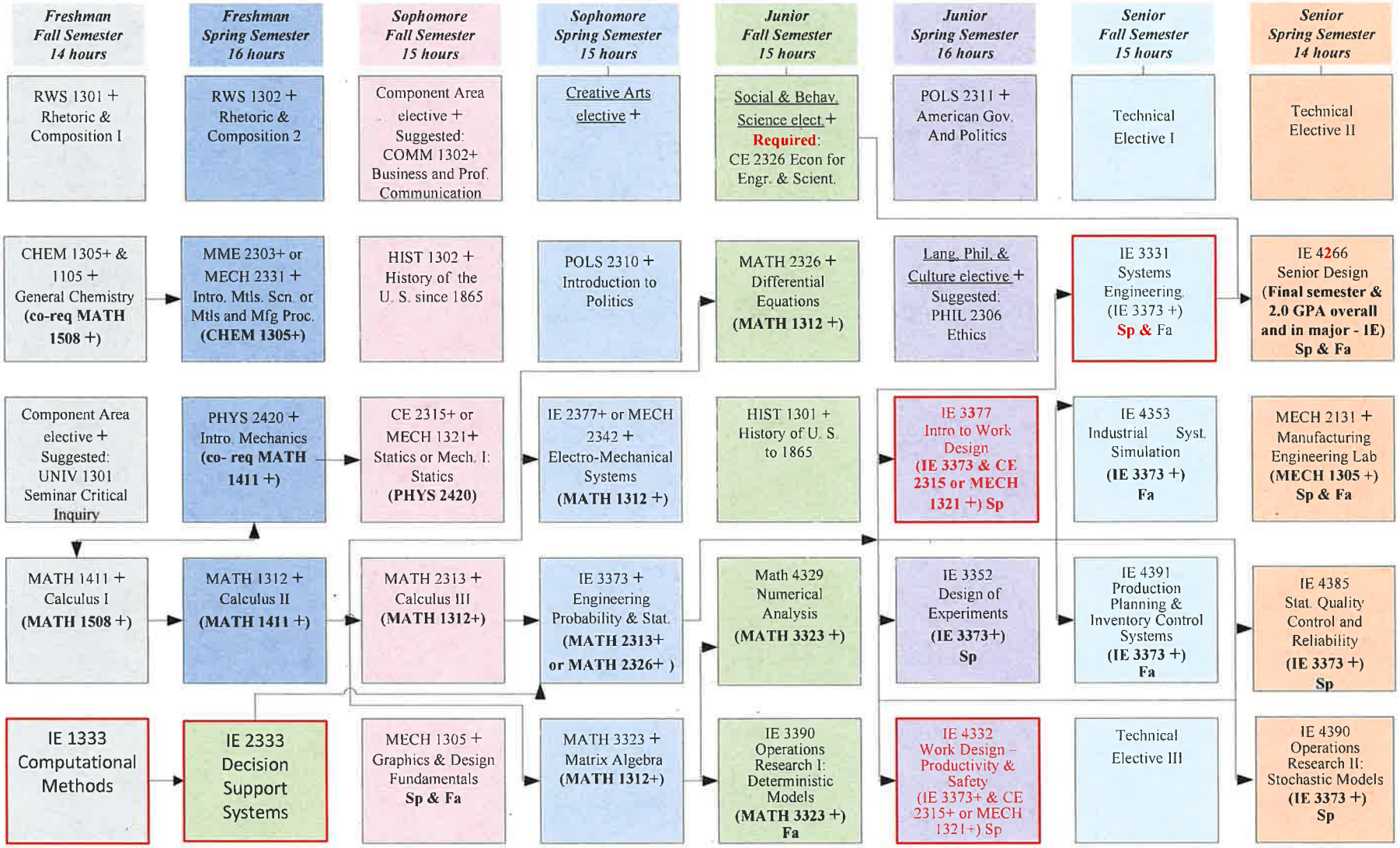
Subject Prefix and number IE 4391

Course Title Production Planning & Inventory Control Systems

Change	From	To
Ex. Prerequisite	**Ex. POLS 2310**	**Ex. POLS 2312**
Title	Production and Inventory Control	Production Planning & Inventory Control Systems

These changes will be reflected in Banner, Goldmine, and the catalog

Fall 2020 Industrial and Systems Engineering Degree Plan Flowchart

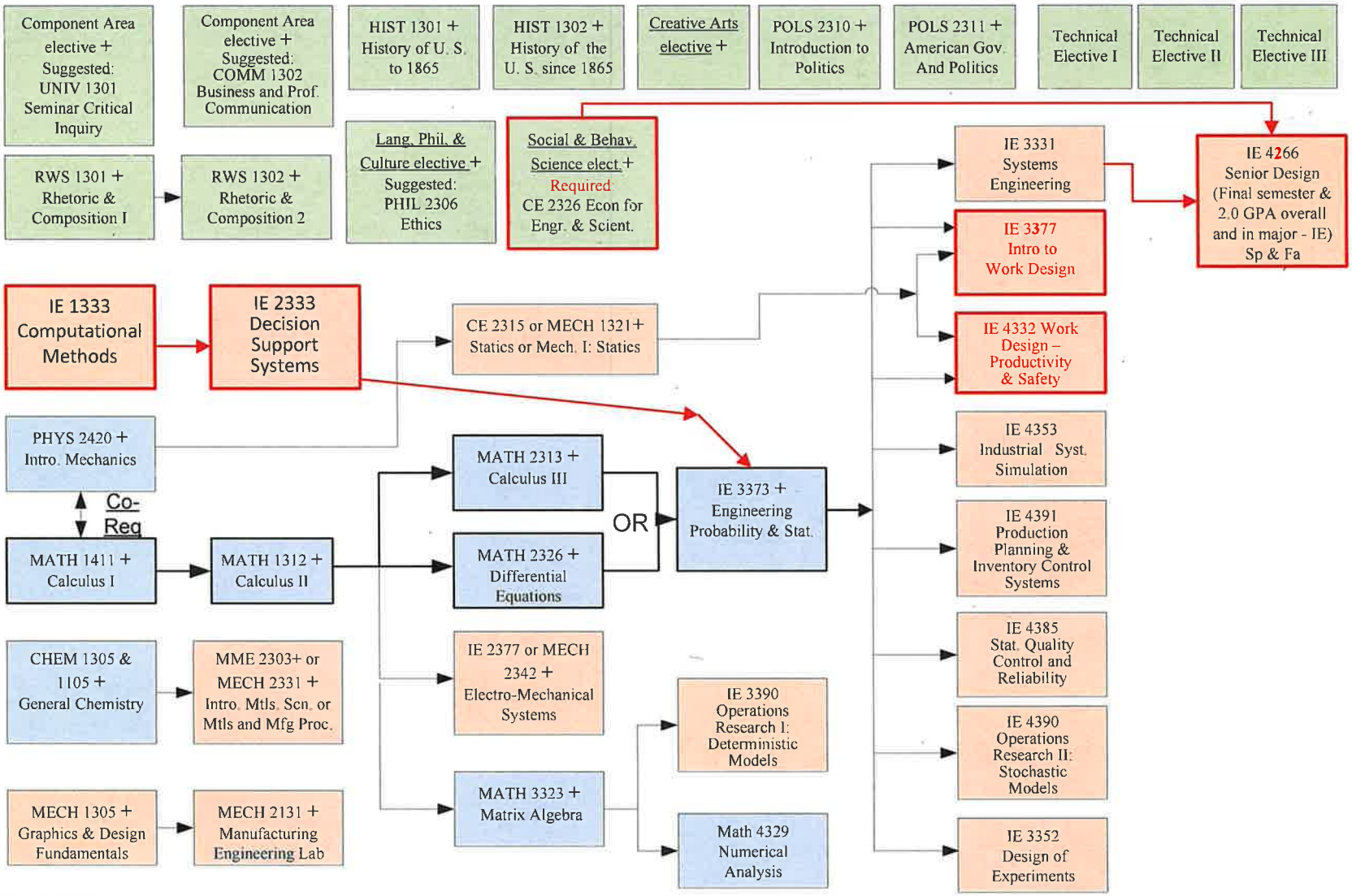


Total credit hours: 120

NOTES:

- **Fa:** offered only on Fall term; **Sp:** offered only on Spring term; **Sp & Fa**: offered only on Spring & Fall terms. All the other courses are offered Fall, Spring and Summer terms
- + **Grade of "C" or better required.** ***( ) or → means prerequisite(s) course(s)***
- Component Area Electives: Select two courses from BUSN 1301; **COMM** 1301, **1302**; CS 1310, 1320; SCI 1301; **UNIV 1301**
- Social and Behavioral Science Elective: Select a course from ANTH 1301, 1302, 1310, 2320; **CE 2326**; COMM 2350, 2372; ECON 2303, 2304; EDPC 1301; EDU 1342; ENGL 2320; GEOG 1310; LING 2320, 2340; PSYC 1301; SOCI 1301, 1310
- Language, Philosophy & Culture Elective: Select a course from ENGL 2311, 2312, 2313, 2314, 2318; FREN 2322; HIST 2301, 2302; **PHIL** 1301, **2306**; RS 1301; SPAN 2340; WS 2300, 2350
- Creative Arts Elective: Select a course from ARTS 1300; ARTH 1305, 1306; DANC 1304; FILM 1390; MUSL 1321; 1324, 1327; THEA 1313
- Technical Electives: Select three courses from the following IE 4333, 4371, **4395**, 4396, 4397; RWS 3359; or any Junior or Senior level course from the College of Engineering, College of Science, or College of Business Administration

Fall 2020 Industrial and Systems Engineering Degree Plan Prerequisite Sequence



Total credit hours: 120

NOTES:

- **+ Grade of "C" or better required.**
- ***→ means prerequisite(s) course(s)***
- Component Area Electives: Select two courses from BUSN 1301; **COMM** 1301, **1302**; CS 1310, 1320; SCI 1301; **UNIV 1301**
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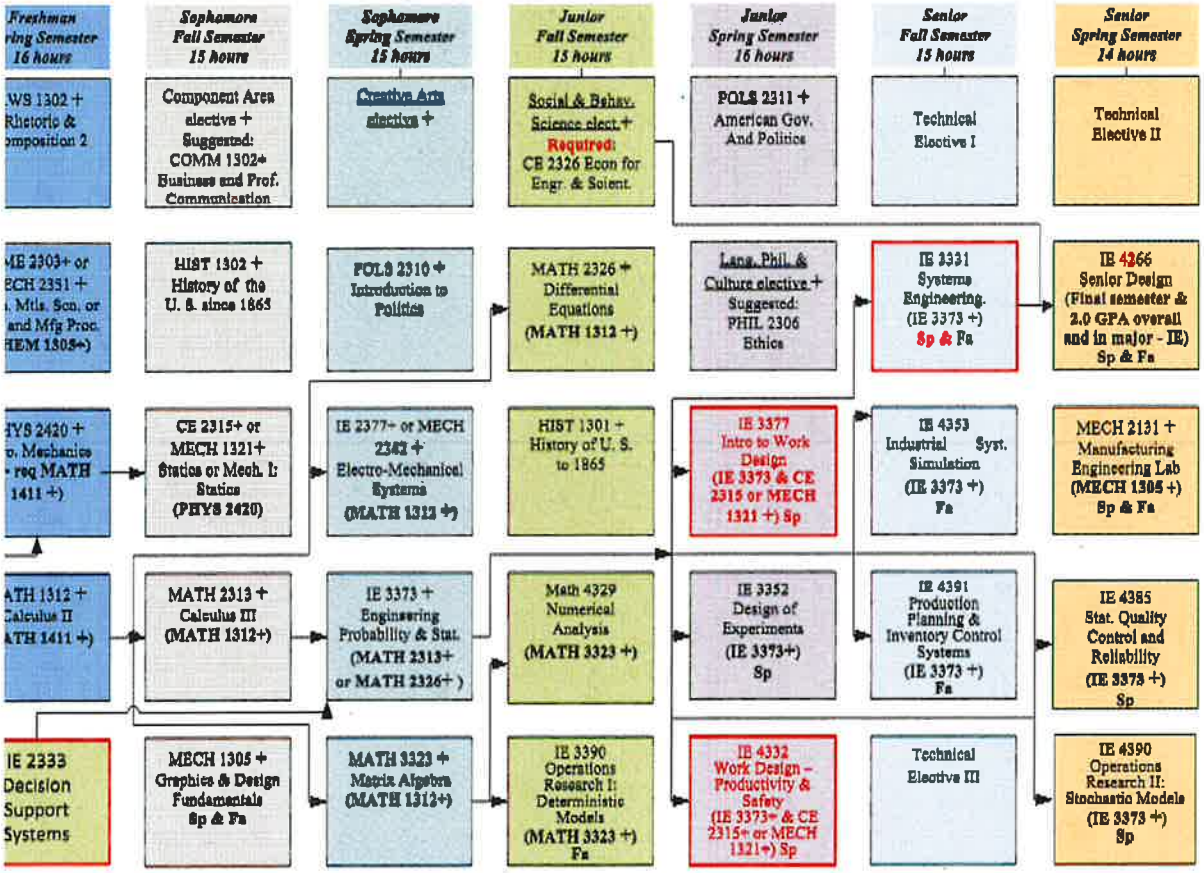
- Technical Electives: Select three courses from the following IE 4333, 4371, **4395**, 4396, 4397; RWS 3359; or any Junior or Senior level course from the College of Engineering, College of Science, or College of Business Administration

Fall 2020 Industrial and Systems Engineering Degree Plan Flowchart



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Elective: Select a course from ANTH 1301, 1302, 1310, 2320; **CE 2326**; COMM 2350, 2372; ECON 2303, 2304; EDPC 1301; EDU 1342; ENGL 2320; GEOG 1310; SOCI 1301, 1310

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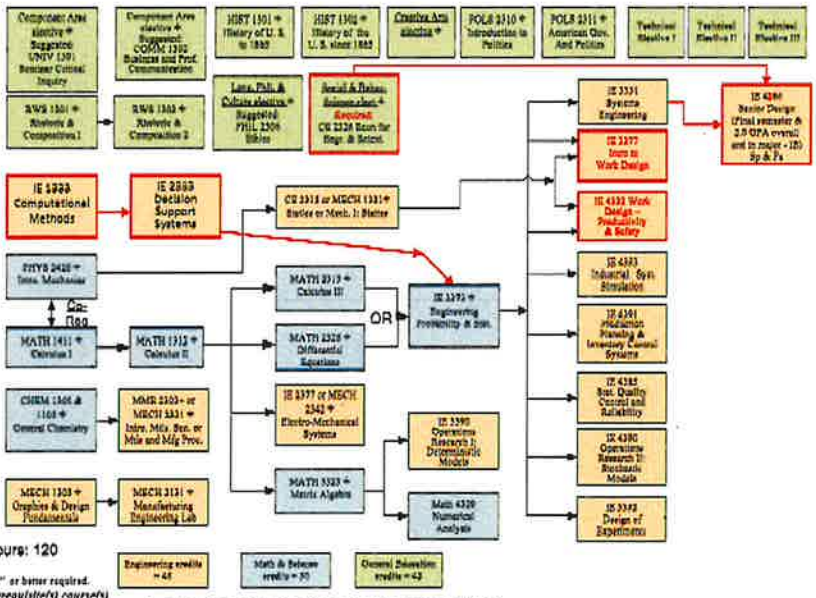
Fall 2020 Industrial and Systems Engineering Degree Plan Prerequisite Sequence



NOTES:

- * = Grade of "C" or better required.
- → *means prerequisite(s) course(s)*
- Component Area Electives: Select two courses from BUSN 1301; COMM 1301, 1302; CS 1310, 1320; SCI 1301; UNIV 1301
- Social and Behavioral Science Elective: Select a course from ANTH 1301, 1302, 1310, 2320, CE 2320; COMM 2350, 2372; ECON 2303, 2304; EDPC 1301; EDU 1342; ENGL 2320; GEOG 1310; LING 2320, 2340; PSYC 1301; SOCI 1301, 1310
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- Creative Arts Elective: Select a course from ARTS 1300; ARTH 1305, 1306; DANC 1304; FILM 1390; MUSL 1321, 1324, 1327; THEA 1313
- Technical Electives: Select three courses from the following IE 4333, 4371, 4398, 4396, 4397; RWS 3359; or any Junior or Senior level course from the College of Engineering, College of Science, or College of Business Administration

Code	Title	Hours
MATH 2326	Differential Equations	3
MECH 1305	Graphic & Design Fundamentals	3
MECH 2131	Manufacturing Engineering Lab	1

Industrial Engineering Major

Required Courses:

IE 3331	Systems Engineering	3
~~IE 3332~~	~~Safety Engineering~~	~~3~~
IE 3352	Design of Experiments	3
IE 3373	Engr Probability & Stat Models [c]	3
IE 3390	Operations Research I: Deterministic Models	3
IE ~~33~~477 3377	Intro to Work DesignMethods ~~and Indust. Ergonomics~~	34
IE 4353	Industrial Systems Simulation	3
~~IE 4384~~ 4332	~~Industrial Layout~~ Work Design – Productivity & Safety	3
IE 4385	Statist Quality Cntrl & Data Analytics~~/Reliabil~~	3
IE 4390	~~Probabilistic~~ Operations Research II: Stochastic Models	3
IE 4391	Production Planning & Inventory Control Systems	3
IE ~~44~~266 4266	Senior Design	24
MATH 3323	Matrix Algebra [c]	3
MATH 4329	Numerical Analysis	3

Technical Electives:

Degree Plan

Required Credits: 120

Code	Title	Hours
University Core Curriculum		
Complete the University Core Curriculum requirements.		42
Industrial Engineering Prerequisites (All courses require a grade of C or better.)		
Required Courses:		
CHEM 1105	Laboratory for CHEM 1305	1
CHEM 1305	General Chemistry	3
MATH 1411	Calculus I	4
PHYS 2420	Introductory Mechanics	4
Industrial Engineering Core (All courses require a grade of C or better.)		
Required Courses:		
CE 2315	Statics	3
or MECH 1321	Mechanics I-Statics	
CE 2326	Econ for Engrs & Scientists	3
IE 1333	Computational Methods	3
IE 2333	Decision Support Systems	3
IE 2303	Materls & Manuftng Processes	3
or MECH 2331	Matl & Manufacturing Processes	
or MME 2303	Intro to Materials Sci & Engrg	
IE 2377	Electro-Mechanical Systems	3
or MECH 2342	Electro Mechanical Systems	
MATH 1312	Calculus II	3
MATH 2313	Calculus III	3

Code	Title	Hours
Select three courses from the following, or any other upper divison course from the College of Engineering, College of Science, or College of Business Administration:		9
IE 4333	Sup Chain Mgmt I: System Model	
IE 4371	Engineering Problems	
IE 4395	Special Topics Industrial Engr	
IE 4396	Intl Manufacturing Intern I	
IE 4397	Intl Manufacturing Intern II	
RWS 3359	Technical Writing	
Total Hours		**120**

Course List