TO: The Engineering Faculty

FROM: The Faculty of the School of Mechanical Engineering

RE: Course Integration for IUPUI Realignment - ME, MSPE, EEN

As part of the IUPUI Realignment, the faculty of the School of Mechanical Engineering has approved the adoption of IUPUI Undergraduate Courses for Mechanical Engineering (ME), Energy Engineering (EEN), and Motorsports Engineering (MSTE) to be offered at Purdue University Indianapolis campus for teach-out purposes. This action is now submitted to the Engineering Faculty with a recommendation for approval.

TITLE:

ME Course Integration for IUPUI Realignment - ME, MSPE, EEN

DESCRIPTION:

The purpose of this EFD is to formally adopt the ME, EEN and MSTE courses to be offered in Indianapolis so they can be included in the Purdue Course Catalog. In the attached Excel spreadsheet, recommended actions for the IUPUI ME, EEN, and MSTE courses are listed. These actions include:

1. For courses that are already aligned between West Lafayette and Indianapolis, PIU (IUPUI) classification will be replaced with PIN (Purdue Indianapolis).
2. Courses that will only be taught at Purdue Indianapolis will be added to the catalog with PIN campus only.
3. IUPUI courses with equivalent courses existing in the catalog will be expired.
4. A PIN section will be added to all Mechanical Engineering courses required for the BSME degree.
5. The EEN prefix will be replaced with ME prefix.
6. The MSTE prefix will be replaced with MSPE prefix.

*These listings do not include the graduate-level ME courses.

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Professor of Mechanical Engineering
Associate Head of Undergraduate Programs

ME Notes (New/Revise/Expire)	Original IUPUI Course Number	Title	Credit	Description	Restrictions
Replace PIU with PIN	ME 20000	Thermodynamics I	3	First and second laws, entropy, reversible and irreversible processes, properties of pure substances. Application to engineering problems.	Requires a C- for Teachout
Add to catalog for teachout. PIN Campus Only	ME 22501	Mechanical Engineering Laboratory I	1	Experiments in thermodynamics, parametric design and component fabrication	C: ME 20000
Add to catalog for teachout. PIN Campus Only	ME 25001	Mechanical Engineering Laboratory II	1	Experiments on data analysis, hands-on programming with devices and fabrication	C: ME 26201
Add to catalog for teachout. PIN Campus Only	ME 26201	Design, Ethics and Entrepreneurship	2	Basic concepts of the design process. Innovative engineering design of real life applications. Engineering ethics topics. Fundamentals of Entrepreneurship. Design projects focus on open-ended problems. Design modeling, simulation, documentation and communication. Implementation and use of modern computer tools in solving design problems and completing team design projects in the area of Mechanical Engineering.	P: ENGR 19600. C: COMM-R 110, ENG-W 131, ENGR 29700, ME 27000, ME 25001; Requires a C- for Teachout
Replace PIU with PIN	ME 27000	Basic Mechanics	3	Fundamental concepts of mechanics, force systems and couples, free body diagrams, and equilibrium of particles and rigid bodies. Distributed forces; centroids and centers of gravity of lines, areas, and volumes. Second moment of area, volumes, and masses. Principal axes and principal moments of inertia. Friction and the laws of dry friction. Application to structures and machine elements, such as bars, beams, trusses, and friction devices.	P: PHYS 15200 C: MATH 26100 Requires a C- for Teachout
Add to catalog for teachout. PIN Campus Only	ME 27200	Mechanics of Materials	3	Analysis of stress and strain; equations of equilibrium and compatibility; stress/strain laws; extension, torsion, and bending of bars; membrane theory of pressure vessels; elastic stability; selected topics.	P: ME 27000 Needed For Teachout Requires C-for Teachout
Replace PUI with PIN	ME 27400	Basic Mechanics II	3	Kinematics of particles in rectilinear and curvilinear motion. Kinetics of particles, Newton's second law, energy, and momentum methods. Systems of particles, kinematics and plane motion of rigid bodies, forces and accelerations, energy and momentum methods. Kinetics, equations of motions, energy and momentum methods for rigid bodies in three-dimensional motion. Application to projectiles, gyroscopes, machine elements, and other engineering systems.	P: ME 27000 C: MATH 26600 Requires C-for Teachout
Expire. Equivalent to Purdue WL's ME 29700	ME 29500	Engineering Topics	1 to 5		
Add to catalog for teachout. PIN Campus Only	ME 31002	Fundamentals of Fluid Mechanics	3		P: MATH 26600, ME 20000, ME 27400 C:ME 32501 Requires a C- for Teachout.

ME Notes (New/Revise/Expire)	Original IUPUI Course Number	Title	Credit	Description	Restrictions
Add to catalog for teachout. PIN Campus Only	ME 31401	Fundamentals of Heat and Mass Transfer	3	Fundamental principles of heat transfer by conduction, convection, and radiation; mass transfer by diffusion and convection. Application to engineering situations.	P: ME 31002 C: ME 35001
Add to catalog for teachout. PIN Campus Only	ME 32501	Mechanical Engineering Laboratory III	1	Experiments on testing of Mechanics of Materials and Fluid Mechanics.	C: ME 30800 and ME 27200
Add to catalog for teachout. PIN Campus Only	ME 32600	Engineering Project Management	3	Project management is an important skill that is needed in the private and public sectors as well as specialty businesses. This course explores the challenges facing today's project managers and provides a broad understanding of the project management environment focused on multiple aspects of the project.	P: Sophomore standing
Add to catalog for teachout. PIN Campus Only	ME 32700	Engineering Economics	3	Engineering economics is the application of economic techniques to the evaluation of design and engineering alternatives. The role of engineering economics is to assess the appropriateness of a given project, estimate its value, and justify it from an engineering standpoint. This course covers the time value of money and other cash-flow concepts, reviews economic practices and techniques used to evaluate and optimize engineering decisions, and discusses the principles of benefit-cost analysis	P: Sophomore standing
Add to catalog for teachout. PIN Campus Only	ME 33000	Modeling and Analysis of Dynamic Systems	3	Introduction to dynamic engineering systems; electrical, mechanical, fluid, and thermal components; linear system response; Fourier series and Laplace transform.	P: ECE 20400 and MATH 26600. C: ME 27400 and ENGR 29700 Requires C- for Teachout.
Add to catalog for teachout. PIN Campus Only	ME 34001	Instrumentation and Measurement Systems	2	Modeling and formulation of differential equations for dynamic systems, including mechanical vibratory systems, thermal systems, fluid systems, electrical systems, and instrumentation systems. Analysis of dynamic systems and measuring devices including transient response and frequency response techniques, mechanical systems, transducers, and operational amplifiers. Consideration of readout devices and their responses to constant, transient, and steady-state sinusoidal phenomena. Calibration and data analysis techniques are introduced. Both analog and digital computation are included	P: ME 33000 C: STAT El.
Add to catalog for teachout. PIN Campus Only	ME 34400	Introduction to Engineering Materials	3	Introduction to the structure and properties of engineering materials, including metals, alloys, ceramics, plastics, and composites. Characteristics and processing affecting behavior of materials in service.	P: CHEM-C 105 and Junior standing in engineering

ME Notes (New/Revise/Expire)	Original IUPUI Course Number	Title	Credit	Description	Restrictions
Add to catalog for teachout. PIN Campus Only	ME 35001	Mechanical Engineering Laboratory IV	1	Experiments on testing of dynamic systems, heat and mass transfer, and materials	C: ME 31401 and ME 37200
Add to catalog for teachout. PIN Campus Only	ME 37200	Design of Mechanisms	3	This course presents fundamental concepts on kinematics and dynamic analysis of linkages and mechanical systems; analytical and graphical approaches to analysis; vector loop and relative velocity/acceleration solutions; design and analysis of cams and gears.	P: ME 26300, ME 32300 and ME 27400 Requires C- for Teachout
Add to catalog for teachout. PIN Campus Only	ME 39700	Selected Topics in Mechanical Engineering	0 to 6	Topics of contemporary importance or of special interest in Mechanical Engineering.	P: Junior Standing and/or Consent of Instructor.
Add to catalog for teachout. PIN Campus Only	ME 40200	Biomechanics of the Musculoskeletal System	3	Mechanical design of organisms, with emphasis on the mechanics of the musculoskeletal system. Selected topics in prosthesis design and biomaterials; emphasis on the unique biological criteria that must be considered in biomechanical engineering design.	P: ME 27200
Add to catalog for teachout. PIN Campus Only	ME 40600	Robust Design, Standards and Contemporary Issues	1	The role of standards, robust design and lifelong learning in engineering design. Application to contemporary issues	P: ME 37200 or (ME 32300 & EEN 34500). C: ME 34400
Add to catalog for teachout. PIN Campus Only	ME 41400	Thermal-Fluid Systems Design	3	Application of basic heat transfer and fluid flow concepts to design of the thermal-fluid systems. Emphasis on design theory and methodology. Design experience in thermal-fluid areas such as piping systems, heat exchangers, HVAC, and energy systems. Design projects are selected from industrial applications and conducted by teams.	P: ME 26201 and STAT Elective. C: ME 31401.
Add to catalog for teachout. PIN Campus Only	ME 42301	Introduction to Nanotechnology	3	The course introduces students to the scale of nanotechnology, materials used in nanotechnology, forces acting in nanomaterials, electronic and mechanical behaviors on the nanometer scale, and applications in industries and life sciences. Nano-versus micro-technology in the evaluation of potential risks and benefits will be covered with emphasis on their impact on society.	
Add to catalog for teachout. PIN Campus Only	ME 42501	Mechanical Engineering Laboratory V	1	Experiments on testing of mechanical measurements and control systems.	C: ME 48200
Replace PUI with PIN	ME 43000	Power Engineering	3	Rankine cycle analysis, fossil-fuel steam generators, energy balances, fans, pumps, cooling towers, steam turbines, availability (second law) analysis of power systems, energy management systems, and rate analysis.	

ME Notes (New/Revise/Expire)	Original IUPUI Course Number	Title	Credit	Description	Restrictions
Replace PUI with PIN	ME 43300	Principles of Turbomachinery	3	Unified treatment of principles underlying fluid mechanic design of hydraulic pumps, turbines, and gas compressors. Similarity and scaling laws. Cavitation. Analysis of radial and axial flow machines. Blade element performance. Radial equilibrium theory. Centrifugal pump design. Axial compressor design.	
Add to catalog for teachout. PIN Campus Only	ME 44100	Design for IP Protection	3		P: (ME 26201 and ME 25001) or (EEN 26201 and EEN 25001) or BME 24101 or ECE 27000.
Add to catalog for teachout. PIN Campus Only	ME 44200	Design for Patentability	3		P: (ME 26201 and ME 25001) or (EEN 26201 and EEN 25001) or BME 24101 or ECE 27000
Add to catalog for teachout. PIN Campus Only	ME 44300	IP Rights for Engineers	3		P: (ME 26201 and ME 25001) or (EEN 26201 and EEN 25001) or BME 24101 or ECE 27000.
Add to catalog for teachout. PIN Campus Only	ME 44600	CAD/CAM Theory and Application	3		P: ME 26201 or consent of instructor.
Add to catalog for teachout. PIN Campus Only	ME 45000	Introduction to Computer-Aided Engineering	3		P: ME 26201 and 27200
Expire. Will be replaced by Purdue WL's ME 35400	ME 45310	Machine Design	3	This course prepares the student to: apply basic mechanics (statics and dynamics), mechanics of materials, and probably and statistics to the analysis and design of machines and machine components; design for strength of various machine components; study of stress/strain and force/deflection relations in machine components; understand fundamental approaches to stress and fatigue analysis and failure prevention; incorporate design methods for machine components such as shafts, bearings, springs, gears, clutches, breaks, chains, belts, and bolted and welded joints; and solve open-ended machine design problems involving structural analysis, life prediction, cost, reliability analysis, and technical communication.	
Add to catalog for teachout. PIN Campus Only	ME 45800	Composite Materials	3	Potential applications of composite materials. Basic concepts of fiber reinforced composites, manufacturing, micro and macro-mechanics, and static analysis of composite laminates. Performance (fatigue and fracture) and their application to engineering design.	P: ME 27200

ME Notes (New/Revise/Expire)	Original IUPUI Course Number	Title	Credit	Description	Restrictions
Add to catalog for teachout. PIN Campus Only	ME 46200	Capstone Design	3	Introduction to the concurrent engineering design process. Emphasis on the application of the design process. Mechanical engineering as well as multi-disciplinary design projects performed by student teams. Lectures are supplemented by guest speakers. Note: This course has required team meetings that may have meeting times outside the regularly scheduled class time.	
Add to catalog for teachout. PIN Campus Only	ME 47200	Advanced Mechanics of Materials	3	Studies of stresses and strains in three-dimensional elastic problems. Failure theories and yield criteria. Bending of curved beams. Torsion of bars with noncircular cross sections. Beams on elastic foundation. Energy methods. Selected topics. Students may not receive credit for both ME 47200 and ME 55000	P: ME 27200 and MATH 26600
Add to catalog for teachout. PIN Campus Only	ME 47400	Vibration Analysis	3		P: ME 27200, ME 27400, and ME 37500
Add to catalog for teachout. PIN Campus Only	ME 48200	Control System Analysis and Design	3	Classical feedback concepts, root locus, Bode and Nyquist techniques, state-space formulation, stability, design applications. Students may not receive credit for both 48200 and ECE 38200.	C: ME 34001
Add to catalog for teachout. PIN Campus Only	ME 49100	Engineering Design Project	1 or 2	The student selects an engineering design project and works under the direction of the faculty sponsor. Suitable projects may be from the local industrial, municipal, state, and educational communities. May be repeated for up to 4 credit hours.	P: Senior standing and consent of a faculty sponsor
Replace PUI with PIN	ME 49700	Selected Topics in Mechanical Engineering	1 to 6		

ME Notes (New/Revise/Expire)	New course number	Original IUPUI Course Number	Title	Credit	Description	Restrictions
Change the course prefix to ME. Course offered in PIN campus only.	ME 22001	EEN 22001	Fundamentals of Energy Materials	3	This course examines the chemistry and structure of materials and their correlation with various electrochemical properties including their suitability for use in conversion and storage of electrochemical energy, energy related materials, and chemical and renewable energy sources.	P: CHEM C105. 20000, ME 22501 C: ME
Change the course prefix to ME. Course offered in PIN campus only.	ME 22501	EEN 22501	Energy Engineering Laboratory I	1	Experiments on testing thermodynamics, parametric design and electrochemistry.	C: ME 22001, EEN 22501
Change the course prefix to ME. Course offered in PIN campus only.	ME 24000	EEN 24000	Basic Engineering Mechanics	4	This course is an introductory mechanics course in energy engineering, covers force systems and couples, equilibrium, centroids, friction, Kinematics, kinetics of particles & rigid body, Newton's second law, energy, and momentum methods; equations of motions, and application to machine elements	P: PHYS 15200. MATH 26100, MATH 26600 C:
Change the course prefix to ME. Course offered in PIN campus only.	ME 25001	EEN 25001	Energy Engineering Laboratory II	1	Experiments on data analysis, hands-on programming with devices and fabrication	C: EEN 26201
Change the course prefix to ME. Course offered in PIN campus only.	ME 26000	EEN 26000	Sustainable Energy	3	The objective of this course is to familiarize the students with various forms of available energy. The concept of these energies in terms of efficiency, raw material, safety, economy and environmental impact will be introduced.	P: CHEM-C 10500. C: PHYS 25100 and ME 20000
Expire. Will be replaced by Purdue WL's ME 29700	ME 29700	EEN 29700	Selected Topics in Energy Engineering	0 to 6		
Change the course prefix to ME. Course offered in PIN campus only.	ME 31000	EEN 31000	Fluid Mechanics	3	Continua, velocity fields, fluid statics, basic conservation laws for systems and control volumes, dimensional analysis. Euler and Bernoulli equations, viscous flows, boundary layers, flows in channels and around submerged bodies, and one-dimensional gas dynamics.	C: EEN 32501
Change the course prefix to ME. Course offered in PIN campus only.	ME 32501	EEN 32501	Energy Engineering Laboratory III	1	Experiments on testing of Mechanics of Materials and Fluid Mechanics.	C: ME 31002 and ME 27200
Change the course prefix to ME. Course offered in PIN campus only.	ME 33001	EEN 33001	Modeling & Measurements of Dynamic Systems	3	This course will cover the fundamentals of instrumentation, measurement, and dynamic systems modeling. Design, selection, and usage of the instrumentation systems and the interpretation of experimental results are also introduced. Basic concepts of measurements methods, measurement system response, assessment, uncertainty analysis of measured data, sensors, signal conditioning, recording / display devices, digital techniques, instrument interface, and measurement theories on stress and strain, temperature, pressure, fluid flow and velocity will also be covered. Additionally, fundamentals of dynamic systems including mechanical, electrical, and electromechanical systems will be introduced. Laplace transform, block diagram, transient and frequency response of linear first and second order system will be covered as well.	P: ECE 20400 and MATH 26600. C: EEN 24000, ENGR 29700
Change the course prefix to ME. Course offered in PIN campus only.	ME 34500	EEN 34500	Renewable Energy System and Design	3	This course is designed to introduce the system and design of energy conversion and storage devices for renewable energy sources. Students will first learn about energy sources available on earth including kinetic, solar, and chemical. Next, the course will provide students with a review of the thermodynamic concepts behind energy constant and energy transfer via an energy conversion device. Finally, this course will tie together concepts of solar and biomass renewable energy sources and thermodynamics teaching students about design elements for energy conversion and storage devices, in which renewable energy sources are converted and stored.	P: EEN 26000 C: ME 31500????
Change the course prefix to ME. Course offered in PIN campus only.	ME 35001	EEN 35001	Energy Engineering Laboratory IV	1	Experiments on testing of heat and mass transfer, and energy engineering.	C: ME 31401
Change the course prefix to ME. Course offered in PIN campus only.	ME 39700	EEN 39700	Selected Topics in Energy Engineering	0 to 6		P: Junior Standing and/or consent of instructor

ME Notes (New/Revise/Expire)	New course number	Original IUPUI Course Number	Title	Credit	Description	Restrictions
Change the course prefix to ME. Course offered in PIN campus only.	ME 40600	EEN 40600	HVAC Design	3		P: ME 31002 C: ME 31401
Change the course prefix to ME. Course offered in PIN campus only.	ME 42501	EEN 42501	Energy Engineering Laboratory V	1	Experiments on testing of mechanical measurements, control systems and alternative energy systems.	C: ME 48200
Change the course prefix to ME. Course offered in PIN campus only.	ME 44500	EEN 44500	Compressible Flow and Renewable Kinetic Energy Design	3	This course is designed to introduce compressible flow, turbomachines and design of kinetic energy conversion and storage devices for wind, wave and tidal renewable energy sources. Students will first learn about compressible flow, turbomachines concepts and kinetic energy sources available on earth. Next, the course will provide students with analysis, design parameters and control renewable kinetic energies.	P: ME 31000, EEN 26000
Change the course prefix to ME. Course offered in PIN campus only.	ME 46200	EEN 46200	Capstone Design	3	Concurrent engineering design concept is introduced and practiced. Application of the design is emphasized. Design problems from all areas of energy engineering are considered. Note: This course has required team meetings that may have meeting times outside the regularly scheduled class time.	P: Senior Standing. C: EEN 44500, ME 48200
Expire. Will be replaced by Purdue WL's ME 49700	ME 49700	EEN 49700	Selected Topics in Energy Engineering	0 to 6		

ME Notes (New/Revise/Expire)	New PUI Course Number	Original IUPUI Course Number	Title	Credit	Description	Restrictions
Change course prefix from MSTE --> MSPE	MSPE 27200	MSTE 27200	Introduction to Motorsports	3	This course provides an introduction to the Motorsports Industry, including careers available, the organization and history of the industry, and technology development that has occurred due to the industry. A student project is required.	P: None
Change course prefix from MSTE --> MSPE	MSPE 29701	MSTE 29701	Computer Modeling for Motorsports	2	An Introductory course detailing methods for designing & modeling motorsports components using computer aided design (CAD) software.	P: None
Change course prefix from MSTE --> MSPE	MSPE 29800	MSTE 29800	Programming & Computer Modeling for Motorsports	2	Introductory course detailing methods for creating virtual models of objects and systems for design, analysis, and optimization of motorsports components. Virtualization methods include object-oriented programming techniques for creating mathematical models, and solid modeling techniques for visualizing objects as three-dimensional representations. The methods introduced through this course lay the foundation for advanced courses in vehicle design, simulation, and analysis.	P: MSPE 27200 & admission to MSPE program
Change course prefix from MSTE --> MSPE	MSPE 29900	MSTE 29900	Motorsports Engineering Directed Study	1 to 3	This is a directed study course for students wishing to pursue additional motorsports studies under the direction of a faculty advisor.	P: Permission of Instructor.
Change course prefix from MSTE --> MSPE	MSPE 31201	MSTE 31201	Business of Motorsports	4	This course covers the unique aspects of the motorsports industry, especially race teams, including organizations, budgeting, marketing, & sponsorships through an examination of literature & guest speakers.	P: MSPE 27200 and Written Communication.
Change course prefix from MSTE --> MSPE	MSPE 31700	MSTE 31700	Motorsports Practicum II	1	This course engages students in a hands-on experiential learning opportunity in which they participate in the design, fabrication, assembly, and preparation of a race vehicle just as they might when engaged with a professional motorsports organization.	P: MSPE 35000 and junior standing.
Change course prefix from MSTE --> MSPE	MSPE 32000	MSTE 32000	Motorsports Design I	3	This course explores the design concepts and approaches of the Motorsports Industry, creating connectivity between the courses of the first two years of the Motorsports Engineering BS Program and preparing students for internships in industry.	P: MSPE 35000, MSPE 47200 or permission of instructor.
Change course prefix from MSTE --> MSPE	MSPE 33001	MSTE 33001	Data Acquisition in Motorsports I	2	This course introduces students to motorsports data acquisition systems and the associated hardware and software that are comprised therein. A hands-on lab component is included in the class where in students learn how to specify a motorsports data system, understand vehicle network communication and build a motorsport industry standard data acquisition wiring harness.	C: ECE 20400
Change course prefix from MSTE --> MSPE	MSPE 33100	MSTE 33100	Race Engineering	3	This course explores the application of vehicle dynamics principles to motorsport vehicles. Students will utilize engineering software tools to develop motorsport engineering workbooks for vehicle performance analysis. Driver performance analysis and race strategy topics are introduced to provide the student with the full fundamentals of race engineering.	P: MSPE 33001 and MSPE 47200

ME Notes (New/Revise/Expire)	New PUI Course Number	Original IUPUI Course Number	Title	Credit	Description	Restrictions
Change course prefix from MSTE --> MSPE	MSPE 34000	MSTE 34000	Dynamic Systems and Signals	3	Introduction to dynamic engineering systems and continuous-time and discrete-time signals, mechanical electromechanical components, linear system response, Fourier and Laplace Transforms. The course is designed to teach the student the basic concept for modeling the behavior of dynamic systems.	P: MA 26600, ME 27000 and ME 27400
Change course prefix from MSTE --> MSPE	MSPE 35000	MSTE 35000	Computer Aided Design & Manufacturing	3	This course provides the basis for the computer aided engineering and analysis skills needed in the Motorsports Industry. The ability to visualize and conceptualize a real part in the physical world and produce graphical representations of it in 2D and 3D in Solidworks or an equivalent is a primary objective. Further skills to be developed include the ability to produce large assemblies of such parts with appropriate tolerancing, free form surfacing, casting shapes and casting machining, 2D drawings for use in 3D sheet metal fabrication including shrink and stretch, use of 3D models to facilitate Finite Element Analysis, Conversion of CAD model to programming of CAM machining.	P: MSPE 29701. C: ME 27000.
Change course prefix from MSTE --> MSPE	MSPE 41400	MSTE 41400	Motorsports Design II	3	This is the culminating course in the Motorsports Engineering Plan of Study, typing together concepts from all the other courses in the curriculum, and requires a capstone design project representative of a real world project within the Motorsports Industry.	P: MSPE 32000 and MSPE 47200. C: MSPE 48200
Change course prefix from MSTE --> MSPE	MSPE 41700	MSTE 41700	Motorsports Practicum II	3	This course engages students in a hands-on experiential learning opportunity in which they participate in the design, fabrication, assembly, and preparation of a race vehicle just as they might when engaged with a race team in the motorsports industry. Students will be expected to show mastery of 12 of the 12 skills outlined in the Course Objectives.	P: MSPE 31700
Change course prefix from MSTE --> MSPE	MSPE 41800	MSTE 41800	Advanced Motorsports Practicum	1	This course engages students in a hands-on experiential learning opportunity in which they participate in the design, fabrication, assembly, and preparation of a race vehicle just as they might when engaged with a race team in the motorsports industry. Students will be expected to show mastery beyond the 12 skills outlined in the Course Objectives.	P: Permission of Instructor
Change course prefix from MSTE --> MSPE	MSPE 42600	MSTE 42600	Internal Combustion Engines	3	This course covers the fundamentals of internal combustion engine design and operation, with a focus on high performance.	P: ME 20000
Change course prefix from MSTE --> MSPE	MSPE 47200	MSTE 47200	Vehicle Dynamics	3	This course develops students understanding in the mathematical model development of the motorsports vehicle. Students will utilize these models to understand how key vehicle parameters influence vehicle performance in the longitudinal and lateral direction.	P: ME 27000 and ME 27400
Change course prefix from MSTE --> MSPE	MSPE 48200	MSTE 48200	Motorsports Aerodynamics	3	Study of fluid flow and aerodynamics as applied to race car design and Computational Fluid Dynamic (CFD) Analysis.	P: ME 31002, MSPE 35000, and MSPE 47200
Change course prefix from MSTE --> MSPE	MSPE 49000	MSTE 49000	Motorsports Engineering Independent Study	1 to 3	This is an independent study course for students wishing to pursue advanced studies under the direction of a faculty advisor.	P: Permission of Instructor

ME Notes (New/Revise/Expire)	New PUI Course Number	Original IUPUI Course Number	Title	Credit	Description	Restrictions
Change course prefix from MSTE --> MSPE	MSPE 49700	MSTE 49700	Motorsports Design Project	3	This is an independent study version of the MSPE 41400 culminating course in the Motorsports Engineering Plan of Study, tying together concepts from all the other courses in the curriculum, and requires a capstone design project representative of a real world project within the Motorsports Industry.	P: Permission of instructor
Change course prefix from MSTE --> MSPE	MSPE 49900	MSTE 49900	Motorsports Engineering Special Topics	1	This is a special topics course for students wishing to pursue advanced studies under the direction of a faculty advisor.	P: MSPE 27000 and Written Communications and Permission of Instructor
Change course prefix from MSTE --> MSPE	MSPE 57200	MSTE 57200	Vehicle Dynamics	3	Vehicle dynamics is the study of behavior of vehicles in motion. The study is one of the most important activities in the Vehicle design and development cycle to design vehicles which drive well and are comfortable to ride in. The course focuses on the development of advanced mathematical engineering models that represent the behavior of automotive vehicles and vehicle subsystems. Topical emphasis is focused on rectilinear performance, steady state handling behavior, tire models and suspension models.	P: Graduate standing or MSPE 21000 and ME 27000
Change course prefix from MSTE --> MSPE	MSPE 57400	MSTE 57400	Advanced Vehicle Dynamics	3	An investigation into advanced topics in the field of vehicle dynamics. This course covers the principles and applications of vehicle handling dynamics from an advanced perspective in depth. The methods required to analyze and optimize vehicle handling dynamics are presented, including tire compound dynamics, vehicle planar dynamics, vehicle roll dynamics, full vehicle dynamics, and in-wheel motor vehicle dynamics. The provided vehicle dynamic model is capable of investigating drift, sliding, and other over-limit vehicle maneuvers. This is an ideal course for postgraduate and research students and engineers in motorsports, mechanical, automotive, transportation, and ground vehicle engineering.	P: MSPE 57200
Change course prefix from MSTE --> MSPE	MSPE 57800	MSTE 57800	Composite Materials for Automotive Applications	3	This course focuses on Development of Low-Cost Carbon Fiber for Automotive Applications, Mechanical Properties of Advanced Composites, Automotive Composite Structures for Crashworthiness, Crashworthiness Analysis of Composite, Hybrid Structures Consisting of Sheet Metal and Fiber Reinforced Plastics for Structural Automotive and Design Solutions to Improve Crash-Box Impact Efficiency for Racing Applications.	

ME Notes (New/Revise/Expire)	New PUI Course Number	Original IUPUI Course Number	Title	Credit	Description	Restrictions
Change course prefix from MSTE --> MSPE	MSPE 57900	MSTE 57900	Design and Analysis of Materials and Structures in Lightweight Vehicles	3	The materials for the construction of automobiles are changing from mostly low carbon steels to a combination of steels, light alloys, such as aluminum and magnesium alloys, and polymer matrix composites. Many of these materials are already used in today's vehicles, albeit in smaller volumes. Future vehicles, which will have to be much lighter in weight for improved fuel economy and reduced environmental pollution, will contain much larger volumes of these materials. The selection of materials will not only be influenced by their weight reduction potential, but also by factors such as safety, durability, processing, joining, recycling and cost. This course focuses on materials, their properties,processing technology and design and materials selection issues pertinent to designing lightweight vehicles. it will provide first-hand knowledge and experience of working with these advanced materials. it starts with a broad review of the materials scenario and design considerations for lightweight automotive structures. it is then divided into two major parts: materials, and design and manufacturing. The materials part contain topics on advanced steels, aluminum alloys, magnesium alloys and polymer matrix composites. it will provide information on material properties, processing characteristics and application examples. The design and manufacturing part contains information	P: Graduate standing or ME 32300
Change course prefix from MSTE --> MSPE	MSPE 58200	MSTE 58200	Motorsports Aerodynamics	3	A study and adaptation of fluid flow and aerodynamics as applied to motorsports design and performance optimization. This course is designed to reinforce student's understanding of aerodynamics as it pertains to a race car. This course breaks down the differences between actual air flow while driving/racing versus air flow within a wind tunnel, and how these flows are different. It discusses how to evaluate those flows, and determine if they need to be improved. it discusses ways to improve the aero on race cars.	P: Graduate standing or ME 20000, 30800 and MSPE 35000
Change course prefix from MSTE --> MSPE	MSPE 58400	MSTE 58400	Advanced Motorsports Aerodynamics	3	This advanced course is designed to adapt the secrets of the rapidly developing field of high-speed vehicle design. From F1 to Indy Car, advanced drag simulation and Sedan racing, this course provides clear advanced explanations for students and engineers who want to improve their design skills and to interpret how their favorite race cars aerodynamics is designed. it differentiates how aerodynamics win races, why downforce is more important than streamlining and drag reduction, designing wings and venturis, plus wind tunnel designs and more. Appraises the development process of advanced motorsports aerodynamics engineering. Extensive use of CFD in the development of race ar aerodynamics.	P: MSPE 58200

ME Notes (New/Revise/Expire)	New PUI Course Number	Original IUPUI Course Number	Title	Credit	Description	Restrictions
Change course prefix from MSTE --> MSPE	MSPE 59200	MSTE 59200	Motorsports Simulations	3	A course on mathematical modeling and computer simulation of mechanical systems offering a complete tool for modeling and simulation of integrated and complex systems for use within automotive and motorsports applications. Complex multi-disciplinary systems modeling and analysis problems will be solved, using a modeling and simulation environment for complex systems analysis such as Dymola's Modelica simulation technology. Dymola is a complete environment for model creation, testing, simulation and post-processing. Equal emphasis is placed on model development and simulation via Dymola GUI interface. Models range from simple spring-mass-damper system to whole vehicle models will be covered.	P: Graduate standing or MSPE 29800 and MSPE 47200
Change course prefix from MSTE --> MSPE	MSPE 59700	MSTE 59700	Selected Topics in Motorsports Engineering	1 to 3	Topics of contemporary importance or of special interest that are outside the scope of the standard graduate curriculum can be offered temporarily under the selected topics category until the course receives a permanent number.	
Change course prefix from MSTE --> MSPE	MSPE 59800	MSTE 59800	Motorsports Engineering Projects	1 to 3	Individual research projects of contemporary importance or of special interest that are outside the scope of the standard graduate curriculum can be studied under the Motorsports Engineering Projects course.	
Change course prefix from MSTE --> MSPE	MSPE 59900	MSTE 59900	Motorsports Advanced Internship	1 to 3	Graduate-level based course, in an off-campus internship position.	
Change course prefix from MSTE --> MSPE	MSPE 69800	MSTE 69800	Research MS Thesis	1 to 6	Research credit for students in thesis option.	
Change course prefix from MSTE --> MSPE	MSPE-I 41000	MSTE-I 41000	Motorsports Internship	1 to 3		P: Sophomore standing and program advisor approval

Changes	Purdue WL Course Number	Title	Credit	Typically Offered	Restrictions
Add PIN Section	ME 20000	Thermodynamics I	3	Fall, Spring, Summer	No change
Add PIN Section	ME 27000	Statics	3	Fall, Spring, Summer	No change
Add PIN Section	ME 27400	Dynamics	3	Fall, Spring, Summer	No change
Add PIN Section	ME 29000	Global Engineering Professional Seminar	1	Fall, Spring, Summer	No change
Add PIN Section	ME 29700	Mechanical Engineering Sophomore Projects	0 to 6	Fall, Spring, Summer	No change
Add PIN Section	ME 30800	Fluid Mechanics	3	Fall, Spring, Summer	No change
Add PIN Section	ME 30801	Fluid Mechanics Lab	1	Fall, Spring, Summer	No change
Add PIN Section	ME 31500	Heat and Mass Transfer	4	Fall, Spring, Summer	No change
Add PIN Section	ME 32300	Mechanics of Materials	3	Fall, Spring, Summer	No change
Add PIN Section	ME 32301	Mechanics of Materials Lab	1	Fall, Spring, Summer	No change
Add PIN Section	ME 35400	Machine Design	3	Fall, Spring, Summer	No change
Add PIN Section	ME 36500	Measurement and Control Systems I	3	Fall, Spring, Summer	No change
Add PIN Section	ME 37500	Measurement and Control Systems II	3	Fall, Spring, Summer	No change
Add PIN Section	ME 43000	Power Engineering	3	Fall, Spring, Summer	No change
Add PIN Section	ME 46300	Engineering Design	3	Fall, Spring, Summer	No change
Add PIN Section	ME 49700	Mechanical Engineering Projects	1 to 6	Fall, Spring, Summer	No change