

**College of Engineering
Proposed Catalog Changes
Effective Summer 2019**

BIOLOGICAL ENGINEERING

1. Add the following courses:

BE 422 Tissue Biomechanics**3 credits**

Joint-listed with BE 522

This course explores the structure and mechanical properties of hard and soft tissues. The main focus will be on musculoskeletal tissues and may include topics in bone, skin, cartilage, muscle, tendon and ligament. Structure-function relationships at a range of anatomical levels, from the cell to the whole tissue, will be examined. Journal articles will be used to discuss current research in tissue biomechanics. Additional projects/assignments are required for graduate credit. Recommended Preparation:

Mechanics of Materials

Prereq: Junior or Senior standing; or Instructor Permission

BE 522 Tissue Biomechanics**3 credits**

Joint-listed with BE 422

This course explores the structure and mechanical properties of hard and soft tissues. The main focus will be on musculoskeletal tissues and may include topics in bone, skin, cartilage, muscle, tendon and ligament. Structure-function relationships at a range of anatomical levels, from the cell to the whole tissue, will be examined. Journal articles will be used to discuss current research in tissue biomechanics. Additional projects/assignments are required for graduate credit. Recommended Preparation:

Mechanics of Materials

Available via distance: No

Geographical Area: Moscow

Rationale: The course adds to the biomedical engineering-focused course content in the Department of Biological Engineering. This course will also be attractive to interdisciplinary students from across a range of engineering and science majors. This course was developed and is taught by an existing faculty in the department, so there is no added workload.

BE 423 Tissue Engineering and Regenerative Medicine**3 credits**

Joint-listed with BE 523

This course explores the principles, strategies, and tools used in the field of tissue engineering and regenerative medicine. Topics may include the application of biomaterials, stem cells, and bioreactors for restoring, maintaining and improving tissue function. Journal articles will be used to discuss current research in tissue engineering and regenerative medicine. Additional projects/assignments are required for graduate credit.

Prereq: Junior or Senior standing or permission of instructor. Math 310 recommended but not required.

BE 523 Tissue Engineering and Regenerative Medicine

3 credits

Joint-listed with BE 423

This course explores the principles, strategies, and tools used in the field of tissue engineering and regenerative medicine. Topics may include the application of biomaterials, stem cells, and bioreactors for restoring, maintaining and improving tissue function. Journal articles will be used to discuss current research in tissue engineering and regenerative medicine. Additional projects/assignments are required for graduate credit.

Available via distance: No

Geographical Area: Moscow

Rationale: The course adds to the biomedical engineering-focused course content in the Department of Biological Engineering. This course will also be attractive to interdisciplinary students from across a range of engineering and science majors. This course was developed and is taught by an existing faculty in the department, so there is no added workload.

BE 426 Medical Imaging Techniques and Applications

3 credits

Joint-listed with BE 526

This course studies the physical and mathematical principles of diagnostic medical imaging systems and may include: X-ray, CT, nuclear medicine (PET and SPECT), ultrasound, MRI, and others. Applications of imaging techniques will be discussed with respect to medical uses. Basic principles of image processing will be discussed and applied using computer programming software. Additional work is required for graduate credit.

Prereq: MATH 275. PHYS 212, Junior or Senior standing or permission of instructor. Math 310 recommended but not required.

BE 526 Medical Imaging Techniques and Applications

3 credits

Joint-listed with BE 426

This course studies the physical and mathematical principles of diagnostic medical imaging systems and may include: X-ray, CT, nuclear medicine (PET and SPECT), ultrasound, MRI, and others. Applications of imaging techniques will be discussed with respect to medical uses. Basic principles of image processing will be discussed and applied using computer programming software. Additional work is required for graduate credit.

Prereq: MATH 275. PHYS 212, Junior or Senior standing or permission of instructor. Math 310 recommended but not required.

Available via distance: No

Geographical Area: Moscow

Rationale: The course adds to the biomedical engineering-focused course content in the Department of Biological Engineering. This course will also be attractive to

interdisciplinary students from across a range of engineering and science majors. This course was developed and is taught by an existing faculty in the department, so there is no added workload.

BE 561 Bioprocess Engineering

3 credits

Joint-listed with BE 461

This course covers advanced applications of biological sciences, processing principles applied to the analysis and design of handling, processing, and separation of biomaterials. Students complete several hands-on laboratory modules, in addition to a bioprocess design project. Additional work is required for graduate credit.

Prereq: Permission

Available via distance: No

Geographical Area: Moscow

Rationale: This joint-listed graduate level course is being added to the existing undergraduate level course taught by an existing faculty to provide content to graduate students without adding a separate graduate course. This helps maintain course enrollment size, and minimize additional department workload demand.

2. Change the following courses:

BE 242 Biological Engineering Analysis and Design

23 credits

Methods of analyzing and solving engineering problems; ~~and~~ introduction to elements of biological engineering design; use of computers in engineering problem solving. ~~Recommended Preparation: computer science elective in a programming language.~~

Prereq: MATH 170

Coreq: MATH 175

Available via distance: No

Geographical Area: Moscow

Rationale: This is a required course for sophomore undergraduate students. Historically, this course has focused more on engineering communication and reports, engineering design procedures, engineering standards and regulations, engineering documentation, material and heat balances, introduction to statistical concepts/ terminology, and engineering data processing and presentation. As more and more engineering tools are available and utilized by industry, such as specialty software including Matlab, MathCAD, SolidWorks, etc., it is essential that we cover these new engineering tools in our curriculum. This requires more lecture time. This course was identified by BE faculty as the best place to cover the added material mentioned above.

Owing to the ABET accrediting agency's upcoming reduction in the engineering-designated credit requirement from 48 to 45, the Biological Engineering program has the room to accommodate the 1-credit increase in the BE curriculum by, for example, reducing the required credits by 1 cr in our engineering elective courses.

BE 461 Bioprocess Engineering**3 credits**Joint-listed with BE 561

~~Carries 2 credits after ME 345. This course covers advanced applications of biological sciences, processing principles and transport processes applied to the analysis and design of handling, processing, and producing separation of bio products, materials and bioprocesses. Course includes advanced biological sciences applications. Two lectures and one 3-hour lab a week. (Spring only) Students complete several hands-on laboratory modules, in addition to a bioprocess design project. Additional work is required for graduate credit.~~

~~Prereq: MATH 310 and ENGR 320 and ENGR 335; or~~ Permission.

Available via distance: No

Geographical Area: Moscow

Rationale: Due to the BE department curriculum change, the course content has been adjusted to serve the student needs.

CIVIL AND ENVIRONMENTAL ENGINEERING

1. Change the following course:

CE 372 Fundamentals of Transportation Engineering**43 credits**

Intro to planning, design, and operation of highway and traffic, public transportation, and airport systems. Three lectures and one 3-hour lab a week; periodic field data collection and one or two field trips.

Prereq: STAT 301 and CE 211. A minimum grade of 'C' or better is required for all pre/coreqs.

Coreq: ~~ENGL 317~~. A minimum grade of 'C' or better is required for all pre/coreqs.

Available via distance: No

Geographical Area: Moscow

Rationale: Credits are reduced to better align credits with effort. Lab exercises will be incorporated into the class. English 317 has been determined not to be necessary.

2. Make the following curricular changes to the **Major in Civil Engineering (B.S.C.E.):**

To graduate in this program, a minimum grade of C must be earned in all engineering, mathematics, and science courses used to satisfy the curriculum.

Any student majoring in civil engineering may accumulate no more than 14 credits of D or F in mathematics, science, technical elective or engineering courses that are used to satisfy graduation requirements. Included in this number are multiple repeats of a single class or single repeats in multiple classes and courses transferred from other institutions. A warning will be issued in writing to students who have accumulated 7 credits of D or F in mathematics, science, technical elective, or engineering classes used to satisfy curricular requirements.

Required course work includes the university requirements (see regulation J-3) and:

CE 115	Introduction to Civil Engineering	1
CE 211	Engineering Surveying	3
CE 215	Civil Engineering Analysis and Design	3
CE 322	Hydraulics	4
CE 325	Fundamentals of Hydrologic Engineering	3
CE 330	Fundamentals of Environmental Engineering	3
CE 342	Theory of Structures	3
CE 357	Properties of Construction Materials	4
CE 360	Fundamentals of Geotechnical Engineering	4
CE 372	Fundamentals of Transportation Engineering	4
CE 491	Civil Engineering Professional Seminar	1
CE 494	Senior Design Project	3
CHEM 111	Principles of Chemistry I	3
CHEM 111L	Principles of Chemistry I Laboratory	1
ENGL 317	Technical Writing	3
ENGR 105	Engineering Graphics	2
ENGR 210	Engineering Statics	3
ENGR 220	Engineering Dynamics	3
ENGR 240	Introduction to Electrical Circuits	3
—or ENGR 320	Engineering Thermodynamics and Heat Transfer	
ENGR 335	Engineering Fluid Mechanics	3
ENGR 350	Engineering Mechanics of Materials	3
ENGR 360	Engineering Economy	2
GEOL 111	Physical Geology for Science Majors	3
GEOL 111L	Physical Geology for Science Majors Lab	1
or GEOL 101L	Physical Geology Lab	
MATH 170	Analytic Geometry and Calculus I	4
MATH 175	Analytic Geometry and Calculus II	4
MATH 275	Analytic Geometry and Calculus III	3
MATH 310	Ordinary Differential Equations	3
PHIL 103	Ethics	3
or AMST 301	Studies in American Culture	
PHYS 211	Engineering Physics I	3
<u>PHYS 211L</u>	<u>Laboratory Physics</u>	<u>1</u>
STAT 301	Probability and Statistics	3
Select one of the following:		3-4
ECON 201	Principles of Macroeconomics	
ECON 202	Principles of Microeconomics	
ECON 272	Foundations of Economic Analysis	

Select one of the following:

~~4-5~~3-4

[BIOL 114](#) [Organisms and Environments](#)
 BIOL 115 Cells & the Evolution of Life
~~& 115L and Cells and the Evolution of Life Laboratory~~
 BIOL 154 Introductory Microbiology
~~& BIOL 155 and Introductory Microbiology Laboratory~~
 CHEM 112 Principles of Chemistry II
~~& 112L and Principles of Chemistry II Laboratory~~
 PHYS 212 Engineering Physics II
~~& 212L and Laboratory Physics II~~
[PHYS 213](#) [Engineering Physics III](#)
[MATH 330](#) [Linear Algebra](#)
[STAT 431](#) [Statistical Analysis](#)

~~Technical~~[Civil and Environmental Engineering](#) Electives

~~1821~~

Select 21 credits from the following with at least 15 credits from at least three of the following five groups:[‡]

A total of 18 credits are required from: CE-prefix 400-level courses (except: CE 400, CE 403, CE 411, CE 491, CE 494, CE 498, and CE 499), GEOE-prefix 400-level courses (except: GEOE 403 and GEOE 499), WS 418).

Environmental:

~~CE 431 Design of Water and Wastewater Systems I~~
~~CE 432 Design of Water and Wastewater Systems II~~
~~CE 433 Water Quality Management~~

Geotechnical:

~~CE 460 Geotechnical Engineering Design~~
~~GEOE 436 Geological Engineering Analysis and Design~~

Hyd/Water Resources:

~~CE 421 Engineering Hydrology~~
~~CE 422 Hydraulic Structures Analysis and Design~~
~~CE 428 Open Channel Hydraulics~~

Structures:

~~CE 441 Reinforced Concrete Design~~
~~CE 444 Steel Design~~
~~CE 445 Matrix Structural Analysis~~

Transportation:

~~CE 474 Traffic Systems Design~~
~~CE 475 Pavement Design and Evaluation~~

Total Hours

~~117-119~~111-113

~~⁴Other CE 400 Seminar level classes (except CE 411 Engineering Fundamentals), or approved alternatives, may be used to complete the required 21 cr of tech electives.~~

Courses to total at least 129~~123~~ credits for this degree, not counting Math below 170, English below 102, and any classes needed to remove deficiencies.

Available via distance: 50% or more of curricular requirements cannot be completed via distance

Geographical Area: Moscow

Rationale: Reduce credits, streamline and update curriculum, remove breadth requirement for technical electives (now Civil and Environmental Engineering Electives). Some catalog typographical errors are also fixed.

3. Make the following curricular changes to the **Geological Engineering Minor:**

<u>CE 325</u>	<u>Fundamentals of Hydrologic Engineering</u>	<u>3</u>
CE 360	Fundamentals of Geotechnical Engineering	4
CE 460	Geotechnical Engineering Design	3
<u>ENGR 220</u>	<u>Engineering Dynamics</u>	<u>3</u>
GEOL 111	Physical Geology for Science Majors	3
GEOL 111L	Physical Geology for Science Majors Lab	1
GEOL 345	Structural Geology	4
GEOL 422	Principles of Geophysics	4
GEOE 407	Rock Mechanics	3
<u>GEOE 465</u>	<u>Excavation and Materials Handling</u>	<u>3</u>
GEOE 436	Geological Engineering Analysis and Design	3
HYDR 409	Quantitative Hydrogeology	3

~~One approved Technical Elective in the Geotechnics area~~ ~~3~~

<u>Elective Courses (choose 3 courses)</u>	<u>7-12</u>
<u>CE 360</u>	<u>Fundamentals of Geotechnical Engineering</u>
<u>CEE 330</u>	<u>Fundamentals of Environmental Engineering</u>
<u>CEE 421</u>	<u>Engineering Hydrology</u>
<u>CEE 460</u>	<u>Geotechnical Engineering Design</u>
<u>GEOE 428</u>	<u>Geostatistics</u>
<u>GEOL 111</u>	<u>Physical Geology for Science Majors</u>
<u>GEOL 111L</u>	<u>Physical Geology for Science Majors Lab</u>
<u>GEOL 345</u>	<u>Structural Geology</u>
<u>GEOL 422</u>	<u>Principles of Geophysics</u>
<u>GEOL 335</u>	<u>Geomorphology</u>
<u>GEOL 344</u>	<u>Earthquakes and Seismic Hazards</u>
<u>GEOL 345</u>	<u>Structural Geology</u>

GEOL 309	Groundwater Geology
GEOL 361	Geology and the Environment
GEOL 410	Techniques of Groundwater Study
GEOL 422	Principles of Geophysics
HYDR 409	Quantitative Hydrogeology
HYDR 412	Environmental Hydrology

Total Hours [319-24](#)

Courses to total [3121](#) credits for this minor

Available via distance: 50% or more of curricular requirements cannot be completed via distance

Geographical Area: Moscow

Rationale: Reduce credits, streamline and update curriculum, remove breadth requirement for technical electives (now Civil and Environmental Engineering Electives). Some catalog typographical errors are also fixed.

CHEMICAL AND MATERIALS ENGINEERING

1. Reactivate the following courses:

CHE 460 Biochemical Engineering

3 credits

Joint-listed with CHE 560

Application of chemical engineering to biological systems including fermentation processes, biochemical reactor design, and biological separation processes. Additional projects/assignments reqd for grad cr.

CHE 560 Biochemical Engineering

3 credits

Joint-listed with CHE 460

Application of chemical engineering to biological systems including fermentation processes, biochemical reactor design, and biological separation processes. Additional projects/assignments reqd for grad cr.

Available via distance: No

Geographical Area: Moscow

Rationale: Due to limited faculty numbers and combining of MSE and ChE programs, CHE electives have not been able to be offered. With additional hiring over the past five years in both programs, course load balancing of required courses has enabled the faculty to offer elective courses previously taught by the department (like CHE460/560) and begin to offer new courses. Biochemical engineering is taught in a significant number of programs nationally (many are joint programs with biological engineering) and is a required course in many of them. This course fills a need within the program to both increase elective offerings and provides a biochemical engineering specific course

that is currently lacking in our program. The course was offered last year (Spring'17) and will be offered in the Fall of 2018 with good student enrollment, but requires bringing it out of dormancy to be offered in the future.

2. Make the following curricular changes to the **Major in Chemical Engineering (B.S.Ch.E.):**

Required course work includes the university requirements (see regulation J-3) and:

CHE 110	Introduction to Chemical Engineering	1
CHE 123	Computations in Chemical Engineering	2
CHE 210	Integrated Chemical Engineering Fundamentals	1
CHE 223	Material and Energy Balances	3
CHE 326	Chemical Engineering Thermodynamics	3
CHE 330	Separation Processes I	3
CHE 340	Transport and Rate Processes I	4
CHE 341	Transport and Rate Processes II	4
CHE 423	Reactor Kinetics and Design	3
CHE 433	Chemical Engineering Lab I	1
CHE 434	Chemical Engineering Lab II	1
CHE 444	Process Analysis and Control	3
CHE 445	Digital Process Control	3
CHE 453	Process Analysis & Design I	3
CHE 454	Process Analysis and Design II	3
CHE 491	Seminar	1
CHEM 111	Principles of Chemistry I	3
CHEM 111L	Principles of Chemistry I Laboratory	1
CHEM 112	Principles of Chemistry II	4
CHEM 112L	Principles of Chemistry II Laboratory	1
CHEM 277	Organic Chemistry I	3
CHEM 278	Organic Chemistry I: Lab	1
CHEM 305	Physical Chemistry	3
CHEM 307	Physical Chemistry Lab	1
CHEM 372	Organic Chemistry II	3
CHEM 374	Organic Chemistry II: Lab	1
ENGR 210	Engineering Statics	3
ENGR 240	Introduction to Electrical Circuits	3
ENGR 320	Engineering Thermodynamics and Heat Transfer	3
ENGR 335	Engineering Fluid Mechanics	3
MATH 170	Analytic Geometry and Calculus I	4
MATH 175	Analytic Geometry and Calculus II	4
MATH 275	Analytic Geometry and Calculus III	3
MATH 310	Ordinary Differential Equations	3
PHYS 211	Engineering Physics I	3
PHYS 212	Engineering Physics II	3

Select one Chemical or Material Science Engineering Technical Elective course 390 or greater	3
Select one Chemical/Bioscience course	3
Select one Chemical/Bioscience lab course	1
Select one Computer Science Elective in a programming language	3
Select one Economics Elective	3
Select three Humanities and Social Science Elective courses:	9
Select one Communications Elective course	2
Select one Mathematics Elective numbered 300 or greater ¹	3
Select 6 credits of Technical Electives in Math, Science, or Engineering numbered 300 or greater ²	6
Total Hours	125 <u>121</u>

¹Must be numbered 300 or greater, excluding any 398, 498, or 598 Internship.

²Technical Electives in Math, Science, or Engineering: must be numbered 300 or greater.

Courses to total 128 credits for this degree, not counting ENGL 101 , any 398 (Internship), any 498 (Internship), any 598 (Internship), or mathematics courses numbered lower than MATH 170 , and other courses that might be required to remove deficiencies.

To be enrolled in upper-division CHE courses, a student majoring in chemical engineering must earn a grade of C or better in each of the following courses:

CHEM 111	Principles of Chemistry I	
& 111L	and Principles of Chemistry I Laboratory	4
CHEM 112	Principles of Chemistry II	
& 112L	and Principles of Chemistry II Laboratory	5
CHE 223	Material and Energy Balances	3
ENGR 210	Engineering Statics	3
ENGR 320	Engineering Thermodynamics and Heat Transfer	3
ENGR 335	Engineering Fluid Mechanics	3
MATH 275	Analytic Geometry and Calculus III	3
MATH 310	Ordinary Differential Equations	3
Total Hours		27

Students transferring CHE 223 or its equivalent from a university without an ABET accredited chemical engineering program must pass a test on the subject matter of this course before enrolling in upper-division CHE courses.

In addition, a passing grade is required in each of the following courses before enrolling in upper-division CHE courses:

CHE 123	Computations in Chemical Engineering	2
Computer Science Elective		3

ENGL 102	College Writing and Rhetoric	3
MATH 170	Analytic Geometry and Calculus I	4
MATH 175	Analytic Geometry and Calculus II	4
PHYS 211	Engineering Physics I	3
PHYS 212	Engineering Physics II	3
Total Hours		22

A student majoring in chemical engineering may not register for upper-division CHE courses after accumulating more than four grades of D or F in UI mathematics, science, or engineering courses. Included in this number are multiple repeats in a single class or single repeats in multiple classes. A warning will be issued in writing to students who have accumulated two grades of D or F used to satisfy curricular requirements.

A GPA in CHE designated courses of at least 2.0 is required to graduate

Courses to total 128 credits for this degree

Available via distance: 50% or more of curricular requirements cannot be completed via distance

Geographical Area: Moscow

Rationale: This change corresponds to more appropriate and broader options for elective considerations in the BS CHE curriculum for students. Based on a recent advisory board and faculty review of 134 similar (semester-based) ChE curricula, and considering the current and future needs of graduates, we are removing this requirement primarily to provide students with the ability to graduate in four years. Otherwise, the total number of credits for the BS ChE degree will be significantly above the national average of 129 semester credits. Recent changes in General Education and Biological Sciences prerequisite courses that would satisfy our chemical/bioscience elective would push our degree over 134 credits to complete. The remaining chemical/bioscience courses accessible to our students may still be taken to satisfy our technical electives (e.g., CHEM 306+308 or BIOL 380+382).

ELECTRICAL AND COMPUTER ENGINEERING

1. Change the following courses:

ECE 421 Introduction to Power Systems

3 credits

One line diagrams, regulating transformers, calculation of transmission line parameters, line models, Ybus, power flow, power flow studies using commercial software, contingency studies, and power system control. (Fall only)

Prereq **Coreq:** ECE 420

Available via distance: Yes

Geographical Area: Moscow

Rationale: Department receives frequent requests from students, especially transfer students to take ECE 420 and ECE 421 concurrently.

We are changing ECE 420 from being a prerequisite for ECE 421 to being a co-requisite. The material in ECE 421 will be sequenced appropriately to support this change. No change in workload.

ECE 521 Power System Stability**3 credits**

Understanding, modeling, and analysis of power system transient and voltage stability; techniques for improving power system stability; use of computer tools. Cooperative: open to WSU degree-seeking students. (Alt/yrs)

~~Prereq: ECE 520 or Permission.~~

Coreq: ECE 422 or permission

Available via distance: Yes

Geographical Area: Moscow, Idaho Falls

Rationale: Due to personnel changes, the topics covered in ECE 521 and the expected prerequisite material has changed.

We are changing the prerequisite for ECE 521 from "ECE 520 or permission" to be "ECE 422 of permission". No change in workload.

INDUSTRIAL TECHNOLOGY

1. Make the following curricular changes to the **Major in Industrial Technology (B.S.Tech):**

The Industrial Technology Bachelor of Science degree program is designed to provide students with the opportunity to develop in-depth knowledge and hands-on experience in basic and advanced industrial processes, procedures, planning, and management.

The degree program requires 122 credits and includes the university requirements (regulation J-3).

There are ~~99~~102 credits of required courses and 24 credits of electives. Of the 24 elective credits 13 are technical electives and 11 free electives. The required courses for this program are:

MHR 311	Introduction to Management	3
CHEM 111	Principles of Chemistry I	3
CHEM 111L	Principles of Chemistry I Laboratory	1
ECON 202	Principles of Microeconomics	3
ENGL 317	Technical Writing	3
ENGR 105	Engineering Graphics	2
INDT 310	Introduction to Industrial Technology	3
INDT 311	Problems in Industrial Technology	1
INDT 332	Introduction to Analog and Digital Electronics	4

INDT 333	Industrial Electronics and Control Systems	3
INDT 350	Introduction to Materials Science	3
INDT 353	Manufacturing Systems	3
INDT 362	Behavior Based Safety	3
INDT 415	Impact of Technology on Society	3
INDT 434	Power Generation and Distribution	3
INDT 435	Network Administration	3
INDT 442	Systems Integration	3
INDT 443	Government Contract Law	3
INDT 444	Quality Assurance Organization and Management	3
INDT 446	Labor Law	3
<u>INDT 448</u>	<u>Project and Program Management</u>	<u>3</u>
INDT 453	Computer Integrated and Robotics Manufacturing Technology	3
INDT 462	Industrial Safety	3
INDT 484	Industrial Technology Capstone I	3
INDT 485	Industrial Technology Capstone II	3
MATH 160	Survey of Calculus	4
or MATH 170	Analytic Geometry and Calculus I	
PHYS 111	General Physics I	3
PHYS 111L	General Physics I Lab	1
PHYS 112	General Physics II	3
PHYS 112L	General Physics II Lab	1
PSYC 101	Introduction to Psychology	3
STAT 251	Statistical Methods	3
or STAT 301	Probability and Statistics	
Select Technical Electives (not limited to the following): ¹		13
INDT 448	Project and Program Management	
INDT 457	Lean to Green Sustainable Technology	
INDT 463	Industrial Transportation Safety	
INDT 464	Human Performance Fundamentals	
INDT 465	Construction Safety	
INDT 466	Human Performance Field Investigation	
INDT 470	Homeland Security	
INDT 472	National Incident Management Systems	
Total Hours		99 <u>102</u>

¹This degree is currently only available at the Idaho Falls Center

²Elective credit can also be obtained through Technical Competency. Up to 24 credits can be obtained in this manner. Consult with your advisor for information on this process.

Courses to total 122 credits for this degree

Available via distance: More than 50% but less than 100% of curricular requirements can be completed via distance

Geographical Area: Idaho Falls

Rationale: CE 482 Project Engineering was dropped by the Civil Engineering department in 2017. It is requested to replace it in the curriculum of Industrial Technology with the course INDT 448 Project and Program Management. INDT 448 has been part of the technical electives in INDT, it has been offered continuously in the past several years, and it covers the same topics as CE 482. [Note: CE 482 was dropped from the curriculum effective Spring 2017/Summer 2018]

MECHANICAL ENGINEERING

1. Reactivate the following courses:

ME 415 Materials Selection and Design

3 credits

Cross-listed with MSE 415

Selection of materials for use in structural applications; consideration of environment, stress conditions, cost, and performance as guide to properties; optimization of choice of materials and fabrication methods; open-ended problems of real applications in various industries. Recommended Preparation: MSE 313 and MSE 456. (Spring only)

Prereq: MSE 201 and ENGR 350

Available via distance: Yes

Geographical Area: Moscow, Engineering Outreach

Rationale: No added workload, new faculty has expertise in this area and the course had previously gone dormant then dropped due to lack of ME faculty to teach the course.

ME 527 Thermodynamics

3 credits

Thermodynamic laws for design and optimization of thermodynamic systems, equations of state, properties of ideal and real fluids and fluid mixtures, stability, phase equilibrium, chemical equilibrium, applications of thermodynamic principles. Cooperative: open to WSU degree-seeking students.

Prereq: [ME 322](#) or ENGR 320 or Permission

Available via distance: Yes

Geographical Area: Moscow, Engineering Outreach

Rationale: No added workload, the course had previously gone dormant then dropped and the department is moving it back to active status

ME 583 Reliability of Engineering Systems

3 credits

Cross-listed with CE 541.

Fundamentals of reliability theory, system reliability analysis including common-mode failures and fault tree and event tree analysis, time-dependent reliability including testing and maintenance, propagation of uncertainty, human reliability analysis, practical applications in component and system design throughout the semester. Cooperative: open to WSU degree-seeking students.

Prereq: Permission

Available via distance: Yes

Geographical Area: Moscow, Engineering Outreach

Rationale: No added workload, the course had previously gone dormant and the department is moving it back to active status