Graduate Council Curriculum Report

The Graduate Council Curriculum Report (GCCR), which includes all graduate curricular proposals approved through the Graduate Council curricular review process, is published 12 times each calendar year.

Questions/comments regarding the GCCR or its contents may be directed to the Director of Graduate Council Administration.

October 9, 2019

Graduate Degree Programs

CHANGE

- **Biomedical Sciences** – add new option in Cancer Biology, rename Biochemistry and Molecular Genetics option to Biochemistry, Genetics, and Genomics (College of Medicine), page 18
- **Corporate Finance** – change degree requirements (Smeal College of Business), page 67
- **Educational Leadership** – change degree requirements (College of Education), page 79
- **Engineering Management** – change degree title to Master of Engineering Management (Penn State Harrisburg), page 130
- **Informatics** – change degree requirements (College of Information Sciences and Technology), page 149
- **Information Sciences** – change program name to Cybersecurity Analytics and Operations, Drop Cybersecurity and Information Assurance option (College of Information Sciences and Technology), page 162
- **Real Estate Analysis and Development** – change dress requirements (Smeal College of Business), page 178
- **Supply Chain Management** – change degree title to Master of Supply Chain Management (Smeal College of Business), page 190

Graduate Courses

ADD

- **AE 523**
  Transdisciplinary Creativity: Eco-social Justice Act
  TRANSDISCIPLINARY CREATIVITY (3)
  Transdisciplinary creativity develops new knowledge, metaphors, visualizations, and insights through performative renderings from dialogue, collaboration, exploration, and experimentation. Transdisciplinary creativity is the coming together of two or more disciplines in order to create something more than the individual or the community by recognizing, combining, and utilizing knowledges of all participants. Moreover, transdisciplinary creativity is a social process that develops sense-abilities. Sense-ability is the capacity to attend to the sensory and sensation, as a collective
affective awareness of the environment. Students in the course will explore how different methodologies enhance understanding of complex issues such as sustainability, climate change, climate diaspora, environmental racism, and resource depletion. The national and international scope of environmental conversations is forging alliances across disciplines around urgent matters such as climate change. Rather than STEAM being used as an acronym for Science, Technology, Engineering, Arts, and Mathematics, STEAM is explored, in this course, in terms of collectives such as EcoArtTech, in which their work is eco-social justice action to create STEAM. Moreover, STEAM is considered as transdisciplinary creativity for eco-social justice. From a transdisciplinary view of STEAM, works of art are not an appendage or a singular discourse. STEAM is a transdisciplinary approach to environmental issues. STEAM as an action emphasizes ecology, transdisciplinary research, and creativity as a social process.

PROPOSED START: SP2020

AE 525
Including Difference
INCLUDING DIFFERENCE (3)
Disability is normal. Ableness is temporary. However, social stigmas, misunderstandings, and notions of “normal” exclude students and adults with disabilities. How have artists with disabilities offered worldviews that decenter normal? To pursue decentering normal, students in the course explore the creative practice of contemporary artists labeled by society as disabled to understand how their viscerally empowered art can function pedagogically to decenter notions of normal. Decentering notions of normal begins with identifying and challenging social systems that—through visual, lingual, and technological cues—communicate which traits are considered normal and which are not. While the analysis of linguistic and visual representations is instructive for articulating identity construction and its relationship to power and privilege, these lines of inquiry within disability studies overlook the realities of embodied difference that are a part of many people who live with disabilities. Notions of a normalized body frame certain patterns of behavior, cognition, affect, and physicality from which bodies are measured as either within or outside of the frame of normalized learning spaces such as schools. The Feminist Disability Studies and Disability Justice readings in the course go beyond labeling difference and invest in articulating and understanding difference as interconnected relationships in which inclusion may be fostered.

CROSS-LISTED COURSES: WMNST 525

PROPOSED START: SP2020

ASTRO 588
Seminar in Astronomical Research Development and Responsible Conduct
ETHICS SEMINAR (1)
The course includes a variety of topics related to ethics and professional development in Astronomy and Astrophysics. The course builds from the mandatory training students receive from Scholarship and Research Integrity. The content is geared toward providing students with "survival skills" that are not encountered in the typical course curriculum. Topics include research paper writing, proposal writing, postdoctoral job applications, career options in research/education and outreach/observatory support/data science/policy, professional networking, effective dissemination of research, funding landscape in the profession, etc.

PROPOSED START: SP2020

BMMB 801
Foundations of Teaching in Biochemistry, Microbiology, and Molecular Biology
FOUNDATIONS OF TEACHING IN BMMB (1)
An overview of the science of learning and teaching in biochemistry, microbiology, and molecular biology. This course is designed to prepare BMMB graduate students to become teachers and communicators, and specifically to prepare students to teach undergraduate students in labs or lecture courses. Students will explore how people learn, develop evidence-based teaching strategies to promote learning, and acquire confidence to create effective and inclusive classrooms.

PROPOSED START: SP2020
BMS 553
Cancer Biology Colloquium
CANCER BIOLOGY COLLOQUIUM (1/Repeatable Max: 2)
Students will be exposed to a range of topics in cancer biology from the primary literature to expand their knowledge of current state-of-the art research in cancer biology, and to enhance their critical thinking skills and ability to critique the primary literature.
PROPOSED START: SP2020

CI 517
Core Readings in Vygotsky’s Cultural Historical Psychology
READINGS VYGOTSKY (3)
The Sociocultural or Cultural Historical theory of mind originated in the writings of Russian psychologist L.S. Vygotsky during the 1920s and 30s. Over the course of only about ten years, Vygotsky and his circle produced a substantial body of theoretical and empirical work that challenged basic epistemological and ontological premises of psychology and that outlined a new way of understanding human abilities and their development. The framework Vygotsky elaborated has come to be referred to as Cultural Historical psychology, emphasizing the fundamental role of mediation in shaping human psychology, mediation through historically created artifacts available in particular cultures and through forms of social interaction. In the decades since Vygotsky’s death, Cultural Historical psychology has been further developed by researchers around the world who have brought Vygotsky’s theoretical proposals to bear on questions and problems as diverse as special education, psychological and educational measurement, early childhood education, psychotherapy, teacher education, linguistics and communication, adult and workforce education, and political and social change.
The course is organized around carefully selected, seminal readings, emphasizing primary texts authored by Vygotsky but complemented by secondary sources generally regarded as leading interpretations. Beginning with an examination of Vygotsky’s enterprise to establish a unified, scientific psychology grounded in Marxian dialectics (historical materialism), the course engages with concepts and principles definitive of Cultural Historical psychology that in some cases have become highly influential in a number of disciplines and that in others are only beginning to be understood. These include mediation, Zone of Proximal Development/ZPD (zona blizhaiishego razvitia/ZBR), spontaneous and scientific concepts, teaching/learning-and-development (obuchenie), inner and private speech, units of analysis and meaning (znachenie/smysl), and perezhivanie, among others. In this way, students obtain a deep understanding of the theory, both in the context of Vygotsky’s own writings and the specific problems he sought to address but also in its contemporary applications. This understanding, in turn, enables students to critically evaluate uses of Vygotsky’s ideas in their particular area of study while also providing the background necessary to employ the theory in their own research.
The course is intended for students in all areas of education, human development, and applied linguistics. No previous knowledge of Vygotsky’s work is required.
PROPOSED START: SP2020

CI 525
Bakhtin and Education
BAKHTIN & ED (3)
This seminar gives students an overview of the writings of key members of the “Bakhtin Circle,” which included Mikhail Bakhtin, Valentin Voloshinov, Pavel Medvedev, and others. The core objective of this course is for students to learn about Bakhtinian theory and how to use Bakhtin as a philosophical method in carrying out research studies and analyzing data. In order to do this, we will read the original works of Bakhtin, Voloshinov, Medvedev, and others alongside contemporary educational researchers, theorists, and methodologists who apply Bakhtinian philosophical methods and analyses to the study of education.
CROSS-LISTED COURSES: CIED 525
PROPOSED START: SP2020
DAAN 570
Deep Learning
DEEP LEARNING (3)
Deep Learning has become a prevalent area and accomplished near-human level in image classification, speech recognition, and autonomous driving. This course will cover the foundations on Neural Networks and Deep Learning Networks and give students a practical understanding of the field of Deep Learning. It covers the core concepts of Deep Neural Networks, including the Convolutional Neural Networks for image recognition, Recurrent Neural Networks for sequence generation, and Generative Adversarial Networks for image generation, and more!
PREREQUISITES: STAT 500
RECOMMENDED PREPERATION: The course requires basic math such as college calculus and linear algebra. Students should be able to take multivariable derivatives and understand matrices and vectors operations and notations. Preliminary programming skills in Python are required.
PROPOSED START: SP2020

DAAN 572
Reinforcement Learning
REINFORCEMENT LEARNING (3)
Reinforcement learning, along with supervised learning and unsupervised learning, is one of the three basic types of machine learning. Applications of reinforcement learning span across medical intervention, robotics, game playing, autonomous driving, financial trading, and marketing, among many others. This course will cover the main theory and approaches of reinforcement learning, along with deep learning and common software libraries and packages.
RECOMMENDED PREPERATION: STAT 500 or equivalent: probabilities, gaussian distributions, mean, standard deviation, etc. Should be able to take multivariable derivatives and understand matrices and vectors operations and notations. Preliminary programming skills in Python.
PROPOSED START: SP2020

EDLDR 831
Leadership for Equity and Diversity
EQUITY & DIVERSITY (3)
Students from culturally, linguistically, socially, and economically diverse backgrounds account for an increasing percentage of the school-age population in the United States. This course serves as an exploration of the school leaders' role in promoting equity and diversity for all members of the school community. Specifically, this course will focus on policy and theory as they inform the development of leadership practice. This course aims to explore issues related to education, equity, and diversity.
PROPOSED START: SP2020

EDLDR 841
Data Informed Leadership
DATA INFORMED LEADERSHIP (3)
This course focuses on the development of skills related to data use that will help inform administrative and leadership decisions in school settings. The purpose of the course is to build the learner’s knowledge and skills for understanding and using a variety of different forms of data to promote improvements in student outcomes and increased equity. This class will be most relevant to those working in K-12 school settings, particularly those who are engaged in using different forms of data to improve instruction and/or schools.
PROPOSED START: SP2020
Planned Change for School Improvement

School Improvement (3)

Standards-based reforms of the past have brought about efforts to improve schools and raise student achievement. Initiatives include (but are not limited to): (1) introduction of standards for learning at all levels of K-12 instruction, including the Common Core Standards introduced in 2011; (2) increased requirements for high school graduation; (3) reduced class sizes, especially in the elementary grades; (4) high-stakes state testing and accountability measures. Yet, despite all this activity and attention, significant changes in student achievement and in basic school practices have been slow to transpire. The reasons for slow progress are many and complex. However, one reason is the need for stronger school leaders (including teachers, principals, superintendents, and other educators) who can direct and implement changes in curriculum, instruction, and school organization. There is consensus in the research literature that school improvement and school leadership are largely inseparable—that leadership is a critical element in order for schools to improve. The course addresses three major questions: (1) What is school improvement? (2) What does it involve? (3) How do we do it? To accomplish this, the course focuses on several general models developed for school improvement purposes. It also explores the component pieces of school improvement, including leadership, professional development/professional learning communities, and a focus on teaching and learning including standards, instruction, and assessments. Taken together, this course explores what education leaders need to know and be able to do to strengthen instruction and raise student achievement. If leaders are to nurture better teaching and learning, they will need greater familiarity with promising instructional approaches, new curricular materials, and ways to adapt them to a particular school's circumstances.

Proposed Start: SP2020

Principles of Instructional Leadership

Instructional Leadership (3)

The purpose of this course is to provide aspiring leaders with learning opportunities and activities authentic to school leaders and leadership roles in educational organizations. While the course is suited to meet the needs of educators preparing for principal positions in K-12 schools, it also serves to meet the needs of aspiring leaders in specific content areas, including special education leaders and curriculum leaders often employed across K-12 as teacher leaders or administrators. The course focuses on development of leadership skills and dispositions that inform highly effective practices of instructional leaders in education. Throughout the course, students explore and investigate social and institutional settings for instructional leadership, including supervision of instructional staff and the functions, activities, and practices of an instructional leader. Students will continually work to develop and refine leadership dispositions, specifically those that support instructional improvement and high levels of learning for all students. Throughout the course, students are provided with opportunities to apply activities and learning to their specific interests, at all levels of instruction and content within schools and educational organizations. Students are expected to have teaching and/or school administrator experience, 18 credits in education (at least five of which are methods of teaching), and access to a school setting for course activities and projects.

Proposed Start: SP2020

The Principalship for Aspiring School Leaders

Principalship (3)

The Principalship course provides students with knowledge specific to the role of the principal in K-12 schools. The course is intended to help students gain theoretical and practical insight into what it means to be an effective principal. It explores principal leadership responsibilities, decision-making/problem-solving skills, and management practices across levels of K-12 leadership. The course calls on students to read, think, write about, and discuss multiple topics related to the day-to-day challenges of a building leader.

Proposed Start: SP2020
**EDLDR 873**  
Money and Schools: Perspectives, Finance Policies, and Leadership  
MONEY & SCHOOLS (3)  
How we raise money for schools and how we spend that money reflects our values. This course gives students an overview of the values and policies shaping school finance in the United States, with a special emphasis on the relationship between education funding and equity. Students will also develop their understanding of technical topics in school finance such as how leaders build and maintain a budget. In learning to think critically about funding issues in education, students will consider the relationship between financial management, educational leadership, and organizational change.  
PROPOSED START: SP2020

**EDLDR 876**  
Law and Education for Educational Leaders  
LAW & EDUC FOR ED LEADERS (3)  
This course will provide an overview of major issues in school law. The course will focus primarily on case law including U.S. Supreme Court decisions as well as relevant state and federal lower court opinions. State legislation and administrative laws will also be considered. Topics to be covered include church/state issues, teacher and student rights, and law associated with equal educational opportunities for various groups including racial and linguistic minorities, individuals with disabilities, and women.  
PROPOSED START: SP2020

**EE 589**  
Smart Grid Control and Dynamics  
SMART GRID CONTROL & DYNAMICS (3)  
This course covers the application of advanced power electronics in power apparatus. The first step is to understand the design of power electronics systems for smart grids. The course starts with an overview of DC/DC converters and covers the controller design for DC/DC converters. Next, voltage source converters and control designs for voltage source converters are covered.  
Electrical machines are the main components of the smart grid system. Therefore, operation and modeling of AC machines are very important in modern smart grid systems. The additional topics to be covered in this course are: simplified model of an induction machine connected to the grid, modeling and analysis of doubly fed induction generators used in wind farms, modeling and control of permanent magnet synchronous machines, and modeling and analysis of transformers. Next, an overview of mathematical modeling of solar energy systems is provided and different control methodologies are discussed.  
Next, the state space modeling is covered and the concepts of eigenvalue analysis, Bode plots, and Nyquist stability criterion are implemented to analyze different generation units. Impedance modeling is another technique used to investigate the interactions between renewable energy sources and grids. The basics of impedance modeling technique are covered and case studies are defined to derive the impedance of voltage source converters in smart grids.  
Dynamic phasor modeling is another technique used to investigate the stability of a dynamic system, especially in unbalanced systems. The main components of dynamic phasor modeling are discussed and an analysis approach is covered to model renewable energy sources in smart grids.  
PREREQUISITES: EE 488  
PROPOSED START: SP2020

**HIED 521**  
Data Analysis for Education Research  
DATA ANALYSIS FOR EDU RESEARCH (3)  
This course bridges theoretical statistics coursework and practical research with real, large-scale data sets. The course emphasizes hands-on data preparation and analysis using statistical software. More specifically, the course will give an overview of national and international data resources that are available for educational researchers, survey the most widely used data analysis techniques in educational research, and
use statistical software and large-scale datasets to produce useful results for educational policy research.
CROSS-LISTED COURSES: EDTHP 521, EDLDR 521
RECOMMENDED PREPERATION: At least one graduate-level statistics course.
PROPOSED START: SP2020

HIED 522
Economics of Education
ECONOMICS OF EDUCATION (3)
The aim of the course is to help students view the educational system and students’ educational decisions through the lens of economics. We will discuss the methods that economists commonly employ to study education and read recent empirical articles that examine the impact of educational policies and practices. At the end of the semester, we will discuss insights from the field of behavioral economics, which builds on the standard economic model to better understand decision making.
This course also surveys the empirical literature on the economics of education which is organized into several broad topics, including human capital and economic return to education, school choice and college access, and education production. Finally, the course covers a variety of econometric methods that are widely used in the economic study of education. These methods include regression models (e.g., ordinary least squares, discrete choice models, Multi-level modeling, panel data models, etc.) and commonly used techniques to deal with self-selection and causal inference (e.g., quasi-experimental methods).
CROSS-LISTED COURSES: EDTHP 522, EDLDR 522
PROPOSED START: SP2020

HIST 540
NATIVE AMERICAN HISTORY (3)
Surveying Native American history from the pre-colonial era to the present, this course examines key historical events, including: Indigenous civilizations before colonialism; the invasion of North America by Europeans; colonial epidemics; the Indian slave trade; the Pueblo Revolt; the Seven Years’ War; the development and impacts of U.S. Indian policy; Indigenous sovereignty.
Methodologically, this course exposes students to a range of historical subfields, such as social history, cultural history, political history, military history, and gender history. Additionally, History 539 gives students an overview of ethnohistory, an interdisciplinary field that draws on techniques and sources from History and Anthropology. By studying ethnohistory, historians will become better acquainted with cultural anthropology and archaeology.
This seminar introduces students to major questions, themes, and problems in Native American history. These include: How can we study pre-colonial Indigenous history? What impact did colonization have on the Americas? How did Indians, Europeans, and Africans attempt to navigate cultural differences? How did the enslavement of Indigenous peoples and Africans impact race in North America? How do Native-centered histories transform our understanding of the American past?
PROPOSED START: SP2020

INFSY 572
Strategic Information Systems
STRATEGIC INFORMATION SYSTEMS (3)
The survival and success of organizations in a highly competitive on-demand economy is dependent on strategic information technology alignment. Strategic Information Systems examines the strategic management and use of information resources, theoretical models, and practices. It examines the alignment of an organization’s business strategy, organizational strategy and design, and information systems strategy in order to achieve a sustainable competitive advantage.
RECOMMENDED PREPERATION: Business information systems knowledge preferred.
PROPOSED START: SP2020
MANGT 855
Project Management and Marketing Linkages: New Product and Service Development Process
NEW PROD SERV DEV PROCESS (3)
This is a graduate-level project management elective designed to expose project managers to strategic issues in marketing, opportunity recognition, and new product/service development. Marketing is presented as more than a business function; rather, as a philosophy of doing business. Students will be exposed to marketing management concepts and techniques in both domestic and international markets. This elective is intended to offer a specific context within which a large number of projects are initiated – i.e., new product and service development (NPSD) while broadening the perspective of students to understand how NPSD and project management directly link to marketing. An overview of the field of marketing is presented – from defining marketing and understanding its role in running a successful business to a thorough examination of the marketing mix, holistic marketing, marketing strategies, market opportunities analysis, branding, brand equity, and so on. It presents the marketer’s view of product and service development as well as an understanding of stakeholder management and how project managers must work with marketing as a key stakeholder in the NPSD process. Further, the course explores linkages between marketing and project management – e.g., identifying opportunities, developing strategies, building a business case, identifying key performance indicators, and so forth. Identifying opportunities, developing strategies, and designing processes for the creation of new products, are key responsibilities for both entrepreneurs and managers in established firms. Developing new products and services is also fraught with risk, however: an overwhelming majority fail when introduced to the market. New product development is thus a joint challenge of marketing and effective project management. This course is about improving the odds of placing winning bets on new products and services. Strategies and processes for new product/service development will be the core of the course.
PREREQUISITES: MANGT 510
PROPOSED START: SP2020

PHS 539
Qualitative Health Research Methods
QUALITATIVE HEALTH RESEARCH METHODS (3)
The course presents the assumptions, techniques, and practical aspects of conducting qualitative health research. Students will develop a good research question, interviewing techniques and guides, codes and coding dictionaries, and an analysis plan for qualitative research. Students will practice qualitative interviewing skills and coding in a health research-based project. The students will critique qualitative articles and learn what constitutes a rigorous methodological and analytic approach to this type of public health research.
PROPOSED START: SP2020

RPTM 535
Collection and Analysis of Qualitative Data
QUAL METHODS (3)
In this course, students will be given an overview of and have the opportunity to apply many techniques employed by qualitative social science researchers. A particular emphasis will be on inductive, fieldwork-based research methods including participant observation and in-depth interviewing. During class meetings students will participate in seminar discussion of assigned reading material and the shared experiences associated with the preparation of course assignments. These assignments will develop methodological experience through activities conducted locally. Across the semester students will also develop a more elaborate funding proposal for research based on qualitative methodologies. The course will be of particular value to students preparing for thesis or dissertation research utilizing qualitative methods. Though qualitative research is often associated with an interpretivist or humanistic research paradigm, participants espousing a scientific/positivist paradigm are also encouraged to enroll, as are students from outside of Recreation, Park, and Tourism Management.
PROPOSED START: SP2020
RSOC 594
Research Topics
RESEARCH TOPICS (1-18/Repeatable Max: 18)
Supervised student activities on research projects identified on an individual or small-group basis.
PROPOSED START: SP2020

CHANGE

OLD
BAN 530
Business Strategies for Data Analytics
DATA ANLYCS STRAT (3)
Data analytics problem-solving strategies applied to a real-world business context. BAN 530 Business Strategies for Data Analytics (3) BAN 530 integrates the descriptive/prescriptive/predictive framework for business analytics courses and sets analytics problem solving in a real-world business context. The objective is to provide students with experience with noisy data sets, potential compliance issues, non-standard measures across business units, and other real-world considerations in using data to drive decisions. The course will examine the entire life cycle of a data analytics project, from data origination through collection, filtering, tool selection, calculation, and communication. Particular emphasis will be placed on problem formulation: identifying what the business issue is at hand, what data might be useful in understanding that issue, and what tools can be most usefully applied in a particular context. In addition, communication skills will be emphasized: how data informs the decision-making process when the audience likely lacks the specialized quantitative literacy of the project team. Other important considerations include many facets of information privacy: students will consider the ethical and legal implications of de-anonymization, of deep insight into individual behavior, and of opt-in versus opt-out models of participation.

NEW
BAN 830
Descriptive Analytics for Business
DESCRIPTIVE ANALYTICS FOR BUS (3)
BAN 830 explores the use of descriptive analytics concepts, tools, and techniques throughout a wide range of business scenarios and problems. Initially focusing on the application of traditional descriptive analytics techniques to answer the question, “What happened?,” the course provides opportunities for students to perform spreadsheet- and programming-based data acquisition, cleaning, manipulation, and visualization using data derived from various business contexts to inform business leaders’ decisions. Later, students progress to applying advanced statistical techniques and concepts including descriptive measures, sampling and estimation, and inference in both spreadsheet and programming environments. The course concludes with a bridge to predictive analytics as students apply linear and multiple linear regression to business-related data in search of relationships among input and output variables. Software packages, concepts, and business applications will vary and evolve to keep pace with technology, theory, and instructor interests. RECOMMENDED PREPERATION: Students are typically expected to have completed a prior statistics course (undergraduate or graduate) or enroll concurrently in STAT 500.

OLD
EDLDR 531
Leadership and Diversity
LDRSHP & DIVERSITY (3)
This course examines what it means to lead educational organizations in an increasingly diverse society. EDLDR 531 Leadership and Diversity (3) This course examines what it means to lead educational organizations in an increasingly diverse society. Specifically, this course will focus on policy, theory and practice as they relate to school leadership and diversity. Students from culturally, linguistically, socially, and economically diverse backgrounds account for an increasing percentage of the school-age population in the United States.
Unfortunately, many of these students are not successful in school. This presents a number of challenges for school leaders as they work to facilitate the teaching and learning process. This is a seminar type course aimed at facilitating discussion and exploration around issues related to education and diversity. Discussions and reflective inquiry will be facilitated by assigned readings and case studies as well as the personal experiences of both the instructor and the students in this course. This course will assist students in developing a better understanding of the knowledge and skills needed to effectively lead increasingly diverse educational organizations.

NEW

EDLDR 531
Research on Leadership for Equity and Diversity
RESEARCH EQUITY & DIVERSITY (3)
This course examines what it means to lead educational organizations in an increasingly diverse society. Specifically, this course will focus on policy, theory and practice as they relate to school leadership, and also equity and diversity as they connect personal experiences with research literature. Students from culturally, linguistically, socially, and economically diverse backgrounds account for an increasing percentage of the school-age population in the United States. This is a seminar aimed at facilitating discussion and exploration around issues related to education, equity, and diversity.
CROSS-LISTED COURSES: BMMB 551, BGEN 551

OLD

IE 527
Additive Manufacturing Processes
ADD MANF PROCESSES (4)
The course will cover the fundamentals of Additive Manufacturing (AM) processes. During the course the students will leverage their background in computer-aided manufacturing to learn the Digital Work Flow steps from Design to Manufactured AM parts. They will learn and gain experience in the various data representation, algorithms and software tools, processes, and techniques that enable advanced/additive manufacturing. Computational algorithms will be researched and evaluated. Detailed research investigations into the fundamental process models of various additive manufacturing (AM) processes using polymers, metals, and other material will provide insight into the operating principles, capabilities, and limitations of AM processes. In addition to theoretical knowledge, the students will gain hands-on experience with AM machines and understand the complete process steps through design, fabrication, and measurement of example parts. The students will study the range of applications of AM across a spectrum of industries (e.g., aerospace/automotive, medical devices, and consumer products) while developing an understanding of the requirements, constraints, and business case for the applications. After completing this course, students will have a fundamental understanding of the research in AM processes and prepare them for additional depth in follow on courses. Additionally the students will be able to appropriately utilize (e.g., evaluate, select, design) this developing technology in the future of manufacturing and digital transformation of manufacturing.
PREREQUISITES: IE 463

NEW

IE 527
Additive Manufacturing Processes
ADDITIVE MANUF PROCESSES (4)
The course will cover the fundamentals of Additive Manufacturing (AM) processes. During the course the students will leverage their background in computer-aided manufacturing to learn the Digital Work Flow steps from Design to Manufactured AM parts. They will learn and gain experience in the various data representation, algorithms and software tools, processes, and techniques that enable advanced/additive manufacturing. Computational algorithms will be researched and evaluated. Detailed research investigations into the fundamental process models of various additive manufacturing (AM) processes using polymers, metals, and other material will provide insight into the operating principles, capabilities, and limitations of AM processes. In addition to theoretical knowledge, the students will gain hands-on experience with AM
machines and understand the complete process steps through design, fabrication, and measurement of example parts. The students will study the range of applications of AM across a spectrum of industries (e.g., aerospace/automotive, medical devices, and consumer products) while developing an understanding of the requirements, constraints, and business case for the applications. After completing this course, students will have a fundamental understanding of the research in AM processes and prepare them for additional depth in follow on courses. Additionally the students will be able to appropriately utilize (e.g., evaluate, select, design) this developing technology in the future of manufacturing and digital transformation of manufacturing.
CROSS-LISTED COURSES: AMD 527
PREREQUISITES: None

OLD
NURS 843
Synthesis and Application of the Nurse Educator Role
NURSE EDUCATOR ROLE (3-6/Repeateable Max: 6)
This capstone practicum course involves the practical application of knowledge from previously completed courses related to the nurse educator role in academic and healthcare settings. Students will work with a preceptor in an educational/healthcare settings to demonstrate multiple aspects of the nurse educator role. In addition, students will demonstrate a direct care role through clinical experiences designed to strengthen patient care delivery skills. The practicum experience will be developed to fulfill mutually agreed-upon objectives based on students’ previous experiences and identified learning needs.
PREREQUISITES: NURS 840, NURS 841, NURS 842

NEW
NURS 843
Synthesis and Application of the Nurse Educator Role
NURSE EDUCATOR ROLE (3-6/Repeateable Max: 6)
This capstone practicum course involves the practical application of knowledge from previously completed courses related to the nurse educator role and advanced nursing care delivery in academic and healthcare settings. Students will work with a preceptor in an educational/healthcare settings to demonstrate multiple aspects of the nurse educator role. In addition, students will demonstrate a direct care role through clinical experiences designed to strengthen patient care delivery skills. The practicum experiences will be developed to fulfill mutually agreed-upon objectives based on students’ previous experiences and identified learning needs.
PREREQUISITES: NURS 840, NURS 841, NURS 842

OLD
SCM 800
Supply Chain Management
SCM (4)
Introduction to the strategic framework, issues, and methods for integrating supply and demand management within and across companies. SCM 800 Supply Chain Management (4) SCM 800 provides an enhanced understanding of key principles, concepts, and methodologies for effective supply chain management. Supply chain management is the integration of core business processes from the end user through original suppliers that provides products, services and information that add value for customers. The systems viewpoint and a process orientation are explored at the firm level and from the perspective of inter-firm collaboration among participants in supply chains. Case studies explore supply chain management and its critical role in business. The course provides opportunities to investigate important topics such as the bullwhip effect, the key approaches to planning and managing inventory across supply chains, the creation of value through alignment and realignment of supply chain capabilities, and the key supply chain performance metrics. After completing this course, students should have the knowledge, skills, and abilities to: a. Articulate the essential principles and concepts of the supply chain approach b. Understand the potential role of supply chains in creating value and in sustaining competitive positions of firms c. Explain the impact of the bullwhip effect on supply chain performance d. Understand the underlying causes of the bullwhip effect and articulate
the principal approaches to ameliorating its impacts on supply chain performance e. Articulate differences in
the principal approaches to managing inventories across supply chains f. Articulate the principal benefits and
challenges associated with collaborative approaches to supply chain management g. Understand the principal
metrics used to manage supply chain performance The evaluation of students is based on small group case
study submissions, short paper and problem assignments, on-line discussion postings, and peer reviews.

NEW
SCM 800
Supply Chain Management
SUPPLY CHAIN MANAGEMENT (3)
This course provides an enhanced understanding of key principles, concepts, and methodologies for effective
supply chain management. Supply chain management is the integration of core business processes from the
end user through original suppliers that provides products, services, and information that add value for
customers.
The systems viewpoint and a process orientation are explored at the firm level and from the perspective of
inter-firm collaboration among participants in supply chains.
The course provides opportunities to investigate important topics such as the bullwhip effect, the key
approaches to planning and managing inventory across supply chains, the creation of value through
alignment and realignment of supply chain capabilities, and the key supply chain performance metrics.
Students successfully completing the course will be able to:
• Articulate the essential principles and concepts of the supply chain approach
• Demonstrate understanding of the potential role of supply chains in creating value and in sustaining
competitive positions of firms
• Explain the impact of the bullwhip effect on supply chain performance
• Demonstrate understanding of the underlying causes of the bullwhip effect and articulate the principal
approaches to ameliorating its impacts on supply chain performance
• Articulate differences in the principal approaches to managing inventories across supply chains
• Articulate the principal benefits and challenges associated with collaborative approaches to supply chain
management
• Demonstrate understanding of the principal metrics used to manage supply chain performance

OLD
SCM 801
Supply Chain Performance Metrics and Financial Analysis
METRICS ANALYSIS (1/Repeatable Max: 999)
Performance metrics used in supply chain management, both within the enterprise and across the extended
enterprise. Performance metrics are essential for effective planning and management of supply chain
operations. Clear understanding of the relationship between supply chain decisions/initiatives and the firm’s
primary financial measures is an increasingly important competency for all supply chain managers. SCM 801
provides professional-level coverage of essential supply chain performance and financial metrics applied both
within the firm and across the extended enterprise. The course helps students develop the ability to choose
and utilize the correct set of performance and financial metrics for varying supply chain decision-making
situations. Students learn how to leverage key supply chain decision variables to impact performance and
financial metrics. Students also learn to apply appropriate accounting tools and techniques and conduct
financial analyses to evaluate and optimize supply chain decisions. Topics addressed include inventory and
financial metrics, measures of supply chain velocity, working capital, ratio analysis, the Strategic Profit Model,
total cost of ownership, the Balanced Scorecard, and the SCOR Model.
CONCURRENTS: SCM 800

NEW
SCM 801
Supply Chain Performance Metrics and Financial Analysis
PERF METRICS & FIN ANALYSIS (3)
Performance metrics are essential for effective planning and management of supply chain operations. Clear understanding of the relationship between supply chain decisions/initiatives and the firm’s primary financial measures is an increasingly important competency for all supply chain managers. SCM 801 provides professional-level coverage of essential supply chain performance and financial metrics applied both within the firm and across the extended enterprise. The course helps students develop the ability to choose and utilize the correct set of performance and financial metrics for varying supply chain decision-making situations. Students learn how to leverage key supply chain decision variables to impact performance and financial metrics. Students also learn to apply appropriate accounting tools and techniques and conduct financial analyses to evaluate and optimize supply chain decisions. Topics addressed include inventory and financial metrics, measures of supply chain velocity, working capital, ratio analysis, the Strategic Profit Model, total cost of ownership, the Balanced Scorecard, and the SCOR Model.

Additionally, the course will utilize various financial tools and techniques (such as Discounted Cash Flow Analysis, Ratio Analysis, Breakeven Point Analysis, and Cost Volume Profit Analysis) to demonstrate the impact of supply chain principles and concepts on the performance of a firm.

Students successfully completing the course will be able to:

- Identify, describe, and measure the essential metrics that are the key indicators of supply chain performance, particularly as that performance relates to financial performance of the firm and the extended enterprise
- Identify and assess the perspectives of alternative stakeholders that analyze and use financial metrics and statements
- Utilize various tools/models (working capital evaluation, ratio analysis, etc.) to calculate, analyze, and gain better insights on the interplay between supply chain decision making and financial performance
- Utilize discounted cash flow models to evaluate supply chain investment proposals
- Describe the role of supply chain costs on the income statement and balance sheet of a firm while understanding different types of costs, cost drivers, and breakeven point evaluation (BEP)
- Demonstrate understanding of how the sales and operations plan is developed and its role in supply chain processes
- Compare various viewpoints regarding performance metrics and the constraints that inhibit effective implementation and utilization of those metrics

CONCURRENTS: SCM 800

OLD

SCM 822
Supply Management
SUPPLY MGMT (2/Repeatable Max: 999)
An overview of the strategic role that supply management has in effective supply, demand, and value chain operations. SCM 822 provides an overview to the sourcing processes in supply chain management. The course focuses on the establishment of an effective supply base and relationships with suppliers. Specific topics include supply market analysis, spend analysis and supplier segmentation, supplier selection and evaluation, and buyer-supplier negotiation.
PREREQUISITES: SCM 800

NEW

SCM 822
Supply Management
SUPPLY MANAGEMENT (3)
This course provides a broad exploration of selecting, evaluating, and determining the nature of relationships with suppliers from the buyer’s perspective within the context of industry and market knowledge. Additionally, the course seeks to develop the ability to understand ethical conduct in business organizations. In particular, the course investigates Supply Market Analysis, Spend Analysis, Supplier Segmentation, Supplier Cost Management, Supplier Selection and Evaluation, Business Ethics, and Negotiation.
PREREQUISITES: SCM 800
OLD
SCM 842
Manufacturing and Service Operations Planning
MFG & OPS PLANNING (2/Repeatable Max: 999)
Planning strategies for managing manufacturing and service operations within supply chains. This course provides foundation concepts necessary for understanding the production function in supply chains. It introduces the student to the strategic position of the operations function of a firm and gives an understanding of best principles and practices. The course covers the mission and strategy of a company and how that strategy feeds into the operations strategy ensuring that manufacturing and service delivery contribute to the success of the firm.
PREREQUISITES: SCM 801

NEW
SCM 843
Operations Management and Demand Fulfillment
OPERATIONS MGMT & DEMAND FULF. (3)
This course covers core concepts of the production function in the supply chain. It gives students an overview of the strategic position of the operations function of a firm and gives an understanding of best principles and practices in process design and control. It also gives students an overview of the basic foundations of project management, which is used to implement product and process improvements in the production functions of a firm.
The course also covers the supply chain activities related to demand planning and inventory management involved in the fulfillment of demand for finished goods. This will include a review of the Sales and Operations Planning (S&OP) framework and the role of demand planning in this framework. The students will develop a basic understanding of forecasting and inventory models, including how to evaluate the performance of these models and manage demand and lead time variability. The course will also help students understand the implications of setting service level targets on inventory, as well as manage cost and service tradeoffs in the demand fulfillment process.
Upon successful completion of this course, the student will be able to:
• Visualize production systems in terms of the environment, strategy, inputs, the transformation process, outputs, and a control mechanism
• Identify frameworks used in developing a business strategy and recall the components of competitiveness
• Appraise the strengths and weaknesses of transformation systems and select the most appropriate transformation system(s) for a product or service
• Interpret the purposes and methods of process monitoring and control
• Utilize project management for process improvement
• Demonstrate understanding of best practices in forecasting and inventory management
• Evaluate performance of different models
• Manage demand and lead time variability
PREREQUISITES: SCM 800

OLD
SCM 850
Supply Chain Design and Strategy
SC DESN AND STRAT (4)
Design and management of supply chain networks, emphasizing the alignment of supply chain networks with corporate competitive strategy. SCM 850 Supply Chain Design and Strategy (4) The focus of this course is the strategic design of supply chain networks. Supply chain design decisions have extraordinary impact on the cost and service value attributes of a product or service over its lifetime. The influence of supply chain design on a firm’s profitability and competitive positioning is one reason why competition today extends beyond firm versus firm to supply chain versus supply chain. Supply chain design decisions are among the most financially influential and long lasting business decisions and yet, supply chain designs should not be static.
Ever increasing customer requirements, expanding product lines and customer segments, decreasing product life cycles, and competitive pressures enabled by a growing range of flexible supply chain design constantly force supply chain executives to evaluate and modify their current supply chain networks and the role of the supply chain in their firm's overall strategy. This course provides an examination of (1) the role of supply chain network design within the context of the firm's competitive strategy, (2) alternative supply chain designs and the factors that influence network design decisions, (3) a framework for the network design process, and (4) the principal models and techniques used for the design of supply chain networks. After completing this course, students should have the knowledge, skills, and abilities to: 1. Explain the importance of achieving strategic fit between a firm's competitive strategy and the design of the firm's supply chain network. 2. Describe the basic decision making framework for achieving strategic fit. 3. Identify the key questions in network design for supply chains. 4. Identify the principal supply chain network design alternatives. 5. Enumerate the principal factors influencing choices among alternative supply chain designs. 6. Present a framework for the supply chain network design process. 7. Examine the principal models and techniques used for making network design decisions. 8. Consider the influence of demand and supply uncertainties on network design choices. Evaluation of students is based on individual and team case study submissions, a culminating simulation exercise, on-line discussion postings, and peer reviews. This course is prescribed for the on-line Master of Professional Studies in Supply Chain Management (MPS/SCM) and its taken in the second year of study, building on the supply chain knowledge, skills and abilities developed in previous foundation courses.

PREREQUISITES: SCM 800, SCM 810, SCM 820

NEW
SCM 850
Supply Chain Design and Strategy
SUPPLY CHAIN DESIGN & STRATEGY (3)
The focus of this course is the strategic design of supply chain networks. Supply chain design decisions have extraordinary impact on the cost and service value attributes of a product or service over its lifetime. The influence of supply chain design on a firm's profitability and competitive positioning is one reason why competition today extends beyond firm versus firm to supply chain versus supply chain. Supply chain design decisions are among the most financially influential and long-lasting business decisions and yet, supply chain designs should not be static. Ever increasing customer requirements, expanding product lines and customer segments, decreasing product life cycles, and competitive pressures enabled by a growing range of flexible supply chain designs constantly force supply chain executives to evaluate and modify their current supply chain networks and the role of the supply chain in their firm's overall strategy.

This course provides an examination of (1) the role of supply chain network design within the context of the firm's competitive strategy, (2) alternative supply chain designs and the factors that influence network design decisions, (3) a framework for the network design process, and (4) the principal models and techniques used for the design of supply chain networks.

Students successfully completing the course will be able to:
- Explain the importance of achieving strategic fit between a firm's competitive strategy and the design of the firm's supply chain network.
- Describe the basic decision-making framework for achieving strategic fit.
- Identify the key questions in network design for supply chains.
- Identify the principal supply chain network design alternatives.
- Enumerate the principal factors influencing choices among alternative supply chain designs.
- Present a framework for the supply chain network design process.
- Examine the principal models and techniques used for making network design decisions.
- Explain the influence of demand and supply uncertainties on network design choices.

PREREQUISITES: SCM 801, SCM 822, SCM 842

OLD
SCM 860
Supply Chain Transformation and Innovation
SC TRANSFORM (4)
Strategic supply chain transformation and innovation with emphasis on (re)configuration of key capabilities to achieve competitive advantages. SCM 860 Supply Chain Transformation and Innovation (4) This course focuses on strategic supply chain transformation, innovation, and organizational change. The course examines current issues and best practices with respect to supply chain strategy; value creation through design and redesign of supply chain capabilities; transformational outsourcing; supply chain role in new product design, development, and market introduction; technology adoption; and change management. Supply chain transformation initiatives offer firms great potential for improving profitability and competitive positioning, both within the market and within the supply chain. Because sustainable competitive advantage is not found in one set of supply chain capabilities, strategic transformations must constantly assemble and reassemble the key capabilities that give the firm and its supply chain successive temporary advantages. This assembling or redesigning of capabilities chains should be an on-going process as the most significant value producing capabilities in any given industry change over time. The ability to consistently assemble the set of capabilities that produce competitive advantages is what some refer to as the ultimate core capability. After completing this course, students should have the knowledge, skills, and abilities to:

1. Articulate the meaning of competitive strategy in the context of transformation of supply chain capabilities chains.
2. Understand value creation through transformation of supply chain capabilities over time.
3. Identify the supply chain structure that is appropriate for various business situations.
4. Examine the development of essential elements of rapid response supply chain capabilities.
5. Understand the conditions under which functional activities, such as, manufacturing, product design, and new concept development, are amenable to outsourcing.
6. Assess operational and strategic challenges of vertical integration and outsourcing and in particular, highlight the nature of the strategic tension created by supplier decisions to integrate vertically into capabilities previously performed by critical customers.
7. Articulate the role of supply chain transformation in support of new product development.
8. Identify ways to organize and lead change in organizations.

The evaluation of students is based on individual and team case study submissions, short paper and problem assignments, on-line discussion postings, and peer reviews. This prescribed course in the on-line Master of Professional Studies in Supply Chain Management (MPS/SCM) is the capstone course taken in the second year of study that integrates previous topics.

PREREQUISITES: SCM 80, SCM 810, SCM 820, SCM 830, SCM 840, SCM 850

NEW

SCM 860
Supply Chain Transformation and Innovation
SUPPLY CHAIN TRANSFORMATION (3)
Strategy, supply chain innovation, transformation, and leadership are the key themes throughout this course. This course is designed to address strategic management issues and offers many framework models for consideration. The course also includes leadership frameworks and insights for more impactful business management through transformational changes, risk mitigation, and crisis management.

The course is designed around four major subjects:

Fundamental Dimensions of Strategy
- Compare/contrast different perspectives on business strategy
- Connecting supply chain strategy to business strategy
- Best in class supply chain strategies: which one fits the mark?
- Supply chains within the context of volatility, market uncertainty, and disruptions
- Optimizing the Supply Chain Diamond: interdependence of customer satisfaction, asset utilization, revenue growth, and supply chain costs.

Supply Chain Innovation
- Disruptive innovation vs. frugal innovation
- How many SC innovations are truly revolutionary?
- What does it take to remain a SC leader?

Supply Chain Transformation
- Defining supply chain transformation: key strategies and capabilities
- Supply chain transformation process model
• Learning to live with complexity
• Distribution strategies for omni-channel
• Deep Dive: innovation, consumer-led transformation, and lead time reduction for long term revenue growth

Organizational and Personal Leadership
• Leading change: why transformation efforts fail?
• Change management during logistics outsourcing
• SC risk assessment, mitigation, and crisis management
• Leadership challenge: keeping pace with skills needed
• Professional career map for path forward after graduation

Upon successful completion of this course, students will be able to discuss, analyze, and demonstrate understanding of:
• Fundamental dimensions of strategy
• Connecting supply chain strategy to business strategy
• Guiding supply chains through recessionary, uncertain, and volatile business environments
• Different ways for businesses to innovate
• Strategies and capabilities for supply chain transformation
• Organizational leadership traits and models to drive success in the workplace
• Personal leadership including working constructively in virtual teams and peer feedback
• Creating a professional development framework for their careers

PREREQUISITES: SCM 801, SCM 822, SCM 842

### IE 555

**Statistical Process Monitoring and Analysis**

**STAT PROC MONITOR (3)**

Statistical techniques for univariate and multivariate monitoring of dependent and autocorrelated processes; theoretical and numerical approaches for analyzing performance. 

This is an advanced course in Statistical Process Control (SPC) techniques for process monitoring, one of the main areas of Quality Engineering (QE) methodology. The aim of QE methods is to improve the quality of products used by our society. The widespread and successful use of basic SPC methods have led to the development of many new techniques and procedures over the past 20 years that contribute to that high purpose. Students should have a background in basic statistical concepts including sampling and sampling distributions, hypothesis testing, confidence intervals, and analysis of variance (ANOVA). This course will give an overview of the traditional SPC methods and time series modeling background, then concentrate on some of the more useful recent developments including univariate and multivariate techniques to monitor autocorrelated data, detect special causes or out-of-control conditions, and identify process changepoint models. A number of practical applications in manufacturing and service fields including polymer processing, nanotechnology, health care, and global sustainability will be considered. The course objectives are to: (1) understand the basic business and economic principles of process monitoring; (2) know how to select, set up, and use monitoring charts effectively depending on the system characteristics; (3) understand the assumptions and theoretical foundations of process monitoring; and (4) understand and execute methods for comparing different monitoring strategies based on run length distributions. More broadly, students will also know how to research and critique the relevant literature and understand the needs for future research in the area. Students will be evaluated based on their performance on homework (25%), a mid-semester examination (25%), presentations (25%), a final course project (25%).

PROPOSED DROP: SP2020
Graduate Council
Program, Option, or Minor Proposal Form

Submit 1 original, signed Graduate Council proposal form and 2 hardcopies of the graduate program proposal document, with a copy of the signed proposal form attached to each proposal copy, to the Office of the Dean of the Graduate School, 211 Kern Building, University Park. For more information about the process, see the Overview of the Graduate Council Curricular Review Process.

The Program Proposal Procedures provide guidance for the development of a graduate program proposal. If you have questions regarding the preparation of a graduate program proposal or how to complete this Graduate Council proposal form, contact the Office of the Dean of the Graduate School.

College/School: College of Medicine
Department or Instructional Area: Biomedical Sciences Graduate Program

New Graduate Program, Option, or Minor: Add

Designation of new graduate program:
Classification of Instructional Programs (CIP) Code: ______________________
Designation of new graduate option: Cancer Biology (CB) Option
Designation of new graduate minor: ______________________________________________________________________

Indicate effective semester:
First semester following approval
Second semester following approval

Existing Graduate Program Option, or Minor: Change Drop

Current designation of graduate program: ________________________________
Current designation of graduate option: Biochemistry and Molecular Genetics (BMG) Option
Current designation of graduate minor: ________________________________

New designation of existing graduate program (if changing):
New designation of existing graduate option (if changing): Biochemistry, Genetics, and Genomics (BGG) Option
New designation of existing graduate minor (if changing):

Brief description of the change (if not noted above): Changes in curriculum

Indicate effective semester:
First semester following approval
Second semester following approval

Submitted by Graduate Program Head
Signed by Ralph L. Keil, Ph.D.
Printed name: ________________________________
Signature: ________________________________
Date: 1/28/19

Noted by College/School Representative to Graduate Council Subcommittee on New and Revised Programs and Courses:

Rebecca Craven, Ph.D.
Printed name: ________________________________
Signature: ________________________________
Date: 2/18/19

Approved by College/School Dean/Chancellor (or Designee):

Charles Lang, Ph.D.
Printed name: ________________________________
Signature: ________________________________
Date: 2/11/19
<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
<th>Signature</th>
<th>Date</th>
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<tbody>
<tr>
<td>On Behalf of David Babb</td>
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<td>10/8/2019</td>
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<tr>
<td>Recommended by Chair, Graduate Council</td>
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<td>Committee on New and Revised Programs and</td>
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<tr>
<td>On Behalf of Timothy McNellis</td>
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<td>10/8/2019</td>
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<td>Recommended by Chair, Graduate Council</td>
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<td>Committee on Programs and Courses:</td>
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<td>Noted by Dean of the Graduate School:</td>
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<tr>
<td>On Behalf of Regina Vasilatos-Youken</td>
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<td>10/8/2019</td>
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</tbody>
</table>
Proposal to

Add a Cancer Biology Option, rename and revise the Biochemistry and Molecular Genetics Option and make associated Program Changes for the Biomedical Science Graduate Program and its Options

SUBMITTED: January 31, 2019

Respectfully submitted by
Ralph L. Keil, Ph.D.
Chair, Biomedical Sciences Graduate Program

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I. Justification

We respectfully submit this proposal to 1) add the Cancer Biology (CB) Option to the Biomedical Sciences (BMS) Graduate Program, 2) make changes to the Biochemistry and Molecular Genetics (BMG) Option to reflect the increased number of faculty conducting research involving genomics, and 3) make associated minor modifications in the description of the BMS Graduate Program.

1) Addition of the CB Option will provide an important opportunity for students in the BMS Graduate Program to receive specific, interdisciplinary training in cancer biology, a major focus of graduate faculty research at the Penn State College of Medicine (COM), home of the BMS Graduate Program. The comprehensive CB curriculum includes five newly developed courses for this Option, and will address all essential elements of Cancer Biology graduate training that have been recommended at the national level (Welch et al., 2015 Cancer Research 75(24)1-4). The CB option will provide a fundamental core of cancer biology scholarship and standardized training across COM cancer research laboratories, while providing students with the flexibility to tailor their degree with an emphasis in basic, population, or clinical sciences.

The curriculum developed for the CB Option provides connections among the numerous students and faculty with research and educational interests in cancer biology at both the Hershey and University Park Campuses. As indicated in the consultation letter from Dr. Glick (attached), students at the University Park Campus are currently enrolled in some of the courses that will be required for the CB Option and the intent is to continue to make CB Option courses taught at Hershey available to interested individuals at both campuses.

2) Change the BMG Option to the Biochemistry, Genetics, and Genomics (BGG) Option to align with the increasing expertise in genomics among faculty in the BMS Graduate Program. Additional courses to provide appropriate background for students in these areas are added to the potential curriculum for students in this Option.

3) Other minor changes are included throughout the Bulletin listing to be consistent with the above two changes, and to make minor edits to correct issues in the new online Bulletin listing.
## II. Program Learning Objectives

<table>
<thead>
<tr>
<th>Table I: Program Learning Objectives (PLO)</th>
<th>Addresses Graduate Council Goal #</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Know:</strong> Graduates will demonstrate a) a broad base of the biological knowledge and concepts required to understand the molecular, cellular, and organismal processes related to biomedical sciences; b) a broad understanding of experimental approaches used to investigate biomedical problems; c) in-depth knowledge within their specific areas of research interests, and d) the highest standards of research ethics.</td>
<td>1, 2, 3, 4, 5</td>
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<tr>
<td><strong>2. Create:</strong> Graduates will creatively synthesize theory and literature to generate questions, ideas, or hypotheses addressing current problems in human health and disease, and will devise critical experimental approaches to test these ideas and hypotheses.</td>
<td>1, 2, 3, 4, 5</td>
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<td><strong>3. Apply:</strong> Graduates will perform independent and original research studies that address current problems in biomedical sciences leading to rigorous and reproducible experimental outcomes.</td>
<td>1, 2, 3, 4, 5</td>
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<td><strong>4. Critical thinking:</strong> Graduates will critically evaluate experimental approaches and results of their own research and the research of others.</td>
<td>1, 2, 3, 4, 5</td>
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<td><strong>5. Communicate:</strong> Graduates will convey ideas, experimental approaches, and results in clear, concise, well-organized papers, posters, proposals, oral presentations, and discussions.</td>
<td>1, 2, 3, 4, 5</td>
</tr>
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<td><strong>6. Professional practice:</strong> Graduates will collaborate in a collegial and ethical manner with other professionals within their field or with diverse scientific backgrounds.</td>
<td>1, 2, 3, 4, 5</td>
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<tr>
<td><strong>7. Career development:</strong> Graduates will evaluate potential careers to pursue following graduation and choose their specific career interest(s).</td>
<td>5</td>
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</tbody>
</table>
III. Option Requirements and New Courses Developed

1) Cancer Biology Option

Table 1: Curriculum to receive the Ph.D. degree in the BMS Graduate Program with the Option in Cancer Biology (CB)

<table>
<thead>
<tr>
<th>Course number</th>
<th>Title (credits)</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>BMS 502</td>
<td>Cell and Systems Biology (3)</td>
<td></td>
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<tr>
<td>BMS 503</td>
<td>Flow of Cellular Information (3)</td>
<td></td>
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<tr>
<td>BMS 504</td>
<td>Art of Scientific Communication I (1)</td>
<td></td>
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<tr>
<td>BMS 505</td>
<td>Art of Scientific Communication II (1)</td>
<td></td>
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<tr>
<td>BMS 591</td>
<td>Biomedical Research Ethics (1)</td>
<td></td>
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<tr>
<td>BMS 596</td>
<td>Individual Studies Research Rotation (2)</td>
<td></td>
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<tr>
<td>BMS 801</td>
<td>Writing Grant Proposals for Biomedical Research (1)</td>
<td></td>
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<tr>
<td>BMS 590</td>
<td>Colloquium (5); one credit each Spring semester</td>
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<tr>
<td></td>
<td>BMS 550 Fundamentals of Cancer Biology (1)</td>
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<td>BMS 551 Cancer Genetics (1)</td>
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<td></td>
<td>BMS 552 Tumor Metabolism (1)</td>
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<td></td>
<td>BMS 553 Cancer Biology Colloquium (2)</td>
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<td></td>
<td>BMS 554 Cancer Therapy and Immunology (2)</td>
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<td></td>
<td>At least 3 credits from the following courses:</td>
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<td>BCHEM 510 Carcinogenesis and Chemoprevention (2);</td>
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<td></td>
<td>BMS 568 Current Topics in Translational Cancer Research (2);</td>
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<td></td>
<td>BMS 571 Clinical Rotation (3); and/or</td>
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<td></td>
<td>PHS 552 Molecular Epidemiology (3)</td>
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<td></td>
<td>Electives (2; may include credits from BCHEM 510, BMS 568, BMS 571, and/or PHS 552 if more than 3 credits are taken from these courses)</td>
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</tbody>
</table>

Table legend: Courses in TURQUOISE shaded boxes are required for all students to receive a Ph.D. in the BMS Graduate Program ("base program" required credits). Courses without shading are required for the CB Option. Courses in red text are new or revised courses for the CB Option.
### Table 2: Curriculum to receive the M.S. degree in the BMS Graduate Program with the Option in Cancer Biology (CB)

<table>
<thead>
<tr>
<th>Course number</th>
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</thead>
<tbody>
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<td>Colloquium (2); one credit each Spring semester</td>
</tr>
<tr>
<td>BMS 550</td>
<td>Fundamentals of Cancer Biology (1)</td>
</tr>
<tr>
<td>BMS 551</td>
<td>Cancer Genetics (1)</td>
</tr>
<tr>
<td>BMS 552</td>
<td>Tumor Metabolism (1)</td>
</tr>
<tr>
<td>BMS 553</td>
<td>Cancer Biology Colloquium (2)</td>
</tr>
<tr>
<td>BMS 554</td>
<td>Cancer Therapy and Immunology (2)</td>
</tr>
<tr>
<td></td>
<td>At least 3 credits from the following courses:</td>
</tr>
<tr>
<td>BMS 550</td>
<td>BCHEM 510 Carcinogenesis and Chemoprevention (2);</td>
</tr>
<tr>
<td>BMS 552</td>
<td>BMS 568 Current Topics in Translational Cancer Research (2);</td>
</tr>
<tr>
<td>BMS 553</td>
<td>BMS 571 Clinical Rotation (3); and/or</td>
</tr>
<tr>
<td>PHS 552</td>
<td>PHS 552 Molecular Epidemiology (3)</td>
</tr>
<tr>
<td></td>
<td>Electives (3; may include credits from BCHEM 510, BMS 568, BMS 571,</td>
</tr>
<tr>
<td></td>
<td>and/or PHS 552 if more than 3 credits are taken from these courses)</td>
</tr>
</tbody>
</table>

**Table legend:** See legend for Table 1.
2) **Biochemistry, Genetics, and Genomics Option**

Table 3: Curriculum to receive the Ph.D. degree in the BMS Graduate Program with the Option in Biochemistry, Genetics, and Genomics (BGG)

<table>
<thead>
<tr>
<th>Course number</th>
<th>Title (credits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMS 502</td>
<td>Cell and Systems Biology (3)</td>
</tr>
<tr>
<td>BMS 503</td>
<td>Flow of Cellular Information (3)</td>
</tr>
<tr>
<td>BMS 504</td>
<td>Art of Scientific Communication I (1)</td>
</tr>
<tr>
<td>BMS 505</td>
<td>Art of Scientific Communication II (1)</td>
</tr>
<tr>
<td>BMS 501</td>
<td>Biomedical Research Ethics (1)</td>
</tr>
<tr>
<td>BMS 596</td>
<td>Individual Studies Research Rotation (2)</td>
</tr>
<tr>
<td>BMS 801</td>
<td>Writing Grant Proposals for Biomedical Research (1)</td>
</tr>
<tr>
<td>BMS 590</td>
<td>Colloquium (5); one credit each Spring semester</td>
</tr>
<tr>
<td>BMS 512</td>
<td>Data Analysis for the Biomedical Laboratory Scientist: A Practical Approach (2)</td>
</tr>
<tr>
<td>BCHEM 590</td>
<td>Colloquium (2)</td>
</tr>
<tr>
<td></td>
<td>At least 6 credits from the following courses:</td>
</tr>
<tr>
<td>BCHEM 522</td>
<td>Molecular Genetics: Genes to Genomes (3)</td>
</tr>
<tr>
<td>BCHEM 581</td>
<td>Enzymology: Structure, Energetics, and Function: A Structural Biology (1)</td>
</tr>
<tr>
<td>BCHEM 582</td>
<td>Enzymology: Structure, Energetics, and Function: B Practical Enzymology (1)</td>
</tr>
<tr>
<td>BCHEM 583</td>
<td>Enzymology: Structure, Energetics, and Function: C Mechanisms of Enzyme Reactions (1)</td>
</tr>
<tr>
<td>GENET 582</td>
<td>Genetics of Model Organisms: Molecular Genetic Analysis of Signaling Pathways (1)</td>
</tr>
<tr>
<td>GENET 587</td>
<td>Genetic Approaches to Biomedical Problems (3)</td>
</tr>
<tr>
<td>MCIBS 551</td>
<td>Genomics (3)</td>
</tr>
<tr>
<td>Electives</td>
<td>(2)</td>
</tr>
</tbody>
</table>

**Table legend:** See legend for Table 1.
Table 2: Curriculum to receive the M.S. degree in the BMS Graduate Program with the Option in Biochemistry, Genetics, and Genomics (BGG)

<table>
<thead>
<tr>
<th>Proposed curriculum for the M.S. degree in the BMS Graduate Program with the Option in Biochemistry, Genetics, and Genomics (32 total credits: 13 “base program” credits; 10 BGG-required credits; 6 credits of BMS 600; 3 elective credits)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course number</strong></td>
</tr>
<tr>
<td>:BMS 502:</td>
</tr>
<tr>
<td>:BMS 503:</td>
</tr>
<tr>
<td>:BMS 504:</td>
</tr>
<tr>
<td>:BMS 505:</td>
</tr>
<tr>
<td>:BMS 591:</td>
</tr>
<tr>
<td>:BMS 596:</td>
</tr>
<tr>
<td>:BMS 590:</td>
</tr>
<tr>
<td>:BMS 512:</td>
</tr>
<tr>
<td>:BCHEM 590:</td>
</tr>
<tr>
<td>At least 6 credits from the following courses:</td>
</tr>
<tr>
<td>:BCHEM 522:</td>
</tr>
<tr>
<td>:GENET 582:</td>
</tr>
<tr>
<td>:GENET 587:</td>
</tr>
<tr>
<td>:MCIBS 551:</td>
</tr>
<tr>
<td>:BMS 600:</td>
</tr>
<tr>
<td>Electives (3)</td>
</tr>
</tbody>
</table>

Table legend: See legend for Table 1.
IV. Bulletin Listing for the Program and its Options (including the Cancer Biology Option)

OVERVIEW https://bulletins.psu.edu/graduate/programs/majors/biomedical-sciences/

<table>
<thead>
<tr>
<th>Graduate Program Head</th>
<th>Ralph L. Keil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Code</td>
<td>BMS</td>
</tr>
<tr>
<td>Campus(es)</td>
<td>Hershey (Ph.D., M.S.)</td>
</tr>
<tr>
<td>Degrees Conferred</td>
<td>Doctor of Philosophy (Ph.D.)</td>
</tr>
<tr>
<td></td>
<td>Master of Science (M.S.)</td>
</tr>
<tr>
<td></td>
<td>Dual-Title Ph.D. in Biomedical Sciences and Clinical and Translational Science</td>
</tr>
<tr>
<td></td>
<td>Joint M.D./Ph.D. with the College of Medicine</td>
</tr>
</tbody>
</table>

The Biomedical Sciences (BMS) Graduate Program with its Options in Biochemistry, and Molecular Genetics, and Genomics, Cancer Biology, Cellular and Integrative Physiology, Translational Therapeutics, and Virology and Immunology provides students curricular training with a unique focus on human health and disease and the opportunity to concentrate in one or more disciplinary approaches including: biochemistry, biophysics, cell biology, genetics, immunology, pharmacology, physiology, structural biology, and virology. Students receive rigorous training that provides the skills necessary to be leaders in biomedical research and other endeavors that benefit from advanced rigorous scientific background training, including industry, education, intellectual property development, technology licensing, journalism, entrepreneurship, and public policy.

The BMS Graduate Program is an interdepartmental program that engages faculty from numerous basic science and clinical science departments. This broad-reaching program provides students a wide-ranging understanding of multiple disciplines with specific expertise in a chosen area, and encourages interdisciplinary research that is the hallmark of biomedical sciences in the 21st century.

ADMISSION REQUIREMENTS
https://bulletins.psu.edu/graduate/programs/majors/biomedical-sciences/#admissionrequirementstext

Applicants apply for admission to the program via the Graduate School application for admission. Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards.

1. Submission of online Penn State Graduate School application and payment of nonrefundable application fee
2. Graduate Record Examinations (GRE) general test scores
3. Three letters of recommendation
4. Statement of goals including
   a. reasons for applying to the BMS Graduate Program,
   b. previous research experiences,
   c. particular areas of research interests if known, and
   d. long-term career goals
5. Official transcripts from all post-secondary institutions attended; Note that post-secondary course
   work should include biochemistry and molecular biology or genetics.

DEGREE REQUIREMENTS
https://bulletins.psu.edu/graduate/programs/majors/biomedical-sciences/#degreerequirementstext

MASTER OF SCIENCE (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600
Research Degree Requirements. Although the BMS Graduate Program awards M.S. degrees, it does
not actively recruit students to earn M.S. degrees.
To receive the M.S. degree in BMS, at least 32 credits from courses at the 400, 500, 600, and 800
level are required, with at least 18 credits at the 500 and 600 level, combined.

REQUIRED COURSES

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMS 502</td>
<td>Cell and Systems Biology</td>
<td>3</td>
</tr>
<tr>
<td>BMS 503</td>
<td>Flow of Cellular Information</td>
<td>3</td>
</tr>
<tr>
<td>BMS 504</td>
<td>Art of Scientific Communication I</td>
<td>1</td>
</tr>
<tr>
<td>BMS 505</td>
<td>Art of Scientific Communication II</td>
<td>1</td>
</tr>
<tr>
<td>BMS 590</td>
<td>Colloquium</td>
<td>2</td>
</tr>
<tr>
<td>BMS 591</td>
<td>Biomedical Research Ethics</td>
<td>1</td>
</tr>
<tr>
<td>BMS 596</td>
<td>Individual Studies (Research Rotation)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Colloquium or Journal Club fulfilled by</td>
<td></td>
</tr>
<tr>
<td></td>
<td>taking 2 credits of any of the following:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BCHEM 590 Colloquium</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BMS 553 Cancer Biology Colloquium</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PHARM 590 Colloquium</td>
<td></td>
</tr>
</tbody>
</table>
### REQUIRED COURSES

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSIO 501</td>
<td>Scientific Analysis and Presentation</td>
</tr>
<tr>
<td>PHARM 590</td>
<td>Colloquium</td>
</tr>
<tr>
<td>MICRO 572</td>
<td>Literature Reports</td>
</tr>
<tr>
<td>MICRO 590</td>
<td>Colloquium</td>
</tr>
<tr>
<td>MICRO 572</td>
<td>Literature Reports</td>
</tr>
<tr>
<td>NEURO 590</td>
<td>Colloquium</td>
</tr>
<tr>
<td>VIRIM 580</td>
<td>Critical Reading in Immunobiology</td>
</tr>
</tbody>
</table>

### ELECTIVES

At least 11 credits of elective courses at the 500 or 800 level selected in consultation with the student’s thesis adviser and thesis committee.  

### THESIS RESEARCH

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMS 600</td>
<td>Thesis Research</td>
</tr>
</tbody>
</table>

**Total Credits**  

| Total Credits | 32 |

1 No more than 6 credits of BMS 600 may be counted toward the 32 credit minimum.

Each candidate for the M.S. degree must fulfill written and spoken English communication requirements that are satisfied by preparing written and oral reports describing the laboratory rotations during the first year.

Students must complete original laboratory research that culminates in a thesis. The thesis must be accepted by the master’s committee, the chair of the graduate program, and the Graduate School.

### DOCTOR OF PHILOSOPHY (PH.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements.

To receive the Ph.D. degree in Biomedical Sciences, at least 29 credits from courses at the 400, 500, 600, and 800 level are required.
## REQUIRED COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMS 502</td>
<td>Cell and Systems Biology</td>
<td>3</td>
</tr>
<tr>
<td>BMS 503</td>
<td>Flow of Cellular Information</td>
<td>3</td>
</tr>
<tr>
<td>BMS 504</td>
<td>Art of Scientific Communication I</td>
<td>1</td>
</tr>
<tr>
<td>BMS 505</td>
<td>Art of Scientific Communication II</td>
<td>1</td>
</tr>
<tr>
<td>BMS 590</td>
<td>Colloquium</td>
<td>5</td>
</tr>
<tr>
<td>BMS 591</td>
<td>Biomedical Research Ethics</td>
<td>1</td>
</tr>
<tr>
<td>BMS 596</td>
<td>Individual Studies (Research)</td>
<td>2</td>
</tr>
<tr>
<td>BMS 801</td>
<td>Writing Grant Proposals for Biomedical Research</td>
<td>1</td>
</tr>
</tbody>
</table>

Colloquium or Journal Club fulfilled by taking 2 credits of any of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCHEM 590</td>
<td>Colloquium</td>
<td></td>
</tr>
<tr>
<td>BMS 553</td>
<td>Cancer Biology Colloquium</td>
<td></td>
</tr>
<tr>
<td>PHARM 590</td>
<td>Colloquium</td>
<td></td>
</tr>
<tr>
<td>PSIO 501</td>
<td>Scientific Analysis and Presentation</td>
<td></td>
</tr>
<tr>
<td>MICRO 572</td>
<td>Literature Reports</td>
<td></td>
</tr>
<tr>
<td>MICRO 590</td>
<td>Colloquium</td>
<td></td>
</tr>
<tr>
<td>PSIO 501</td>
<td>Scientific Analysis and Presentation</td>
<td></td>
</tr>
<tr>
<td>PHARM 590</td>
<td>Colloquium</td>
<td></td>
</tr>
<tr>
<td>MICRO 590</td>
<td>Colloquium</td>
<td></td>
</tr>
<tr>
<td>MICRO 572</td>
<td>Literature Reports</td>
<td></td>
</tr>
<tr>
<td>NEURO 590</td>
<td>Colloquium</td>
<td></td>
</tr>
<tr>
<td>VIRIM 580</td>
<td>Critical Reading in Immunobiology</td>
<td></td>
</tr>
</tbody>
</table>

## ELECTIVES
REQUIRED COURSES

At least 10 credits of elective courses at the 500 or 800 level selected in consultation with the student's dissertation adviser and dissertation committee.

<table>
<thead>
<tr>
<th>Total Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>29</td>
</tr>
</tbody>
</table>

Each candidate for the Ph.D. degree must fulfill written and spoken English communication requirements that are satisfied by preparing written and oral reports describing the laboratory rotations during the first year.

The first-year Fall curriculum provides the student an understanding of basic cellular processes through a core curriculum that includes two integrated three-credit courses: Flow of Cellular Information (BMS 503) and Cell and Systems Biology (BMS 502). These courses develop concepts related to genome structure and function, regulation of gene expression, regulation of energy supply and demand, cellular and subcellular structures, cell-to-cell signaling, and the organization and function of cells in multicellular systems. The Fall curriculum also includes the one-credit Art of Scientific Communication I (BMS 504) course that reinforces concepts developed in the integrated courses and aids students in the transition from textbooks to primary literature as a source of information.

The first-year Spring curriculum offers an opportunity to explore one or more curricular paths that lead to entry into one of the Options or to design an individualized curricular path within the BMS Graduate Program. The Spring curriculum also includes the one-credit Art of Scientific Communication II (BMS 505) course that further develops the student's knowledge acquisition from the primary literature and assists improvement of presentation and writing skills necessary for subsequent journal clubs, literature-based courses, and scientific learning and discourse throughout their career.

In addition, students complete at least three research rotations during the first year that expose them to the wide range of research interests of the Penn State Graduate Faculty from both basic and clinical science departments at the College of Medicine in Hershey. These rotations serve to inform the students with regard to choosing a dissertation adviser and dissertation committee.

The BMS Graduate Program Executive Advisory Committee, which includes representation from the Program and each Option of the Program, advises students about academic and related matters until the student has a dissertation adviser. If desired, students formally make a decision to join an Option by the end of the Spring semester of their first year and must satisfy all admission requirements of the Option.

Students must have a dissertation adviser by the end of the summer of the first year. The student and dissertation adviser then plan additional course work and develop a research plan in consultation with the dissertation committee.

Curriculum in the second year is determined by the choice to participate in one of the Options, or an individualized curricular path designed by the student in consultation with the dissertation adviser and dissertation committee.

All doctoral students must pass a qualifying examination, a comprehensive examination, and a final oral examination (the dissertation defense). At the end of the first year, continuation in the Ph.D.
program is determined by performance in course work, laboratory rotations, and the BMS Graduate Program Qualifying Examination. Students join their research laboratory by the end of the summer of the first year.

Ph.D. students prepare a written comprehensive examination in the format of a grant application prior to the end of the fifth semester of enrollment. As part of this examination, the candidate also gives an oral presentation of this proposal to their dissertation committee.

To earn the Ph.D. degree, doctoral students must write a dissertation that is accepted by the dissertation committee, the chair of the graduate program, and the Graduate School. Students are required to have at least one first-author publication accepted or published based on their dissertation research prior to the final oral examination. A student may petition the Chair of the BMS Graduate Program to waive this requirement due to extenuating circumstances (e.g., adviser relocation, abnormal issues with publication process). All waivers must be approved by the Vice Dean for Research and Graduate Studies of the College of Medicine.

OPTIONS

The Options offered within the BMS Graduate Program provide the student a curricular specialization focused on different approaches to biomedical research.

**BIOCHEMISTRY, AND MOLECULAR GENETICS, AND GENOMICS (BGMG) OPTION**

The objective of the BGMG Option is to provide course work and laboratory training that focus on the principles and application of biochemical, and molecular genetic, and genomic analyses. These approaches play key roles in identifying and characterizing cellular processes and elucidating the structure and function of key macromolecules including DNA, RNA, proteins, lipids, and carbohydrates. The Option also stresses the biological intersections of these classes of macromolecules. The combination of didactic courses, colloquia, seminars, and laboratory research provides students with an integrated approach for applying biochemical, and molecular genetic, and genomic analyses to interrogate and manipulate basic cellular processes and macromolecules of biomedical significance. The training afforded by this Option exposes graduates to the fundamentals needed to experimentally address scientific questions in areas such as epigenetic control of gene expression, structure/function, biomolecular engineering, and systems analysis using genetic and biochemical approaches.

**ADMISSION REQUIREMENTS**

To be admitted to the BGMG Option, students must successfully complete:

1. the first year of the BMS Graduate Program, and
2. three research rotations, at least two with faculty in the BGMG Option.
DEGREE REQUIREMENTS FOR THE M.S.

In addition to the 13 credits of required BMS Core Courses for the M.S. degree and 6 credits of thesis research, students pursuing the M.S. degree in the BGM G Option must take:

**REQUIRED COURSES**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCHEM 521</td>
<td>Biochemistry: Structure/Function/Regulation of Biological Molecules</td>
<td>3</td>
</tr>
<tr>
<td>BMS 512 BCHEM 522</td>
<td>Data Analysis for the Biomedical Laboratory Scientist: A Practical Approach</td>
<td>2</td>
</tr>
<tr>
<td>BCHEM 590</td>
<td>Colloquium</td>
<td>2</td>
</tr>
<tr>
<td>BCHEM 522</td>
<td>Molecular Genetics: Genes to Genomes</td>
<td>3</td>
</tr>
<tr>
<td>BCHEM 581</td>
<td>Enzymology: Structure, Energetics, and Function: A Structural Biology</td>
<td>1</td>
</tr>
<tr>
<td>BCHEM 582</td>
<td>Enzymology: Structure, Energetics, and Function: B Practical Enzymology</td>
<td>1</td>
</tr>
<tr>
<td>BCHEM 583</td>
<td>Enzymology: Structure, Energetics, and Function: C</td>
<td>1</td>
</tr>
<tr>
<td>GENET 582</td>
<td>Genetics of Model Organisms: Molecular Genetic Analysis of Signaling Pathways</td>
<td>1</td>
</tr>
<tr>
<td>GENET 587</td>
<td>Genetic Approaches to Biomedical Problems</td>
<td>3</td>
</tr>
<tr>
<td>MCIBS 551 BMS 512</td>
<td>Genomics Data Analysis For The Biomedical Laboratory Scientist, A Practical Approach</td>
<td>3.2</td>
</tr>
</tbody>
</table>

At least 3 credits of 500-level elective courses selected in consultation with the student’s thesis adviser and thesis committee.

**Total Credits** 13

DEGREE REQUIREMENTS FOR THE PH.D.

In addition to the 17 credits of required BMS Core Courses for the Ph.D. degree, students pursuing the Ph.D. degree in the BGM G Option must take:
REQUIRED COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMS 512</td>
<td>Data Analysis for the Biomedical Laboratory Scientist: A Practical Approach</td>
<td>2.5</td>
</tr>
<tr>
<td>BCHEM 521</td>
<td>Biochemistry: Structure/Function/Regulation of Biological Molecules</td>
<td>2.5</td>
</tr>
<tr>
<td>BCHEM 590</td>
<td>Colloquium</td>
<td>2.5</td>
</tr>
<tr>
<td>BCHEM 522</td>
<td>Molecular Genetics: Genes to Genomes</td>
<td>3.0</td>
</tr>
<tr>
<td>BCHEM 581</td>
<td>Enzymology: Structure, Energetics, and Function: A Structural Biology</td>
<td>1.0</td>
</tr>
<tr>
<td>BCHEM 582</td>
<td>Enzymology: Structure, Energetics, and Function: B Practical Enzymology</td>
<td>1.0</td>
</tr>
<tr>
<td>BCHEM 583</td>
<td>Enzymology: Structure, Energetics, and Function: C Mechanisms of Enzyme Reactions</td>
<td>1.0</td>
</tr>
<tr>
<td>GENET 582</td>
<td>Genetics of Model Organisms: Molecular Genetic Analysis of Signaling Pathways</td>
<td>1.0</td>
</tr>
<tr>
<td>GENET 587</td>
<td>Genetic Approaches to Biomedical Problems</td>
<td>3.0</td>
</tr>
<tr>
<td>MCIBS 551</td>
<td>Genomics</td>
<td>3.0</td>
</tr>
</tbody>
</table>

At least 6 credits from the following courses:

- Molecular Genetics: Genes to Genomes
- Enzymology: Structure, Energetics, and Function: A Structural Biology
- Genetics of Model Organisms: Molecular Genetic Analysis of Signaling Pathways
- Genetic Approaches to Biomedical Problems
- Genomics

At least 2 credits of 500-level elective courses selected in consultation with the student's dissertation adviser and doctoral committee.

Total Credits: 12

CANCER BIOLOGY (CB) OPTION

The CB Option provides comprehensive, interdisciplinary training in cancer research, thus preparing students to pursue competitive careers in the field of cancer biology. The Option provides fundamental knowledge in cancer biology, while emphasizing state-of-the-art research approaches. The curriculum provides an appreciation for the dynamic nature of cancer research by exposing students to current paradigms in this quickly changing field of research. The CB Option includes courses that highlight essential knowledge of the basic cellular and molecular mechanisms underlying cancer etiology, cancer progression, and metastasis, together with an understanding of translational research and cancer treatment. The Option also allows flexibility for students to individually tailor their studies by choosing additional CB courses in basic, population, or clinical science aspects of cancer research. This intensive training program will prepare trainees for advanced careers in a variety of areas of cancer research.
ADMISSION REQUIREMENTS

To be admitted to the CB Option, students must successfully complete:

1. the first year of the BMS Graduate Program, and
2. three research rotations, at least two with faculty in the CB Option.

DEGREE REQUIREMENTS FOR THE M.S.

In addition to the 13 credits of required BMS Core Courses for the M.S. degree and 6 credits of thesis research, students pursuing the M.S. degree in the CB Option must take:

**REQUIRED COURSES**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMS 550</td>
<td>Fundamentals of Cancer Biology</td>
<td>1</td>
</tr>
<tr>
<td>BMS 551</td>
<td>Cancer Genetics</td>
<td>1</td>
</tr>
<tr>
<td>BMS 552</td>
<td>Tumor Metabolism</td>
<td>1</td>
</tr>
<tr>
<td>BMS 553</td>
<td>Cancer Biology Colloquium</td>
<td>2</td>
</tr>
<tr>
<td>BMS 554</td>
<td>Tumor Therapy and Immunobiology</td>
<td>2</td>
</tr>
<tr>
<td>BCHEM 510</td>
<td>At least 3 credits from the following courses:</td>
<td></td>
</tr>
<tr>
<td>BMS 568</td>
<td>Carcinogenesis and Chemoprevention</td>
<td>2</td>
</tr>
<tr>
<td>BMS 571</td>
<td>Current Topics in Translational Cancer Research</td>
<td>2</td>
</tr>
<tr>
<td>PHS 552</td>
<td>Clinical Rotation</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Molecular Epidemiology</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3 credits of 500-level elective courses selected in consultation with the student's thesis adviser and thesis committee.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits** 13

DEGREE REQUIREMENTS FOR THE PH.D.

In addition to the 17 credits of required BMS Core Courses for the Ph.D. degree, students pursuing the Ph.D. degree in the CB Option must take:
REQUIRED COURSES

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMS 550</td>
<td>Fundamentals of Cancer Biology</td>
<td>1</td>
</tr>
<tr>
<td>BMS 551</td>
<td>Cancer Genetics</td>
<td>1</td>
</tr>
<tr>
<td>BMS 552</td>
<td>Tumor Metabolism</td>
<td>1</td>
</tr>
<tr>
<td>BMS 553</td>
<td>Cancer Biology Colloquium</td>
<td>2</td>
</tr>
<tr>
<td>BMS 554</td>
<td>Tumor Therapy and Immunobiology</td>
<td>2</td>
</tr>
</tbody>
</table>

At least 3 credits from the following courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCHEM 510</td>
<td>Carcinogenesis and Chemoprevention</td>
<td>2</td>
</tr>
<tr>
<td>BMS 568</td>
<td>Current Topics in Translational Cancer Research</td>
<td>2</td>
</tr>
<tr>
<td>BMS 571</td>
<td>Clinical Rotation</td>
<td>3</td>
</tr>
<tr>
<td>PHS 552</td>
<td>Molecular Epidemiology</td>
<td>3</td>
</tr>
</tbody>
</table>

2 credits of 500-level elective courses selected in consultation with the student's thesis adviser and thesis committee. 2

Total Credits 12

CELLULAR AND INTEGRATIVE PHYSIOLOGY (CIP) OPTION

The objective of the CIP Option is to provide students training that focuses on cellular and integrative physiology, which includes the functions and interactions between different tissues and cell types and different organ systems. The training afforded by this Option exposes graduates to the fundamentals needed to experimentally address scientific questions in areas such as intracellular organization, and the regulation of key biological processes including cell signaling, ion channel and transport function, gene expression, protein translation and turnover, molecular motors, and intercellular communication. In addition, the Option stresses the importance of systems biology and inter-organ signaling to understand the biological basis of health and disease. The combination of didactic courses, colloquia, seminars, and laboratory research provides students with an integrated approach for applying advanced imaging, biochemical, and molecular analyses to interrogate and manipulate basic cellular processes and macromolecules of biomedical significance.

ADMISSION REQUIREMENTS

To be admitted to the CIP Option, students must successfully complete:

1. the first year of the BMS Graduate Program, and
2. three research rotations, at least two with faculty in the CIP Option.
DEGREE REQUIREMENTS FOR THE M.S.

In addition to the 13 credits of required BMS Core Courses for the M.S. degree and 6 credits of thesis research, students pursuing the M.S. degree in the CIP Option must take:

**REQUIRED COURSES**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSIO 504</td>
<td>Cellular and Integrative Physiology</td>
<td>3</td>
</tr>
<tr>
<td>PSIO 505</td>
<td>Cellular and Integrative Physiology II</td>
<td>3</td>
</tr>
<tr>
<td>BMS 581</td>
<td>Molecular and Translational Approaches to Human Disease</td>
<td>3</td>
</tr>
<tr>
<td>PSIO 501</td>
<td>Scientific Analysis and Presentation</td>
<td>2</td>
</tr>
</tbody>
</table>

At least 2 credits of 500-level elective courses selected in consultation with the student's thesis adviser and thesis committee. 2

**Total Credits** 13

DEGREE REQUIREMENTS FOR THE PH.D.

In addition to the 17 credits of required BMS Core Courses for the Ph.D. degree, students pursuing the Ph.D. degree in the CIP Option must take:

**REQUIRED COURSES**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSIO 504</td>
<td>Cellular and Integrative Physiology</td>
<td>3</td>
</tr>
<tr>
<td>PSIO 505</td>
<td>Cellular and Integrative Physiology II</td>
<td>3</td>
</tr>
<tr>
<td>BMS 581</td>
<td>Molecular and Translational Approaches to Human Disease</td>
<td>3</td>
</tr>
<tr>
<td>PSIO 501</td>
<td>Scientific Analysis and Presentation</td>
<td>2</td>
</tr>
</tbody>
</table>

At least 1 credit of a 500-level elective course selected in consultation with the student's dissertation adviser and dissertation committee. 1

**Total Credits** 12
**TRANSLATIONAL THERAPEUTICS (TT) OPTION**

The TT Option is designed to give students a combination of didactic instruction, informal interaction, and laboratory experience that enables them to obtain a firm foundation in the principles, methods, and contributions of pharmacology, defined broadly as the science of the interaction of chemical agents with biological systems. Of primary importance, this Option focuses on identification of disease targets, development of therapeutic strategies, and refinement of drug delivery approaches. With this preparation, graduates of the TT Option will be capable of designing and executing high-quality independent research, and of assuming positions of responsibility within the therapeutic community.

This Option offers studies in the general areas of drug discovery and development, molecular pathophysiology, drug metabolism, molecular pharmacology, endocrine pharmacology, neuropharmacology, cardiovascular-renal pharmacology, pharmacogenetics, and clinical pharmacology. Primary emphasis is placed on the molecular mechanism by which drugs act in the body and by which the body transforms drugs.

**ADMISSION REQUIREMENTS**

To be admitted to the TT Option, students must successfully complete:

1. the first year of the BMS Graduate Program, and
2. three research rotations, at least two with faculty in the TT Option.

**DEGREE REQUIREMENTS FOR THE M.S.**

In addition to the 13 credits of required BMS Core Courses for the M.S. degree and 6 credits of thesis research, students pursuing the M.S. degree in the TT Option must take:

**REQUIRED COURSES**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHARM 520</td>
<td>Principles of Drug Action</td>
<td>2</td>
</tr>
<tr>
<td>PHARM 551</td>
<td>Anti-infective Therapeutics</td>
<td>1</td>
</tr>
<tr>
<td>PHARM 552</td>
<td>Integrated System Pharmacology</td>
<td>1</td>
</tr>
<tr>
<td>PHARM 553</td>
<td>Gastrointestinal and Immunomodulatory Therapeutics</td>
<td>1</td>
</tr>
<tr>
<td>PHARM 554</td>
<td>Anticancer Therapeutics</td>
<td>1</td>
</tr>
<tr>
<td>PHARM 561</td>
<td>Neuropharmacology</td>
<td>2</td>
</tr>
</tbody>
</table>
### REQUIRED COURSES

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHARM 562</td>
<td>Endocrine Pharmacology</td>
<td>2</td>
</tr>
<tr>
<td>PHARM 590</td>
<td>Colloquium</td>
<td>1</td>
</tr>
</tbody>
</table>

At least 2 credits of 500-level elective courses selected in consultation with the student’s thesis advisor and thesis committee.

**Total Credits** 13

### DEGREE REQUIREMENTS FOR THE PH.D.

In addition to the 17 credits of required BMS Core Courses for the Ph.D. degree, students pursuing the Ph.D. degree in the TT Option must take:

### REQUIRED COURSES

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHARM 520</td>
<td>Principles of Drug Action</td>
<td>2</td>
</tr>
<tr>
<td>PHARM 551</td>
<td>Anti-infective Therapeutics</td>
<td>1</td>
</tr>
<tr>
<td>PHARM 552</td>
<td>Integrated System Pharmacology</td>
<td>1</td>
</tr>
<tr>
<td>PHARM 553</td>
<td>Gastrointestinal and Immunomodulatory Therapeutics</td>
<td>1</td>
</tr>
<tr>
<td>PHARM 554</td>
<td>Anticancer Therapeutics</td>
<td>1</td>
</tr>
<tr>
<td>PHARM 561</td>
<td>Neuropharmacology</td>
<td>2</td>
</tr>
<tr>
<td>PHARM 562</td>
<td>Endocrine Pharmacology</td>
<td>2</td>
</tr>
<tr>
<td>PHARM 590</td>
<td>Colloquium</td>
<td>1</td>
</tr>
</tbody>
</table>

At least 1 credit of a 500-level elective course selected in consultation with the candidate’s dissertation adviser and dissertation committee.

**Total Credits** 12
**Virology and Immunology (VIRIM) Option**

The objective of the VIRIM Option is to provide graduate students the opportunity to focus their graduate-level coursework and laboratory research in areas related to virology and immunology. The areas of research within virology include viral oncology, virus-cell interactions, the structure and assembly of viruses, functional role of viral gene products, the molecular biology of virus replication, and viral induced latency. The areas of research within immunology include adaptive and innate immunity, cellular and humoral immunity, antigen presentation, tumor immunology, vaccine development, and neuroimmunology. The VIRIM Option allows students to develop an integrative research approach using aspects of biochemistry, molecular and cellular biology, and genetics to approach scientific questions associated with areas of virology and immunology.

**Admission Requirements**

To be admitted to the VIRIM Option, students must successfully complete:

1. the first year of the BMS Graduate Program, and
2. three research rotations, at least two with faculty members in the VIRIM Option.

**Degree Requirements for the M.S.**

In addition to the 13 credits of required BMS Core Courses for the M.S. degree and 6 credits of thesis research, students pursuing the M.S. degree in the VIRIM Option must take:

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MICRO 550</td>
<td>Medical Microbiology</td>
<td>2</td>
</tr>
<tr>
<td>MICRO 581</td>
<td>Immunology A: Basic Concepts in Innate and Adaptive Immunity</td>
<td>1</td>
</tr>
<tr>
<td>MICRO 582</td>
<td>Immunology B: Adaptive Immunity</td>
<td>1</td>
</tr>
<tr>
<td>BMS 562</td>
<td>Principles of Immunology C: Dysfunction and Manipulation of the Immune System</td>
<td>1</td>
</tr>
<tr>
<td>or BMS 566</td>
<td>Viral Oncogenesis</td>
<td></td>
</tr>
<tr>
<td>BMS 564</td>
<td>Concepts in Virology</td>
<td>2</td>
</tr>
<tr>
<td>or MICRO 560</td>
<td>Concepts in Immunology</td>
<td></td>
</tr>
<tr>
<td>BMS 567</td>
<td>Viral Pathogenesis</td>
<td>1</td>
</tr>
</tbody>
</table>
REQUIRED COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENET 581</td>
<td>Genetics of Model Organisms: Bacterial and Viral Pathogenesis: A</td>
<td>1</td>
</tr>
<tr>
<td>MICRO 572</td>
<td>Literature Reports</td>
<td>1</td>
</tr>
<tr>
<td>or VIRIM 580</td>
<td>Critical Reading in Immunobiology</td>
<td></td>
</tr>
<tr>
<td>MICRO 590</td>
<td>Colloquium</td>
<td>1</td>
</tr>
</tbody>
</table>

At least 2 credits of 500-level elective courses selected in consultation with the student’s thesis adviser and thesis committee.

Total Credits 13

DEGREE REQUIREMENTS FOR THE PH.D.

In addition to the 17 credits of required BMS Core Courses for the Ph.D. degree, students pursuing the Ph.D. degree in the VIRIM Option must take:

REQUIRED COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MICRO 550</td>
<td>Medical Microbiology</td>
<td>2</td>
</tr>
<tr>
<td>MICRO 581</td>
<td>Immunology A: Basic Concepts in Innate and Adaptive Immunity</td>
<td>1</td>
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<td>1</td>
</tr>
<tr>
<td>BMS 562</td>
<td>Principles of Immunology C: Dysfunction and Manipulation of the Immune System</td>
<td>1</td>
</tr>
<tr>
<td>or BMS 566</td>
<td>Viral Oncogenesis</td>
<td></td>
</tr>
<tr>
<td>BMS 564</td>
<td>Concepts in Virology</td>
<td>2</td>
</tr>
<tr>
<td>or MICRO 560</td>
<td>Concepts in Immunology</td>
<td></td>
</tr>
<tr>
<td>BMS 567</td>
<td>Viral Pathogenesis</td>
<td>1</td>
</tr>
<tr>
<td>GENET 581</td>
<td>Genetics of Model Organisms: Bacterial and Viral Pathogenesis: A</td>
<td>1</td>
</tr>
</tbody>
</table>
### REQUIRED COURSES

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MICRO 572</td>
<td>Literature Reports</td>
<td>1</td>
</tr>
<tr>
<td>or VIRIM 580</td>
<td>Critical Reading in Immunobiology</td>
<td></td>
</tr>
<tr>
<td>MICRO 590</td>
<td>Colloquium</td>
<td>1</td>
</tr>
</tbody>
</table>

At least 1 credit of a 500-level elective course selected in consultation with the candidate’s dissertation adviser and dissertation committee.

**Total Credits** 12

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### DUAL-TITLES  [https://bulletins.psu.edu/graduate/programs/majors/biomedical-sciences/#dualtitletext](https://bulletins.psu.edu/graduate/programs/majors/biomedical-sciences/#dualtitletext)

### DUAL-TITLE PH.D. IN BIOMEDICAL SCIENCES AND CLINICAL AND TRANSLATIONAL SCIENCES

Requirements listed here are in addition to requirements listed in [GCAC-208 Dual-Title Graduate Degree Programs](https://bulletins.psu.edu/graduate/programs/majors/biomedical-sciences/#dualtitletext).

### ADMISSION REQUIREMENTS

Potential dual-title students can express an interest in the dual-title program as early as during the recruitment process for the BMS Graduate Program. Students must apply and be admitted to the graduate program in BMS and the Graduate School before they can apply for admission to the dual-title Ph.D. in Clinical and Translational Sciences (CTS). Refer to the Admission Requirements section of the Clinical and Translational Sciences Bulletin page. Students must apply and be admitted to the dual-title program in CTS prior to taking the qualifying exam.

### DEGREE REQUIREMENTS

To qualify for the dual-title degree in Biomedical Sciences and Clinical and Translational Sciences, students must satisfy the BMS Ph.D. degree requirements listed on the Degree Requirements tab. In addition, students pursuing the dual-title Ph.D. in BMS and CTS must complete the degree requirements for the dual-title CTS Ph.D., listed on the CTS Bulletin page. Up to 7 credits for the Ph.D. degree in BMS that overlap with the CTS elective requirements can be counted toward the CTS dual-title.

The choice of CTS electives is subject to approval by the student’s academic adviser(s) from the BMS and CTS programs. The electives should complement the student's work in BMS. A list of approved electives is maintained by the CTS program office.
The qualifying examination contains elements of both BMS and CTS. In accordance with Graduate Council policy, the qualifying examination committee must include at least one member of the CTS Graduate Faculty. Faculty with graduate appointments in both programs may serve in a combined role. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees, the dissertation committee must include at least one member of the CTS Graduate Faculty. Faculty members who hold appointments in the Graduate Faculty of both programs may serve in a combined role. If the chair of the dissertation committee is not a member of the Graduate Faculty in CTS, the member of the committee representing CTS must be appointed as co-chair. The fields of BMS and CTS will be integrated in the student’s comprehensive exam, and the dissertation committee member representing CTS is responsible for insuring coverage of information relevant to the CTS field of study.

The candidate must complete a dissertation on a topic that reflects their original research and education in both BMS and CTS. To earn the dual-title Ph.D. degree, the dissertation must be accepted by the dissertation committee, the chair of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

**JOINT DEGREES** [https://bulletins.psu.edu/graduate/programs/majors/biomedical-sciences/#jointdegreestext](https://bulletins.psu.edu/graduate/programs/majors/biomedical-sciences/#jointdegreestext)

**JOINT M.D./PH.D. WITH THE COLLEGE OF MEDICINE**

Requirements listed here are in addition to requirements listed in [GCAC-211 Joint Degree Programs](https://bulletins.psu.edu/graduate/programs/majors/biomedical-sciences/#jointdegreestext).

**ADMISSION REQUIREMENTS**

Prospective students interested in simultaneously pursuing a M.D. and Ph.D. degree must apply to the College of Medicine M.D. program using the national American Medical College Application Service (AMCAS) application system and indicate their intent to pursue the joint-degree program. Applicants must also meet the admission requirements of the Graduate School and the Ph.D. admission requirements listed on the Admission Requirements tab, however, GRE scores are not required. The M.D./Ph.D. Admissions Committee reviews applications and evaluates candidates for acceptance into both the M.D. and Ph.D. programs. After the review committee has accepted an applicant to the joint degree program, s/he must apply to the Graduate School for admission to the graduate program. Students must be admitted to the joint degree program prior to taking the first course they intend to count towards the graduate degree. Applicants not accepted into the joint-degree program may be referred to either the M.D. or Ph.D. program, depending on their qualifications.

Applicants to this program generally have very strong grades and MCAT scores, as well as a strong and sustained background in research. Applicants must be able to clearly articulate reasons for pursuing the joint degree. Letters of recommendation from faculty who have advised the applicant in research and who can comment on the applicant’s passion and potential for research are strongly encouraged.
DEGREE REQUIREMENTS

Students must fulfill all requirements for each degree in order to be awarded that degree. Degree requirements for the M.D. program are listed on the Penn State College of Medicine website. If students accepted into the joint degree program are unable to complete the M.D. degree, they are still eligible to receive the Ph.D. degree if all the Ph.D. degree requirements have been satisfied. During the first two years of medical school, the student conducts at least three research rotations. After successful completion of the first two years of medical school the student enters the BMS Graduate Program and may be admitted to one of its options.

During the summer after the second year of medical school M.D./Ph.D. students take Step 1 of the United States Medical Licensing Examination (USMLE), which serves as the qualifying examination for the BMS Graduate Program.

In addition to the requirements for the dissertation committee for a Ph.D. student in the BMS Graduate Program, at least one member of the dissertation committee must be on the M.D./Ph.D. Steering Committee. This member may serve other roles on the dissertation committee. M.D./Ph.D. students must complete 28 credits:

REQUIRED COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMS 502</td>
<td>Cell and Systems Biology</td>
<td>8</td>
</tr>
<tr>
<td>BMS 503</td>
<td>Flow of Cellular Information</td>
<td>8</td>
</tr>
<tr>
<td>BMS 596</td>
<td>Individual Studies</td>
<td>8</td>
</tr>
</tbody>
</table>

In addition to the curriculum of the first two years of medical school at the Penn State College of Medicine, all M.D./Ph.D. students in the BMS Graduate Program take the following core courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMS 506A</td>
<td>Biological Basis of Human Health and Disease A</td>
<td>2</td>
</tr>
<tr>
<td>BMS 506B</td>
<td>Biological Basis of Human Health and Disease B</td>
<td>2</td>
</tr>
<tr>
<td>BMS 512</td>
<td>Data Analysis for The Biomedical Laboratory Scientist A</td>
<td>2</td>
</tr>
<tr>
<td>BMS 590</td>
<td>Colloquium</td>
<td>4</td>
</tr>
<tr>
<td>BMS 591</td>
<td>Biomedical Research Ethics</td>
<td>1</td>
</tr>
<tr>
<td>BMS 801</td>
<td>Writing Grant Proposals for Biomedical Research</td>
<td>1</td>
</tr>
</tbody>
</table>
REQUIRED COURSES

In addition, students must take 2 credits of Colloquium or Journal Club, which is fulfilled by taking any of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCHEM 590</td>
<td>Colloquium</td>
</tr>
<tr>
<td>PSIO 501</td>
<td>Scientific Analysis and Presentation</td>
</tr>
<tr>
<td>PHARM 590</td>
<td>Colloquium</td>
</tr>
<tr>
<td>MICRO 590</td>
<td>Colloquium</td>
</tr>
<tr>
<td>MICRO 572</td>
<td>Literature Reports</td>
</tr>
<tr>
<td>NEURO 590</td>
<td>Colloquium</td>
</tr>
<tr>
<td>VIRIM 580</td>
<td>Critical Reading in Immunobiology</td>
</tr>
</tbody>
</table>

At least 6 elective credits of 500-level elective courses selected in consultation with the student’s dissertation adviser and dissertation committee.

Total Credits 28

The M.D./Ph.D. candidate prepares a written comprehensive examination in the format of a grant application and gives an oral presentation of this proposal to their dissertation committee.

A dissertation must be prepared and defended by each M.D./Ph.D. candidate. The dissertation must be accepted by the dissertation committee, the chair of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense). Students are required to have at least one first-author publication accepted or published based on their dissertation research prior to the final oral examination.

STUDENT AID https://bulletins.psu.edu/graduate/programs/majors/biomedical-sciences/#studentaidtext

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits set by The Graduate School.

COURSES https://bulletins.psu.edu/graduate/programs/majors/biomedical-sciences/#coursestext

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.
CONTACT https://bulletins.psu.edu/graduate/programs/majors/biomedical-sciences/#contacttext

Graduate Program Head: Ralph L. Keil
BMS Program Director: Lisa Shantz
Biochemistry and Molecular Genetics, and Genomics Option Director: Thomas Spratt
Cancer Biology Option Director: Rosalyn Irby
Cellular and Integrative Physiology Option Director: David Waning
Translational Therapeutics Option Director: Yun-Jong Yun
Virology and Immunology Option Director: Clare Sample
Primary Program Contact: Kristin Smith
Email: kec17@psu.edu
Mailing Address: H170, College of Medicine, 500 University Drive, Hershey, PA 17033
Telephone: (717) 531-1045
Program Website: Biomedical Sciences
V. Consultation

a. HY campus:
   i. Charles Lang: Associate Dean for Graduate Studies, Penn State College of Medicine (clang@pennstatehealth.psu.edu)
   ii. Kristin Eckert: Associate Director for Career Enhancement, Penn State Cancer Institute (kae4@psu.edu)
   iii. Thomas Spratt: Director, Biochemistry and Molecular Genetics Option of the Biomedical Sciences Graduate Program (tspratt@pennstatehealth.psu.edu)

b. UP campus:
   i. Jeffrey Peters: Deputy Director, Penn State Cancer Institute (jmp21@psu.edu)
   ii. Adam Glick: Director, MCIBS Cancer Biology Emphasis Program (abg11@psu.edu)
   iii. Dr. Cooduvalli Shashikant; Co-Director Bioinformatics and Genomics Graduate Program (css13@psu.edu)
Ralph L. Keil, Ph.D.
Professor of Biochemistry and Molecular Biology
Director, Biomedical Sciences Graduate Program
Penn State College of Medicine

February 8, 2019
Dear Dr. Keil,

I am writing to give my strongest support for the proposed program changes for the Biomedical Sciences Program: (i) establishment of the new option in Cancer Biology and (ii) a change from Biochemistry and Molecule Genetics Option to Biochemistry, Genetics, and Genomics Option.

Regarding the Cancer Biology Option, I have reviewed the proposed curriculum and programmatic elements in this new option, and have concluded that the structure and courses will offer students a thorough and well-rounded education in the biological processes underlying the development of cancer, as well as the option for a clinical rotation or a study of epidemiology. In addition, this option provides courses on cancer genetics, tumor metabolism, cancer therapy and immunology, translational approaches. Due to the institutional focus on building research programs in cancer in support of the Penn State Cancer Institute, this option will be highly valuable in supporting basic and translational research in cancer. I fully expect that the addition of this option will attract more students into our program given the significance of understanding the biological basis of cancer and the recent, exciting development of new therapeutic options resulting from basic sciences discoveries.

The change in the name of the Biochemistry, Genetics, and Genomics Option reflects the emphasis on emerging methods in genetics and genomics research, including epigenetics and structural studies of nucleic acids, proteins, lipids, and other metabolic macromolecules with significant roles in health and disease. Students in this program will learn essential skills to make progress in this important area of study. The importance of using genomics and epigenetics to study personalized medicine will attract students to this program. Moreover, with the expansion of high-resolution imaging techniques available for structural analysis, including the new cryo-electron microscope that can achieve atomic resolution, this area will be of high interests to students interested in cutting-edge structural biology.

In reviewing these options, I have concluded that these new opportunities are significant additions to our graduate program offerings and will not directly compete with other graduate programs at Penn State, including Molecular and Integrative Biosciences or Bioinformatics and Genomics, because of their unique focus on specific areas of concentration.

Best regards,

Leslie J. Parent, M.D.
Vice Dean for Research and Graduate Studies
11 December 2018

Ralph L. Keil, PhD
Chair, Biomedical Sciences Graduate Program

RE: Consultation on Program Change for the BMS Graduate Program

Dear Ralph,

Thank you for the opportunity to comment on the program changes that you have proposed for the BMS Graduate Program at the College of Medicine. The proposed changes are both timely and are of significant importance. As I read the proposal, there are two major changes to the current curricular structure that deserve comment. First, the development and inclusion of an Option in Cancer Biology. As an increasing number of prospective students are looking for formal training and course work in the general field of cancer biology, this new option will increase the attractiveness of the BMS Graduate Program, thereby increasing both the quantity and quality of recruited students. Moreover, the newly designed courses will provide necessary graduate-level training for students in other options and programs in areas that are currently under-developed. Importantly, the new option takes advantage of the increased number of both basic and clinical scientists whose research is cancer-related, providing a truly interdisciplinary training experience for your trainees. Overall, the Cancer Biology Option fills a major gap in the graduate programing at the College of Medicine. The second significant program change outlined is the proposed name change of the Option in Biochemistry and Molecular Genetics (BMG) to Biochemistry, Genetics, and Genomics (BGG). This name change complements and highlights the increasing number of faculty hires that have been made in the past several years with research interests in genomics. Moreover, the proposed name change not only better reflects the research strength of the College of Medicine but again is anticipated to expand student recruitment. As graduate students are an integral part of the research engine, these two important changes will undoubtedly reinforce and advance the research efforts at the College. In doing so, there is every reason to believe that these new programs will enhance and not compete with current graduate programs at the College and University.

In summary, I am extremely excited by these proposed changes, and the opportunity to grow and mature our largest graduate training program at the College of Medicine. I enthusiastically support the proposed changes and have no reservations. Thank you for the opportunity to comment.

Sincerely yours,

Charles H. Lang, PhD
Distinguished University Professor
Associate Dean Graduate Studies
Ralph Keil, Ph.D.
Department of Biochemistry & Molecular Biology
Penn State Hershey College of Medicine
Chair, Biomedical Sciences Graduate Program
Pennsylvania State University

Dear Ralph,

I am writing in full support of your proposal to add a Cancer Biology (CB) Option to the Biomedical Sciences Graduate Program at the Penn State College of Medicine. I am the Associate Director for Career Enhancement of the Penn State Cancer Institute (PSCI), and as such, I coordinate all cancer research education and training across the entire Penn State University. The proposed CB Option is vital to the PSCI’s mission, and developing this program is an essential component of a Cancer Center Support Grant application to the National Cancer Institute.

The CB Option is a natural fit for the College of Medicine, whose faculty has a long and outstanding record of basic cancer research and graduate student training. The new BMS courses created by the PSCI faculty to support the CB Option are cutting-edge, and reflect the level and breadth of cancer biology graduate training at the national level. Penn State is a member of the national Cancer Biology Training Consortium, and I expect that implementing the CB Option will elevate the visibility of Penn State among universities nationwide. Also, many of the current and past basic BMS trainees have engaged in cancer biology research for their dissertations, showing that there is great interest in this field of study. Therefore, I expect that adding a specific CB Option with specialized courses will ultimately increase the number of graduate students applying to the BMS Graduate Program each year.

Only one other graduate program focused on cancer biology exists at Penn State; namely, the Cancer Biology Emphasis Area within MCIBS at the University Park campus. However, the course requirements for this program and the training faculty do not overlap with those proposed for the BMS Cancer Biology Option. Indeed, the programs are best described as complementary, which will further enhance the already rich cancer research training environment present at Penn State.

In summary, I have reviewed the proposed curricular track, and find that it will serve a unique niche within our College, and will not overlap with any other graduate programs at Penn State.

Sincerely yours,

Kristin Eckert, Ph.D., Associate Director for Career Enhancement, Penn State Cancer Institute
Professor of Pathology and Biochemistry & Molecular Biology
Dear Ralph,

I am happy to be writing to you in response to your request for written consultation for the proposed changes to the Biomedical Sciences (BMS) Graduate Program. Having read your proposal, I fully support the proposed changes to the BMS program, in particular the addition of the Cancer Biology Option. This change would be of great benefit to the University's goal of attaining National Cancer Institute (NCI)-designation for our cancer center. This is due to the opportunity for training and mentoring in cancer biology that is incorporated directly into graduate education. Given the new guidelines outlined recently by NCI, education in cancer biology is a critical component for any cancer center seeking to attain NCI-designation. Thus, I view this change very enthusiastically. Moreover, given the strong interest in students in cancer research, providing a graduate option in this field will likely lead to strong student recruitments. Since the College of Medicine is juxtaposed to the Penn State Cancer Institute (PSCI) and integrally supportive of PSCI, this change in option should markedly improve the overall appeal of the BMS graduate program at the College of Medicine. It is worth noting that the University Park recently approved a similar change to the Molecular, Cellular and Integrative Biosciences (MCIBs) Graduate Program, and that this year's recruitment class consisted of at least 6 students who wanted to choose the Cancer Biology option in this program. I am confident that the change to the BMS program will have a similar, immediate impact. While there is some overlap in the programs by definition, I do not view this negatively since there is a need to provide students with suitable educational opportunities in cancer biology at all campuses, including Hershey and University Park. There are no other comparable programs at either Hershey and University Park, so the need for this change is critical. As noted above this is particularly true given the University's aspiration to attain NCI-designation of PSCI and this requires a strong and diverse educational component. This change will largely satisfy the portion of our planned submission that centers on graduate education. I strongly support this change. I would be happy to discuss this with you more if you have any other issues I may have omitted.

Best regards,

Jeff

Jeffrey M. Peters, Ph.D., A.T.S.
Distinguished Professor of Molecular Toxicology and Carcinogenesis
Deputy Director, The Penn State Cancer Institute
Center for Molecular Toxicology and Carcinogenesis
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(814) 863-1696 FAX
Ralph Keil
Chair, Biomedical Sciences Graduate Program
PennState College of Medicine, Hershey PA

January 5 2019

Dear Ralph,

I have been involved in Graduate Education at University Park since 2010 first as Chair of the Molecular Medicine IDGP program and for the last year as Chair of the Cancer Biology Emphasis Area in the MCIBS graduate program. Cancer is a significant research focus at both University Park and Hershey campuses. At the University Park campus at least 21 faculty from 7 different academic departments are engaged in cancer research. At Hershey campus there are an even larger number of faculty involved in cancer research. While the PSCI has brought together these faculty and facilitated interactions, collaborations and a commonality of purpose, what has been lacking on both campuses is an educational component to bring in and train graduate students in Cancer Biology. The new Cancer Biology option in the BMS graduate program described in this proposal fulfills this need on the Hershey campus. The required and elective courses for this option are well thought out, represent the strengths of the faculty doing cancer research at Hershey and reflect the breadth of essential knowledge required for graduate training in cancer research.

We recruited 6 students into the Cancer Biology Emphasis Area in MCIBS for the entering class of 2018, the first year it was available. This reflects the significant interest in cancer research among applicants to MCIBS and who in prior years were likely accepting offers at other universities that had meaningful cancer biology graduate programs. Thus I strongly believe that this new option in BMS will enable recruitment of a substantial number of new graduate students.

The courses listed for the Cancer Biology option do not substantially overlap with those offered for the MCIBS Cancer Biology Emphasis Area, and indeed significantly complement the courses available on the university park campus. Several students in the Cancer biology emphasis area will be taking one of these courses this semester by Zoom. In my opinion the CB option and cancer training for Penn State University as a whole would be strengthened by codifying in the text of the option proposal that UP Cancer Biology Emphasis area graduate students will be able to register and take these CB option courses. I believe this will greatly facilitate interaction and integration of cancer research between the two campuses.
One other point regarding the structure of the option. For the required courses, the following is indicated: At least 3 credits from the following courses: BCHEM 510; BMS 568; BMS 571; PHS 552. Since BCHEM 510 and BMS 568 are only listed as 2 credits each it seems likely to me that students will avoid taking these courses since it wouldn’t fulfill the 3 credit requirement. However it is possible that the program developers believe that these courses will be taken as the 2 credits of elective courses selected in consultation with the students advisor. If not, then I suggest making BCHEM 510 and BMS 568 3 credits otherwise enrollment may be affected.

Sincerely

Adam Glick, Ph.D.
Professor of Molecular Toxicology and Carcinogenesis
Department of Veterinary and Biomedical Sciences

Associate Chair MCIBS Graduate Program
Chair Cancer Biology Emphasis Area

The Pennsylvania State University
**BMS Response to Items in Dr. Glick’s Consultation**

1) Availability of Hershey courses for University Park students: We fully intend to make these courses available to students at the University Park campus whenever there are students interested in taking the courses. The Option description does not seem to be an appropriate place to codify this intent as the proposal lays out the requirements for students in the Option.

2) Course credits: The material to be presented in BCHEM 510 and BMS 568 only justifies these to be 2-credit courses. We anticipate that some students will take both these courses with one of the credits serving as an elective credit. There are several other CB-relevant 1-credit courses at Hershey that students can use to fill the other elective credit (e.g., BMS 566 Viral Oncogenesis; GENET 582 Genetics of Model Organisms: Molecular Genetic Analysis of Signaling Pathways).
Consultation from Dr. Craig Meyers  
Director NCI Viruses and Cancer Training Program

I have read over the application to add an option in Cancer Biology to the Biomedical Sciences graduate program at the Penn State College of Medicine. I agree that this could be a very important option but there are a couple of issues that have been overlooked. The first is the dilution of students in the various options that now exist. In addition to having a new option with the proposed Cancer Biology program two of the standing options have recently divided their options into two; Biochemistry and Molecular Genetics has proposed two tracks within their option and Virology and Immunology has created two tracks within their option. This has created a situation where there will be more courses than students, already many courses have only one or two students in them not making for the ideal situation for having fruitful discussions. Offering the course every other year is not a choice because students within an option or a particular track within an option are required to take the classes. While the Cancer Institute has hinted at provided funds to increase the number of students recruited each year, they have a history of promises and with only lip service it would be a reckless move to increase the number of students we recruit. In addition, to increase the number of options with the same number of students or even with a few more if the Cancer Institute comes through would still dilute the number of students taking the required courses fro each option.

The second issue is with the course requirements for the Cancer Biology option. There is no course on cancer caused by infectious agents; viruses bacteria, etc. With infectious cancer accounting for over 20% of all human cancers this is a major hole in the curriculum. The best way to rectify the problem would be to have a course that not only covers oncogenic viruses but covers all oncogenic infectious, for example Heliobacter which accounts for over 5% of human cancer worldwide is presently not included in any course that I know of. A less satisfactory proposal would be to mention BMS 566 Viral Oncogenesis as an option to fill out the required extra 3 credits the students would need. However, the students still would have to choose this course as it would not be required and this would still include non viral infectious cancers, but this could be rectified by including non viral infectious cancers in another course.

As for the Biochemistry option I agree with others that the GENET 581 Genetics of Model Organisms should be taken by the students in this option together with GENET 582 Molecular Genetic Analysis of Signaling Pathways.
BMS Response to Items in Dr. Meyer’s Consultation

1) “This has created a situation where there will be more courses than students, already many courses have only one or two students in them....”

During the initial discussions about forming the BMS Graduate Program and its Options, there was extensive discussion about this possibility. The outcome was the clear understanding that the Program was set up to evolve as the research and educational interests of our faculty and students change over time. This included the possibility of adding Options, changing curricular requirements of an Option, and the potential dissolution of existing Options. This evolution is a healthy and ongoing process that will reflect changes in the research directions of faculty at the College of Medicine. As indicated by the proposed name change to Biochemistry, Genetics, and Genomics and the proposed changes in the curriculum of that Option, a continued evaluation by each Option of its required curriculum is an ongoing process that the Program encourages. We expect that these changes will, in part, be driven by the number of students interested in taking specific courses. But, the Program leaves these decisions up to each Option as they rightfully should determine their required curriculum.

Two of the courses developed for the CB Option were offered in Spring 2019. Enrollment for these two courses was robust (11 students for Foundations and 8 students for Tumor Metabolism), despite the fact that the CB Option is not yet approved. Thus, no students are currently taking these courses as a requirement. These enrollment numbers demonstrate that BMS students in the existing options perceive a need for specific coursework in Cancer Biology. In addition, the CB Option expects to enroll students from the UP campus MCIBS-Cancer Biology emphasis area (Adam Glick, Director). Indeed, that is already the case for the Tumor Metabolism course being taught this semester.

2) Financial support for additional BMS graduate students

We agree that adding the CB Option is expected to increase visibility of the BMS Graduate Program nationwide, as only a few graduate schools offer PhD training specifically in cancer research. Financial support of an increased number of BMS students is clearly an important issue and the Dr. Ralph L. Keil, Chair of the BMS Graduate Program, has discussed this issue with Dr. Ray Hohl, Director of the Penn State Cancer Institute (PSCI), and Dr. Kristin Eckert, PSCI Associate Director for Career Enhancement. Since a graduate option in Cancer Biology is a key component for NCI designation of the PSCI as a Comprehensive Cancer Center, and Dr. Hohl is actively working to secure funding for additional student slots in the BMS Graduate Program.

Moreover, as the research enterprise at the College of Medicine expands, we also continue to press for increased funding to support additional student slots in the BMS Graduate Program from the Vice Dean for Research and Graduate Studies and the Associate Dean for Graduate Studies.

3) “The second issue is with the course requirements for the Cancer Biology option. There is no course on cancer caused by infectious agents; viruses, bacteria, etc”

This statement is misleading. Several courses developed specifically for the CB Option do, in fact, address the role of viruses and infectious agents and associated mechanisms,
although a specific course was not devoted to this topic. For instance, viral proteins that act as oncogenes/tumor suppressor genes are discussed in BMS 550; infectious agents contributing to genome instability are discussed in BMS 551, and viruses as carcinogens contributing to cancer progression are covered in BCHEM 510. Regarding a course devoted to non-viral infectious agents causing cancer, the curriculum reflects the research interests and expertise of faculty currently in the CB Option. We would certainly welcome a faculty member whose research includes this area who is willing to develop a future course that could be included in the curriculum of the CB Option.

Importantly, the CB Option was developed to be complementary to, not duplicative of, the VIRIM Option. For BMS students whose primary interest is in tumorigenic viruses (that is, cancer from the virus point of view), the VIRIM Option would be the appropriate choice. For students whose primary interest is in cancer biology (that is, cancer from a cellular point of view), the CB Option would be the appropriate choice. Using BMS 566 Viral Oncogenesis as an example: this is a required course for the VIRIM Option but a highly relevant elective course for students in the CB Option. The Graduate School wording about the requirements for an option is, “Each option in a graduate major requires at least a certain minimum number of specific course credits that are distinct to the option. The minimum number of these option-specific credits is the lesser of 18 credits or one-third (1/3) of the total number of course credits required for the major”; http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/gcac-207-degree-program-options/; italics added for emphasis). Our understanding is that a course that is required by one option, cannot be required by a second option. Our expectation is that a number of CB students may take this course as an elective. If our understanding of the Graduate School policy is not correct, the CB Option could include BMS 566 as a potential course that a student in this option could choose to fulfill the option-specific credit requirement.

4) “As for the Biochemistry option I agree with others that the GENET 581 Genetics of Model Organisms should be taken by the students in this option...”

As for the BMS 566 (above), GENET 581 is already a required course for the VIRIM Option and thus our understanding is that this cannot also be listed as a required course for another option.
February 11, 2019

Dear Ralph,

Thank you for this opportunity to comment on the proposal to add a Cancer Biology (CB) option and to rename the Biochemistry and Molecular Genetics (BMG) option to Biochemistry, Genetics and Genomics (BGG). I have carefully considered the proposal and believe that these changes are needed to further strengthen our Biomedical Sciences Graduate Program. The study of carcinogenesis is an inter-departmental discipline and numerous faculty have recently been hired that study cancer in the majority, if not all, of our basic sciences departments. Therefore, a specific curricular program is needed to ensure that our students are adequately prepared to complete their dissertation work in these labs, as well as the numerous established labs that focus on cancer biology. Moreover, as a significant portion of our clinical scientists on campus also study cancer, this option will serve as an important facet to facilitate collaborations aimed at translating lab discoveries to improve patient care- an increasingly important research requirement to secure NIH funding. In terms of changing BMG to BGG, since the establishment of the Institution of Personalized Medicine on campus approximately seven years ago, the Penn State College of Medicine has continued to recruit the computational biologists with the appropriate expertise to manage, mine, and deconvolute large digital datasets. This area of study is increasingly important in the fields of human biology and adding genomics-based classes to the current curriculum is needed. In addition, both the CB and BGG options will make us more competitive in attracting the very best students to our Biomedical Sciences Program. Having these options will make it more apparent to prospective students that these fields of study are well represented by our Graduate Faculty. Finally, I do not foresee that such changes will result in competition with other graduate programs. Rather, they will allow our students to further tailor their chosen curriculum to satisfy their personal interests. In summary, I have no hesitations in supporting these much-needed changes and please do not hesitate to contact me if I can be of further assistance.

With best regards,

Gregory S. Yochum, Ph.D.
February 11, 2019

Ralph L. Keil, PhD
Chair, Biomedical Sciences Graduate Program

RE: Consultation on Program Change for the BMS Graduate Program

Dear Ralph,

This is in response to your request for consultation regarding the new Cancer Biology option in the Biomedical Sciences (BMS) graduate program. I was part of the group that developed the option, and we are very excited about bringing this opportunity to our students interested in cancer biology. With a growing number of our interviewing students expressing an interest in cancer research, inclusion of this option will help us to enhance our efforts to attract the highest quality graduate students into the BMS program. We also have a critical mass of faculty who do both basic science and clinical cancer research, and this new option will take advantage of their expertise in the development of courses and identification of mentors for our students. As an example, I directed the first offering of BMS 550, Fundamentals of Cancer Biology, in January and February of this year, and we had 11 students registered for the course as an elective. This suggests we are filling an unmet need among our students in all options for training in cancer biology.

In summary, I strongly support the addition of this option to the Biomedical Sciences graduate program.

Sincerely yours,

Lisa M. Shantz, Ph.D.
Director, Biomedical Sciences Curricular Track
February 11, 2019

Ralph Keil, PhD  
Chair, Biomedical Sciences Graduate Program  
Penn State College of Medicine, Hershey PA

Dear Ralph,

I am happy to provide you with written consultation for the proposed changes to the Biomedical Sciences Graduate Program (BMS). I support this proposal to enact changes to the Biochemistry, Genetics, and Genomics Option (BGG) and the addition of a Cancer Biology Option (CB).

The changes proposed for the BGG Option will more closely align faculty expertise and current research efforts with interests of incoming students. The addition of the CB Option reflects the tremendous interest among graduate students entering their PhD studies and benefits the University’s goal of attaining National Cancer Institute (NCI)-designation for the Penn State Cancer Institute. Cancer biology and genomics are two important fields that will greatly help with recruitment to the BMS program by raising awareness of our faculty’s expertise.

The BGG Option will provide students with research training in computational methodologies and functional genomics with possibilities to specialize in various aspects of genetic research. A major advantage is the incorporation of bioinformatics with genomics in the research setting. The CB Option fills a critical need for education in cancer biology and serves the strong interest of students. This is an opportunity for training and mentoring in basic and clinical research with the adjacent Penn State Cancer Institute and the availability of a large cohort of clinical faculty on the Hershey campus.

There are no other comparable programs for either the BGG or CB Options at Penn State and these Options will aid in recruitment of strong students, and strengthen the education and research for BMS students.

Sincerely,

David Waning
Hi Ralph,
As we have extensively discussed in our BMS executive committee meetings, I am fully supportive of 1) addition of Cancer Biology (CB) option in BMS graduate program, and 2) changes to the Biochemistry and Molecular Genetics Option to become the Biochemistry, Genetics, and Genomics (BGG) Option in the BMS graduate program at Penn State College of Medicine.

After closer examination of the proposed CB option curricular track, I concluded that these changes do not overlap with any other graduate programs at Penn State. In fact, I believe CB curriculum will further strengthen our BMS graduate program (including Translational Therapeutics option) as a significant number of BMS faculty members are engaged in research areas of cancer biology as well as genome sciences. Importantly, I believe these changes will enhance the visibility of BMS graduate program, and will, therefore, significantly increase the number of potential applicants to BMS graduate program.

Sincerely,

Jong.

Jong Yun, Ph.D.
Associate Professor, Dept. of Pharmacology
Director, Translational Therapeutics Option, BMS
The Jake Gittlen Laboratories for Cancer Research
Penn State Hershey College of Medicine
Tel: 717-531-1508

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February 12, 2019

Ralph Keil, Ph.D.
Department of Biochemistry & Molecular Biology
Penn State Hershey College of Medicine
Chair, Biomedical Sciences Graduate Program
Penn State College of Medicine
Hershey, PA

Dear Ralph,

Thank you for the opportunity to review the program change proposed for the BMS Program, detailing the addition of a new option, Cancer Biology (CB), and a revised one, Biochemistry, Genetics and Genomics (BGG). Many students are interested in cancer, so I believe that the CB Option will be a popular one. It also fits with the focus in cancer at Penn State College of Medicine, particularly with the number of faculty recruited who have an interest in cancer, many of whom are members of the Penn State Cancer Institute. One concern that several faculty have is that this option will pull students from other options so it is reassuring to hear that monies are being sought to recruit additional students. There are plans to hire more faculty in the coming years so a larger graduate student body will be necessary. Although I think the students who will be interested in the CB Option are largely distinct from those who are interested in the other options, I look forward to a few of them taking BMS 566 Viral Oncogenesis, which is a requirement for the VIRIM Option. In addition, the CB Option offers courses that provide opportunities for electives to other students. I am also supportive of the changes implemented for the BGG Option, which now allows students to choose from an array of courses enabling them to select a genetic focus or a biochemical one based on individual interests, a change that will make the BGG Option more attractive to students. Together, I believe these changes will strengthen the BMS Program and increase the interest of prospective students, who increasingly express interest in these areas.

Sincerely,

VIRIM Option Director
1) how these changes reflect expanding research and graduate education strengths in Biochemistry, Genetics, and Genomics at the College of Medicine,

The primary goal of the new track of *Biochemistry, Genetics, and Genomics* is to educate PhD students so that they can design experiments to elucidate mechanisms by which the cell maintains homeostasis, and responds to external stimuli. The focus of much of the work will involve investigating biomolecular interactions such as protein-ligand, enzyme-substrate, protein-protein, protein-lipid, protein-DNA, protein-RNA, and DNA-RNA. Recent advances in genomic analysis technology has enabled these techniques to be readily used to study interactions involving nucleic acids. Therefore, we have and will continue to modify our curriculum to increase understanding in the design, implementation, and data analysis of these experiments.

2) the expected effect this change will have to increase the appeal of our Program to potential applicants and entrants given the high profile nature of this research area,

The field of genomics is new and has high interest among recent college graduate students. The courses that will be given will significantly increase our appeal to students.

3) that these changes add to, and do not compete against, other graduate programs at Penn State [e.g., Bioinformatics and Genomics (BG)].

With the changes in the tack we will not be competing with other programs at Penn State. In particular we will not be competing with the Bioinformatics and Genomics (BG) program

The goals of the BG are to:

- Provides students with educational and research training in broad areas of computational, evolutionary, and functional genomics
- Offers optional specialization in algorithms and computation and statistical genomics
- Delivers problem-based instruction, starting with exposure to bioinformatics and genomics tools and moving on to in-depth analysis of genomic and proteomic data

Our genomic-related goals are to

- Provides students with educational and research training in to carry out genomic analyses to elucidate significant biological problems involving biomolecular interactions.
- Delivers problem-based instruction, to demonstrate how genomic data can be utilized to elucidate molecular mechanisms involving nucleic acid metabolism involving themes such as regulation of RNA transcription and DNA replication and repair.

**Thomas E. Spratt**
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web: [http://sites.psu.edu/spratt](http://sites.psu.edu/spratt)
[https://orcid.org/0000-0002-6805-3729](https://orcid.org/0000-0002-6805-3729)
Hello Ralph,

Thanks for reaching out to me. As we discussed, I am supportive of change of the name of the Option to 'Biochemistry, Genetics and Genomics' in the BioMedical Science graduate program at Hershey. I do not see a conflict with the 'Bioinformatics and Genomics' program, which is active on both campuses. The growth of genomics has been pervasive and its influence on several fields is undeniable. I hope including 'Genomics' in the title will be more attractive to potential applicants considering BMS graduate program.

Best, Shashi

--
Cooduvalli S Shashikant
Associate Professor of Molecular and Developmental Biology Assistant Director for Graduate Training Initiatives
Co-Director, Bioinformatics and Genomics Graduate Program
Huck Institutes of the Life Sciences
The Pennsylvania State University
Office: 305 Wartik, Tel no: 814-883-5572 (cell)
Graduate Council
Program, Option, or Minor Proposal Form

Submit 1 original, signed Graduate Council proposal form and 2 hardcopies of the graduate program proposal document, with a copy of the signed proposal form attached to each proposal copy, to the Office of the Dean of the Graduate School, 211 Kern Building, University Park. For more information about the process, see the Overview of the Graduate Council Curricular Review Process.

The Program Proposal Procedures provide guidance for the development of a graduate program proposal. If you have questions regarding the preparation of a graduate program proposal or how to complete this Graduate Council proposal form, contact the Office of the Dean of the Graduate School.

College/School: Smear College of Business
Department or Instructional Area: Finance

New Graduate Program, Option, or Minor: Add
Designation of new graduate program:
Classification of Instructional Programs (CIP) Code: ____________
Designation of new graduate option:
Designation of new graduate minor:

Indicate effective semester:
First semester following approval
Second semester following approval

Existing Graduate Program Option, or Minor: Change Drop
Current designation of graduate program: Master of Finance in Corporate Finance
Current designation of graduate option:
Current designation of graduate minor:

New designation of existing graduate program (if changing):
New designation of existing graduate option (if changing):
New designation of existing graduate minor (if changing):

Brief description of the change (if not noted above): Change in course requirement FIN 577 to FIN 550

Indicate effective semester:
First semester following approval
Second semester following approval

Submitted by Graduate Program Head
William Kracaw
Printed name
Signature
Date: 7/15/19

Noted by College/School Representative to Graduate Council Subcommittee on New and Revised Programs and Courses:
Arvind Rangaswamy
Printed name
Signature
Date: 7/11/19

Approved by College/School Dean/Chancellor (or Designee):
Steven Huddart
Printed name
Signature
Date: 7/15/19
Recommended by Chair, Graduate Council Subcommittee on New and Revised Programs and Courses:

On Behalf of David Babb
Printed name
Signature
Date: 10/8/2019

Recommended by Chair, Graduate Council Committee on Programs and Courses:

On Behalf of Timothy McNellis
Printed name
Signature
Date: 10/8/2019

Noted by Dean of the Graduate School:

On Behalf of Regina Vasilatos-Younken
Printed name
Signature
Date: 10/8/2019
PROGRAM CHANGE PROPOSAL —
MASTER OF FINANCE IN CORPORATE FINANCE

THE PENNSYLVANIA STATE UNIVERSITY — SMEAL COLLEGE OF BUSINESS
DR. WILLIAM KRACAW, DEPARTMENT CHAIR, DAVID AND SHIRLEY SYKES PROFESSOR OF FINANCE
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A. Program Change Justification

The required course FIN 577 Financial Engineering and Corporate Strategy will be changed to FIN 550 Financial Analysis and Valuation. After conferring with faculty, it was decided that FIN 550 is a better fit for the overall program and student experience. FIN 550 builds upon and reinforces the theoretical and institutional finance frameworks learned in introductory business finance.

B. Learning Goals and Objectives

The Master of Finance in Corporate Finance Program Learning Goals and Objectives include:

1. **Broad Core of Finance Knowledge**
   CFIN graduates will master a broad core of financial and economic knowledge and be able to integrate and apply this knowledge to business situations as corporate managers and strategic partners in industries requiring interdisciplinary skills and global perspectives.

   **Learning Objectives:**
   - CFIN graduates will demonstrate advanced competency in the underlying concepts, theory, and tools taught in core finance and economics programs.
   - CFIN graduates will be prepared to apply their knowledge of finance, economics and markets to identify, analyze, and recommend solutions to complex corporate strategic problems and projects requiring interdisciplinary and global perspectives.

   **Assessment Method:** Course-embedded measure (FIN 550, FIN 831, FIN 855)

2. **Analytical and Critical Thinking Skills**
   CFIN graduates will develop analytical and critical thinking skills needed to excel in today’s business environment.

   **Learning Objectives:**
   - CFIN graduates will acquire the analytical and critical thinking skills needed to identify, analyze, and evaluate alternative solutions to problems and projects facing today’s corporate managers and strategic planners.
   - CFIN graduates will develop the skills needed to craft and implement unique and “cutting edge” strategic and tactical plans.
CFIN graduates will be able to articulate and defend their analysis and recommended solutions to multiple audiences from business, government, and the community.

CFIN graduates will be able to integrate findings and analysis from cutting edge academic and practitioner research to problems and projects confronting corporate America.

Assessment Method: Course-embedded measure (FIN 550, FIN 880, MGMT 861)

3. **Interpersonal Skills**

CFIN graduates will possess the interpersonal skills needed to impress hiring managers and become effective corporate managers and leaders.

Learning Objectives:

- CFIN graduates will be skilled at leadership, team building, interpersonal influence, and the management of change.

- CFIN graduates will be able to communicate and work effectively with others in work settings involving cultural and demographic diversity.

- CFIN graduates will become natural team leaders with the unique ability to identify and limit the phenomenon of “group think” that often plagues underperforming corporations. Graduates will draw out the high potential from their team members, leveraging the team’s ability to analyze problems from many points of reference.

Assessment Method: Course-embedded measure (BA 817, MGMT 861)

4. **Value System**

CFIN graduates will be able to evaluate the ethical and societal implications of the corporate strategic decision-making for which they are involved and responsible.

Learning Objectives:

- CFIN graduates will be skilled at evaluating the impact of various courses of action on multiple stakeholders, including investors, lenders, customers, and the broader community.

Assessment Method: Course-embedded measure (FIN 883)

These learning outcomes will be achieved by a combination of lectures by faculty and invited guest lecturers, reading of key literature, individual and team projects, and practical involvement in a corporate finance capstone experience.
C. Comparison of Changes

**Old Degree Requirements:**

There are 31 specified credits comprised of the following courses:

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<td>Spring – Modules III &amp; IV</td>
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D. Revised Bulletin

CORPORATE FINANCE

Graduate Program Head
William Kracaw
Program Code
CFIN
Campus(es)
University Park (M.Fin.)
Master of Finance (M.Fin.)

The Graduate Faculty

The Master of Finance in Corporate Finance program prepares graduates to stand out in a competitive job market by studying at a highly reputed business school with some of the world’s leading academic thinkers in finance and industry experts. This program provides students with the analytical skills grounded in finance and economics needed to successfully engage as corporate strategic managers. Students will gain the skills needed to succeed in today’s dynamic work environments, gain a firm understanding of issues and problems facing corporate management, develop an understanding and appreciation for leading edge research in corporate finance, and be prepared to become a successful corporate leader. World-class professors who are specialists in finance and economics will teach in the program. A solid foundation in finance, decision analysis, project management, accounting, valuation, market analysis, econometrics, and investment analysis will make the target audience more attractive to hiring managers and enable graduates to advance more rapidly into management and leadership positions.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 Admissions (http://gradschool.psu.edu/graduate-education-policies).

Educational Background

Applicants must:

- Hold either a baccalaureate degree from a regionally accredited U.S. institution or a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution.

- Submit GMAT or GRE results. Candidates who have demonstrated a strong academic background may apply for a GMAT/GRE waiver.

- Submit a completed online Graduate School Application for Admission (http://gradschool.psu.edu/prospective-students/how-to-apply), including nonrefundable application fee, a Statement of Purpose, resume, and two letters of recommendation.

- Submit official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission). Applicants who are still completing their baccalaureate requirements at the time of application may be provisionally admitted (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) to the Graduate School, pending the award of the baccalaureate degree; refer to GCAC-303 Provisional Admission (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission).
Language of Instruction
The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/gcac-305-admission-requirements-international-students) for more information.

Core Application Packet
• Completed official online Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply) and payment of nonrefundable application fee.
• Statement of Purpose: a 600 word essay articulating career and educational goals that demonstrate strong written communication skills.
• Résumé.
• Two letters of recommendation that attest to readiness for graduate study.
• Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission).
• GMAT or GRE results. Candidates who have demonstrated a strong academic background may apply for a GMAT/GRE waiver.
• Visa Application (International Candidates).
• Official English Language Proficiency Exam Scores (International Candidates).

Degree Requirements
Master of Finance (M.Fin.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Total number of total credits required for the CFIN program is 31 credits at the 400, 500, or 800 level, with at least 18 credits at the 500 or 800 level, and at least 6 credits at the 500 level.

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Culminating Experience
FIN 880 Corporate Finance Analytical Research Projects 2
(Capstone Course)

Total Credits 31

The CFIN program culminates with the capstone course, FIN 880 Corporate Finance Analytical Research Projects. FIN 880 combines multidisciplinary critical analysis and problem solving of corporate strategy in the context of a challenging business environment. The capstone course integrates all of the essential concepts involved in corporate financial decision making cultivated throughout the program.

The aim of the capstone is to assess students' ability to synthesize and integrate the skills they have developed throughout their course work. This course is structured to support student success in fulfilling program goals and requirements. The projects students tackle will mirror what they'll encounter on the job as a significant member of the corporate planning strategic management team. The course integrates topics and methodologies analyzed throughout the program, leading students to understand that corporate strategic analysis, and ultimately, the firm's ability to enhance shareholder value, is a holistic and multifaceted analytical process.

Student Aid
Refer to the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students in this program are not eligible for graduate assistantships.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Business Administration (BA) Course List (https://bulletins.psu.edu/university-course-descriptions/graduate/ba)
Finance (FIN) Course List (https://bulletins.psu.edu/university-course-descriptions/graduate/fin)

Learning Outcomes
The Master of Finance in Corporate Finance Program Learning Goals and Objectives include:

1. Broad Core of Finance Knowledge
   CFIN graduates will master a broad core of financial and economic knowledge and be able to integrate and apply this knowledge to business situations as corporate managers and strategic partners in industries requiring interdisciplinary skills and global perspectives. Learning Objectives:
   • CFIN graduates will demonstrate advanced competency in the underlying concepts, theory, and tools taught in core finance and economics programs.
   • CFIN graduates will be prepared to apply their knowledge of finance, economics and markets to identify, analyze, and recommend solutions to complex corporate strategic problems and projects requiring interdisciplinary and global perspectives.
2. Analytical and Critical Thinking Skills
CFIN graduates will develop analytical and critical thinking skills needed to excel in today's business environment.
Learning Objectives:
- CFIN graduates will acquire the analytical and critical thinking skills needed to identify, analyze, and evaluate alternative solutions to problems and projects facing today's corporate managers and strategic planners.
- CFIN graduates will develop the skills needed to craft and implement unique and “cutting edge” strategic and tactical plans.
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Learning Objectives:
- CFIN graduates will be skilled at evaluating the impact of various courses of action on multiple stakeholders, including investors, lenders, customers, and the broader community.

Assessment Method: Course-embedded measure (BA 817, MGMT 861)

These learning outcomes will be achieved by a combination of lectures by faculty and invited guest lecturers, reading of key literature, individual and team projects, and practical involvement in a corporate finance capstone experience.

Contact
Graduate Council
Program, Option, or Minor Proposal Form

Submit 1 original, signed Graduate Council proposal form and 2 hardcopies of the graduate program proposal document, with a copy of the signed proposal form attached to each proposal copy, to the Curriculum Coordinator, University Faculty Senate, 101 Kern Graduate Building, University Park. The proposals will be transmitted to the Office of the Dean of the Graduate School for entry into the Graduate Council curricular review process; for more information about the process, see the Overview of the Graduate Council Curricular Review Process.

The Program Proposal Procedures provide guidance for the development of a graduate program proposal. If you have questions regarding the preparation of a graduate program proposal or how to complete this Graduate Council proposal form, contact the Office of the Dean of the Graduate School.

College/School: College of Education
Department or Instructional Area: Education Policy Studies

New Graduate Program, Option, or Minor: □ Add
Designation of new graduate program: ____________________________
Classification of Instructional Programs (CIP) Code: ____________________________
Designation of new graduate option: ____________________________
Designation of new graduate minor: ____________________________

Indicate effective semester:
☑ First semester following approval
□ Second semester following approval

Existing Graduate Program Option, or Minor: □ Change
□ Drop
Current designation of graduate program: Educational Leadership
Current designation of graduate option: ____________________________
Current designation of graduate minor: ____________________________

New designation of existing graduate program (if changing):
New designation of existing graduate option (if changing):
New designation of existing graduate minor (if changing):

Brief description of the change (if not noted above): structural changes in Master's programs
Indicate effective semester:
□ First semester following approval
☑ Second semester following approval

Submitted by Graduate Program Head
David Gamsen
Printed name
Signature
Date: 5/6/19

Noted by College/School Representative to Graduate Council Subcommittee on New and Revised Programs and Courses:
John Holst
Printed name
Signature
Date: 5-6-19

Approved by College/School Dean/Chancellor (or Designee):
David Monk
Printed name
Signature
Date: 6/1/19
<table>
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**Recommended by Chair, Graduate Council Subcommittee on New and Revised Programs and Courses:**

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Proposal for Change in Program for Educational Leadership (EDLDR)

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III. Current Graduate Bulletin
IV. Proposed Graduate Bulletin
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VI. Letters of Support
I. Justification for Program Change

The faculty of the Educational Leadership (EDLDR) Program at Penn State University (PSU) affirm that regular revisions are important respective to continual growth and development of our rigorous instructional program. Renewed emphasis for equally rigorous assessment processes, both within the field of Educational Leadership and at PSU, along with changes called for and continuing to develop within current and relevant research, as well as the addition of new (junior and senior) faculty members who bring varied strengths and expertise to inform program development, taken together, form the impetus for changes as supported within this proposal. Overall, in the past, our professional degree program included a majority of scholarship (500) level courses and a great deal of reading and response activities to apply learning. Currently our program is in need of changes conducive to necessary assessment processes for knowledge and skills development, as well as enhanced activities for engagement with the learning, all comprised within proposed revisions appropriate for 800 level courses to be added to this professional program. Proposed changes included here are determined by:

- development of a fully formed and rapidly successful online program for two program emphases (school leader and teacher leader) and principal certification
- data-informed decisions about instructional improvement, specific to student learning outcomes from select courses, via assessment processes designed both for CAEP accreditation and for continual growth of program
- need for change following a decade of delivering the instructional program without necessary updates prudent within rigorous programs of higher learning
- review of survey results of a faculty/graduate student-initiated study of prospective EDLDR students exploring needs of learners from student perspective
- review of leadership standards specific to relevant governing bodies in our field including: Pennsylvania Inspired Leadership (PIL), Educational Leadership Constituent Council (ELCC), Interstate School Leaders Licensure Consortium (ISLLC), National Policy Board for Educational Administration (NPBEA), and the National Board for Leadership Preparation (NLP), as well as Teacher Leader Model Standards
- collaboration among EDLDR faculty with input from individuals with expertise in varied and specific areas of educational leadership content, and resulting decisions for instructional improvement about necessary revisions for EDLDR courses
- response to the need for increased influence, specifically the facilitation of instruction, from practitioners in K-12 to enhance learning from a first-hand experience perspective
- addition of new department leadership and new program leadership
- collaboration and leadership resulting from work of a sub-committee formed within and comprised of EDLDR faculty for the specific purpose of informing these changes
- requirement for program renewal as per end of five-year agreement made with PSU

We anticipate that these changes will have a positive impact on our enrollments by further enhancing the relevance of the program for incoming students and, thus, increasing the positive impact of future leaders in the field of education. Further, we feel these proposed changes are necessary for appropriately increasing the rigor of our program and providing enhanced focus on equitable leadership practices, connections between school/district leaders
and better alignment with continually evolving leadership standards. Although our program is already ranked among the top ten programs, we anticipate that these proposed changes, in combination with plans for further developing marketing and recruitment, specifically via increased connections with PA school districts for the School Leader program and on a global scale for the Teacher Leader program, will lead to increased enrollments overall. We anticipate a 20% increase in graduate applications to the program over the next three years and, thus, increased enrollments in the EDLDR program as a result.

As our program is not competitive with other Penn State programs, we do not anticipate any negative impact of these changes on the greater Penn State community. On the contrary, we project these changes to contribute to the continual improvement of instruction, not only for students in education leadership, but students enrolled in our courses from other Penn State programs as well. We expect these changes to enhance learning for all students interested in developing knowledge and skills for leadership in education.

Taken together, these factors provide the reason and information necessary to cultivate important and positive change to improve our instructional program. We anticipate that these program changes will serve only to increase our program enrollments. We have taken steps to prepare for efficient and effective communication to alleviate any potential confusion or disruption for students. We anticipate an official launch of program revisions at the earliest possible date following approval of governing bodies at Penn State University in support of our continual growth and development as a rigorous and competitive program of instruction for aspiring leaders in education.

II. Overview of Program Change

The faculty of Educational Leadership in Educational Policy Studies Department propose the program changes in the descriptions that follow. Please find an outline of proposed courses for M.Ed. Degree, for preparation of school leaders, which includes the pathway to Principal Certification, as well as changes that apply to the Principal Certificate program specifically. Additionally, please find an outline of proposed changes for M.Ed. Degree for preparation of teacher leaders, which includes a proposed pathway to teacher leadership endorsement certification through the Pennsylvania Department of Education and, as newly proposed in a separate document, a Certificate Program for Teacher Leaders through Penn State. For clarity, we present changes in the proposal, first for the school leader emphasis, and then followed by changes for the teacher leader emphasis.

School Leader Emphasis

For the informational purposes, please find below a list of the existing EDLDR Program requirements for M.Ed. with emphasis in School Leadership. Information provided in this section is organized with current program requirements in the left column, and proposed requirements in the right column. Subsections that follow will specify purpose for and explanation of proposed changes as applicable to each course. Courses in this section are numbered sequentially to demonstrate the 10, three-credit courses that make up the 30-credit program. Numbers with an asterisk (*) are designated as part of the 18 credits that make up the
Principal Certificate program. Numbers with two asterisks (**) are to call special attention to a proposed change in requirements for the principal certificate program, which would replace the past required EDLDR 579, School Finance, with the proposed EDLDR 841, Data Informed Leadership.

Further, while changes here (see below, right hand column) include added courses at the 800 level, (which keeps us in compliance with Penn State requirement for at least 18 credits at 500 level or higher), at least six of these credits (EDLDR 500 and EDLDR 595), as required, will remain at the 500 level.

<table>
<thead>
<tr>
<th>#</th>
<th>Current Course Prefix &amp; Name</th>
<th>Proposed Course Prefix &amp; Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Current Course Description</td>
<td>Proposed Course Description</td>
</tr>
<tr>
<td>1</td>
<td><strong>EDLDR 480 Introduction to Educational Leadership</strong></td>
<td><strong>EDLDR 480 Introduction to Educational Leadership</strong></td>
</tr>
<tr>
<td></td>
<td>Development of educational leadership. Relationships among local, state, &amp; federal agencies. Introduction to current concepts &amp; theories.</td>
<td>This course explores introductory topics relevant to the field of educational leadership including current concepts, theories, and practices.</td>
</tr>
<tr>
<td>2</td>
<td><strong>EDLDR 530 Leadership for Inclusive Education</strong></td>
<td><strong>EDLDR 831 Leadership for Equity and Diversity— Professional Practice</strong></td>
</tr>
<tr>
<td></td>
<td>In-depth analysis and discussion of the school leaders’ role in creating and sustaining an inclusive learning environment for all.</td>
<td>This course serves as an exploration of the school leader’s role in promoting equity and diversity for all members of the school community.</td>
</tr>
<tr>
<td>3</td>
<td><strong>EDLDR 540 Microcomputer Applications in Education</strong></td>
<td><strong>EDLDR 841 Data Informed Leadership— Professional Practice</strong></td>
</tr>
<tr>
<td></td>
<td>Development and use of simple to complex spreadsheet models to analyze common problems faced by educational administrators.</td>
<td>This course focuses on development of skills related to data use to inform administrative and leadership decisions in a school setting.</td>
</tr>
<tr>
<td>4</td>
<td><strong>CS 551 Curriculum Design: Theory and Practice</strong></td>
<td><strong>CS 551 Curriculum Design: Theory and Practice</strong></td>
</tr>
<tr>
<td></td>
<td>The analysis and use of the foundations which underlie models of curriculum design.</td>
<td>The analysis and use of the foundations which underlie models of curriculum design.</td>
</tr>
<tr>
<td>5</td>
<td><strong>EDLDR 559 School Improvement</strong></td>
<td><strong>EDLDR 859 School Improvement— Professional Practice</strong></td>
</tr>
<tr>
<td></td>
<td>The course examines how educational leaders at all levels can determine, promote, support, and achieve successful school improvement.</td>
<td>The course examines how educational leaders at all levels can determine, promote, support, and achieve successful school improvement.</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Program Description</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>EDLDR 560</td>
<td>Principles of Instructional Supervision</td>
<td>Social and institutional settings for instructional supervision; functions, activities, and practices of supervision; supervisory case studies.</td>
</tr>
<tr>
<td>EDLDR 861</td>
<td>Principles of Leadership—Professional Practice</td>
<td>The course explores critical concepts of leadership for instruction with an emphasis on skills in supervising, evaluating, and establishing a positive school culture for instructional staff.</td>
</tr>
<tr>
<td>EDLDR 568</td>
<td>The Principalship</td>
<td>Principles and practices of administration of elementary and secondary schools.</td>
</tr>
<tr>
<td>EDLDR 868</td>
<td>The Principalship—Professional Practice</td>
<td>The course focuses on understanding and developing principles, dispositions, and practices of school leadership in elementary and secondary schools.</td>
</tr>
<tr>
<td>EDLDR 576</td>
<td>The Law and Education</td>
<td>Legal bases for education; rights and responsibilities of school board members, administrators, teachers, students, and parents; due process.</td>
</tr>
<tr>
<td>EDLDR 876</td>
<td>The Law in Education—Professional Practice</td>
<td>This course focuses on understanding legal bases for education; rights and responsibilities of school board members, administrators, teachers, students, and parents; due process.</td>
</tr>
<tr>
<td>EDLDR 579</td>
<td>School Finance</td>
<td>Financial management concepts &amp; techniques for educators: district and school level budgeting process, hands-on budget prep workshop, &amp; budget management.</td>
</tr>
<tr>
<td>EDLDR 873</td>
<td>Money and Schools: Perspectives, Finance Policies, and Leadership</td>
<td>This course focuses on financing of public education, including values underlying system, revenue sources and taxation, school funding formulas, equity, and school finance reform.</td>
</tr>
<tr>
<td>EDLDR 595</td>
<td>Internship for Principals</td>
<td>Guided experience in a school or other educational organization in which the student is not regularly employed, under supervision of a graduate faculty member.</td>
</tr>
<tr>
<td>EDLDR 595</td>
<td>Internship for Educational Leaders</td>
<td>This course provides guided professionally-oriented experience in a school/other educational organization, including field experiences and internship activities, under supervision of graduate faculty member. Written/oral critique of activity required. Prerequisite: prior approval of program advisor.</td>
</tr>
</tbody>
</table>
Changes outlined below are organized into four categories of change including:

- Change in title and/or course description only
- Addition of 800 level courses
- Addition of 800 level course AND Change in requirement that apply specifically to the 18-credit Principal Certification program and also as a component of the 30-credit M.Ed. Degree program
- Addition of 800 level course AND Change in requirement specific only to the remaining 12 credits in the 30 total credits that make up the M.Ed. School Leadership program – Note: these courses do not apply to students enrolled in the Principal Certification program, although, students enrolled in M.Ed. degree program may pursue certification along with their degree

The following section include changes to title and/or course description only. Descriptions are changed to reflect updated elements advancement of content in the existing course.

<table>
<thead>
<tr>
<th>Current Course Prefix &amp; Name</th>
<th>Proposed 800 Level Prefix &amp; Name</th>
<th>Proposed 800 Level Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDLDR 480 Introduction to Educational Leadership</td>
<td>EDLDR 480 Introduction to Educational Leadership</td>
<td>This course explores introductory topics relevant to the field of educational leadership including: relationships among local, state, and federal agencies, current concepts and theories, and common leadership practices.</td>
</tr>
<tr>
<td>Development of educational leadership. Relationships among local, state, and federal agencies. Introduction to current concepts and theories.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EDLDR 595 Internship for Principals</td>
<td>EDLDR 595 Internship for Educational Leaders</td>
<td>This course provides guided professionally-oriented experience in a school or other educational organization, including field experiences and internship activities, under supervision of graduate faculty member. Written and oral critique of activity required. Prerequisite: prior approval of program advisor.</td>
</tr>
<tr>
<td>Guided experience in a school or other educational organization in which the student is not regularly employed, under supervision of a graduate faculty member.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Courses specified below indicate proposed addition of 800 level courses. Title change is included to differentiate new 800 level course from its related 500 level course. These proposed courses are designed not only to address content more specifically with regard to knowledge and methodologies as applied within leadership practice, but also to make way for additional highly qualified K-12 field-based practitioners to facilitate instruction from first-hand experience. Note: as noted in the complete program chart at the top of this section, the three
courses listed below are part of both the EDLDR M.Ed. with an emphasis in School Leadership AND the optional Principal Certificate Program component of that 30-credit degree.

<table>
<thead>
<tr>
<th>Current Course Prefix &amp; Name</th>
<th>Proposed 800 Level Prefix &amp; Name</th>
<th>Proposed 800 Level Description</th>
</tr>
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<tbody>
<tr>
<td>EDLDR 559 School Improvement</td>
<td>EDLDR 859 School Improvement — Professional Practice</td>
<td>The course examines how educational leaders at all levels can determine, promote, support, and achieve successful school improvement.</td>
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<td>EDLDR 568 The Principalship</td>
<td>EDLDR 868 The Principalship — Professional Practice</td>
<td>The course focuses on understanding and developing principles, dispositions, and practices of school leadership in elementary and secondary schools.</td>
</tr>
<tr>
<td>EDLDR 576 The Law and Education</td>
<td>EDLDR 876 The Law in Education — Professional Practice</td>
<td>This course focuses on understanding legal bases for education; rights and responsibilities of school board members, administrators, teachers, students, and parents; due process.</td>
</tr>
</tbody>
</table>

Changes proposed below depict the addition of an 800 level course and revised program requirements specific to the remaining courses in the 18-credit Principal Certification Program component of the EDLDR M.Ed. with an emphasis in School Leadership program (in addition to the list immediately above, as noted accordingly). Changes in requirements will also apply to those students taking these courses who are enrolled only in the Principal Certificate Program and thereby only completing the total 18 credits required in the Certificate program. In addition, one change is also requested that is specific only to the EDLDR M.Ed. with an emphasis in Teacher Leadership program (details to follow below).

In this section, EDLDR 841 is proposed to replace the existing EDLDR 579, School Finance course for Principal Certification program only. This decision was reached as a result of collaboration among faculty, as part of a sub-committee for program improvement. The school finance related content that is most relevant for school principals is being incorporated into the EDLDR 841, Data Informed Leadership proposed here, and also in the EDLDR 861, Principles of Instructional Leadership course (proposed within this document in a later section). The faculty feel that while specific content from the 579 course continues to be appropriate for those completing the EDLDR M.Ed. with an emphasis in School Leadership, a dedicated course in school finance is not as relevant as part of an already condensed 18-credit program of study, such as the Principal Certificate program. As select content is covered in it (along with broader
principal leadership topics focus, as described here), the Data Informed Leadership course is a better requirement as a dedicated course. As noted below, the EDLDR 841 course is also being proposed to replace a course for the M.Ed. program, however that fulfills a different requirement. The EDLDR 841 course also serves, in this way, to increase the efficiency of the program and enhance ability of the program to offer the course.

Likewise, while the proposed 861 Principles of Instructional Leadership course, still covers the important topic of “instructional supervision” within the overall course content, the faculty feel that a dedicated course that focuses more broadly on the study of “instructional leadership” better serves students interested in studying in preparation for principal practice.

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<thead>
<tr>
<th>Current Course Prefix &amp; Name</th>
<th>Proposed 800 Level Prefix &amp; Name</th>
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</thead>
<tbody>
<tr>
<td><strong>EDLDR 579 School Finance</strong></td>
<td>EDLDR 841 Data Informed Leadership—Professional Practice</td>
</tr>
<tr>
<td>Financial management concepts &amp; techniques for educators: district and school level budgeting process, hands-on budget prep workshop, &amp; budget management.</td>
<td>This course focuses on development of skills related to data use to inform administrative and leadership decisions in a school setting.</td>
</tr>
<tr>
<td><strong>EDLDR 560 Principles of Instructional Supervision</strong></td>
<td>EDLDR 861 Principles of Instructional Leadership—Professional Practice</td>
</tr>
<tr>
<td>Social and institutional settings for instructional supervision; functions, activities, and practices of supervision; supervisory case studies.</td>
<td>The course explores critical concepts of leadership for instruction with an emphasis on skills in supervising, evaluating, and establishing a positive school culture for instructional staff.</td>
</tr>
</tbody>
</table>

The next group of courses are specific to the 12 out of 30 credits remaining for completion of the EDLDR M.Ed. with an emphasis in School Leadership. Changes proposed below depict the addition of an 800 level course and revised program requirements specific to the remaining courses (in addition to the list immediately above) in the 30-credit EDLDR M.Ed. with an emphasis in School Leadership program. These courses do not apply to the Principal Certificate Program, although, students enrolled in this M.Ed. program may qualify for principal certification upon completion of the 18 other credits that are designated for the Certificate program. Courses identified below apply only to students completing the M.Ed. degree.

To date, as part of the existing M.Ed. program, as noted in the program comparison columns at the top, EDLDR 540, Microcomputer Applications in Education, and also EDLDR 530, Leadership for Inclusive Education, have been included as program requirements.

The EDLDR 540 course, similar to the 530 course, as described in the paragraph above, with time and the evolution of student needs, is too narrowly focused on one application of data in K-12 schools, that of using spreadsheets for data organization. The EDLDR 841 course is proposed to cover a broader focus on use of data to inform overall leadership practice. Based
upon current research, student feedback, and faculty discussion, the faculty feel this broader focus better serves aspiring leaders in preparation for practice. Please note that the 841 course is being proposed here to replace the EDLDR 540 requirement. As noted above, it is also being proposed to replace a course for the Principal Certificate program, however that fulfills a different requirement.

EDLDR 530 was too narrowly focused, and the faculty feel that EDLDR 531, as it more broadly addresses the matters of equity and diversity in K-12 schools, also more appropriately meets the needs of school leaders. Further, the faculty feel that Leadership for Equity and Diversity is an area of content missing from the Teacher Leadership emphasis program. Given that, with help from our C&I colleagues, a review of the CI 501 course syllabus revealed content for this course to cover advanced inquiry (already covered in our 894 Capstone course), and not introduction to inquiry as we had originally expected, it seems most appropriate to eliminate overlap in instruction by no longer requiring C&I 501 as part of our EDLDR M.Ed. with an emphasis in Teacher Leadership program, and instead to require the proposed EDLDR 831 Leadership for Equity and Diversity as a more suitable three-credit course to prepare teacher leaders for practice.

It has also been determined, after evaluation of the course, that the EDLDR 579 course requires extensive update and revision. History shows us that the EDLDR 579 course was designed for the purpose of taking content from the residential 573 course and putting it online for WC students. With the program being reviewed and revisions being proposed, the faculty have determined that one of these courses may better serve the needs of all students. With the recent addition of a new faculty member, a content expert in school finance, the EDLDR 573, Public School Finance course will be updated and developed residentially. Rather than spread faculty too thin developing two courses for similar content, the faculty propose that same updated 573 content should also be developed in an online environment for practitioners at the 800 level, specifically as EDLDR 873, and required of WC students completing Master’s Degree in Education for School Leadership preparation.

<table>
<thead>
<tr>
<th>Current Course Prefix &amp; Name</th>
<th>Proposed 800 Level Prefix &amp; Name</th>
<th>Current Course Description</th>
<th>Proposed 800 Level Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EDLDR 530 Leadership for Inclusive Education</strong></td>
<td><strong>EDLDR 831 Leadership for Equity and Diversity— Professional Practice</strong></td>
<td>In-depth analysis and discussion of the school leaders’ role in creating and sustaining an inclusive learning environment for all.</td>
<td>This course serves as an exploration of the school and teacher leader’s role in promoting equity and diversity for all members of the school community.</td>
</tr>
<tr>
<td><strong>EDLDR 540 Microcomputer Applications in Education</strong></td>
<td><strong>EDLDR 841 Data Informed Leadership— Professional Practice</strong></td>
<td>Development and use of simple to complex spreadsheet models to analyze common problems faced by educational administrators.</td>
<td>This course focuses on development of skills related to data use to inform administrative and leadership decisions in a school setting.</td>
</tr>
</tbody>
</table>
### Teacher Leadership Emphasis

For the informational purposes, please find below a list of the existing EDLDR Program requirements for M.Ed. with emphasis in Teacher Leadership. Information provided in this section is organized with current program requirements in the left column, and proposed requirements in the right column. Subsections that follow will specify purpose for, and explanation of, proposed changes as applicable to each course. Courses in this section are numbered sequentially to demonstrate the 10, three-credit courses that make up the 30-credit program. Numbers with an asterisk (*) are designated as part of the 12 credits that make up (newly proposed via a separate document) Teacher Certificate program.

Further, while changes here (see below, right hand column) include added electives for increase choice and flexibility in program for teacher leadership preparation, at least 18 credits are required at 500 level or higher, with at least six of these credits, as required by Penn State, will be selected at the 500 level of instruction. See Bulletin changes that follow for this stipulation to be explicitly stated.

Additionally, specific to individual courses previously required from other programs, reasons for proposed changes are outlined below.

<table>
<thead>
<tr>
<th><strong>EDLDR 579 School Finance</strong></th>
<th><strong>EDLDR 873 Money and Schools: Perspectives, Finance Policies, and Leadership</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial management concepts &amp; techniques for educators: district and school level budgeting process, hands-on budget prep workshop, &amp; budget management.</td>
<td>This course focuses on financing of public education, including values underlying system, revenue sources and taxation, school funding formulas, equity, and school finance reform.</td>
</tr>
</tbody>
</table>

The C&I 501 course has changed over time from an introductory level inquiry course taken at the start of a semester to a more comprehensive inquiry course with a full inquiry. This means content from C&I 501 now overlaps with EDLDR 894. Additionally C&I recommend that this is now a course for students to take at a more advanced level of instruction.

The C&I 551 course may continue to be appropriate for our Teacher Leaders, and we will continue to promote it, as advisors, for students interested in curricular work in schools. However, as part of our efforts to open elective options for the benefit of individualized curricula /to allow for our program to be less prescribed for aspiring teacher leaders, we no longer make this a requirement.
As described above, our revised TL program is designed to be more individualized (expanding electives) to student need/goals, specifically aligned with their aspired leadership lens. As advisors, we will continue to promote the C&I 563 course as a suggested ‘Open Elective’ as appropriate for an individualized plan of instruction where Staff Development applies.

These courses will remain, as they have served in the past, as an elective option for aspiring Teacher Leaders. We are simply expanding our electives to allow for more individualized instruction. While elective choices will include ADTED 505 and EDPSY 421, students will just not be limited to choosing only one.

<table>
<thead>
<tr>
<th>#</th>
<th>Current Course Prefix &amp; Name</th>
<th>Proposed Course Prefix &amp; Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Current Course Description</td>
<td>Proposed Course Description</td>
</tr>
<tr>
<td>1</td>
<td>CI 501 Teaching as Inquiry</td>
<td>Selected Course in Educational Leadership</td>
</tr>
<tr>
<td></td>
<td>This course guides teachers in developing systematic inquiries into effective teaching and learning.</td>
<td>Course to be determined by faculty advisor in collaboration with individual student</td>
</tr>
<tr>
<td>2</td>
<td>CS 551 Curriculum Design: Theory and Practice</td>
<td>Selected Course in Educational Leadership</td>
</tr>
<tr>
<td></td>
<td>The analysis and use of the foundations which underlie models of curriculum design.</td>
<td>Course to be determined by faculty advisor in collaboration with individual student</td>
</tr>
<tr>
<td>3</td>
<td>CS 563 Designing Staff Development Programs</td>
<td>Open Graduate Elective</td>
</tr>
<tr>
<td></td>
<td>Designing, implementing, and evaluating effective staff development programs for personnel in educational settings.</td>
<td>Course to be determined by faculty advisor in collaboration with individual student</td>
</tr>
<tr>
<td>4</td>
<td>ADTED 505 The Teaching of Adults OR EDPSY 421 Learning Processes in Relation to Educational Priorities</td>
<td>Open Graduate Elective</td>
</tr>
<tr>
<td></td>
<td>Examination of direct and indirect teaching; contracts, application of current technology, andragogy, motivation, evaluation; knowledge of research OR An introduction to the empirical study of variables and conditions that influence school learning</td>
<td>Course to be determined by faculty advisor in collaboration with individual student</td>
</tr>
<tr>
<td></td>
<td>Course Code</td>
<td>Course Title</td>
</tr>
<tr>
<td>---</td>
<td>-------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td></td>
<td>EDLDR 540</td>
<td>Microcomputer Applications in Education</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Development and use of simple to complex spreadsheet models to analyze common problems faced by educational administrators.</td>
</tr>
<tr>
<td>5</td>
<td>EDLDR 559</td>
<td>School Improvement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The course examines how educational leaders at all levels can determine, promote, support, and achieve successful school improvement.</td>
</tr>
<tr>
<td>6</td>
<td>EDLDR 560</td>
<td>Principles of Instructional Supervision</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Social and institutional settings for instructional supervision; functions, activities, and practices of supervision; supervisory case studies.</td>
</tr>
<tr>
<td>*7</td>
<td>EDLDR 801</td>
<td>Introduction to Teacher Leadership</td>
</tr>
<tr>
<td></td>
<td></td>
<td>This course focuses on understanding teacher leadership and its function within the school system.</td>
</tr>
<tr>
<td>*8</td>
<td>EDLDR 802</td>
<td>How Schools Work</td>
</tr>
<tr>
<td></td>
<td></td>
<td>This course focuses on understanding schools as organizations and how teacher leadership works in such organizations.</td>
</tr>
<tr>
<td>*9</td>
<td>EDLDR 894</td>
<td>Capstone Inquiry Course</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Completion and public presentation of an inquiry project reflecting an understanding of the five leadership strands</td>
</tr>
<tr>
<td>*10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Changes outlined below are organized into five categories of change including:

- Change in title and/or course description only
- Addition of 800 level courses
- Addition of 800 level course AND Change in requirement that apply specifically to the 30-credit M.Ed. Degree program
- Change from required course to an elective course determined by advisor in collaboration with individual student
Designation of core courses for newly proposed (separate document) Certificate Program in Teacher Leadership

The following section include changes to title and/or course description only. Descriptions are changed to reflect updated elements advancement of content in the existing course.

<table>
<thead>
<tr>
<th>Current Course Prefix &amp; Name</th>
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<tbody>
<tr>
<td>Current Course Description</td>
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</tr>
<tr>
<td>EDLDR 802 How Schools Work</td>
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</tr>
<tr>
<td>This course focuses on understanding schools as organizations and how teacher leadership works in such organizations.</td>
<td>This course focuses on understanding schools as organizations and how teacher leadership works in such organizations.</td>
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</table>

Courses specified below indicate proposed addition of 800 level courses. Title change is included to differentiate new 800 level course from its related 500 level course. These proposed courses are designed not only to address content more specifically with regard to knowledge and methodologies as applied within leadership practice, but also to make way for additional highly qualified K-12 field-based practitioners to facilitate instruction from first-hand experience.

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<td>Current Course Description</td>
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<tr>
<td>EDLDR 559 School Improvement</td>
<td>EDLDR 859 School Improvement—Professional Practice</td>
</tr>
<tr>
<td>The course examines how educational leaders at all levels can determine, promote, support, and achieve successful school improvement.</td>
<td>The course examines how educational leaders at all levels can determine, promote, support, and achieve successful school improvement.</td>
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</table>

Changes proposed below depict the addition of an 800 level course and revised program requirements specific to the remaining courses in the EDLDR M.Ed. with an emphasis in Teacher Leadership program (in addition to the list immediately above, as noted accordingly).

The EDLDR 540 course, with time and the evolution of student needs, is too narrowly focused on one application of data in K-12 schools, that of using spreadsheets for data organization. The EDLDR 841 course is proposed to cover a broader focus on use of data to inform overall leadership practice. Based upon current research, student feedback, and faculty discussion, the faculty feel this broader focus better serves aspiring leaders in preparation for practice. Please note that the 841 course is being proposed here to replace the EDLDR 540 requirement.

Likewise, while the proposed 861 Principles of Instructional Leadership course, still covers the important topic of “instructional supervision” within the overall course content, the faculty feel
that a dedicated course that focuses more broadly on the study of “instructional leadership” better serves students interested in studying in preparation for principal practice.

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<th>Current Course Prefix &amp; Name</th>
<th>Proposed 800 Level Prefix &amp; Name</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current Course Description</strong></td>
<td><strong>Proposed 800 Level Description</strong></td>
</tr>
<tr>
<td><strong>EDLDR 560 Principles of Instructional Supervision</strong></td>
<td><strong>EDLDR 861 Principles of Instructional Leadership—Professional Practice</strong></td>
</tr>
<tr>
<td>Social and institutional settings for instructional supervision; functions, activities, and practices of supervision; supervisory case studies.</td>
<td>The course explores critical concepts of leadership for instruction with an emphasis on skills in supervising, evaluating, and establishing a positive school culture for instructional staff.</td>
</tr>
<tr>
<td><strong>EDLDR 540 Microcomputer Applications in Education</strong></td>
<td><strong>EDLDR 841 Data Informed Leadership—Professional Practice</strong></td>
</tr>
<tr>
<td>Development and use of simple to complex spreadsheet models to analyze common problems faced by educational administrators.</td>
<td>This course focuses on development of skills related to data use to inform administrative and leadership decisions in a school setting.</td>
</tr>
</tbody>
</table>

To date, as part of the existing Teacher Leadership emphasis within the EDLDR M.Ed. program, as noted in the program comparison columns at the top, 10 total courses are specified as required for completion of the program. The faculty feel that this level of specification is too restrictive for the preparation of teacher leaders for the profession. Rather, the faculty propose a program that provides six courses or 18 credits that are required, leaving room for four additional elective courses to be determined in collaboration between student and assigned advisor. This revised program, provides aspiring teacher leaders with flexibility to pursue study in courses that reflect their individual goals and cater to their instructional needs. For example, a teacher leader working as a mentor for new teachers at the elementary level may require more course work in teacher development and organizational change than perhaps a subject-area coordinator for mathematics who, in turn, require more courses in Math Education. This proposed program plan also provides for additional development of skills specific to intentionality and strategy that are required of teacher leaders preparing for the profession.

<table>
<thead>
<tr>
<th>Current Course Prefix &amp; Name</th>
<th>Proposed 800 Level Prefix &amp; Name</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current Course Description</strong></td>
<td><strong>Proposed 800 Level Description</strong></td>
</tr>
<tr>
<td><strong>CI 501 Teaching as Inquiry</strong></td>
<td>Selected Course in Educational Leadership</td>
</tr>
<tr>
<td>This course guides teachers in developing systematic inquiries into effective teaching and learning.</td>
<td>Course to be determined by faculty advisor in collaboration with individual student</td>
</tr>
<tr>
<td><strong>CS 551 Curriculum Design: Theory and Practice</strong></td>
<td>Selected Course in Educational Leadership</td>
</tr>
<tr>
<td>The analysis and use of the foundations which underlie models of curriculum design.</td>
<td>Course to be determined by faculty advisor in collaboration with individual student</td>
</tr>
</tbody>
</table>
CS 563 Designing Staff Development Programs
Designing, implementing, and evaluating effective staff development programs for personnel in educational settings.
Course to be determined by faculty advisor in collaboration with individual student

ADTED 505 The Teaching of Adults OR EDPSY 421 Learning Processes in Relation to Educational Priorities
Examination of direct and indirect teaching; contracts, application of current technology, andragogy, motivation, evaluation; knowledge of research OR An introduction to the empirical study of variables and conditions that influence school learning
Course to be determined by faculty advisor in collaboration with individual student

As detailed in a separate document included with this package for program changes in Educational Leadership, the faculty propose the following courses as required for Teacher Leadership Certificate from Penn State. We feel confident that the establishment of a Teacher Leadership Certificate Program will enable our program to continue to attract interest among audiences both outside of PA and internationally. In this way, a Teacher Leader Certificate Program, along with emerging plans for increased marketing and recruitment, both inside the department and in collaboration with World Campus, enables us to be increasingly competitive in a burgeoning area of need in education, that of preparing teacher leaders for leadership roles in education.

<table>
<thead>
<tr>
<th>Current Course Prefix &amp; Name</th>
<th>Proposed 800 Level Prefix &amp; Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Course Description</td>
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<tr>
<td><strong>EDLDR 560 Principles of Instructional Supervision</strong></td>
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<tr>
<td>Social and institutional settings for instructional supervision; functions, activities, and practices of supervision; supervisory case studies.</td>
<td>The course explores critical concepts of leadership for instruction with an emphasis on skills in supervising, evaluating, and establishing a positive school culture for instructional staff.</td>
</tr>
<tr>
<td><strong>EDLDR 801 Introduction to Teacher Leadership</strong></td>
<td><strong>EDLDR 801 Introduction to Teacher Leadership</strong></td>
</tr>
<tr>
<td>This course focuses on understanding teacher leadership and its function within the school system</td>
<td>This course focuses on understanding teacher leadership and its function within the school system</td>
</tr>
<tr>
<td><strong>EDLDR 802 How Schools Work</strong></td>
<td><strong>EDLDR 802 How Schools Work</strong></td>
</tr>
<tr>
<td>This course focuses on understanding schools as organizations and how teacher leadership works in such organizations.</td>
<td>This course focuses on understanding schools as organizations and how teacher leadership works in such organizations.</td>
</tr>
</tbody>
</table>
### EDLDR 894 Capstone Inquiry Course

| Completion and public presentation of an inquiry project reflecting an understanding of the five leadership strands | Completion and public presentation of an inquiry project reflecting an understanding of knowledge, skills, and competencies that teachers need to assume leadership roles in their schools/districts. |

**Summary:** The proposed program modifications included in this document are the result of thoughtful committee work as a faculty, over a period of 18 months to:

1. evaluate and determine necessary course revisions;
2. evaluate and ascertain program efficiency and effectiveness and the resulting needs identified from such evaluation; and
3. review proposal recommendations, as proposed here, to ensure proposal meets needs as identified by work as explained above and in accordance with the development of high quality instruction for Penn State students of Educational Leadership.

Student feedback, current research, and the expertise of EDLDR faculty informed conclusions leading to these suggestions. At this time, we have also prepared and submitted for review of the Committee, a detailed proposal for related course changes via the Penn State curriculum review web system. Further, included in this package for review is a program renewal request for our Principal Certification Program, and a proposal for a new Certificate Program in Teacher Leadership. The EDLDR faculty enthusiastically anticipate full implementation of these proposed program changes.
Graduate work in the Educational Leadership program encompasses two major career paths. The first path focuses on those who want to engage in a wide variety of leadership roles within and directly affecting schools and districts. These roles include, but are not limited to: teacher leadership, instructional leadership, principal leadership, and district-level leadership. This path may also lead to certification and/or letters of endorsement in supervision, the principalship or the superintendent. The second path focuses on those who want to exercise leadership roles in educational policy arenas and/or engage in educational research. Possible roles include: intermediate unit officials, state and federal agency administrators and staff, professors of educational administration, and research and development personnel. The principalship certification is also available at Penn State Harrisburg. The teacher leadership path and principal certification may also be pursued in the online M.Ed.

The M.Ed. in Educational Leadership is designed for students who wish to pursue leadership positions in educational organizations.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 Admissions (http://gradschool.psu.edu/graduate-education-policies).

The Educational Leadership program requires all graduate program applicants to submit:

- three letters of recommendation,
- official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission),
- a brief personal statement of intent, and
- a current resume or curriculum vita.

Applicants must present evidence of at least a 3.0 grade-point average in the last two years of undergraduate work. A grade-point average of 3.50 in prior graduate work is required of those desiring admission to enter a doctoral program. The best-qualified students will be accepted up to the number of spaces available. Special backgrounds and experiences may allow for conditional admission to those not meeting stated criteria, at the discretion of the program.

Applicants are required to submit a writing sample. For master’s degree applicants, this should be a reflection paper. Doctoral degree applicants should submit a writing sample that reviews and critiques an academic article related to education leadership or education policy that affects education leaders.

Official scores from the GRE, the Miller Analogy Test, or the Law School Admissions Test (LSAT) from within the last 5 years are required.

Degree Requirements

Master of Education (M.Ed.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

All candidates for the M.Ed. degree will complete a minimum of 30 credits, with at least 18 credits at the 500 or 800 level, and at least 6 credits at the 500 level. M.Ed. students also must complete a capstone project as described below.

The three designated emphases for the Educational Leadership M.Ed. are Teacher Leadership, School Leadership, and General Leadership.

Teacher Leadership (Online)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDLDR 540</td>
<td>Technology Applications in Educational Leadership</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 559</td>
<td>School Improvement</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 560</td>
<td>Principles of Instructional Supervision</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR/C-S 551</td>
<td>Curriculum Design: Theory and Practice</td>
<td>3</td>
</tr>
<tr>
<td>CI 501</td>
<td>Teaching as Inquiry</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 801</td>
<td>Introduction to Teacher Leadership</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 802</td>
<td>How Schools Work</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR/C-S 563</td>
<td>Designing Staff Development Programs</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 505</td>
<td>The Teaching of Adults</td>
<td>3</td>
</tr>
<tr>
<td>or EDPSY 421</td>
<td>Learning Processes in Relation to Educational Practices</td>
<td></td>
</tr>
</tbody>
</table>

Culminating Experience

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDLDR 894</td>
<td><strong>SPECIAL TOPICS</strong> (Capstone Inquiry Course)</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 30

The final course (EDLDR 894) is a project-based course that represents the culmination of academic work toward the M.Ed. degree. Course requirements involve the development of a final capstone project focused on evaluation, analysis, or application of concepts first introduced and developed over the course of the student’s M.Ed. program. The project should be planned in coordination with an EDLDR faculty member who agrees to serve as the student’s adviser for this project and must reflect an appropriate degree of graduate-level scholarship, as determined by the adviser.
School Leadership (Online)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDLDR 540</td>
<td>Technology Applications in Educational Leadership</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 559</td>
<td>School Improvement</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 560</td>
<td>Principles of Instructional Supervision</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR/C-S 551</td>
<td>Curriculum Design: Theory and Practice</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 480</td>
<td>Introduction to Educational Leadership</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 530</td>
<td>Leadership for Inclusive Education</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 568</td>
<td>The Principalship</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 576</td>
<td>The Law and Education</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 579</td>
<td>Financial Management for Schools</td>
<td>3</td>
</tr>
</tbody>
</table>

Culminating Experience

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDLDR 595</td>
<td>Internship</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 30

The final course (EDLDR 595) is a project-based course that represents the culmination of academic work toward the M.Ed. degree. Course requirements involve the development of a final capstone project focused on evaluation, analysis, or application of concepts first introduced and developed over the course of the student’s M.Ed. program. The project should be planned in coordination with an EDLDR faculty member who agrees to serve as the student’s adviser for this project and must reflect an appropriate degree of graduate-level scholarship, as determined by the adviser.

General M.Ed. (Residential)

18 credits of Educational Leadership coursework required, with a total of 30 credits, inclusive of EDLDR 596. This emphasis is created and defined through the interaction of student and adviser based on the student’s career path.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDLDR 480</td>
<td>Introduction to Educational Leadership</td>
<td></td>
</tr>
<tr>
<td>EDLDR 530</td>
<td>Leadership for Inclusive Education</td>
<td></td>
</tr>
<tr>
<td>EDLDR 540</td>
<td>Technology Applications in Educational Leadership</td>
<td></td>
</tr>
<tr>
<td>EDLDR 559</td>
<td>School Improvement</td>
<td></td>
</tr>
<tr>
<td>EDLDR 560</td>
<td>Principles of Instructional Supervision</td>
<td></td>
</tr>
<tr>
<td>EDLDR 576</td>
<td>The Law and Education</td>
<td></td>
</tr>
<tr>
<td>EDLDR 579</td>
<td>Financial Management for Schools</td>
<td></td>
</tr>
</tbody>
</table>

Electives 9

The final course (EDLDR 596) is a project-based course that represents the culmination of academic work toward the M.Ed. degree. Course requirements involve the development of a final capstone project focused on evaluation, analysis, or application of concepts first introduced and developed over the course of the student’s M.Ed. program. The project should be planned in coordination with an EDLDR faculty member who agrees to serve as the student’s adviser for this project and must reflect an appropriate degree of graduate-level scholarship, as determined by the adviser.

Doctor of Education (D.Ed.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Expectations of candidates for both the D.Ed. and Ph.D. are high in the field of research competence and require the ability to identify and conceptualize a research problem for the thesis. The D.Ed. is more appropriate for those with career goals in administration and policy making. The Ph.D. is more appropriate for those with career goals in research and scholarship.

A minimum of 90 credits is required for the D.Ed., of which at least 30 credits must be earned in residence at the University Park campus. A maximum of 30 credits from a completed master's degree earned at an institution that does not grant a doctorate in the student’s major program may be accepted towards this minimum, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit). A maximum of 60 credits beyond the baccalaureate from an institution that grants the doctorate in the student’s major program may be accepted towards this minimum, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit).

The 90 required credits, including transfer credits, must be earned in the following:

- Major Field (48 cr.): In the Major Field Area, D.Ed. students are required to take a minimum of 48 credits in Educational Leadership courses and courses related to the graduate major field. These courses should be selected in consultation with the student’s adviser from a list of areas of concentration and courses that have been approved by the program to fulfill this requirement. If approved, transfer credits may be used to fulfill a portion of this requirement.
- Minor or General Studies Group (15 cr.): A graduate minor can be taken in any approved graduate degree program offered at Penn State, or in one of the approved stand-alone minors. A general studies group may include up to 6 credits taken as part of previous master’s degree. These courses must be taken outside the EDLDR program. Selection of these courses should be done in close consultation with the student’s adviser.
- Special Education Focused Course (3 cr.): A minimum of 3 credits concerning special education issues in a course approved by the program to fulfill this requirement.
- Research (9 cr.):
  - 3 credits of quantitative research
  - 3 credits of qualitative research
  - 3 credits of research design or advanced research methods
- Dissertation Research (15 cr.): EDLDR 600 or EDLDR 610.

Doctoral students must pass a qualifying examination, a comprehensive written and oral examination (the proposal defense), and a final oral examination (the dissertation defense). To earn the D.Ed. degree, doctoral students must also write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School.
Doctor of Philosophy (Ph.D.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Expectations of candidates for both the D.Ed. and Ph.D. are high in the field of research competence and require the ability to identify and conceptualize a research problem for the thesis. The D.Ed. is more appropriate for those with career goals in administration and policy making. The Ph.D. is more appropriate for those with career goals in research and scholarship.

A minimum of 36 credits is required for the Ph.D.:

- EDLDR Course Work (15 cr.): A minimum of 15 credits chosen in conjunction with the student's academic adviser from a list of areas of concentration and courses that have been approved by the program to fulfill this requirement.
- Research Course Requirements (12 cr.):
  - A 3-credit course with statistical focus up to multivariate inference
  - A 3-credit course with focus on qualitative research methods
  - A 3-credit advanced course in either of the above areas (including course work in Mixed Methods)
- EDLDR 585 Research Design: Implications for Decisions in Higher Education
- Supporting Field (9 cr.): A minimum of 9 credits selected from outside of the EDLDR program. All supporting field courses should be at the 500-level or above; however, appropriate 400-level courses may be approved by the adviser. As noted above, a student may choose to have research as a supporting field and substitute additional research courses to fulfill this requirement.

Ph.D. students may not enroll in more than 6 credits of independent study.

Doctoral students must pass a qualifying examination, a comprehensive written and oral examination (the proposal defense), and a final oral examination (the dissertation defense). To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Dual-Titles
Dual-Title M.Ed., D.Ed., and Ph.D. in Comparative and International Education
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/gcac-208-dual-title-graduate-degree-programs).

Admission Requirements
Students must apply and be admitted to the graduate program in Educational Leadership and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Comparative and International Education dual-title program. Refer to the Admission Requirements section of the Comparative and International Education Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education). Doctoral students must be admitted into the dual-title degree program in Comparative and International Education prior to taking the qualifying examination in their primary graduate program.

Degree Requirements
To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Educational Leadership. In addition, students must complete the degree requirements for the dual-title in Comparative and International Education, listed on the Comparative and International Education Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education). Some courses may satisfy both Educational Leadership and Comparative and International Education degree requirements. Final course selection must be approved by the student's dissertation committee.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Educational Leadership and must include at least one Graduate Faculty member from the Comparative and International Education program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Educational Leadership and Comparative and International Education. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committees of an Educational Leadership and Comparative and International Education dual-title Ph.D. student must include at least one member of the Comparative and International Education Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Comparative and International Education, the member of the committee representing Comparative and International Education must be appointed as co-chair. The Comparative and International Education representative on the student's dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Educational Leadership and Comparative and International Education. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Joint Degrees
Joint J.D. / M.Ed., D.Ed., or Ph.D. with Penn State Law
Requirements listed here are in addition to requirements listed in GCAC-211 Joint Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/gcac-211-joint-degree-programs).

Penn State Law (PSL) and the Educational Leadership (EDLDR) Program offer a joint degree program leading to a Juris Doctor (J.D.); and either a Master of Education (M.Ed.), a Doctor of Education (D.Ed) or a Doctor of Philosophy (Ph.D.) in Educational Leadership.
Admission Requirements
Applicants to the joint degree program must apply and be admitted first to Penn State Law, and subsequently to the Educational Leadership graduate program. Admissions requirements and applications for admission to Penn State Law are listed in the J.D. Admissions (https://pennstatelaw.psu.edu/penn-state-law-jd-admissions) section of the Penn State Law website. When applying to the Educational Leadership graduate program, applicants must include two letters of recommendation from Penn State Law faculty members and a career statement. Applicants to the joint degree program may submit LSAT scores instead of GRE scores. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree.

Residency
Students will normally spend four semesters in residence at the Law School and as many additional semesters in residence as needed to complete the additional requirements for the pertinent EDLDR degree. Ph.D. students must arrange the sequence of semesters to ensure that they are in residence as full-time students in the EDLDR program for at least two consecutive semesters (Fall-Spring or Spring-Fall) excluding summer in a single twelve-month period.

Degree Requirements
Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the J.D. program are listed on the Penn State Law website (https://pennstatelaw.psu.edu/jd-degree-requirements).

PSL: A maximum of twelve credits for EDLDR course work may be double-counted for credit toward the J.D. degree at PSL. Students must obtain a grade satisfactory to PSL for the course work to be credited toward the J.D. degree. The following EDLDR courses may qualify for credit in PSL:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDLDR 533</td>
<td>The Politics of Local School Districts</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 565</td>
<td>Personnel Management and Contract Administration</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 568</td>
<td>The Principalship</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 569</td>
<td>Decision Making in Educational Organizations</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 573</td>
<td>Public School Finance</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 576</td>
<td>The Law and Education</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 577</td>
<td>Law and Ethics in Education</td>
<td>3</td>
</tr>
</tbody>
</table>

EDLDR: The courses that may be double-counted will be determined by the student's degree program. Normally a maximum of twelve credits of PSL course work will be counted for credit for the minimum requirements for a master's degree, subject to approval by the student's advisory committee. Normally, a maximum of 30 credits from a master's degree program will be counted for credit for the minimum requirements for a Ph.D. or D.Ed. degree.

Sequence
The sequence of courses will be determined by students and their advisers.

Recommended Program of Study and Advising
All students in the program will have two advisers, one from PSL and one from EDLDR. Periodic interaction between the two advisers is encouraged.

Tuition
Students will be charged the applicable PSL tuition to cover the J.D. program and the applicable graduate tuition to cover the EDLDR degree program. PSL tuition will be paid for the semesters in which the student is registered for PSL courses, and graduate tuition will be paid for the semesters in which the student is registered for graduate courses. A student may take up to one course (3 credit hours) per semester in the program where the student is not primarily registered without any change in tuition, but must pay additional tuition to the program that the student is not primarily registered if he or she wishes to take additional course work pursuant to that program during the semester.

Financial Aid and Assistantships
Decisions on financial aid and assistantships will be made by each school according to that school's procedures.

Fulfillment of Degree Requirements and Graduation
All courses in one program that will count toward meeting the requirements of the other program must be completed before the awarding of either degree. If students accepted into the joint degree program are unable to complete the J.D. degree, they are still eligible to receive the EDLDR degree if all EDLDR degree requirements have been satisfied.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/gsad-500/gsad-501-credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Educational Leadership Program (EDLDR) Course List (https://bulletins.psu.edu/university-course-descriptions/graduate/edldr)

Learning Outcomes
Master of Education (M.Ed.)
1. Demonstrate mastery of the student's specific program emphasis area, which includes knowledge of primary and secondary literature related to research methodologies, programmatic research priorities, and implications of that research for professional practice. Assessed through methods and theory coursework.
2. Students will design and carry out a research project that includes articulating an important and original question, analyzing appropriate literature, demonstrating conceptual and methodological creativity, and carrying out an original inquiry. Assessed through master's paper.
3. Demonstrate mastery of the student’s specific program emphasis area, which includes knowledge of primary and secondary literature related to research methodologies, programmatic research priorities, and implications of that research for professional practice. Assessed through candidacy and comprehensive exams (rubric).

4. Demonstrate standards of field in written and oral communication by requiring research presentations in several courses.

5. Demonstrate knowledge and comprehension of research ethics issues including knowledge of ethical principles related to authorship, research reporting, data fabrication, plagiarism, conflicts of interest, peer review, data sharing and other areas of misconduct. Assessed through SARI examinations and participation.

Doctor of Education (D.Ed.)

1. Demonstrate mastery of the student’s specific program emphasis area, which includes knowledge of primary and secondary literature related to research methodologies, programmatic research priorities, and implications of that research for professional practice. Assessed through candidacy and comprehensive exams (rubric).

2. Students will design and carry out a research project that includes articulating an important and original question, analyzing appropriate literature, demonstrating conceptual and methodological creativity, and carrying out an original inquiry. Assessed through dissertation proposal and defense (rubric).

3. Demonstrate critical thinking about selected recent research in the program emphasis area through the description of an emerging scholarly theme/area, identification of specific publications that reflect it, and assessment of its strengths and weaknesses. Assessed through coursework and master’s paper.

4. Demonstrate standards of field in written and oral communication by requiring research presentations in several courses.

5. Demonstrate knowledge and comprehension of research ethics issues including knowledge of ethical principles related to authorship, research reporting, data fabrication, plagiarism, conflicts of interest, peer review, data sharing and other areas of misconduct. Assessed through SARI examinations and participation.

6. Participate in conducting research with faculty, working on the boards of professional journals, teaching an undergraduate or graduate course, or other significant professional engagement as identified by the doctoral adviser. Assessed through faculty written evaluation, standardized assessment instruments, and/or other appropriate and clearly defined means.

Doctor of Philosophy (Ph.D.)

1. Demonstrate mastery of the student’s specific program emphasis area, which includes knowledge of primary and secondary literature related to research methodologies, programmatic research priorities, and implications of that research for professional practice. Assessed through candidacy and comprehensive exams (rubric).

2. Students will design and carry out a research project that includes articulating an important and original question, analyzing appropriate literature, demonstrating conceptual and methodological creativity, and carrying out an original inquiry. Assessed through dissertation proposal and defense (rubric).
EDUCATIONAL LEADERSHIP

Graduate Program Head
Kevin Kinser

Program Code
EDLDR

Campuses
University Park (Ph.D., D.Ed., M.Ed.)
World Campus (M.Ed. Principal Certificate)

Degrees Conferred
Doctor of Philosophy (Ph.D.)
Doctor of Education (D.Ed.)
Master of Education (M.Ed.)
Dual-Title Ph.D., D.Ed., and M.Ed. in Comparative and International Education
Joint J.D./Ph.D., D.Ed., or M.Ed. with Penn State Law

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=EDLDR)

Graduate work in the Educational Leadership program encompasses two major career paths. The first path focuses on those who want to engage in a wide variety of leadership roles within and directly affecting schools and districts. These roles include, but are not limited to: teacher leadership, instructional leadership, principal leadership, and district-level leadership. This path may also lead to certification through the Pennsylvania Department of Education for the principalship and/or letters of endorsement in the superintendency. The second path focuses on those who want to exercise leadership roles in educational policy arenas and/or engage in educational research. Possible roles include: intermediate unit officials, state and federal agency administrators and staff, professors of educational administration, and research and development personnel. The Principal Certificate is also available at Penn State Harrisburg.

The Educational Leadership program offers degree programs in residence at the University Park campus, and also offers the M.Ed program along with Principal Certificate and Teacher Leadership Certificate programs online through World Campus.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 Admissions (http://gradschool.psu.edu/graduate-education-policies).

The Educational Leadership program requires all graduate program applicants to submit:

- three letters of recommendation,
- official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission),
- a statement of purpose,
- a writing sample, and
- a current resume or curriculum vita.

Applicants must present evidence of at least a 3.0 grade-point average in the last two years of undergraduate work. A grade-point average of 3.50 in prior graduate work is required of those desiring admission to enter a doctoral program. The best-qualified students will be accepted up to the number of spaces available. Special backgrounds and experiences may allow for conditional admission to those not meeting stated criteria, at the discretion of the program.
Applicants are required to submit a writing sample. Applicants should submit a writing sample that reviews and critiques an academic article related to education leadership or education policy that affects education leaders.

Official scores from the GRE, the Miller Analogy Test, or the Law School Admissions Test (LSAT) from within the last 5 years are required for admission to Doctoral programs.

Degree Requirements
Master of Education (M.Ed.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

All candidates for the M.Ed. degree will complete a minimum of 30 credits, with at least 18 credits at the 500 or 800 level, and at least 6 credits at the 500 level. M.Ed. students also must complete a capstone project/internship as described below.

The three designated emphases for the Educational Leadership M.Ed. are Teacher Leadership, School Leadership, and General Leadership.

Teacher Leadership (Online)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDLDR 802</td>
<td>Principles of Instructional Leadership</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 804</td>
<td>Introduction to Teacher Leadership</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 805</td>
<td>How Schools Work</td>
<td>3</td>
</tr>
<tr>
<td>500 or 800 Level</td>
<td>Selected Course in EDLDR</td>
<td>3</td>
</tr>
<tr>
<td>500 or 800 Level</td>
<td>Selected Course in EDLDR</td>
<td>3</td>
</tr>
<tr>
<td>500 Level</td>
<td>Selected Course in EDLDR</td>
<td>3</td>
</tr>
<tr>
<td>500 Level</td>
<td>Open Graduate Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

Culminating Experience

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDLDR 894</td>
<td>Capstone Inquiry Course/Capstone Project</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 30

A total of 30 course credits, including EDLDR 894, are required. Further, 18 credits are required at the 500 level or higher, with six credits of selected courses in Educational Leadership and six credits of open elective credits. In total, at least six selected/elective credits must be taken specifically at the 500 level.

The final course (EDLDR 894) is a project-based course that represents the culmination of academic work toward the M.Ed. degree. Course requirements involve the development of a final capstone project focused on evaluation, analysis, or application of concepts first introduced and developed over the course of the student’s M.Ed. program. The project should be planned in coordination with an EDLDR faculty member who agrees to serve as the student’s adviser for this project and must reflect an appropriate degree of graduate-level scholarship, as determined by the adviser.
Educational Leadership

School Leadership (Online)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDLDR 841</td>
<td>Data Informed Leadership</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 859</td>
<td>School Improvement</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 861</td>
<td>Principles of Instructional Leadership</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR/C-S 551</td>
<td>Curriculum Design: Theory and Practice</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 480</td>
<td>Introduction to Educational Leadership</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 551</td>
<td>Leadership for Equity and Diversity</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 552</td>
<td>The Principals</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 579</td>
<td>The Law and Education</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 587</td>
<td>Money and Schools</td>
<td>3</td>
</tr>
</tbody>
</table>

Culminating Experience
- EDLDR 595 Internship (Capstone Project) 3

Total Credits 30

A total of 30 course credits, including EDLDR 595, are required. Further, 18 credits are required at the 500 level or higher, with at least six credits to be taken specifically at the 500 level.

The final course (EDLDR 595) is a project-based course that represents the culmination of academic work toward the M.Ed. degree. Course requirements involve the development of signature assessments focused on evaluation, analysis, or application of concepts first introduced and developed over the course of the student’s M.Ed. program. The project should be planned in collaboration with an EDLDR faculty member who agrees to serve as the student’s adviser and a school principal who agrees to serve as the student’s mentor, for this project and must reflect an appropriate degree of graduate-level scholarship, as determined by the program.

General M.Ed. (Residential)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDLDR 480</td>
<td>Introduction to Educational Leadership</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 532</td>
<td>ProSeminar</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 596</td>
<td>Selected Course in EDLDR Strand*</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 597</td>
<td>Selected Course in EDLDR Strand*</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 598</td>
<td>Selected Course in EDLDR Strand*</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 599</td>
<td>Selected Course in EDLDR Strand*</td>
<td>3</td>
</tr>
</tbody>
</table>

Culminating Experience
- EDLDR 596 Individual Studies (Master’s Paper) 3

Total Credits 30

A total of 30 course credits, including EDLDR 596, are required. Further, 18 of those credits are required specifically in Educational Leadership courses. Students should select 18 credits from 6 of the 7 EDLDR strands listed in the handbook.
The final course (EDLDR 596) is a project-based course that represents the culmination of academic work toward the M.Ed. degree. Course requirements involve the development of a final capstone project focused on evaluation, analysis, or application of concepts first introduced and developed over the course of the student’s M.Ed. program. The project should be planned in coordination with an EDLDR faculty member who agrees to serve as the student’s adviser for this project and must reflect an appropriate degree of graduate-level scholarship, as determined by the adviser.
Doctor of Education (D.Ed.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Expectations of candidates for both the D.Ed. and Ph.D. are high in the field of research competence and require the ability to identify and conceptualize a research problem for the dissertation. The D.Ed. is more appropriate for those with career goals in administration and policy making. The Ph.D. is more appropriate for those with career goals in research and scholarship.

A minimum of 90 credits is required for the D.Ed., of which at least 30 credits must be earned in residence at the University Park campus. A maximum of 30 credits from a completed master’s degree earned at an institution that does not grant a doctorate in the student’s major program may be accepted towards this minimum, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-309/transfer-credit). A maximum of 60 credits beyond the baccalaureate from an institution that grants the doctorate in the student's major program may be accepted towards this minimum, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-309/transfer-credit).

The 90 required credits, including transfer credits, must be earned in the following:

• Major Field (48 cr.): In the Major Field Area, D.Ed. students are required to take a minimum of 48 credits in Educational Leadership courses and courses related to the graduate major field. These courses should be selected in consultation with the student’s adviser from a list of areas of concentration and courses that have been approved by the program to fulfill this requirement. If approved, transfer credits may be used to fulfill a portion of this requirement.

• Minor or General Studies Group (15 cr.): A graduate minor can be taken in any approved graduate degree program offered at Penn State, or in one of the approved stand-alone minors. A general studies group may include up to 6 credits taken as part of previous master’s degree. These courses must be taken outside the EDLDR program. Selection of these courses should be done in close consultation with the student’s academic adviser.

• Special Education Focused Course (3 cr.): a minimum of 3 credits concerning special education issues in a course approved by the program to fulfill this requirement.

• Research (9 cr.):
  • 3 credits of quantitative research
  • 3 credits of qualitative research
  • 3 credits of research design or advanced research methods
  • Dissertation Research (15 cr.) EDLDR 600 or EDLDR 610.

Doctoral students must pass a qualifying examination, a comprehensive written and oral examination (the proposal defense), and a final oral examination (the dissertation defense). To earn the D.Ed. degree, doctoral students must also write a dissertation that is accepted by the dissertation committees, the head of the graduate program, and the Graduate School.
Doctor of Philosophy (Ph.D.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Expectations of candidates for both the D.Ed. and Ph.D. are high in the field of research competence and require the ability to identify and conceptualize a research problem for the dissertation. The D.Ed. is more appropriate for those with career goals in administration and policy making. The Ph.D. is more appropriate for those with career goals in research and scholarship.

A minimum of 36 credits is required for the Ph.D.:

• EDLDR Course Work (15 cr.): A minimum of 15 credits chosen in conjunction with the student’s academic advisor from areas of concentration and courses that have been approved by the program to fulfill this requirement.
• Research Course Requirements (12 cr.):
  • A 3-credit course with statistical focus to multivariate inference
  • A 3-credit course with focus on qualitative research methods
  • A 3-credit advanced course in either of the above areas (including course work in Mixed Methods)
• EDLDR 556 Research Design: Implications for Decisions in Higher Education
• Supporting Field (9 cr.): A minimum of 9 credits selected from outside of the EDLDR program. All supporting field courses should be at the 500-level or above; however, appropriate 400-level courses may be approved by the adviser. As noted above, a student may choose to have research as a supporting field and substitute additional research courses to fulfill this requirement.

Ph.D. students may not enroll in more than 6 credits of independent study.

Doctoral students must pass a qualifying examination, a comprehensive written and oral examination (the proposal defense), and a final oral examination (the dissertation defense). To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Dual-Titles
Dual-Title M.Ed., D.Ed., and Ph.D. in Comparative and International Education
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/gcac-208-dual-title-graduate-degree-programs).

Admission Requirements
Students must apply and be admitted to the graduate program in Educational Leadership and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Comparative and International Education dual-title program. Refer to the Admission Requirements section of the Comparative and International Education Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education). Doctoral students must be admitted into the dual-title degree program in Comparative and International Education prior to taking the qualifying examination in their primary graduate program.

Degree Requirements
To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Educational Leadership. In addition, students must complete the degree requirements for the dual-title in Comparative and International Education, listed on the Comparative and International Education Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education). Some courses may satisfy both Educational Leadership and Comparative and International Education degree requirements. Final course selection must be approved by the student’s dissertation committee.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Educational Leadership and must include at least one Graduate Faculty member from the Comparative and International Education program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Educational Leadership and Comparative and International Education. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation/), the dissertation committee of an Educational Leadership and Comparative and International Education dual-title Ph.D. student must include at least one member of the Comparative and International Education Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Comparative and International Education, the member of the committee representing Comparative and International Education must be appointed as co-chair. The Comparative and International Education representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Educational Leadership and Comparative and International Education. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Joint Degrees
Joint J.D. / M.Ed., D.Ed., or Ph.D. with Penn State Law
Requirements listed here are in addition to requirements listed in GCAC-211 Joint Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/gcac-211-joint-degree-programs).

Penn State Law (PSL) and the Educational Leadership (EDLDR) Program offer a joint degree program leading to a Juris Doctor (J.D.), and either a Master of Education (M.Ed.), a Doctor of Education (D.Ed.) or a Doctor of Philosophy (Ph.D.) in Educational Leadership.
Admission Requirements
Applicants to the joint degree program must apply and be admitted first to Penn State Law, and subsequently to the Educational Leadership graduate program. Admissions requirements and applications for admission to Penn State Law are listed in the J.D. Admissions (https://pennstatelaw.psu.edu/penn-state-law-jd-admissions) section of the Penn State Law website. When applying to the Educational Leadership graduate program, applicants must include two letters of recommendation from Penn State Law faculty members and a career statement. Applicants to the joint degree program may submit LSAT scores instead of GRE scores.

Residency
Students will normally spend four semesters in residence at the Law School and as many additional semesters in residence as needed to complete the additional requirements for the pertinent EDLDR degree. Ph.D. students must arrange the sequence of semesters to ensure that they are in residence as full-time students in the EDLDR program for at least two consecutive semesters (Fall-Spring or Spring-Fall) excluding summer in a single twelve-month period.

Degree Requirements
Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the J.D. program are listed on the Penn State Law website (https://pennstatelaw.psu.edu/jd-degree-requirements).

PSL: A maximum of twelve credits for EDLDR course work may be double-counted for credit toward the J.D. degree at PSL. Students must obtain a grade satisfactory to PSL for the course work to be credited toward the J.D. degree. The following EDLDR courses may qualify for credit in PSL:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDLDR 533</td>
<td>The Politics of Local School Districts</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 565</td>
<td>Personnel Management and Contract</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 568</td>
<td>The Principalship</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 569</td>
<td>Decision Making in Educational Organizations</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 573</td>
<td>Public School Finance</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 576</td>
<td>The Law and Education</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 577</td>
<td>Law and Ethics in Education</td>
<td>3</td>
</tr>
</tbody>
</table>

EDLDR: The courses that may be double-counted will be determined by the student's degree program, and must fall within the limits set in GCAC-211 Joint Degree Programs. Normally a maximum of twelve credits of PSL course work will be counted for credit for the minimum requirements for a master's degree, subject to approval by the student's advisory committee.

Sequence
The sequence of courses will be determined by students and their advisers.

Recommended Program of Study and Advising
All students in the program will have two advisers, one from PSL and one from EDLDR. Periodic interaction between the two advisers is encouraged.

Tuition
Students will be charged the applicable PSL tuition to cover the J.D. program and the applicable graduate tuition to cover the EDLDR degree program. PSL tuition will be paid for the semesters in which the student is registered for PSL courses, and graduate tuition will be paid for the semesters in which the student is registered for graduate courses. A student may take up to one course (3 credit hours) per semester in the program where the student is not primarily registered without any change in tuition, but must pay additional tuition to the program that the student is not primarily registered if he or she wishes to take additional course work pursuant to that program during the semester.

Financial Aid and Assistantships
Decisions on financial aid and assistantships will be made by each school according to that school's procedures.

Fulfillment of Degree Requirements and Graduation
All courses in one program that will count toward meeting the requirements of the other program must be completed before the awarding of either degree. If students accepted into the joint degree program are unable to complete the J.D. degree, they are still eligible to receive the EDLDR degree if all EDLDR degree requirements have been satisfied.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/gsad-500/gsad-501-credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Educational Leadership Program (EDLDR) Course List (https://bulletins.psu.edu/university-course-descriptions/graduate/edldr)

Learning Outcomes
Master of Education (M.Ed.)
1. Demonstrate mastery of the student's specific program emphasis area, which includes knowledge of primary and secondary literature related to research methodologies, programmatic research priorities, and implications of that research for professional practice. Assessed through methods and theory coursework.
2. Students will design and carry out a research project that includes articulating an important and original question, analyzing appropriate literature, demonstrating conceptual and methodological creativity, and carrying out an original inquiry. Assessed through master's paper.
3. Demonstrate critical thinking about selected recent research in the program emphasis area through the description of an emerging scholarly theme/area, identification of specific publications that reflect it, and assessment of its strengths and weaknesses. Assessed through coursework and master's paper.

4. Demonstrate standards of field in written and oral communication by requiring research presentations in several courses.

5. Demonstrate knowledge and comprehension of research ethics issues including knowledge of ethical principles related to authorship, research reporting, data fabrication, plagiarism, conflicts of interest, peer review, data sharing and other areas of misconduct. Assessed through SARI examinations and participation.

**Doctor of Education (D.Ed.)**

1. Demonstrate mastery of the student's specific program emphasis area, which includes knowledge of primary and secondary literature related to research methodologies, programmatic research priorities, and implications of that research for professional practice. Assessed through candidacy and comprehensive exams (rubric).

2. Students will design and carry out a research project that includes articulating an important and original question, analyzing appropriate literature, demonstrating conceptual and methodological creativity, and carrying out an original inquiry. Assessed through dissertation proposal and defense (rubric).

3. Demonstrate critical thinking about selected recent research in the program emphasis area through the description of an emerging scholarly theme/area, identification of specific publications that reflect it, and assessment of its strengths and weaknesses. Assessed through written and oral candidacy assessment (rubric).

4. Demonstrate standards of field in written and oral communication by (a) preparing a qualifying paper for Advancement to Doctoral Candidacy (b) preparing and presenting a written thesis proposal/comprehensive exam for the dissertation, and (c) preparing and presenting the results of dissertation research in clear, concise oral presentations to an audience of peers. Assessed through qualifying paper, thesis proposal and dissertation defense.

5. Demonstrate knowledge and comprehension of research ethics issues including knowledge of ethical principles related to authorship, research reporting, data fabrication, plagiarism, conflicts of interest, peer review, data sharing and other areas of misconduct. Assessed through SARI examinations and participation in EPS 585 and 586.

6. Participate in conducting research with faculty, working on the boards of professional journals, teaching an undergraduate or graduate course, or other significant professional engagement as identified by the doctoral adviser. Assessed through faculty written evaluation, standardized assessment instruments, and/or other appropriate and clearly defined means.

**Contact**

**Campus**

University Park

**Graduate Program Head**

Kevin Kinser

**Director of Graduate Studies (DGS)**

Edward J Fuller

**Program Contact**

Sue Tighe

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University Park PA 16802

etj11@psu.edu

(814) 865-0619

**Program Website**

View (http://www.ed.psu.edu/educ/eps/edldr)

**Campus**

World Campus

**Graduate Program Head**

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**Director of Graduate Studies (DGS)**

Edward J Fuller

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**Program Website**

View (http://www.worldcampus.psu.edu/degrees-and-certificates/educational-leadership-masters/overview)
EDUCATIONAL LEADERSHIP

Graduate Program Head: Kevin Kinser
Program Code: EDLDR
Campus(es): University Park (Ph.D., D.Ed., M.Ed.)
World Campus (M.Ed. Principal Certificate)

Degrees Conferred
- Doctor of Philosophy (Ph.D.)
- Doctor of Education (D.Ed.)
- Master of Education (M.Ed.)
- Dual-Title Ph.D., D.Ed., and M.Ed. in Comparative and International Education
- Joint J.D./Ph.D., D.Ed., or M.Ed. with Penn State Law

The Graduate Faculty View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=EDLDR)

Graduate work in the Educational Leadership program encompasses two major career paths. The first path focuses on those who want to engage in a wide variety of leadership roles within and directly affecting schools and districts. These roles include, but are not limited to: teacher leadership, instructional leadership, principal leadership, and district-level leadership. This path may also lead to certification through the Pennsylvania Department of Education for the principalship and/or a letter of endorsement in the superintendency. The second path focuses on those who want to exercise leadership roles in educational policy arenas and/or engage in educational research. Possible roles include: intermediate unit officials, state and federal agency administrators and staff, professors of educational administration, and research and development personnel. The Principal Certificate is also available at Penn State Harrisburg.

The Educational Leadership program offers degree programs in residence at the University Park campus, and also offers the MEd program along with Principal Certificate and Teacher Leadership Certificate programs online through World Campus.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 Admissions (http://gradschool.psu.edu/graduate-education-policies).

The Educational Leadership program requires all graduate program applicants to submit:
- three letters of recommendation,
- official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission),
- a statement of purpose,
- a writing sample, and
- a current resume or curriculum vita.

Applicants must present evidence of at least a 3.0 grade-point average in the last two years of undergraduate work. A grade-point average of 3.50 in prior graduate work is required of those desiring admission to enter a doctoral program. The best-qualified students will be accepted up to the number of spaces available. Special backgrounds and experiences may
allow for conditional admission to those not meeting stated criteria, at
the discretion of the program.

Applicants are required to submit a writing sample. Applicants should
submit a writing sample that reviews and critiques an academic article
related to education leadership or education policy that affects
education leaders.

Official scores from the GRE, the Miller Analogy Test, or the Law School
Admissions Test (LSAT) from within the last 5 years are required for
admission to Doctoral programs.

**Degree Requirements**

**Master of Education (M.Ed.)**

Requirements listed here are in addition to Graduate Council
policies listed under GCAC-700 Professional Degree Requirements
(http://gradschool.psu.edu/graduate-education-policies).

All candidates for the M.Ed. degree will complete a minimum of 30
credits, with at least 18 credits at the 500 or 800 level, and at least 6
credits at the 500 level. M.Ed. students also must complete a capstone
project/internship as described below.

The three designated emphases for the Educational Leadership M.Ed.
are Teacher Leadership, School Leadership, and General Leadership.

### Teacher Leadership (Online)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDLDR 859</td>
<td>School Improvement</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 861</td>
<td>Principles of Instructional Leadership</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 801</td>
<td>Introduction to Teacher Leadership</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 802</td>
<td>How Schools Work</td>
<td>3</td>
</tr>
<tr>
<td>500 or 800 Level</td>
<td>Selected Course in EDLDR</td>
<td>3</td>
</tr>
<tr>
<td>500 or 800 Level</td>
<td>Selected Course in EDLDR</td>
<td>3</td>
</tr>
<tr>
<td>500 Level</td>
<td>Selected Course in EDLDR</td>
<td>3</td>
</tr>
<tr>
<td>500 or 800 Level</td>
<td>Open Graduate Elective</td>
<td>3</td>
</tr>
<tr>
<td>500 Level</td>
<td>Open Graduate Elective</td>
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#### Culminating Experience

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDLDR 894</td>
<td>Capstone Inquiry Course (Capstone Project)</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 30

A total of 30 course credits, including EDLDR 894, are required.
Further, 18 credits are required at the 500 level or higher, with six
credits of selected courses in Educational Leadership and six credits
of open elective credits. In total, at least six selected/elective credits
must be taken specifically at the 500 level.

The final course (EDLDR 894) is a project-based course that represents
the culmination of academic work toward the M.Ed. degree. Course
requirements involve the development of a final capstone project
focused on evaluation, analysis, or application of concepts first
introduced and developed over the course of the student's M.Ed.
program. The project should be planned in coordination with an
EDLDR faculty member who agrees to serve as the student's adviser
for this project and must reflect an appropriate degree of graduate-level
scholarship, as determined by the adviser.
## School Leadership (Online)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td><strong>Required Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EDLDR 841</td>
<td>Data Informed Leadership</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 859</td>
<td>School Improvement</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 861</td>
<td>Principles of Instructional Leadership</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR/C-S 551</td>
<td>Curriculum Design: Theory and Practice</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 480</td>
<td>Introduction to Educational Leadership</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 831</td>
<td>Leadership for Equity and Diversity</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 868</td>
<td>The Principalship</td>
<td>3</td>
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<tr>
<td>EDLDR 876</td>
<td>The Law and Education</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 873</td>
<td>Money and Schools</td>
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**Culminating Experience**

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDLDR 595</td>
<td>Internship (Capstone Project)</td>
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</table>

Total Credits 30

A total of 30 course credits, including EDLDR 595, are required.

Further, 18 credits are required at the 500 level or higher, with at least six credits to be taken specifically at the 500 level.

The final course (EDLDR 595) is a project-based course that represents the culmination of academic work toward the M.Ed. degree. Course requirements involve the development of signature assessments focused on evaluation, analysis, or application of concepts first introduced and developed over the course of the student’s M.Ed. program. The project should be planned in collaboration with an EDLDR faculty member who agrees to serve as the student’s adviser and with a school principal who agrees to serve as the student’s mentor, for this project and must reflect an appropriate degree of graduate-level scholarship, as determined by the program.

## General M.Ed. (Residential)

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td><strong>Required Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EDLDR 480</td>
<td>Introduction to Educational Leadership</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 532</td>
<td>ProSeminar</td>
<td>3</td>
</tr>
<tr>
<td>500 or 800 Level</td>
<td>Selected Course in EDLDR Strand*</td>
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</tr>
<tr>
<td>500 or 800 Level</td>
<td>Selected Course in EDLDR Strand*</td>
<td>3</td>
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<tr>
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<tr>
<td>500 or 800 Level</td>
<td>Selected Course in EDLDR Strand*</td>
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**Culminating Experience**

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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>EDLDR 596</td>
<td>Individual Studies (Master’s Paper)</td>
<td>3</td>
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</table>

Total Credits 30

*see EDLDR Graduate Student Handbook

A total of 30 course credits, including EDLDR 596, are required.

Further, 18 of those credits are required specifically in Educational Leadership courses. Students should select 18 credits from 6 of the 7 EDLDR strands listed in the handbook.
The final course (EDLDR 596) is a project-based course that represents the culmination of academic work toward the M.Ed. degree. Course requirements involve the development of a final capstone project focused on evaluation, analysis, or application of concepts first introduced and developed over the course of the student’s M.Ed. program. The project should be planned in coordination with an EDLDR faculty member who agrees to serve as the student’s adviser for this project and must reflect an appropriate degree of graduate-level scholarship, as determined by the adviser.
Doctor of Education (D.Ed.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Expectations of candidates for both the D.Ed. and Ph.D. are high in the field of research competence and require the ability to identify and conceptualize a research problem for the dissertation. The D.Ed. is more appropriate for those with career goals in administration and policy making. The Ph.D. is more appropriate for those with career goals in research and scholarship.

A minimum of 90 credits is required for the D.Ed., of which at least 30 credits must be earned in residence at the University Park campus. A maximum of 30 credits from a completed master’s degree earned at an institution that does not grant a doctorate in the student’s major program may be accepted towards this minimum, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit). A maximum of 60 credits beyond the baccalaureate from an institution that grants the doctorate in the student’s major program may be accepted towards this minimum, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit).

The 90 required credits, including transfer credits, must be earned in the following:

- Major Field (48 cr.): In the Major Field Area, D.Ed. students are required to take a minimum of 48 credits in Educational Leadership courses and courses related to the graduate major field. These courses should be selected in consultation with the student’s adviser from a list of areas of concentration and courses that have been approved by the program to fulfill this requirement. If approved, transfer credits may be used to fulfill a portion of this requirement.
- Minor or General Studies Group (15 cr.): A graduate minor can be taken in any approved graduate degree program offered at Penn State, or in one of the approved stand-alone minors. A general studies group may include up to 6 credits taken as part of previous master’s degree. These courses must be taken outside the EDLDR program. Selection of these courses should be done in close consultation with the student’s academic adviser.
- Special Education Focused Course (3 cr.): a minimum of 3 credits concerning special education issues in a course approved by the program to fulfill this requirement.
- Research (9 cr.):
  - 3 credits of quantitative research
  - 3 credits of qualitative research
  - 3 credits of research design or advanced research methods
- Dissertation Research (15 cr.): EDLDR 600 or EDLDR 610.

Doctoral students must pass a qualifying examination, a comprehensive written and oral examination (the proposal defense), and a final oral examination (the dissertation defense). To earn the D.Ed. degree, doctoral students must also write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School.
Doctor of Philosophy (Ph.D.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)
Expectations of candidates for both the D.Ed. and Ph.D. are high in the field of research competence and require the ability to identify and conceptualize a research problem for the dissertation. The D.Ed. is more appropriate for those with career goals in administration and policy making. The Ph.D. is more appropriate for those with career goals in research and scholarship.
A minimum of 36 credits is required for the Ph.D.:

- EDLDR Course Work (15 cr.): A minimum of 15 credits chosen in conjunction with the student’s academic adviser from a list of areas of concentration and courses that have been approved by the program to fulfill this requirement.
- Research Course Requirements (12 cr.):
  - A 3-credit course with statistical focus up to multivariate inference
  - A 3-credit course with focus on qualitative research methods
  - A 3-credit advanced course in either of the above areas (including course work in Mixed Methods)
- EDLDR 585 Research Design: Implications for Decisions in Higher Education
- Supporting Field (9 cr.): A minimum of 9 credits selected from outside of the EDLDR program. All supporting field courses should be at the 500-level or above; however, appropriate 400-level courses may be approved by the adviser. As noted above, a student may choose to have research as a supporting field and substitute additional research courses to fulfill this requirement.

Ph.D. students may not enroll in more than 6 credits of independent study.

Doctoral students must pass a qualifying examination, a comprehensive written and oral examination (the proposal defense), and a final oral examination (the dissertation defense). To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Dual-Titles
Dual-Title M.Ed., D.Ed., and Ph.D. in Comparative and International Education
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/gcac-208-dual-title-graduate-degree-programs).

Admission Requirements
Students must apply and be admitted to the graduate program in Educational Leadership and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Comparative and International Education dual-title program. Refer to the Admission Requirements section of the Comparative and International Education Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education). Doctoral students must be admitted into the dual-title degree program in Comparative and International Education prior to taking the qualifying examination in their primary graduate program.

Degree Requirements
To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Educational Leadership. In addition, students must complete the degree requirements for the dual-title in Comparative and International Education, listed on the Comparative and International Education Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education). Some courses may satisfy both Educational Leadership and Comparative and International Education degree requirements. Final course selection must be approved by the student’s dissertation committee.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Educational Leadership and must include at least one Graduate Faculty member from the Comparative and International Education program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Educational Leadership and Comparative and International Education. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an Educational Leadership and Comparative and International Education dual-title Ph.D. student must include at least one member of the Comparative and International Education Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Comparative and International Education, the member of the committee representing Comparative and International Education must be appointed as co-chair. The Comparative and International Education representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Educational Leadership and Comparative and International Education. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Joint Degrees
Joint J.D. / M.Ed., D.Ed., or Ph.D. with Penn State Law
Requirements listed here are in addition to requirements listed in GCAC-211 Joint Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/gcac-211-joint-degree-programs).

Penn State Law (PSL) and the Educational Leadership (EDLDR) Program offer a joint degree program leading to a Juris Doctor (J.D.); and either a Master of Education (M.Ed.), a Doctor of Education (D.Ed) or a Doctor of Philosophy (Ph.D.) in Educational Leadership.
Admission Requirements
Applicants to the joint degree program must apply and be admitted first to Penn State Law, and subsequently to the Educational Leadership graduate program. Admissions requirements and applications for admission to Penn State Law are listed in the J.D. Admissions (https://pennstatelaw.psu.edu/penn-state-law-jd-admissions) section of the Penn State Law website. When applying to the Educational Leadership graduate program, applicants must include two letters of recommendation from Penn State Law faculty members and a career statement. Applicants to the joint degree program may submit LSAT scores instead of GRE scores.

Residency
Students will normally spend four semesters in residence at the Law School and as many additional semesters in residence as needed to complete the additional requirements for the pertinent EDLDR degree. Ph.D. students must arrange the sequence of semesters to ensure that they are in residence as full-time students in the EDLDR program for at least two consecutive semesters (Fall-Spring or Spring-Fall) excluding summer in a single twelve-month period.

Degree Requirements
The courses that may be double-counted will be determined by the student’s degree program, and must fall within the limits set in GCAC-211 Joint Degree Programs. Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the J.D. program are listed on the Penn State Law website (https://pennstatelaw.psu.edu/jd-degree-requirements).

PSL: A maximum of twelve credits for EDLDR course work may be double-counted toward the J.D. degree at PSL. Students must obtain a grade satisfactory to PSL for the course work to be credited toward the J.D. degree. The following EDLDR courses may qualify for credit in PSL:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDLDR 533</td>
<td>The Politics of Local School Districts</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 565</td>
<td>Personnel Management and Contract Administration</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 568</td>
<td>The Principalship</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 569</td>
<td>Decision Making in Educational Organizations</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 573</td>
<td>Public School Finance</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 576</td>
<td>The Law and Education</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 577</td>
<td>Law and Ethics in Education</td>
<td>3</td>
</tr>
</tbody>
</table>

EDLDR: The courses that may be double-counted will be determined by the student's degree program, and must fall within the limits set in GCAC-211 Joint Degree Programs. Normally a maximum of twelve credits of PSL course work will be counted for credit for the minimum requirements for a master's degree, subject to approval by the student’s advisory committee.

Sequence
The sequence of courses will be determined by students and their advisers.

Recommended Program of Study and Advising
All students in the program will have two advisers, one from PSL and one from EDLDR. Periodic interaction between the two advisers is encouraged.

Tuition
Students will be charged the applicable PSL tuition to cover the J.D. program and the applicable graduate tuition to cover the EDLDR degree program. PSL tuition will be paid for the semesters in which the student is registered for PSL courses, and graduate tuition will be paid for the semesters in which the student is registered for graduate courses. A student may take up to one course (3 credit hours) per semester in the program where the student is not primarily registered without any change in tuition, but must pay additional tuition to the program that the student is not primarily registered if he or she wishes to take additional course work pursuant to that program during the semester.

Financial Aid and Assistantships
Decisions on financial aid and assistantships will be made by each school according to that school’s procedures.

Fulfillment of Degree Requirements and Graduation
All courses in one program that will count toward meeting the requirements of the other program must be completed before the awarding of either degree. If students accepted into the joint degree program are unable to complete the J.D. degree, they are still eligible to receive the EDLDR degree if all EDLDR degree requirements have been satisfied.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/gsad-500/gsad-501-credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Educational Leadership Program (EDLDR) Course List (https://bulletins.psu.edu/university-course-descriptions/graduate/edldr)

Learning Outcomes
Master of Education (M.Ed.)
1. Demonstrate mastery of the student's specific program emphasis area, which includes knowledge of primary and secondary literature related to research methodologies, programmatic research priorities, and implications of that research for professional practice. Assessed through methods and theory coursework.
2. Students will design and carry out a research project that includes articulating an important and original question, analyzing appropriate literature, demonstrating conceptual and methodological creativity, and carrying out an original inquiry. Assessed through master’s paper.
3. Demonstrate critical thinking about selected recent research in the program emphasis area through the description of an emerging scholarly theme/area, identification of specific publications that reflect it, and assessment of its strengths and weaknesses. Assessed through coursework and master's paper.

4. Demonstrate standards of field in written and oral communication by requiring research presentations in several courses.

5. Demonstrate knowledge and comprehension of research ethics issues including knowledge of ethical principles related to authorship, research reporting, data fabrication, plagiarism, conflicts of interest, peer review, data sharing and other areas of misconduct. Assessed through SARI examinations and participation.

Doctor of Education (D.Ed.)

1. Demonstrate mastery of the student’s specific program emphasis area, which includes knowledge of primary and secondary literature related to research methodologies, programmatic research priorities, and implications of that research for professional practice. Assessed through candidacy and comprehensive exams (rubric).

2. Students will design and carry out a research project that includes articulating an important and original question, analyzing appropriate literature, demonstrating conceptual and methodological creativity, and carrying out an original inquiry. Assessed through dissertation proposal and defense (rubric).

3. Demonstrate critical thinking about selected recent research in the program emphasis area through the description of an emerging scholarly theme/area, identification of specific publications that reflect it, and assessment of its strengths and weaknesses. Assessed through written and oral candidacy assessment (rubric).

4. Demonstrate standards of field in written and oral communication by (a) preparing a qualifying paper for Advancement to Doctoral Candidacy (b) preparing and presenting a written thesis proposal for the dissertation, and (c) preparing and presenting the results of dissertation research in clear, concise oral presentations to an audience of peers. Assessed through qualifying paper, thesis proposal and dissertation defense.

5. Demonstrate knowledge and comprehension of research ethics issues including knowledge of ethical principles related to authorship, research reporting, data fabrication, plagiarism, conflicts of interest, peer review, data sharing and other areas of misconduct. Assessed through SARI examinations and participation in EPS 585 and 586.

6. Participate in conducting research with faculty, working on the boards of professional journals, teaching an undergraduate or graduate course, or other significant professional engagement as identified by the doctoral adviser. Assessed through faculty written evaluation, standardized assessment instruments, and/or other appropriate and clearly defined means.

Contact

Campus University Park
Graduate Program Head Kevin Kinser
Director of Graduate Studies (DGS) Edward J Fuller or Professor-in-Charge (PIC)
Program Contact Sue Tighe
200 Rackley Bldg.
University Park PA 16802
sjt11@psu.edu
(814) 863-0619

Program Website View (http://www.ed.psu.edu/educ/eps/edldr)
Campus World Campus
Graduate Program Head Kevin Kinser
Director of Graduate Studies (DGS) or Professor-in-Charge (PIC) Edward J Fuller
Program Contact Barbara Lynn Duncan
200 Rackley Bldg.
University Park PA 16802
bld11@psu.edu
(814) 865-1487

Program Website View (http://www.worldcampus.psu.edu/degrees-and-certificates/educational-leadership-masters/overview)
David,

We would like to commend EDLDR for what looks to us like a very good program design. My apologies for the delayed response. I wanted all C&S faculty to discuss the program proposal before replying. There were a few questions from our group, but nothing that should prevent our endorsement. Ravi, for example wanted to clarify that CS551 will still be part of your course requirements in Resident Instruction, but will become an elective in the Teacher Leader Program. CS 560 will be changed to an 800 level course for World Campus and will be discontinued in RI. And just for your information, C&S will continue to offer that course in our masters program for WD and in RI. Finally, I have to say that we are very pleased that some C&S courses will remain on your preferred electives list. As we revise the C&S program, we hope to include several of your new course titles in our elective list as well. Also, our doctoral program requires a “supporting field” of 12 credits. I can easily see us recommending EDLDR as a supporting field for some of our students.

Thank you for looping us in on the consultation. We wish the new EDLDR program success with the redesign.

Bern

Bernard Badiali
Associate Professor
179 Chambers Building
University Park, Pa. 16802
814 863 3286

From: David Gamson <dag17@psu.edu>
Date: Tuesday, April 16, 2019 at 12:45 PM
To: "Badiali, Bernard Joel" <bxb8@psu.edu>
Cc: "Kelley, Sally J" <sjk4@psu.edu>, "Squires, Tiffany M" <tms474@psu.edu>
Subject: EDLDR program changes

Hi Bernie,

You should have already received several course consultation requests regarding the individual course proposals from Educational Leadership.
The full proposal for the EDLDR program changes is now complete and ready for your review (attached here). These changes incorporate all feedback from the EDLDR meeting with C&S.

If you could send us an email response indicating your support, that would be very helpful. We are trying to gather together all consults by Friday, April 26.

Thank you!
David

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David Gamson
Associate Professor of Education
Educational Theory & Policy, Department of Education Policy Studies
Book Review Editor, American Journal of Education
The Pennsylvania State University
University Park, PA 16802
(814) 865-2583
gamson@psu.edu
Hello Tiffany,

My apologies for the delay. I support the changes to your program and see little if any impact on programs in EPCSE. I note that there is room for an elective in some options. I am also happy to discuss the suitability of courses offered in EPCSE (e.g., EDPSY, SPLED) should your students have interest at some point in the future.

Take care,
David Lee
Dear Team!
I support the changes in the Ed Leader Program. Thanks so much for all the work that has gone into making the program even stronger.

Sincerely,

Brad

Brad D. Sterner, Ed.D.
Coordinator, Educational Leadership Program
Principal Certification Program
Penn State Harrisburg
School of Behavioral Sciences & Education
Olmsted Building W331
I first reviewed and provided feedback on the proposal for EDLDR program changes (teacher leadership and school leadership emphases) in F18. At that time my primary concerns centered on the removal of required courses that are offered by C&I (e.g., CI 501) or cross-listed with C&S (e.g., C&S/EDLDR 551). It is evident in the final version that consultation with C&I faculty occurred and that input was incorporated into the proposed changes in meaningful ways. A representative example of the collaborative review of program goals and curriculum alignment can be found on p. 8, "Given that, with help from our C&I colleagues, a review of the CI 501 course syllabus revealed content for this course to cover advanced inquiry (already covered in our 894 Capstone course), and not introduction to inquiry as we had originally expected, it seems most appropriate to eliminate overlap in instruction by no longer requiring CI 501 as part of our M.Ed. Teacher Leader program, and instead to require the proposed EDLDR 831 Leadership for Equity and Diversity as a more suitable three-credit course to prepare teacher leaders for practice."

I find the proposed changes to the EDLDR program be substantive, timely, and attentive to the changing needs of teacher and school leaders. This kind of thoughtful revisiting of program requirements and experiences, although a massive undertaking, is an endeavor that requires investment and commitment on the part of faculty, keeps programs in high standing nationally, and allows for new recruitment possibilities. I am pleased to support the proposed changes and compliment the EDLDR faculty on moving forward with their vision for preparing school and teacher leaders.

Best wishes!

Carla Zembal-Saul, Ph.D.
Kahn Professor of STEM Education
Co-Director, Elementary and Early Childhood Education
Project Director, Science 20/20
Penn State University

On Tue, Apr 16, 2019 at 1:04 PM David Gamson <dag17@psu.edu> wrote:

Hi Carla,

This past October you had provided some valuable feedback and suggestions regarding an earlier draft of a proposal from Educational Leadership regarding its program changes.

We have incorporated your suggestions, and we also took your suggestion about meeting with Gwen (in fact, Gwen, Julia Plummer, and I facilitated a meeting between C&S and EDLDR faculty last month). The attached version of the program change proposal also incorporates all feedback from that EDLDR meeting with C&S.

Since you had reviewed the earlier version, we wanted to send you the final result. If you could send us an email response indicating your support for the proposal, that would be very helpful (we have also sent it to Bernie and Greg Kelly). We are trying to gather together all consults by Friday, April 26.

Much appreciated,

David
David Gamson
Associate Professor of Education
Educational Theory & Policy, Department of Education Policy Studies
Book Review Editor, American Journal of Education
The Pennsylvania State University
University Park, PA 16802
(814) 865-2583
gamson@psu.edu
Hi Gerry and Tiffany --

Thought I would send a summary of how the proposal may affect C&I.

- Cl 501 will no longer be required; revenue issue?
- 3 courses cross-listed with C&I are being replaced, including CS 551 (not sure what this means for Ravi)
- Revised teacher leader program is still in direct competition with C&I emphasis (WD and residential) in terms of potential students
- Not sure I am the correct person for formal consultation; no leadership role in WD, C&I or Grad

I really want to avoid stirring up old issues. Any chance Dana and Gwen can meet to discuss it as grad directors? I think Gwen is also affiliated with C&I.

I will be away at a conference most of this week, but can meet by phone mid-afternoon tomorrow/Monday.

Carla

Carla Zembal-Saul, Ph.D.
Kahn Professor of STEM Education
Co-Director, Elementary and Early Childhood Education
Project Director, Science 20/20
Penn State University
As our program is not competitive with other Penn State programs, we do not anticipate any negative impact of these changes on the greater Penn State community. On the contrary, we project these changes to contribute to the continual improvement of instruction, not only for students in education leadership, but students enrolled in our courses from other Penn State programs as well. We expect these changes to enhance learning for all students interested in developing knowledge and skills for leadership in education.

The faculty of Educational Leadership in Educational Policy Studies Department propose the program changes in the descriptions that follow. Please find an outline of proposed courses for MEd Degree, for preparation of school leaders, which includes the pathway to Principal Certification, as well as changes that apply to the Principal Certificate program specifically. Additionally, please find an outline of proposed changes for MEd Degree for preparation of teacher leaders, which includes a proposed pathway to teacher leadership endorsement through the Pennsylvania Department of Education and, as newly proposed in a separate document, a Certificate Program for Teacher Leaders through Penn State. For clarity, we present changes in the proposal, first for the school leader emphasis, and then followed by changes for the teacher leader emphasis.

<table>
<thead>
<tr>
<th>4</th>
<th>CS 551 Curriculum Design: Theory and Practice</th>
<th>CS 550 Curriculum Leadership—Scholarship</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The analysis and use of the foundations which underlie models of curriculum design.</td>
<td>This course explores curriculum leadership practices and serves as appropriate preparation for teacher leaders, school leaders, directors of instruction, and other curricular leaders.</td>
</tr>
</tbody>
</table>

EDLDR 530 was too narrowly focused, and the faculty feel that EDLDR 531, as it more broadly addresses the matters of equity and diversity in K-12 schools, also more appropriately meets the needs of school leaders. Further, the faculty feel that Leadership for Equity and Diversity is an area of content missing from the Teacher Leadership preparation program. Given that, with help from our C&I colleagues, a review of the CS 501 course syllabus revealed content for this course to cover advanced inquiry (already covered in our 894 Capstone course), and not introduction to inquiry as we had originally expected, it seems most appropriate to eliminate overlap in instruction by no longer requiring CS 501 as part of our MEd Teacher Leader Certification.
program, and instead to require the proposed EDLDR 831 Leadership for Equity and Diversity as a more suitable three-credit course to prepare teacher leaders for practice.

**Teacher Leadership Emphasis**

For the informational purposes, please find below a list of the existing EDLDR Program requirements for MEd with emphasis in Teacher Leadership. Information provided in this section is organized with current program requirements in the left column, and proposed requirements in the right column. Subsections that follow will specify purpose for, and explanation of, proposed changes as applicable to each course. Courses in this section are numbered sequentially to demonstrate the 10, three-credit courses that make up the 30-credit program. Numbers with an asterisk (*) are designated as part of the 12 credits that make up (newly proposed via a separate document) Teacher Certificate program.

<table>
<thead>
<tr>
<th>Current Course Prefix &amp; Name</th>
<th>Proposed 800 Level Prefix &amp; Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 551 Curriculum Design: Theory and Practice</td>
<td>Selected Course in Educational Leadership</td>
</tr>
<tr>
<td>EDLDR 560 Principles of Instructional Supervision</td>
<td>EDLDR 861 Principles of Instructional Leadership—Professional Practice</td>
</tr>
<tr>
<td>CI 501 Teaching as Inquiry</td>
<td>Selected Course in Educational Leadership</td>
</tr>
</tbody>
</table>

**Table Notes:**

- Commented [CZS13]: After EDLDR and C&S parted ways, the courses were left crosslisted to continue to serve this program:
  - CS/EDLDR 551
  - CS/EDLDR 560
  - CS/EDLDR 563
  - Given that they are being replaced by new courses, can these courses be returned to C&S?

- Commented [LGK14]: After EDLDR and C&S parted ways, the courses were left crosslisted to continue to serve this program:
  - CS/EDLDR 551
  - CS/EDLDR 560
  - CS/EDLDR 563
  - Given that they are being replaced by new courses, can these courses be returned to C&S?

- Commented [LGK14R13]: 551 and 563 were already turned over to C&S in the changes supervised by the office of the Senior Associate Dean (circa fall '17). These changes allocate revenue for these courses only to C&S. 560 revenue was allocated at that time only to EDLDR. At the time, it was explained that it's just "simpler" this way for all concerned. 560 should remain with EDLDR, and we welcome C&S students in the course.

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The analysis and use of the foundations which underlie models of curriculum design.

Course to be determined by faculty advisor in collaboration with individual student

*CS 563 Designing Staff Development Programs* | Open Graduate Elective

---

As detailed in a separate document included with this package for program changes in Educational Leadership, the faculty propose the following courses as required for Teacher Leadership Certificate from Penn State. We feel confident that the establishment of a Teacher Leadership Certificate Program will enable our program to continue to attract interest among audiences both outside of PA and internationally. In this way, a Teacher Leader Certificate Program, along with emerging plans for increased marketing and recruitment, both inside the department and in collaboration with World Campus, enables us to be increasingly competitive in a burgeoning area of need in education, that of preparing teacher leaders for leadership roles in education.

<table>
<thead>
<tr>
<th>Current Course Prefix &amp; Name</th>
<th>Proposed 800 Level Prefix &amp; Name</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>EDLDR 560 Principles of Instructional Supervision</em></td>
<td><em>EDLDR 861 Principles of Leadership—Professional Practice</em></td>
</tr>
<tr>
<td>Social and institutional settings for instructional supervision; functions, activities, and practices of supervision; supervisory case studies.</td>
<td>The course explores critical concepts of leadership for instruction with an emphasis on skills in supervising, evaluating, and establishing a positive school culture for instructional staff.</td>
</tr>
</tbody>
</table>

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1. Letters of Support

Carla Zembal-Saul—Professor of Education in Science Education

---

Commented [CZS12]: Current crosslist

Commented [CZS14]: Distinct from teacher certification

Commented [LGK25R24]: Correct

Commented [CZS16]: Current crosslist

Commented [CZS17]: This would be more powerful if it came from our Grad Director or CS PIC.

Commented [LGK25R27]: We concur, and through our dept. head we have tried to reach out to C&I leadership. We will be happy to consult with C&I faculty through the course consultation process.
I teach 560. I do have a number of C&I students in it. I also have a number of SpEd students in it. The revised content was created to provide students with the opportunity to select a leadership lens for application to learning throughout the course. If, for example, they are interested in becoming a department chair for HS Science, then structures in the course are built for them to explore leadership using that lens and articles/information most relevant to it.

The C&I 501 appears to have changed over time from a preparation for inquiry to a full inquiry project. This means it now directly overlaps with EDLR 894. We now have a core sequence of 801, 802 and 894 that develops the inquiry project in a sustained way across the program. We anticipate expanding the range of our electives, and would be happy to have students select C&I 501 as an elective if a second inquiry project is relevant to their needs.
Graduate Council
Program, Option, or Minor Proposal Form

Submit 1 original, signed Graduate Council proposal form and 2 hardcopies of the graduate program proposal document, with a copy of the signed proposal form attached to each proposal copy, to the Office of the Dean of the Graduate School, 211 Kern Building, University Park. For more information about the process, see the Overview of the Graduate Council Curricular Review Process.

The Program Proposal Procedures provide guidance for the development of a graduate program proposal. If you have questions regarding the preparation of a graduate program proposal or how to complete this Graduate Council proposal form, contact the Office of the Dean of the Graduate School.

College/School: Penn State Harrisburg
Department or Instructional Area: School of Science, Engineering and Technology

New Graduate Program, Option, or Minor: Add

Designation of new graduate program: 
Classification of Instructional Programs (CIP) Code: Penn State Graduate School
Designation of new graduate option: 
Designation of new graduate minor: 

Indicate effective semester:
First semester following approval
Second semester following approval

Office of the Vice Provost and Dean of the Graduate School

Existing Graduate Program Option, or Minor: Change
Drop

Current designation of graduate program: Master of Professional Studies in Engineering Mgt
Current designation of graduate option: 
Current designation of graduate minor: 

New designation of existing graduate program (if changing): Master of Engineering Management
New designation of existing graduate option (if changing): 
New designation of existing graduate minor (if changing): 

Brief description of the change (if not noted above): Change in program title

Indicate effective semester:
X First semester following approval
Second semester following approval

Submitted by Graduate Program Head
Rafic Bachak, Ph.D. Date: 7/24/19
Printed name Signature

Noted by College/School Representative to Graduate Council Subcommittee on New and Revised Programs and Courses:
John Haddad, Ph.D. Date: 7/24/19
Printed name Signature

Approved by College/School Dean/Chancellor (or Designee):
Peter Idowu, Ph.D. Date: Aug. 5, 2019
Printed name Signature
<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
<th>Signatures</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended by Chair, Graduate Council Subcommittee on New and Revised Programs and Courses:</td>
<td></td>
<td></td>
<td>10/8/2019</td>
</tr>
<tr>
<td>On Behalf of David Babb</td>
<td>Vidiekruit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommended by Chair, Graduate Council Committee on Programs and Courses:</td>
<td></td>
<td></td>
<td>10/8/2019</td>
</tr>
<tr>
<td>On Behalf of Timothy McNellis</td>
<td>Vidiekruit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noted by Dean of the Graduate School:</td>
<td></td>
<td></td>
<td>10/8/2019</td>
</tr>
<tr>
<td>On Behalf of Regina Vasilatos-Younken</td>
<td>Vidiekruit</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Penn State Harrisburg
School of Science, Engineering and Technology

Master of Professional Studies in Engineering Management
Program Change Proposal
Submitted to the Graduate School

July 23, 2019

For questions/comments, contact the Master of Professional Studies in Engineering Management Program at Penn State Harrisburg, 717-948-6091.
Executive Summary

The Master of Professional Studies in Engineering Management (MPS-EM) program at Penn State Harrisburg comprises 33 total credits, including 21 credits of core courses, 6 credits of electives, and a culminating experience comprising two courses (6 credits).

The MPS-EM faculty is proposing the name of the degree be changed to Master of Engineering Management (MEM), consistent with other similar programs within Penn State, within Pennsylvania, and nation-wide.

There would be no other change to the program contents or requirements. There is a minor change to the Graduate Bulletin to reorder the Professional Learning Objectives.
<table>
<thead>
<tr>
<th>I.  Justification for Proposed Changes and Anticipated Impact</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>II. Program Learning Objectives</td>
<td>3</td>
</tr>
<tr>
<td>III. Comparison of Current and Proposed Program</td>
<td>6</td>
</tr>
<tr>
<td>IV. Current Graduate Bulletin (MPS-EM at Penn State Harrisburg)</td>
<td>6</td>
</tr>
<tr>
<td>V. Proposed Graduate Bulletin (MEM) at Penn State Harrisburg</td>
<td>9</td>
</tr>
</tbody>
</table>

Attachments:

1. Response to consultation with Dr. James Nemes, Chancellor of Penn State Great Valley; he is responsible for both the ground and online versions of the PSU Master of Engineering Management

2. Response to consultation with Dr. Rhoda Joseph, Professor-in-Charge (PIC) of the MBA and Co-PIC (with Dr. van Tonningen), for the Master of Professional Studies in Engineering Management at Penn State Harrisburg

3. Approval of the SSET Curriculum Committee (Dr. Mackertich)
I. Justification for Proposed Changes and Anticipated Impact

Background. The Master of Professional Studies in Engineering Management (MPS-EM) program has been offered at Penn State Harrisburg since fall semester 2007. It is a combination of business/management courses and engineering/engineering management courses offered through the School of Science, Engineering and Technology (SSET) and the School of Business. The current enrollment in the MPS-EM program is 12 students.

The current program structure is shown in Table 1 (next page), along with the two other Engineering Management programs offered within the University – Penn State World Campus and Penn State Great Valley. Penn State Harrisburg is requesting a change of the program name from Master of Professional Studies in Engineering Management (MPS-EM) to Master of Engineering Management (MEM).

Justification. There are a number of reasons for requesting the change:

- Student candidates researching the program at Penn State Harrisburg do not understand the title of the program. There is a much better understanding of the title, "Master of Engineering Management." This evidence is anecdotal, based on email exchanges, phone calls, and face-to-face meetings among Admissions, the Professor-in-Charge (PIC) of the engineering management program, and interested prospects.

- Consistency with other programs statewide and nationally. Here are some data on other schools offering similar programs:
  - Within Pennsylvania, 5 other universities offer engineering management graduate degrees (Drexel, Gannon, Robert Morris, Widener, and Wilkes). All 5 are titled "Master of Engineering Management."
  - Nationally, there are approximately 12 more universities that offer engineering management. Among these schools there are 8 Master of Science in Engineering Management, 6 Master of Engineering Management, and 1 Master of Engineering in Engineering Management. No one nationally offers the MPS-EM except Penn State Harrisburg

- Consistency within the University. Although program length and course structures differ among the three campuses (reference Table 1), there is synergy to be obtained within the University in titling all three programs the same.

This proposal was presented to the SSET Graduate Technical Advisory Council (GTAC). Over 50% of GTAC members are in engineering management positions and they understand the value of the degree. They also supported the idea that employers and prospective students would understand the Master of Engineering Management designation better.

Impact. The anticipated impact of this change for the program will be an increase in enrollment due to better recognition of the program name. Most prospects are looking for a Master of Engineering Management.
Table 1. Comparison of MEM and MPS-EM programs offered by Penn State University

<table>
<thead>
<tr>
<th>Penn State World Campus</th>
<th>Penn State Great Valley</th>
<th>Penn State Harrisburg</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Master of Engineering Management</strong></td>
<td><strong>Master of Engineering Management</strong></td>
<td><strong>MPS in Engineering Management</strong></td>
</tr>
<tr>
<td>ENGMT 511 Engineering for Energy and the Environment</td>
<td>SYSEN 505 Technical Project Management</td>
<td>SYSEN 505 Technical Project Management</td>
</tr>
<tr>
<td>SYSEN 505 Technical Project Management</td>
<td>SYSEN 536 Decision and Risk Analysis in Engineering</td>
<td>MRKT 513 Marketing Management</td>
</tr>
<tr>
<td>SYSEN 536 Decision and Risk Analysis in Engineering</td>
<td>SYSEN 550 Creativity and Problem Solving I</td>
<td>ACCT 501 Financial Statement Analysis</td>
</tr>
<tr>
<td>SYSEN 550 Creativity and Problem Solving I</td>
<td>SYSEN 552 Creativity and Problem Solving II</td>
<td>FINAN 521 Corporate Finance</td>
</tr>
<tr>
<td>SYSEN 552 Creativity and Problem Solving II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MNGMT 511 Organizational Behavior</td>
<td>4 Electives (12 credits)</td>
<td>MNGMT 511 Organizational Behavior</td>
</tr>
<tr>
<td>MNGMT 514 Organizational Innovation and New Venture Development</td>
<td></td>
<td>BUS 588 Strategic Management*</td>
</tr>
<tr>
<td>STS 589 Ethics and Values in Science and Technology</td>
<td></td>
<td>MFGSE 550 Design for Manufacturability*</td>
</tr>
<tr>
<td>ENGMT 539 Engineering Management Strategy</td>
<td>ENGMT 539 Engineering Management Strategy</td>
<td>2 Engineering Electives (6 credits)</td>
</tr>
<tr>
<td><strong>33 credits</strong></td>
<td><strong>33 credits</strong></td>
<td><strong>33 credits</strong></td>
</tr>
</tbody>
</table>

* BUS 588 and MFGSE 550 provide a two-course capstone experience for the program
II. Program Learning Objectives.

The program learning objectives for the newly titled MEM program will be the same as for the current MPS-EM program:

<table>
<thead>
<tr>
<th>Penn State Graduate Student Scholarly and Professional Goal</th>
<th>Master of Engineering Management Program Learning Objective (PLO)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrate appropriate breadth and depth of disciplinary knowledge, and comprehension of the major issues of their discipline</td>
<td>Graduates will be able to demonstrate mastery of core principles in engineering management.</td>
</tr>
</tbody>
</table>
| Use disciplinary methods and techniques to apply knowledge, and – if appropriate to the degree – create new knowledge or achieve advanced creative accomplishment | a. Graduates will be able to apply business strategy to solve engineering management problems.  
b. Graduates will be able to apply project management to solve engineering management problems |
| Communicate the major issues of their discipline effectively | Graduates will be able to effectively communicate project outcomes, such as ideas, requirements, business analyses, findings, and justification for decisions. |
| Demonstrate analytical and critical thinking within their discipline, and, where appropriate, across disciplines, and | Graduates will be able to critically and creatively conceptualize, evaluate and formulate engineering management problems, as well as perform the analyses required for problem definition. |
| Know and conduct themselves in accordance with the highest ethical standards, values, and, where these are defined, the best practices of their discipline | Graduates will be able to demonstrate an understanding of professional and ethical responsibility and conduct themselves accordingly. |
III. Comparison of Current (MPS-EM) and Proposed MEM Program

a. Admissions requirements

<table>
<thead>
<tr>
<th>Current Program</th>
<th>Proposed Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>An undergraduate cumulative grade-point average of 3.0 or better on a 4.0 scale.</td>
<td>[No change]</td>
</tr>
<tr>
<td>Applicants should have undergraduate degrees in engineering or technology from an accredited university and are expected to have completed undergraduate course work in calculus and economics.</td>
<td>[No change]</td>
</tr>
<tr>
<td>Test scores on the Graduate Management Admission Test (GMAT).</td>
<td>[No change]</td>
</tr>
<tr>
<td>Graduate Record Examination (GRE) test scores are required for those indicating interest in an assistantship.</td>
<td>[No change]</td>
</tr>
</tbody>
</table>

b. General curricular requirements

<table>
<thead>
<tr>
<th>Current Program</th>
<th>Proposed Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Master of Professional Studies (MPS) in Engineering Management is a 33-credit graduate program that integrates engineering with business and management principles. The multi-disciplinary, broadly based MPS program will provide engineers with business and management perspectives to enhance capabilities in management of large projects.</td>
<td>The Master of Engineering Management (MEM) is a 33-credit graduate program that integrates engineering with business and management principles. The multi-disciplinary, broadly based MEM program will provide engineers with business and management perspectives to enhance capabilities in management of large projects.</td>
</tr>
<tr>
<td>All MPS students will be required to take seven core courses (21 credits) focusing on economic analysis, communication and teamwork, management processes, corporate finance, energy and the environment, and engineering analysis.</td>
<td>All MEM students will be required to take seven core courses (21 credits) focusing on economic analysis, communication and teamwork, management processes, corporate finance, energy and the environment, and engineering analysis.</td>
</tr>
<tr>
<td>The curriculum requires the completion of two free electives (6 credits) in any of the engineering disciplines, and a culminating experience through a two-course sequence (6 credits) on strategic management of new ventures and innovations. Of the 33 credits required for the degree, 30 credits must be earned in 500-level graduate courses.</td>
<td>The curriculum requires the completion of two free electives (6 credits) in any of the engineering disciplines, and a culminating experience through a two-course sequence (6 credits) on strategic management of new ventures and innovations. Of the 33 credits required for the degree, 30 credits must be earned in 500-level graduate courses.</td>
</tr>
</tbody>
</table>
### c. Required courses

<table>
<thead>
<tr>
<th>Current Program</th>
<th>Credits</th>
<th>Proposed Program</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 501 Financial Statement Analysis</td>
<td>3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>EMCH 524A Mathematical Methods in</td>
<td>3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Engineering</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGMT 511 Engineering for Energy and</td>
<td>3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>the Environment</td>
<td></td>
<td>[No change]</td>
<td></td>
</tr>
<tr>
<td>FINAN 521 Corporate Finance</td>
<td>3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>MNGMT 511 Organizational Behavior</td>
<td>3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>MRKT 513 Marketing Management</td>
<td>3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>SYSEN 506 Technical Project Management</td>
<td>3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>Total credit hours</strong></td>
<td><strong>21</strong></td>
<td></td>
<td><strong>21</strong></td>
</tr>
</tbody>
</table>

### d. Electives

<table>
<thead>
<tr>
<th>Current Program</th>
<th>Credits</th>
<th>Proposed Program</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two free electives in any of the</td>
<td>6</td>
<td>[No change]</td>
<td>6</td>
</tr>
<tr>
<td>engineering disciplines</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total credit hours</strong></td>
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<td></td>
<td><strong>6</strong></td>
</tr>
</tbody>
</table>

### e. Culminating Experience

<table>
<thead>
<tr>
<th>Current Program</th>
<th>Credits</th>
<th>Proposed Program</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS 588 Strategic Management</td>
<td>3</td>
<td>[No change]</td>
<td>3</td>
</tr>
<tr>
<td>MFGSE 550 Design for Manufacturability I</td>
<td>3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>Total credit hours</strong></td>
<td><strong>6</strong></td>
<td></td>
<td><strong>6</strong></td>
</tr>
</tbody>
</table>
IV. Current Graduate Bulletin

Overview

ENGINEERING MANAGEMENT (CAPITAL)

Graduate Program Head  Rafic Bachnak
Program Code           EM
Campus                 Harrisburg (M.P.S.)
Degrees Conferred      Master of Professional Studies (M.P.S.)
The Graduate Faculty    View

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission. Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 Admissions.

Applicants must have undergraduate degrees in engineering or technology from an accredited university and must have completed undergraduate course work in calculus and economics.

An undergraduate cumulative grade-point average of 3.0 or better on a 4.0 scale, and scores from the Graduate Management Admission Test (GMAT) or the Graduate Record Examination (GRE) are required for admission. Students demonstrating high potential but failing to meet the minimum GMAT or GRE score requirements may be considered on the basis of professional accomplishments and other criteria that may predict success in the program.

Applicants must submit the following:

- a complete Graduate School application for admission with the nonrefundable application fee.
- official transcripts from all post-secondary institutions attended.
- three (3) letters of reference, especially from faculty who can evaluate academic potential
- a personal statement of technical interest, goals, and experience
- test scores from the Graduate Management Admission Test (GMAT) or the Graduate Record Examination (GRE) [GRE scores are required for those indicating interest in an assistantship and to be eligible for many graduate fellowship opportunities.]

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students for more information.

Degree Requirements

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements.

All graduate students in Engineering Management are required to adhere to the requirements of Graduate Council, listed in the link above. These, however, are minimum requirements and the policies, procedures, and regulations listed below are additional and more specific for graduates
students pursuing the M.P.S. degree in Engineering Management. Advisers will call pertinent regulations to the attention of their advisees, but it should be understood that it is the student's personal responsibility to see that all requirements listed are satisfied.

The M.P.S. in Engineering Management is a 33-credit graduate program that integrates engineering with business and management principles. The multidisciplinary, broadly based M.P.S. program provides engineers with business and management perspectives to enhance capabilities in management of large projects. Of the 33 credits required for the degree, 30 must be earned in 500-level graduate courses.

**REQUIRED COURSES**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 501</td>
<td>Financial Statement Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 524A</td>
<td>Mathematical Methods in Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ENGMT 511</td>
<td>Engineering for Energy and the Environment</td>
<td>3</td>
</tr>
<tr>
<td>FINAN 521</td>
<td>Corporate Finance</td>
<td>3</td>
</tr>
<tr>
<td>MNGMT 511</td>
<td>Organizational Behavior</td>
<td>3</td>
</tr>
<tr>
<td>MKRT 513</td>
<td>Marketing Management</td>
<td>3</td>
</tr>
<tr>
<td>SYSEN 505</td>
<td>Technical Project Management</td>
<td>3</td>
</tr>
</tbody>
</table>

**ELECTIVES**
The curriculum requires the completion of two free electives (6 credits) in any of the engineering disciplines. A list of these elective courses is maintained by the graduate program office.

**CULMINATING EXPERIENCE**

All students are required to complete a culminating experience through a two-course capstone course sequence:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS 588</td>
<td>Strategic Management</td>
<td>3</td>
</tr>
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<td>MFGSE 550</td>
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<td>3</td>
</tr>
</tbody>
</table>

**Total Credits**

<table>
<thead>
<tr>
<th>Credits</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>33</td>
<td></td>
</tr>
</tbody>
</table>

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.
Learning Outcomes

1. **KNOW.** Graduates will be able to demonstrate mastery of core principles in engineering management.

2. **CRITICAL THINKING.** Graduates will be able to critically and creatively conceptualize, evaluate and formulate engineering management problems, as well as perform the analyses required for problem definition.

3. **PROBLEM SOLVING.**
   a. Graduates will be able to apply business strategy to solve engineering management problems.
   b. Graduates will be able to apply project management to solve engineering management problems.

4. **COMMUNICATE.** Graduates will be able to effectively communicate project outcomes, such as ideas, requirements, business analyses, findings, and justification for decisions.

5. **ETHICS AND PROFESSIONALISM.** Graduates will be able to demonstrate and understanding of professional and ethical responsibility and conduct themselves accordingly.

Contact

**Campus**
Harrisburg

**Graduate Program Head**
Rafic A Bachnak

**Director of Graduate Studies (DGS) or Professor-in-Charge (PIC)**
Scott Van Tonningen

**Program Contact**
Donna Griffith
W215 Olmsted - Penn State Harrisburg
777 West Harrisburg Pike
Middletown PA 17057
dlg47@psu.edu
(717) 948-4344

**Program Website**
[View](#)
V. Proposed Graduate Bulletin

Overview

ENGINEERING MANAGEMENT (CAPITAL)

Graduate Program Head
Rafic Bachnak
Program Code
EM [to be determined]
Campus
Harrisburg (M.P.S.)
Degrees Conferred
Master of Professional Studies Engineering Management (M.P.-SMEM.)
The Graduate Faculty
View

Admission Requirements

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All graduate students in Engineering Management are required to adhere to the requirements of Graduate Council, listed in the link above. These, however, are minimum requirements and the policies, procedures, and regulations listed below are additional and more specific for graduates.
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student's personal responsibility to see that all requirements listed are satisfied.

The M.P.S. in Master of Engineering Management (MEM) is a 33-credit graduate program that
integrates engineering with business and management principles. The multidisciplinary, broadly
based M.P.S. MEM program provides engineers with business and management perspectives to
enhance capabilities in management of large projects. Of the 33 credits required for the degree,
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</tr>
</tbody>
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<th>Credits</th>
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<tbody>
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<td>Strategic Management</td>
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</tr>
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</table>

Total Credits 33

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   evaluate and formulate engineering management problems, as well as perform the
   analyses required for problem definition.

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---

**Contact**

**Campus**
Harrisburg

**Graduate Program Head**
Rafic A Bachnak

**Director of Graduate Studies**
Scott Van Tonningen

**(DGS) or Professor-in-Charge (PIC)**
Donna Griffith
W215 Olmsted - Penn State Harrisburg
777 West Harrisburg Pike
Middletown PA 17057
dlg47@psu.edu
(717) 948-4344

**Program Contact**

**Program Website**
View
Attachment 1. Response to consultation with Dr. James Nemes, Chancellor of Penn State Great Valley; he is responsible for both the ground and online versions of the PSU Master of Engineering Management

From: Nemes, James A  
Sent: Monday, November 26, 2018 3:01 PM  
To: Bachnak, Rafic A  
Subject: RE: seeking feedback about a proposal

Ray,

We have no objection if Harrisburg wants to seek a name change.

Jim

James A. Nemes, D.Sc.

Chancellor and Chief Academic Officer  
Professor of Mechanical Engineering  
School of Graduate Professional Studies  
Penn State Great Valley  
30 East Swedesford Road  
Malvern, PA 19355-1443  
Phone: 610-648-3206  
jan16@psu.edu

From: Bachnak, Rafic A  
Sent: Monday, November 26, 2018 2:58 PM  
To: Nemes, James A <jan16@psu.edu>  
Subject: Fw: seeking feedback about a proposal

Hi Jim,

Hope you had a good Thanksgiving break! Let me know when you will be able to get back to us. I have a meeting tomorrow and wanted to share an update if possible. Thanks,

From: Bachnak, Rafic A  
Sent: Monday, October 8, 2018 9:34 AM  
To: Nemes, James A  
Subject: Re: seeking feedback about a proposal

Good morning Jim,

The revised document is attached. Look forward to hearing from you again. regards,

Ray
Attachment 2. Response to consultation with Dr. Rhoda Joseph, Professor-in-Charge (PIC) of the MBA and Co-PIC (with Dr. van Tonningen), for the Master of Professional Studies in Engineering Management at Penn State Harrisburg

Joseph, Rhoda
Mon 2/11, 8:35 AM

Dear Scott,

I support the name change. It is a great idea and will make it easier for students to find the program with the easier acronym of MEM. This also clarified the degree to us and we can Market the dual degree option to MBA students with an Engineering.

Please let me know if you need additional information.

Best Regards,

Rhoda

Van Tonningen, Scott
Mon 2/11, 7:21 AM

MPSEM_Program Change Proposal_1-29-19.docx

56 KB

Hi Rhoda. I am going to be meeting with Dr. Bachnak today and wanted to give him an update on this. I was really just looking for feedback on the concept of changing the name, really. Nothing else in the program would change.

Thanks

Scott

Scott van Tonningen, Ph.D.
Associate Teaching Professor and
Associate Director, Graduate Programs
School of Science, Engineering, and Technology (SSET)
Penn State Harrisburg
Attachment 3. Approval of the SSET Curriculum Committee (Dr. Mackertich)

Mackertich-Sengerdy, Seroj

Mon 3/18, 2:36 PM

Hi Scott,

The Curriculum Committee met Thursday (March 14, 2019) to review your proposal to change the name of "Master of Professional Studies in Engineering Management" to "Master of Engineering Management". The Committee unanimously approved your proposal.

Regards,

Seroj Mackertich, Ph.D
Chair of Civil Engineering & SDCET
777 W. Harrisburg Pike, W-236
Middletown, PA 17057
717-948-6131

Van Tonningen, Scott
Wed 3/20, 12:43 PM

MPSEM_Program Change Proposal_2-20-19.docx
Graduate Program Proposal Requirements - Procedure - Default.html

Dear Dr. Mackertich: As you are the Chair of the SSET Curriculum Committee, I am sending this to you first. We have been working for several months on a proposal to change the name of the Master of Professional Studies in Engineering Management to simply the Master of Engineering Management. This proposal essentially follows the requirements listed in the PSU policy which I have also attached. It may be too long and I would like some feedback on that. For example, Section IV is a complete listing of the current program in the Graduate Bulletin whereas Section V is the listing again with proposed changes. That is how we did things two years ago when we put another proposal through the system to align the MPS Engr Mgt with the new MBA. I am not sure that is necessary now, based on the attached guidance. But, better to be safe than sorry.

Dr. Bachnak and I agreed that consultation should be primarily with Dr. Jim Nemes at Great Valley, because he is responsible for the other two Engineering Management programs at PSU (a ground version and the World Campus version). There was also consultation with our School of Business, of course, via Dr. Rhoda Joseph, because they co-teach the program with us. Dr. Bachnak indicated that the review would start with your committee (SSET level), and then I can send it along with your endorsement to the campus level and then UP.

Let me know if you have any questions. We are simply trying to get this done as soon as possible and don't foresee any real difficulties with approval.

Thanks

Scott
Graduate Council  
Program, Option, or Minor Proposal Form  

Submit 1 original, signed Graduate Council proposal form and 2 hardcopies of the graduate program proposal document, with a copy of the signed proposal form attached to each proposal copy, to the Office of the Dean of the Graduate School, 211 Kern Building, University Park. For more information about the process, see the Overview of the Graduate Council Curricular Review Process.

The Program Proposal Procedures provide guidance for the development of a graduate program proposal. If you have questions regarding the preparation of a graduate program proposal or how to complete this Graduate Council proposal form, contact the Office of the Dean of the Graduate School.

College/School: College of Information Sciences and Technology  
Department or Instructional Area:  

New Graduate Program, Option, or Minor: Add  
Designation of new graduate program:  
Classification of Instructional Programs (CIP) Code:  
Designation of new graduate option:  
Designation of new graduate minor:  

Indicate effective semester:  
First semester following approval  
Second semester following approval  

Existing Graduate Program Option, or Minor: X Change. Drop  
Current designation of graduate program: Ph.D. in Informatics  
Current designation of graduate option:  
Current designation of graduate minor:  

New designation of existing graduate program (if changing):  
New designation of existing graduate option (if changing):  
New designation of existing graduate minor (if changing):  

Brief description of the change (if not noted above): Total credit change and reorganization of required courses.  
Indicate effective semester:  
First semester following approval  
X Second semester following approval Fall 2020  

Submitted by Graduate Program Head  
Mary Beth Rosson  
Printed name  Signature  Date: 8/5/19  

Noted by College/School Representative to Graduate Council Subcommittee on New and Revised Programs and Courses:  
Fred Fonseca  
Printed name  Signature  Date: 08/05/2019  

Approved by College/School Dean/Chancellor (or Designee):  
Amy Lee  
Printed name  Signature  Date: 8/6/19
<table>
<thead>
<tr>
<th>Recommended by Chair, Graduate Council Subcommittee on New and Revised Programs and Courses:</th>
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</thead>
<tbody>
<tr>
<td>On Behalf of David Babb</td>
</tr>
<tr>
<td>Printed name</td>
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<tr>
<td>Signature</td>
</tr>
<tr>
<td>Date: 10/8/2019</td>
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</table>

<table>
<thead>
<tr>
<th>Recommended by Chair, Graduate Council Committee on Programs and Courses:</th>
</tr>
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<tbody>
<tr>
<td>On Behalf of Timothy McNellis</td>
</tr>
<tr>
<td>Printed name</td>
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<tr>
<td>Signature</td>
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<tr>
<td>Date: 10/8/2019</td>
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<table>
<thead>
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</tr>
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<tbody>
<tr>
<td>On Behalf of Regina Vasilatos-Younken</td>
</tr>
<tr>
<td>Printed name</td>
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<tr>
<td>Signature</td>
</tr>
<tr>
<td>Date: 10/8/2019</td>
</tr>
</tbody>
</table>
Program Change Proposal

PhD of Informatics

Contact:

Dr. Mary Beth Rosson, Director of Doctoral Programs and Professor

College of Information Sciences and Technology

August 5, 2019
Table of Contents

Supporting Documentation pg 3
Justification pg 3
Evidence of Consultation pg 3
New Graduate Bulletin Listing (separate document)
Supporting Documentation

A. Comparison of current vs. proposed requirements

<table>
<thead>
<tr>
<th>Current</th>
<th>Proposed Change</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>PhD Informatics (INMAC) 32-credits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Required Courses 8-credits</td>
<td>Required Courses 32-credits</td>
<td>Regrouped and removed required courses.</td>
</tr>
<tr>
<td>IST 501, IST 590 and select one of the following: IST 510, 520 530</td>
<td>IST 501 (3 crs.) and IST 590 (2 crs.)</td>
<td>Added text regarding additional courses from department-maintained list.</td>
</tr>
<tr>
<td></td>
<td>Select nine credits (9) from the department-maintained list of foundation courses.</td>
<td>Added text regarding additional research methodology and specialization courses.</td>
</tr>
<tr>
<td></td>
<td>Select eighteen credits (18) of research methodology and specialization courses in consultation with your adviser to support progress on your dissertation research.</td>
<td></td>
</tr>
<tr>
<td>Research Methodologies 12-credits</td>
<td></td>
<td>Removed heading.</td>
</tr>
<tr>
<td>Specialization Courses 12-credits</td>
<td></td>
<td>Removed heading.</td>
</tr>
</tbody>
</table>

B. Justification

The original Ph.D. in the College of Information Sciences and Technology (IST) conceptualized the interdisciplinary study of informatics as encompassing social informatics, human-centered design, and computational informatics. All Ph.D. students were expected to develop some core familiarity with these three areas. Although these three areas are still important facets of the College’s interdisciplinary research portfolio, as the College has grown this portfolio has expanded in its disciplinary roots. As a result, we now recognize additional foundational knowledge areas and expect that different students will benefit from exposure to different subsets of these areas. To meet this need, we will regularly offer a set of 5-6 foundational courses across the two semesters of a doctoral student’s first year. In concert with his or her adviser, and with approval by the Director of Graduate Programs, each student will make a thoughtful selection of three courses. Generally, one of a student’s foundational courses will overlap his or her current research interests, whereas the other two will be complementary.
C. Consultation
Approved by College of IST Graduate Advisory Committee in May 2019. No outside consultation conducted as the changes do not impact any other college or programs (see below).

From: Hewitt, Vicki <vlh16@psu.edu>
Sent: Thursday, February 21, 2019 12:18 PM
To: Rosson, Mary Beth <mrosson@psu.edu>
Cc: Sieber, Jenna <jns5431@psu.edu>; Stever, Amy <als39@psu.edu>; Sieber, Jenna <jns5431@psu.edu>
Subject: RE: Update to PhD core courses

Mary Beth,

No, you don’t need to submit a prospectus. This would be a program change proposal to change the degree requirements for the Ph.D. degree. There are four required elements to a program change proposal:

- Justification – why the change is being proposed, and any expected outcomes as a result.
- Comparison of Changes – a description of the proposed changes as compared to the existing program requirements. A table is recommended, showing the contrast between the existing program requirements and the proposed new requirements.
- Revised Bulletin Copy – a complete and current copy of the existing Informatics Bulletin page (including all of the tabs), with any changes that need to be made marked by using Track Changes. Any changes and updates that need to be made, even those not specifically required by the proposal, should be included here.
- Consultation – written evidence of consultation with any departments affected by the proposed change. For a change in degree requirements that doesn’t affect any other program, no Consultation is typically necessary; however, if the new requirements include courses from other graduate programs, those programs should provide Consultation stating that they are aware of and approve of the change.
INFORMATICS

Graduate Program Head: Mary Beth Rosson

Program Code: INMAC

Campus(es): University Park (Ph.D., M.S.)

Degrees Conferred

- Doctor of Philosophy (Ph.D.)
- Master of Science (M.S.)
- Dual-Title Ph.D. in Informatics and Social Data Analytics
- Integrated B.S. in Information Sciences and Technology and M.S. in Informatics
- Integrated B.S. in Security and Risk Analysis and M.S. in Informatics

The Graduate Faculty

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=INMAC)

The Ph.D. in Informatics offers advanced graduate education for students contemplating careers in academic teaching and research, or research in a non-academic setting. The program is interdisciplinary in nature and expects scholarship at the highest level exhibiting depth of competency in at least one of the core areas of informatics, and an understanding of the integration of the critical constructs that drive the field: people, information, and technology.

The Dual-Title Ph.D. in Informatics and Social Data Analytics degree program is administered by the Social Data Analytics Committee, which is responsible for the management of the program. The committee maintains program definition, identifies faculty and courses appropriate to the program, and recommends policy and procedures for its operation to the Dean of the Graduate School. The program enables students from diverse graduate programs to attain and be identified with an interdisciplinary array of tools, techniques, and methodologies for social data analytics, while maintaining a close association with a home discipline. Social data analytics is the integration of social scientific, computational, informational, statistical, and visual analytic approaches to the analysis of large or complex data that arise from human interaction. To pursue a dual-title degree under this program, the student must apply to the Graduate School and register through one of the approved graduate programs.

The Master of Science in Informatics is an interdisciplinary degree program that focuses on the theoretical, application-oriented, and educational issues facing a digital, global economy. The program is designed to build an understanding of how information and technology fundamentally impact (and are impacted by) people, organizations, and the world community. Topical areas within the program span a broad range including: human computer interaction, computational techniques, applications (e.g., bio-informatics and geographical information systems), societal issues (such as digital divide issues), user issues (e.g., computer-aided cognition), and information systems design and development providing exposure and grounding in many of the aspects of the information sciences. The program is especially attractive to students interested in gaining state-of-the-art understanding of informatics and its use as a solution in multiple venues.

The Integrated Undergraduate Graduate (IUG) program is available for strong undergraduate students who wish to pursue a bachelor’s and master’s degree in a shorter period of time than would be necessary if the degrees were pursued separately. There are two approved IUG programs: an Integrated B.S. in Information Sciences and Technology and M.S. in Informatics, and an Integrated B.S. in Security and Risk Analysis and M.S. in Informatics.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospectivestudents/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 Admissions (http://gradschool.psu.edu/graduate-education-policies).

Applicants to the program are required to submit scores from the general portions of the Graduate Record Examinations (GRE), three letters of reference, a current resume (including present position and any publications), a 1 to 3 page statement of research background and goals related to pursuing an advanced degree and career in informatics, which also briefly discusses personal motivation for obtaining an M.S. or Ph.D., and a sample of the applicant’s writing (e.g., technical paper, etc.).

Because the program is multidisciplinary in nature, students from many different disciplines may be accepted for entry into the program. A bachelor's degree in a related area (e.g., engineering and science), while not necessary for admission, is helpful in the successful completion of the degree. It is expected that students will have a basic level of competency in statistics, as well as computer and information technology. Related work experience can be used to demonstrate such competency. A student may be accepted into the program with provisional status (http://gradschool.psu.edu/graduate-educationpolicies/gcac/gcac-300/provisional-admission) for no more than one year while work is completed to meet these expectations.

It is expected that the successful applicant will have an overall grade point average of 3.00 (on a 4.00 scale) or higher for his or her undergraduate study and/or graduate-level study. However, accomplishments demonstrated through work experience and recommendation letters from the
applicant’s academic adviser or employer will also play an important role in making the admission decision. The most qualified applicants will be accepted into the program until all spaces for new students are filled.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/gcac-305-admission-requirements-international-students) for more information.

Degree Requirements

Master of Science (M.S.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Policies.

The M.S. in Informatics requires a minimum of 30 credits at the 400, 500, 600, or 800 level, with at least 18 credits at the 500 or 600 series combined; 27 of the 30 credits must be earned at Penn State. These 30 credits are distributed among the following requirements:

Core Courses (3-6 credits)
All candidates are expected to develop a broad understanding of the core constructs of people, information, technology, and the significant interactions among those elements by taking . Candidates may also take IST 505 to gain a deeper understanding of research design.

Specialization Courses (12-18 credits)
In consultation with his/her adviser, a candidate is expected to choose courses in one or more areas customized to support the thesis or scholarly paper. In addition to advanced courses in IST, a support area could be in cybersecurity, data science, law, business, education, engineering, the liberal arts, science, or any area that is linked to the information sciences. A list of suggested specialization courses is maintained by the graduate program office.

Research Methods (6 credits)
All candidates must develop a basic understanding of the research methods utilized in the information sciences, by taking at least two research methods courses offered in IST or elsewhere. The focus of the course must be on the methods being learned rather than application of some method to a research topic. A list of courses that will satisfy this requirement is maintained by the graduate program office.

Thesis or Scholarly paper (3-6 credits)

Doctor of Philosophy (Ph.D.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The doctoral degree in Informatics requires a minimum of 32 credits, including 6-14 credits of foundational courses and 18 credits of research and specialization courses in consultation with the student’s adviser to support research progress. Required core credits.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Informatics</td>
<td></td>
</tr>
</tbody>
</table>

Students may choose a thesis or scholarly paper option. Students who choose the thesis option must register for 6 credits of IST 600 or IST 610, write a satisfactory thesis accepted by the master’s committee, the head of the graduate program, and the Graduate School, and pass a thesis defense. The thesis should focus on a well-defined problem relevant to the information sciences. Students who choose the thesis option must also complete IST 505.

Students who choose the scholarly paper option must register for 3 credits of IST 594 and complete the scholarly paper. The scholarly paper will be a focused piece of technical work that applies the student’s expertise and knowledge base, and that is documented and presented as a scholarly paper report. Students who choose the scholarly paper option must write a scholarly paper that is accepted by their M.S. committee. An oral presentation may be required at the discretion of the student’s adviser.
Finally, all students must be competent in the English language, with demonstrated skills in the communication of ideas both verbally and in writing commensurate with the requirement of English proficiency and plan for remediation (including additional courses, mentoring, or experiences) for all students. A brief critical literature review in three complementary research areas will be included as part of the qualifying examination. Students must have completed 18 graduate credits before taking the qualifying exam and must pass the qualifying exam within three semesters. Students must pass the Ph.D. comprehensive examination after completion of most of their course work, usually after the student's second year in the program. A research-based dissertation must be completed under the direction of the dissertation committee, with the student submitting a dissertation proposal and defending that proposal in the defense examination. To earn the Ph.D. degree, doctoral students must write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense). In addition, all students must be competent in the English language and must have demonstrated skills in the communication of ideas both verbally and in writing commensurate with the requirement of scholarly and professional work. The qualifying examination will be used as an occasion to assess English proficiency and plan for remediation (including additional courses, mentoring, or experiences) for all students. A brief critical literature review in three complementary research areas will be included as part of the qualifying examination. Students must have completed 18 graduate credits before taking the qualifying exam and must pass the qualifying exam within three semesters. Students must pass the Ph.D. comprehensive examination after completion of most of their course work, usually after the student's second year in the program. A research-based dissertation must be completed under the direction of the dissertation committee, with the student submitting a dissertation proposal and defending that proposal in the defense examination. To earn the Ph.D. degree, doctoral students must write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

### Degree Requirements

#### Dual-Title Ph.D. in Informatics and Social Data Analytics

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/ gcac-208-dual-title-graduate-degree-programs).  

**Admission Requirements**

For the Dual-Title Ph.D. in Informatics and Social Data Analytics, students must apply and be
admitted to the Informatics graduate program and The Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known on their applications to Informatics and include remarks in their statement of purpose that address the ways in which their research and professional goals in Informatics reflect an expanded interest in Social Data Analytics. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Social Data Analytics dual-title program. To be enrolled in the Dual Title Doctoral Degree Program in Social Data Analytics, a student must submit a letter of application and transcript, which will be reviewed by the Social Data Analytics Admissions Committee. An applicant must have a minimum grade point average of 3.0 (on a 4-point scale) to be considered for enrollment in the dual-title degree program. Refer to the Admission Requirements section of the Social Data Analytics Bulletin Page (http://bulletins.psu.edu/graduate/programs/majors/social-data-analytics). Students must apply for enrollment into the dual-title degree program in Social Data Analytics prior to taking the qualifying examination in their primary graduate program. Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in Informatics. In addition, students must complete the degree requirements for the dual-title in Social Data Analytics, listed on the Social Data Analytics Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/social-data-analytics).

The qualifying examination committee must conform to all requirements of the primary program and the Graduate Council. In accordance with Graduate Council, the qualifying examination committee must include at least one member of the Social Data Analytics Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. The dual-title degree will be guided by the qualifying examination procedure of the primary graduate program and the Graduate Council. In accordance with Graduate Council, there will be a single qualifying examination, assessing both the primary graduate program and the dual-title program. Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

The dissertation committee must conform to all requirements of the primary graduate program and the Graduate Council. In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Social Data Analytics dual-title doctoral degree student must include at least one member of the Social Data Analytics Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role.

If the chair of the dissertation committee is not also a member of the Graduate Faculty in Social Data Analytics, the member of the committee representing Social Data Analytics must be appointed as co-chair.

The dual-title degree will be guided by the comprehensive exam procedure of the primary graduate program. After completion of required course work, doctoral students in the dual-title doctoral degree program must pass a comprehensive examination. In programs where this includes evaluation of a written exam, the Social Data Analytics representative on the student's dissertation committee will participate in the writing and evaluation of the exam, in accordance with procedures maintained by the primary graduate program. In programs where the comprehensive exam involves defense of a dissertation prospectus, the Social Data Analytics representative on the student's dissertation committee will participate in the evaluation of the prospectus, including ensuring the proposed dissertation has substantial Social Data Analytics content.

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Informatics and Social Data Analytics. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Integrated Undergrad-Grad Programs

Integrated B.S. in Information Sciences and Technology and M.S. in Information Sciences and Technology

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/gcac-210-integrated-undergraduate-graduate-degree-programs).

The first two to three years of undergraduate course work follow the same undergraduate curriculum that other students follow in the Information Sciences and Technology major. Information Sciences and Technology undergraduates may apply for admission to the IUG program no earlier than February 15th of their sophomore year and no later than February 15 of their junior year after completing a
minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in a College of IST undergraduate degree program.
2. Must have completed 60 credits of an IST undergraduate degree program.
3. Must apply to the IUG program by February 15 of their junior year.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in Informatics. Students must complete the Graduate School application (http://www.gradschool.psu.edu/apply/?CFID=4347157&CFTOKEN=809212809140639-22E9BF85-AF21D9DA-933F35E90FB10EAB&jsessionid=84304e7b7ae255ec9a524e5b1e59 12501 Admission requirements for the M.S. in Informatics are listed on the Admission Requirements tab.
5. Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate course work and a minimum GPA of 3.5 in all course work completed for the major.
6. Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
7. Must present two letters of recommendation from faculty members.
8. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

Integrated B.S. in Security and Risk Analysis and M.S. in Information Sciences and Technology

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/gcac-210-integrated-undergraduate-graduate-degree-programs/). The Integrated Undergraduate Graduate (IUG) program is available for strong undergraduate students who wish to pursue a bachelor’s and master’s degree in a shorter period of time than would be necessary if the degrees were pursued separately.

The first two to three years of undergraduate course work follow the same undergraduate curriculum that other students follow in the Security and Risk Analysis major. Security and Risk Analysis undergraduates may apply for admission to the IUG program no earlier than February 15th of their sophomore year and no later than February 15 of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in a College of IST undergraduate degree program.
2. Must have completed 60 credits of an IST undergraduate degree program.
3. Must apply to the IUG program by February 15 of their junior year.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in Informatics. Students must complete the Graduate School application (http://www.gradschool.psu.edu/apply/?CFID=4347157&CFTOKEN=809212809140639-22E9BF85-AF21D9DA-933F35E90FB10EAB&jsessionid=84304e7b7ae255ec9a524e5b1e59 12501 Admission requirements for the M.S. in Informatics are listed on the Admission Requirements tab.

The following are courses eligible to double count for both undergraduate and graduate degrees from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 411</td>
<td>Distributed-Object Computing</td>
<td>3</td>
</tr>
<tr>
<td>IST 412</td>
<td>The Engineering of Complex Software</td>
<td>3</td>
</tr>
<tr>
<td>IST 413</td>
<td>Usability Engineering</td>
<td>3</td>
</tr>
<tr>
<td>IST 420</td>
<td>Fundamentals of Systems and Enterprise Integration</td>
<td>3</td>
</tr>
<tr>
<td>IST 421</td>
<td>Advanced Enterprise Integration: Technologies and Applications</td>
<td>3</td>
</tr>
<tr>
<td>IST 431</td>
<td>The Information Environment</td>
<td>3</td>
</tr>
<tr>
<td>IST 432</td>
<td>Legal and Regulatory Environment of Information Science and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 505</td>
<td>Foundations of Research Design in Information Sciences and Technology</td>
<td>3</td>
</tr>
</tbody>
</table>

The Engineering of Complex Software

The required 3 credits of IST 504 will apply to both the graduate program and the undergraduate program. Students may choose an additional 9 credits to double-count for both the
Admission requirements for the M.S. in Informatics are listed on the Admission Requirements tab.

5. Must have an overall GPA of 3.5 (on a 4.0 scale) in all undergraduate course work and a minimum GPA of 3.5 in all course work completed for the major.

6. Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.

7. Must present two letters of recommendation from faculty members.

8. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

Students must fulfill all degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted. The required 3 credits of IST 504 will apply to both the graduate program and the undergraduate program. Students may choose an additional 9 credits to double-count for both the undergraduate and graduate degrees from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 451</td>
<td>Network Security</td>
<td>3</td>
</tr>
<tr>
<td>IST 452</td>
<td>Legal and Regulatory Environment of Privacy and Security</td>
<td>3</td>
</tr>
<tr>
<td>IST 454</td>
<td>Computer and Cyber Forensics</td>
<td>3</td>
</tr>
<tr>
<td>IST 505</td>
<td>Foundations of Research Design in Information Sciences and Technology</td>
<td>3</td>
</tr>
<tr>
<td>SRA 433</td>
<td>Deception and Counterdeception</td>
<td>3</td>
</tr>
<tr>
<td>SRA 468</td>
<td>Visual Analytics for Security Intelligence</td>
<td>3</td>
</tr>
<tr>
<td>SRA 471</td>
<td>Informatics, Risk, and the Post-Modern World</td>
<td>3</td>
</tr>
</tbody>
</table>

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/ gsad/gsad-500/gsad-501-credit-loads-graduate-assistants) set by The Graduate School.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899.
previous education but not to meet requirements for an advanced degree.

Information Sciences and Technology (IST) Course List
(https://bulletins.psu.edu/university-course-descriptions/graduate/ist)

**Learning Outcomes**

1. **KNOW:** Demonstrate appropriate breadth and depth of interdisciplinary knowledge, and comprehension of the major issues in information sciences and technology (IST).

2. **APPLY/CREATE:** Use interdisciplinary knowledge and methods of IST to plan and conduct a research thesis.

3. **COMMUNICATE:** Communicate the major issues of IST effectively, including publications in high quality journals and presentations at high value conferences.

4. **THINK:** Demonstrate analytical and critical thinking within IST, including across disciplines.

5. **PROFESSIONAL PRACTICE:** Know and conduct themselves in accordance with the highest ethical standards, values, and, where these are defined, the best practices of IST (as expressed in SARI training modules).

**Contact**

<table>
<thead>
<tr>
<th>Campus</th>
<th>University Park</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graduate Program Head</td>
<td>Mary Beth Rosson</td>
</tr>
<tr>
<td>Director of Graduate Studies (DGS) or Professor-in-Charge (PIC)</td>
<td>Mary Beth Rosson</td>
</tr>
<tr>
<td>Program Contact</td>
<td>Jenna N Sieber</td>
</tr>
<tr>
<td></td>
<td>Westgate Building</td>
</tr>
<tr>
<td></td>
<td>University Park PA</td>
</tr>
<tr>
<td></td>
<td>16802</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:jns5431@psu.edu">jns5431@psu.edu</a></td>
</tr>
<tr>
<td></td>
<td>(814) 867-5787</td>
</tr>
<tr>
<td>Program Website</td>
<td>View</td>
</tr>
<tr>
<td></td>
<td>(<a href="https://ist.psu.edu/education/degree">https://ist.psu.edu/education/degree</a>)</td>
</tr>
</tbody>
</table>
Graduate Council
Program, Option, or Minor Proposal Form

Submit 1 original, signed Graduate Council proposal form and 2 hardcopies of the graduate program proposal document, with a copy of the signed proposal form attached to each proposal copy, to the Office of the Dean of the Graduate School, 211 Kern Building, University Park. For more information about the process, see the Overview of the Graduate Council Curricular Review Process.

The Program Proposal Procedures provide guidance for the development of a graduate program proposal. If you have questions regarding the preparation of a graduate program proposal or how to complete this Graduate Council proposal form, contact the Office of the Dean of the Graduate School.

College/School: Information Sciences and Technology
Department or Instructional Area: _________________________________

New Graduate Program, Option, or Minor: Add

Designation of new graduate program: _________________________________
Classification of Instructional Programs (CIP) Code: ____________________
Designation of new graduate option: _________________________________
Designation of new graduate minor: _________________________________

Indicate effective semester:
- First semester following approval
- Second semester following approval

Existing Graduate Program Option, or Minor: Change Drop

Current designation of graduate program: M.P.S. in Information Sciences
Current designation of graduate option: _________________________________
Current designation of graduate minor: _________________________________

New designation of existing graduate program (if changing): M.P.S. in Cybersecurity Analytics and Operations
New designation of existing graduate option (if changing): _________________________________
New designation of existing graduate minor (if changing): _________________________________

Brief description of the change (if not noted above): Title change; curriculum reorganization to drop options

Indicate effective semester:
- First semester following approval
- Second semester following approval

Fall 2020

Submitted by Graduate Program Head

Mary Beth Rossen
Printed name
Signature
Date: 4/19/2019

Noted by College/School Representative to Graduate Council Subcommitte on New and Revised Programs and Courses:

Frederico Fonseca
Printed name
Signature
Date: 4/19/2019

Approved by College/School Dean/Chancellor (or Designee):

Printed name
Signature
Date: 4/19/2019
<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>On Behalf of David Babb</td>
<td></td>
<td></td>
<td>10/8/2019</td>
</tr>
<tr>
<td>Recommended by Chair, Graduate Council Subcommittee on New and Revised Programs and Courses:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On Behalf of Timothy McNellis</td>
<td></td>
<td></td>
<td>10/8/2019</td>
</tr>
<tr>
<td>Noted by Dean of the Graduate School:</td>
<td></td>
<td></td>
<td>10/8/2019</td>
</tr>
<tr>
<td>On Behalf of Regina Vasilatos-Younken</td>
<td></td>
<td></td>
<td>10/8/2019</td>
</tr>
</tbody>
</table>
Program Change Proposal

Master of Professional Studies in Information Sciences

Contact: Dr. David J. Fusco, Director of Masters Programs
Djf3@psu.edu (814) 867-5862
April 18, 2019
<table>
<thead>
<tr>
<th>Supporting Documentation</th>
<th>pg 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Justification</td>
<td>pg 3</td>
</tr>
<tr>
<td>Evidence of Consultation</td>
<td>pg 4</td>
</tr>
<tr>
<td>New Graduate Bulletin Listing</td>
<td>pg 5</td>
</tr>
</tbody>
</table>
# Supporting Documentation

## A. Comparison of current vs. proposed requirements

<table>
<thead>
<tr>
<th>Current</th>
<th>Proposed</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPS in Information Sciences (INSCI) 33-credits</td>
<td>MPS in Cybersecurity Analytics and Operations (INSCI) 33-credits</td>
<td>Title of degree has been changed.</td>
</tr>
<tr>
<td>Core (9 credits)</td>
<td>Core (21 credits)</td>
<td>Core and prescribed courses from options have been reorganized into the core.</td>
</tr>
<tr>
<td>IST 852, IST 816 and IST 554</td>
<td>INSC 561, IST 451, IST 456, IST 543, IST 554, IST 815, and IST 820.</td>
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</tr>
<tr>
<td>.The Base Program (12 credits)</td>
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<td>Delete base program.</td>
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<tr>
<td>IST 815, IST 521, IST 532 and IST 564</td>
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<tr>
<td>Cybersecurity and Information Assurance option (12 credits)</td>
<td></td>
<td>Delete cybersecurity and information assurance option.</td>
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<tr>
<td>IST 815, IST 555, IST 456, and IST 885</td>
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</tr>
<tr>
<td>Electives (9 credits)</td>
<td>Electives (9 credits)</td>
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</tr>
<tr>
<td>Capstone Project (3 credits)</td>
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</tr>
<tr>
<td>IST 594</td>
<td>IST 594</td>
<td></td>
</tr>
</tbody>
</table>

## B. Justification

### Changing the Title of the Degree

When the M.P.S. in Information Sciences degree was originally created, there was a need to have several supportive options when a more generic M.P.S. in Information Sciences was in demand. We have found that students better identify with a program name that directly reflects the courses and content found within the curriculum. In addition, the movement in the market has moved away from the
more generic Information Sciences degree name towards a more purposeful naming convention. We have seen this in our M.P.S. in Enterprise Architecture and Business Transformation as well as other college programs, such as Engineering Management and Project Management, to name a few. In addition, through the name change, it will allow World Campus to better market to our eventual target audience who are seeking a more technical and professionally oriented program named more appropriately in Cybersecurity Analytics and Operations. In relation to other IST program offerings, this naming convention matches our undergraduate degree and soon to be created M.S. at the residential level.

**Updating Core Courses**

This program change proposal, with regards to the core courses, has a two-fold purpose:

1. to increase the number of core courses from 9 credits to 21 credits;
2. and to change the actual courses in the core itself to better reflect a purposeful concentration in cybersecurity analytics and operations.

Students will be required to take an increased number of credits at the core, thus demonstrating a substantial amount of knowledge in the cybersecurity field. In addition, IST 816 and 852 are being moved into the elective category and replaced with a substantially stronger set of core courses. These new core courses will increase the student’s knowledge in: network security, information security management, web security and privacy, information security and assurance, software and network management, and cybersecurity analytics. The professionally-oriented nature of this program will provide the students with a more concentrated series of courses supporting their cybersecurity interests.

**Deleting Base and Cybersecurity and Information Assurance options**

The original core curriculum for the M.P.S. in Information Sciences included knowledge management as a core course for both the Base Program and the Cybersecurity and Information Assurance option. Since that time, analytical skills for cybersecurity professionals have eclipsed the market as a critical area of proficiency in the workplace. Cybersecurity analytics is an emerging knowledge domain and is now identified as core technical foundation in information sciences and technology. Finally, proposed new course IST 820 Cybersecurity Analytics will replace IST 852 Knowledge Management as a core course for both options. IST 852 will remain in the curriculum as an elective course. Therefore, it is urgent to address this need in the core curriculum for the M.P.S in Information Sciences.
C. Evidence of Consultation

[As of April 18, and after a second email, only a response from Great Valley, Dr. Nemes]

From: Mary Beth Rosson <mrosson@psu.edu>
Date: Wednesday, March 20, 2019 at 8:17 PM
To: Karen Pollack <kiw1@psu.edu>, "Nemes, James A" <jan16@psu.edu>, "Idowu, Jacob Oluwadara" <ili5029@psu.edu>, "Leslieutre, George A" <gal4@psu.edu>, "Das, Chitaranjan" <cxdl2@psu.edu>
Cc: "Stever, Amy" <als39@psu.edu>, "Fusco, David Joseph" <dif3@psu.edu>, "Bierly, Cindy" <cgb2@psu.edu>, "Hartman, Sherry" <slr8@psu.edu>
Subject: MPS Name Change - consultation request

Karen, James, Jacob, George, Chita:

Attached is a program change proposal for the M.P.S. in Information Sciences. Dr. Sears has indicated that he strongly endorses changing the name of the degree to Cybersecurity Analytics and Operations. As indicated in the proposal, this change represents a maturing industry that recognizes the critical need for cybersecurity education, as indicated in the market analysis from World Campus. Further, not only does this proposal align the graduate degree with the existing bachelor’s degree and establish a clear academic progression for students, it also eliminates confusion around Information Sciences and strengthens the University’s position as a leader in cybersecurity.

Before submitting to the Grad School, I am submitting the proposed change to you for consultation and comment. Would it be possible to provide your comments and concurrence with this change by COB 27 March? I realize this is less time than normal but we are trying to push forward quickly with the proposal.

Best regards,

Mary Beth

Mary Beth Rosson

Professor and Associate Dean

College of Information Sciences & Technology

The Pennsylvania State University

http://mrosson.ist.psu.edu

From: "Nemes, James A" <jan16@psu.edu>
Date: Tuesday, April 16, 2019 at 7:41 AM
To: "Fusco, David Joseph" <dif3@psu.edu>
Subject: RE: MPS Name Change - consultation request

Thanks Dave,

I did check with faculty and we will offer this at least twice a year, and if demand is there we could probably go to every semester if needed.

Jim

From: Fusco, David Joseph
Sent: Monday, April 15, 2019 8:34 AM
To: Rosson, Mary Beth <mrosson@psu.edu>; Stever, Amy <als39@psu.edu>; Nemes, James A <jan16@psu.edu>
Cc: Hartman, Sherry <slr8@psu.edu>; Bierly, Cindy <cqb2@psu.edu>
Subject: Re: MPS Name Change - consultation request

Good morning Jim,

Thank you for your response on our proposed program change.

I wanted to send a quick note to help assure that we can offer one of your courses that has become very popular in the program – INSC 561. We were hoping to have this course offered twice a year to help with the demand.

We appreciate the positive relationship we’ve built between IST and Great Valley. Please let me know if you have any questions.

Thanks,

Dave.

Dr. David J. Fusco | Director of Masters Programs
Assistant Teaching Professor

E314 Westgate Building | University Park, PA 16802
Office 814.867.5862 | Cell 814.386.3000

From: "Nemes, James A" <jan16@psu.edu>
Date: Wednesday, March 27, 2019 at 5:10 PM
To: Mary Beth Rosson <mrosson@psu.edu>
Subject: RE: MPS Name Change - consultation request
Mary Beth,

We have no objections to the proposed program change.

Best of luck with the proposal.

Jim

James A. Nemes, D.Sc.

Chancellor and Chief Academic Officer

Professor of Mechanical Engineering

School of Graduate Professional Studies

Penn State Great Valley

30 East Swedesford Road

Malvern, PA 19355-1443

Phone: 610-648-3206

jan16@psu.edu
From: Stever, Amy <als39@psu.edu>
Sent: Friday, June 14, 2019 2:02 PM
To: Hewitt, Vicki <vlh16@psu.edu>
Cc: Rosson, Mary Beth <mrosson@psu.edu>
Subject: Additional page for MPS IS Program Change proposal

Vicki – FYI
We received this consultation today (it was sent to the wrong email in the first instance). I am sending two copies to you to add to our program change. Could you kindly add to the agenda? Is that ok?

Thanks
A

From: Idowu, Peter <pbi1@psu.edu>
Sent: Friday, June 14, 2019 10:31 AM
To: Rosson, Mary Beth <mrosson@psu.edu>
Cc: Fusco, David Joseph <djf3@psu.edu>; Stever, Amy <als39@psu.edu>
Subject: Re: MPS Name Change - consultation request

Mary Beth,
No problems, and thank you.
Peter

Peter Idowu, Ph.D., P.E.
Assistant Dean of Graduate Studies, Penn State Harrisburg
Professor of Electrical Engineering

Penn State Harrisburg
W-102 Olmsted Building
777 W. Harrisburg Pike, Middletown PA 17057
(717) 948-6315 - Phone
(717) 948-6737 - Fax
idowu@psu.edu
http://sites.psu.edu/microgridtestbedpsh/
http://harrisburg.psu.edu/graduate-studies
From: Rosson, Mary Beth
Sent: Friday, June 14, 2019 10:15 AM
To: Idowu, Peter
Cc: Fusco, David Joseph; Stever, Amy
Subject: FW: MPS Name Change - consultation request

Peter – sorry about that, not sure how I ended up with the wrong name, though it is nice to know your son is a Penn Stater! Here’s what went around in April.

Mary Beth

Mary Beth Rosson
Professor and Associate Dean
College of Information Sciences & Technology
The Pennsylvania State University
http://mrosson.ist.psu.edu

From: Mary Beth Rosson <mrosson@psu.edu>
Date: Friday, April 12, 2019 at 4:29 PM
To: Karen Pollack <kiw1@psu.edu>, "Idowu, Jacob O" <jqi5029@psu.edu>, "Lesieutre, George A" <gal4@psu.edu>, "Das, Chitarianjan" <cxd12@psu.edu>
Cc: "Stever, Amy" <als39@psu.edu>, "Fusco, David Joseph" <djf3@psu.edu>, "Bierly, Cindy" <cqb2@psu.edu>, "Hartman, Sherry" <slr8@psu.edu>
Subject: Re: MPS Name Change - consultation request

Hi everyone – this is just a quick follow up. We had asked for feedback by 29 March, but are just now getting ready to send on, so there is still a brief time to send any reactions you may have.

From: Mary Beth Rosson <mrosson@psu.edu>
Date: Wednesday, March 20, 2019 at 8:17 PM
To: Karen Pollack <kiw1@psu.edu>, "Nemes, James A" <jan16@psu.edu>, "Idowu, Jacob Oluwadara" <jqi5029@psu.edu>, "Lesieutre, George A" <gal4@psu.edu>, "Das, Chitarianjan" <cxd12@psu.edu>
Cc: "Stever, Amy" <als39@psu.edu>, "Fusco, David Joseph" <djf3@psu.edu>, "Bierly, Cindy" <cqb2@psu.edu>, "Hartman, Sherry" <slr8@psu.edu>
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Attached is a program change proposal for the M.P.S. in Information Sciences. Dr. Sears has indicated that he strongly endorses changing the name of the degree to Cybersecurity Analytics and Operations. As indicated in the proposal, this change represents a maturing industry that recognizes the critical need for cybersecurity education, as indicated in the
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Best regards,
Mary Beth

Mary Beth Rosson
Professor and Associate Dean
College of Information Sciences & Technology
The Pennsylvania State University
http://mrosson.ist.psu.edu

Mary Beth
INFORMATION SCIENCES CYBERSECURITY ANALYTICS AND OPERATIONS

Graduate Program Head: Mary Beth Rosson
Program Code: INSCI
Campus(es): University Park (M.P.S.), World Campus (M.P.S.)
Degrees Conferred: Master of Professional Studies (M.P.S.)
The Graduate Faculty: View (https://secure.gradsch.psu.edu/gpms/index.cfm?
searchType=fac&prog=INSCI)

The Master of Professional Studies in Information Sciences Cybersecurity Analytics and Operations (MPS-INSCI) is an innovative program that targets professionals and organizational leaders who seek a professional education and training program. The purpose of the professional master's program is to produce professionals and organizational leaders who not only can select and draw upon the necessary foundations within the information sciences and information technology areas, test the applicability of these foundations for addressing a given issue, and apply the resulting solutions, but also can be aware of the multitude of technological trends and environmental factors that organizations must address in the changing global economy.

The MPS-INSCI equips students to:

1. Understand and analyze the profound information and technological changes sweeping the world;
2. Meet challenges by developing innovative solutions using the foundations of information sciences and technology; and
3. Have a clear advantage in today’s highly competitive and dynamic environment by continuously learning new trends, issues, and innovations.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 Admissions (http://gradschool.psu.edu/graduate-education-policies).

Applicants to the program are required to submit scores from the general portions of the Graduate Record Examinations (GRE) or the Graduate Management Admissions Test (GMAT), three letters of reference, and a one-three page personal statement of relevant experience and goals. The GRE or GMAT requirement may be waived for applicants to the Master of Professional Studies Program at the discretion of the program if the student has five or more years of relevant information sciences and technology working experience.

Because the program is multidisciplinary in nature, students from many different disciplines may be accepted for entry into the program. A bachelor's degree in a related area (e.g., engineering and science), while not necessary for admission, is helpful in the successful completion of the degree. It is expected that students will have a basic level
policies/gcac/gcac-300/provisional-admission) for no more than one year while work is completed to meet these expectations.

It is expected that the successful applicant will have an overall grade point average of 3.00 (on a 4.00 scale) or higher for his or her undergraduate study and/or graduate-level study. However, accomplishments demonstrated through work experience and recommendation letters from the applicant’s academic adviser or employer will also play an important role in making the admission decision. The most qualified applicants will be accepted into the program until all spaces for new students are filled.

Degree Requirements

Master of Professional Studies (M.P.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The MPS-INSCI program requires a minimum of 33 credits, 24 of which must be earned at Penn State. A maximum of 9 transfer credits of high-quality graduate work may be applied toward the requirements for the degree, subject to restrictions outlined in GCAC-309 Transfer Credit the Transfer Courses (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit) section of the Graduate Bulletin. At least 18 credits must be courses at the 500 or 800 level, with at least 6 credits at the 500 level. A student can choose to be in the Base Program or in the Cybersecurity and Information Assurance (CIA) Option.

The 33 credits are distributed among the following requirements. A student first takes 219 credits of core courses. The student then takes 129 credits of prescribed electives courses for either the base program or the Cybersecurity and Information Assurance Option. An additional 9 credits are elective courses. Lastly, the student must complete a master's project guided by the student’s adviser and completed while enrolled in IST 594.

Core Courses

The core of the MPS-INSCI consists of three seven courses – IST 451, IST 456, IST 554, IST 815, IST 820, and INSC 561, 852, IST 554, and IST 816. These courses represent the technical core technical foundations to study Cybersecurity Analytics and Information Sciences and Technology.

Elective Courses

The elective courses for the MPS-INSCI will be selected from a list maintained by the program office.

The Base Program

The base program consists of four required courses – IST 815, IST 521, IST 532, and IST 564 – and 9 credits of elective courses, in addition to the 9-credit core and 3-credit capstone course. It is designed for students who do not have a special interest in mind. The elective courses are chosen in consultation with the student’s adviser. Hence, it offers the flexibility that enables the student to build an in-depth knowledge and skills about information sciences tailored to his/her interests and background. Students from the Harrisburg region can also select courses from Penn State Harrisburg to fulfill the prescribed courses (by substitution) and 9 credits of electives.

Master’s Project

The project requires all students in the MPS-INSCI to focus on a well-defined issue or problem relevant to the information sciences and technology. The student will submit a project proposal to his/her faculty adviser for approval. Upon completion of the project, the student will share or present the project results at a final presentation as a component of IST 594.
### Required Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 862</td>
<td>Knowledge Management</td>
<td>3</td>
</tr>
<tr>
<td>IST 554</td>
<td>Network Management and Security</td>
<td>3</td>
</tr>
<tr>
<td>IST 816</td>
<td>Web Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>IST 815</td>
<td>Foundations of Information Security and Assurance</td>
<td>3</td>
</tr>
<tr>
<td>IST 521</td>
<td>Human-Computer Interaction: The User and Technology</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 532</td>
<td>Organizational Informatics</td>
<td>3</td>
</tr>
<tr>
<td>IST 564</td>
<td>Crisis, Disaster and Risk Management</td>
<td>3</td>
</tr>
</tbody>
</table>

### Electives

Select 9 credits of elective courses chosen in consultation with the advisor.

### Culminating Experience

- **IST 594** Research Topics (Master's Project) 3

### Total Credits

33

---

### Cybersecurity and Information Assurance (CIA) Option

The CIA option consists of four prescribed courses, IST 815, IST 555, IST 456, and IST 885, and 9 credits of elective courses selected from a list of approved electives available from the program office. These courses enable the student to focus on developing knowledge and skills for information analysis, information assurance, and decision support including theories, techniques, and applications of data mining, data fusion, information search, information security, and intelligent resource allocation.

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INSC 561</td>
<td>Web Security and Privacy</td>
<td>3</td>
</tr>
<tr>
<td>IST 451</td>
<td>Network Security</td>
<td>3</td>
</tr>
<tr>
<td>IST 456</td>
<td>Information Security Management</td>
<td>3</td>
</tr>
<tr>
<td>IST 543</td>
<td>Foundations of Software Security</td>
<td>3</td>
</tr>
<tr>
<td>IST 554</td>
<td>Network Management and Security</td>
<td>3</td>
</tr>
<tr>
<td>IST 815</td>
<td>Foundations of Information Security and Assurance</td>
<td>3</td>
</tr>
<tr>
<td>IST 820</td>
<td>Cybersecurity Analytics</td>
<td>3</td>
</tr>
</tbody>
</table>

### Electives

Select 9 credits of electives from a list of approved electives available from the program office.

### Culminating Experience

- **IST 594** Research Topics (Master's Project) 3

### Total Credits

33

---

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits set by The Graduate School.

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section of the World Campus website for more information.

### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### Learning Outcomes

1. **[KNOW]** Recognize, understand, identify and assess potential threats, vulnerabilities, and consequences in a context from local to global environments.
2. **[APPLY/CREATE]** Integrate the use of disciplinary methods, techniques, and knowledge to solve practical, real-world problems.
3. **[COMMUNICATE]** Present scientific evidence and best practice to inform and improve practical, real-world decisions.
4. **[THINK]** Search, evaluate, and synthesize literature to integrate cybersecurity principles into disciplines and professional fields.
5. **[PROFESSIONAL PRACTICE]** Make use of ethical standards and principles of integrity as a foundation in decision-making.

### Contact

**Campus**
University Park

**Graduate Program Head**
Mary Beth Rosson

**Director of Graduate Studies (DGS)**
David Joseph Fusco

**Program Contact**
Sherry Hartman
Education Strategy and Planning Office
College of IST/E143 Westgate Building
University Park PA 16802
sir8@psu.edu
(814) 863-9461

**Program Website**
View (http://www.worldcampus.psu.edu/degrees-and-certificates/information-sciences-masters/overview)
Campus: World Campus
Graduate Program Head: Mary Beth Rosson
Director of Graduate Studies (DGS) or Professor-in-Charge (PIC): David Joseph Fusco

Program Contact: Sherry Hartman
College of Information Sciences and Technology
E103 Westgate Building
University Park PA 16802
slr8@psu.edu
(814) 863-9461

Program Website: View (http://www.worldcampus.psu.edu/degrees-and-certificates/information-sciences-masters/overview)
Graduate Council
Program, Option, or Minor Proposal Form

Submit 1 original, signed Graduate Council proposal form and 2 hardcopies of the graduate program proposal document, with a copy of the signed proposal form attached to each proposal copy, to the Office of the Dean of the Graduate School, 211 Kern Building, University Park. For more information about the process, see the Overview of the Graduate Council Curricular Review Process.

The Program Proposal Procedures provide guidance for the development of a graduate program proposal. If you have questions regarding the preparation of a graduate program proposal or how to complete this Graduate Council proposal form, contact the Office of the Dean of the Graduate School.

College/School:  
Smee College of Business

Department or Instructional Area:  
Risk Management

New Graduate Program, Option, or Minor:  
Add

Designation of new graduate program:  
Classification of Instructional Programs (CIP) Code:  

Designation of new graduate option:  
Designation of new graduate minor:  

Indicate effective semester:  
First semester following approval
Second semester following approval

Existing Graduate Program Option, or Minor:  
Change  Drop

Current designation of graduate program:  
Master of Science in Real Estate Analysis and Development
Current designation of graduate option:  
Current designation of graduate minor:  

New designation of existing graduate program (if changing):  
New designation of existing graduate option (if changing):  
New designation of existing graduate minor (if changing):  

Brief description of the change (if not noted above):  
Change in one course requirement FIN 577 to FIN 550

Indicate effective semester:  
First semester following approval
Second semester following approval

Submitted by Graduate Program Head

Brent Ambrose  
Printed name  
Signature  
Date: 7/15/19

Noted by College/School Representative to Graduate Council Subcommittee on New and Revised Programs and Courses:

Arvind Rangaswamy  
Printed name  
Signature  
Date: 7/11/19

Approved by College/School Dean/Chancellor (or Designee):

Steven Huddart  
Printed name  
Signature  
Date: 7/15/19
Recommended by Chair, Graduate Council Subcommittee on New and Revised Programs and Courses:

On Behalf of David Babb
Printed name
Signature
Date: 10/8/2019

Recommended by Chair, Graduate Council Committee on Programs and Courses:

On Behalf of Timothy McNellis
Printed name
Signature
Date: 10/8/2019

Noted by Dean of the Graduate School:

On Behalf of Regina Vasilatos-Younken
Printed name
Signature
Date: 10/8/2019
PROGRAM CHANGE PROPOSAL —
MASTER OF SCIENCE IN REAL ESTATE ANALYSIS AND DEVELOPMENT

THE PENNSYLVANIA STATE UNIVERSITY — SMEAL COLLEGE OF BUSINESS
DR. BRENT AMBROSE, SMEAL PROFESSOR OF REAL ESTATE, DIRECTOR, INSTITUTE FOR REAL ESTATE STUDIES, PH.D. PROGRAM FACULTY DIRECTOR
A. Program Change Justification

The required course FIN 577 Financial Engineering and Corporate Strategy will be changed to FIN 550 Financial Analysis and Valuation. After conferring with faculty, it was decided that FIN 550 is a better fit for the overall program and student experience. FIN 550 builds upon and reinforces the theoretical and institutional finance frameworks learned in introductory business finance.

B. Learning Goals and Objectives

The Master of Science in Real Estate Analysis and Development Learning Goals and Objectives include:

1. **Demonstrate Competency In and Across Real Estate Disciplines**
   REA_MS graduates will master a broad core of financial and economic knowledge and be able to integrate and apply this knowledge to business situations within the real estate industry requiring interdisciplinary and global perspectives.
   Learning Objectives:
   - REA_MS graduates will be able to demonstrate competency in the underlying concepts, theory, and tools taught in the REA_MS curriculum.
   - REA_MS graduates will be able to use their knowledge of economics, finance, and real estate institutions and markets to identify, analyze, and recommend solutions to complex real estate problems and projects requiring interdisciplinary and global perspectives.
   - REA_MS graduates will be capable of designing and implementing rigorous research methods to create new solutions to critical problems facing the real estate industry.
   Assessment Method: Course-embedded measure (REST 570)

2. **Analytical and Critical Thinking Skills**
   REA_MS graduates will develop analytical and critical thinking skills needed to excel in today’s business environment.
   Learning Objectives:
   - REA_MS graduates will acquire the analytical and critical thinking skills needed to identify, analyze, and evaluate alternative solutions to problems and projects facing the real estate industry.
   - REA_MS graduates will develop the skills needed to craft and implement strategic and tactical plans.
   - REA_MS graduates will be able to articulate and defend their analysis and recommended solutions to multiple audiences from business, government, and the community.
   - REA_MS graduates will be able to integrate findings and analysis from cutting edge research to problems and projects in the real estate industry.
3. **Interpersonal Skills**

REA_MS graduates will possess the interpersonal skills needed to be effective managers and leaders.

Learning Objectives:
- REA_MS graduates will be skilled at leadership, team building, interpersonal influence, and the management of change.
- REA_MS graduates will be able to communicate and work effectively with others in work settings involving cultural and demographic diversity.
- REA_MS graduates will be competent at writing clear, concise, and analytical reports and documents.

Assessment Method: Course-embedded measure (REST 570, REST 880, REST 590)

4. **Value System**

REA_MS graduates will be able to evaluate the ethical and societal implications of real estate investment and development decisions.

Learning Objectives:
- REA_MS graduates will be skilled at evaluating the impact of various courses of action on multiple stakeholders, including investors, lenders, customers, and the broader community.

Assessment Method: Course-embedded measure (REST 880, REST 590)

Assessment Measures:
These learning outcomes will be achieved by a combination of lectures by faculty and invited guest lecturers, reading of key literature, individual and team projects, and practical involvement in a real estate development capstone experience and or a research project. Course embedded measures will include an exam administered every Spring in the capstone course (REST 570), writing assignments embedded in REST 590 and REST 570, and a speaking assignment embedded every Spring in BA 817.

---

C. Comparison of Changes

**Old Degree Requirements:**

Required Courses (32 cr.):

There are 32 specified credits comprised of the following courses:

<table>
<thead>
<tr>
<th>Course</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>MBADM 811</td>
<td>Financial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>STAT 500</td>
<td>Applied Statistics</td>
<td>3</td>
</tr>
<tr>
<td>BA 512</td>
<td>Quantitative Analysis for Managerial Decision Making</td>
<td>2</td>
</tr>
<tr>
<td>BA 817</td>
<td>Communication Skills for Management (repeatable)</td>
<td>2 total</td>
</tr>
<tr>
<td>BA 821</td>
<td>Foundations in Managerial Accounting</td>
<td>2</td>
</tr>
<tr>
<td>BA 831</td>
<td>Foundations in Finance</td>
<td>2</td>
</tr>
<tr>
<td>FIN 577</td>
<td>Financial Engineering and Corporate Strategy</td>
<td>2</td>
</tr>
<tr>
<td>REST 550</td>
<td>Contemporary Issues in Real Estate Markets</td>
<td>3</td>
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New Degree Requirements:

Required Courses (32 cr.):

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<td>Applied Statistics</td>
<td>3</td>
</tr>
<tr>
<td>BA 512</td>
<td>Quantitative Analysis for Managerial Decision Making</td>
<td>2</td>
</tr>
<tr>
<td>BA 817</td>
<td>Communication Skills for Management (repeatable)–2 total</td>
<td></td>
</tr>
<tr>
<td>BA 821</td>
<td>Foundations in Managerial Accounting</td>
<td>2</td>
</tr>
<tr>
<td>BA 831</td>
<td>Foundations in Finance</td>
<td>2</td>
</tr>
<tr>
<td>FIN 550</td>
<td>Financial Analysis and Valuation</td>
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</tr>
<tr>
<td>REST 550</td>
<td>Contemporary Issues in Real Estate Markets</td>
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<tr>
<td>REST 560</td>
<td>Real Estate Financial Analysis</td>
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<tr>
<td>REST 570</td>
<td>Institutional Real Estate Investment</td>
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<tr>
<td>REST 575</td>
<td>Quantitative Analysis for Real Estate</td>
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<tr>
<td>REST 590*</td>
<td>Real Estate Colloquium (repeatable)–2 total</td>
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<tr>
<td>REST 830</td>
<td>Real Estate Institutions and Market Analysis</td>
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<tr>
<td>REST 840</td>
<td>Real Estate Analysis Software Tools</td>
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<tr>
<td>REST 880</td>
<td>Real Estate Development and Analysis</td>
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</table>

Old Pattern of Course Scheduling:

<table>
<thead>
<tr>
<th>Semester/Module</th>
<th>CourseTitle</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>Summer</td>
<td>MBADM 811</td>
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</tr>
<tr>
<td></td>
<td>STAT 500</td>
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<tr>
<td>Fall – Module I</td>
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<tr>
<td></td>
<td>STAT 500</td>
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<td>BA 821</td>
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<td></td>
<td>BA 512</td>
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<td></td>
<td>REST 830</td>
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<tr>
<td></td>
<td>REST 590*</td>
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<tr>
<td>Fall – Module II</td>
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<td>FIN 557</td>
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<td>REST 840</td>
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<tr>
<td>Spring – Modules III &amp; IV</td>
<td>REST 570</td>
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<tr>
<td></td>
<td>REST 550</td>
<td>3</td>
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<tr>
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<td>REST 575</td>
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</table>
Spring – Module III
REST 590* Real Estate Colloquium 0.5
BA 817 Communication Skills for Management 1

Spring – Module IV
REST 590* Real Estate Colloquium 0.5
BA 817 Communication Skills for Management 1
REST 880 Real Estate Development and Analysis 2

* The two Modules of REST 590 will total 1 credit for the corresponding semester

New Pattern of Course Scheduling:

<table>
<thead>
<tr>
<th>Semester/Module</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer</td>
<td>MBADM 811 Financial Accounting</td>
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</tr>
<tr>
<td></td>
<td>STAT 500 Applied Statistics</td>
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<tr>
<td>Fall – Module I</td>
<td>BA 831 Foundations in Finance</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>BA 821 Foundation in Managerial Accounting</td>
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<tr>
<td></td>
<td>BA 512 Quantitative Analysis for Managerial Decision Making</td>
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<tr>
<td></td>
<td>REST 830 Real Estate Institutions and Market Analysis</td>
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</tr>
<tr>
<td></td>
<td>REST 590* Real Estate Colloquium 0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Fall – Module II</td>
<td>REST 560 Real Estate Financial Analysis</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>REST 590* Real Estate Colloquium 0.5</td>
<td>0.5</td>
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<tr>
<td></td>
<td><strong>FIN 550 Financial Analysis and Valuation</strong></td>
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<tr>
<td></td>
<td>REST 840 Real Estate Analysis Software and Tools</td>
<td>1</td>
</tr>
<tr>
<td>Spring – Modules III &amp; IV</td>
<td>REST 570 Institutional Real Estate Investment</td>
<td>2</td>
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<tr>
<td></td>
<td>REST 550 Contemporary Issues in Real Estate Markets</td>
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</tr>
<tr>
<td></td>
<td>REST 575 Quantitative Analysis for Real Estate</td>
<td>3</td>
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</table>

Spring – Module III
REST 590* Real Estate Colloquium 0.5
BA 817 Communication Skills for Management 1

Spring – Module IV
REST 590* Real Estate Colloquium 0.5
BA 817 Communication Skills for Management 1
REST 880 Real Estate Development and Analysis 2

* The two Modules of REST 590 will total 1 credit for the corresponding semester
The Master of Science in Real Estate Analysis and Development will prepare graduates to stand out in a competitive job market by studying at a highly reputed business school with some of the world’s leading real estate academic thinkers and industry experts. This program will provide students with the analytical skills grounded in economics and finance required to successfully engage in the real estate industry.

Students will gain the skills needed to succeed in today’s dynamic work environments, gain a firm understanding of issues and problems facing the real estate industry, develop an understanding and appreciation for leading edge research used to solve problems in real estate markets, and be prepared to become a successful leader. World-class professors who are specialists in real estate finance and economics will teach in the program. A solid foundation in decision analysis, project management, accounting, valuation, market analysis, econometrics, investment analysis and finance will make the target audience more attractive to hiring managers and enable graduates to advance more rapidly into management and leadership positions.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 Admissions (http://gradschool.psu.edu/graduate-education-policies).

Educational Background

Applicants must:

- Hold a Baccalaureate degree with a 3.00 minimum undergraduate GPA (or equivalent).
- Submit GMAT or GRE results. Candidates who have demonstrated a strong academic background may apply for a GMAT/GRE waiver.
- Submit a completed online Graduate School Application for Admission (http://gradschool.psu.edu/prospective-students/how-to-apply), including nonrefundable application fee, a Statement of Purpose, resume, and three letters of recommendation.
- Submit official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission).

Applicants who are still completing their baccalaureate requirements at the time of application may be provisionally admitted (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) to the Graduate School, pending the award of the baccalaureate degree; refer to GCAC-303 Provisional Admission.
Language of Instruction
The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/gcac-305-admission-requirements-international-students) for more information.

Core Application Packet
• Completed official online Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply) and payment of nonrefundable application fee.
• Statement of purpose: a 2-3-page essay articulating career and educational goals that demonstrates the applicant’s written communication skills.
• Vita or Résumé.
• Three letters of recommendation that attest to the applicant’s readiness for graduate study and document the requisite minimum of one year of work experience. Letters must be submitted through the online application.
• GMAT or GRE results. Candidates who have demonstrated a strong academic background may apply for a GMAT/GRE waiver.
• Official transcripts from all post-secondary institutions attended (http://gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission).

Degree Requirements
Master of Science (M.S.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

**Total**: The number of total credits required for the REA_MS program is 32 credits at the 400, 500, or 800 level, with at least 18 credits at the 500 level. The culminating experience for the degree program is the capstone course REST 570. This course requires students to apply and integrate the knowledge, skills, and research methods that were gained throughout the REA_MS program.

The platform of institutional real estate investment provides numerous opportunities for research projects related to real estate securities and markets. Thus, REST 570 offers students the opportunity to expand on research topics, tools, and methods acquired in previous courses. Students will create a capstone research paper or project as one of the major deliverables in this course.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBADM 811</td>
<td>Financial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>STAT 500</td>
<td>Applied Statistics</td>
<td>3</td>
</tr>
<tr>
<td>BA 512</td>
<td>Quantitative Analysis for Managerial Decision Making</td>
<td>2</td>
</tr>
<tr>
<td>BA 817</td>
<td>Communication Skills for Management (repeatable for a total of 2 credits)</td>
<td>2</td>
</tr>
<tr>
<td>BA 821</td>
<td>Foundation in Managerial Accounting</td>
<td>2</td>
</tr>
<tr>
<td>BA 831</td>
<td>Foundations in Finance</td>
<td>2</td>
</tr>
<tr>
<td>FIN 572/FIN 550</td>
<td>Financial Engineering and Corporate Fundamentals (repeatable for a total of 2 credits)</td>
<td>2</td>
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</table>
REST 550 Contemporary Issues in Real Estate Markets 3
REST 575 Quantitative Analysis for Real Estate 3
REST 590 Colloquium (repeatable for a total of 2 credits) 2
REST 560 Real Estate Financial Analysis 2
REST 830 Real Estate Institutions and Markets Analysis 1
REST 840 Real Estate Analysis Software and Tools 1
REST 880 Real Estate Development and Analysis 2
Culminating Experience
REST 570 Institutional Real Estate Investment 2

Total Credits 32

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/gsad-900/gsad-901-graduate-assistants) set by The Graduate School.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Real Estate (REST) Course List (https://bulletins.psu.edu/university-course-descriptions/graduate/rest)

Learning Outcomes

The Master of Science in Real Estate Analysis and Development Learning Goals and Objectives include:

1. Demonstrate Competency In and Across Real Estate Disciplines REA_MS graduates will master a broad core of financial and economic knowledge and be able to integrate and apply this knowledge to business situations within the real estate industry requiring interdisciplinary and global perspectives.
   Learning Objectives:
   • REA_MS graduates will be able to demonstrate competency in the underlying concepts, theory, and tools taught in the REA_MS curriculum.
   • REA_MS graduates will be able to use their knowledge of economics, finance, and real estate institutions and markets to identify, analyze, and recommend solutions to complex real estate problems and projects requiring interdisciplinary and global perspectives.
   • REA_MS graduates will be capable of designing and implementing rigorous research methods to create new solutions to critical problems facing the real estate industry.
   Assessment Method: Course-embedded measure (REST 570)

2. Analytical and Critical Thinking Skills
   REA_MS graduates will develop analytical and critical thinking skills needed to excel in today’s business environment.
   Learning Objectives:
REA_MS graduates will acquire the analytical and critical thinking skills needed to identify, analyze, and evaluate alternative solutions to problems and projects facing the real estate industry.

REA_MS graduates will develop the skills needed to craft and implement strategic and tactical plans.

REA_MS graduates will be able to articulate and defend their analysis and recommended solutions to multiple audiences from business, government, and the community.

REA_MS graduates will be able to integrate findings and analysis from cutting edge research to problems and projects in the real estate industry.

Assessment Method: Course-embedded measure (REST 570, REST 880, REST 590)

3. Interpersonal Skills

REA_MS graduates will possess the interpersonal skills needed to be effective managers and leaders.

Learning Objectives:

- REA_MS graduates will be skilled at leadership, team building, interpersonal influence, and the management of change.
- REA_MS graduates will be able to communicate and work effectively with others in work settings involving cultural and demographic diversity.
- REA_MS graduates will be competent at writing clear, concise, and analytical reports and documents.

Assessment Method: Course-embedded measure (REST 590, BA 817)

4. Value System

REA_MS graduates will be able to evaluate the ethical and societal implications of real estate investment and development decisions.

Learning Objectives:

- REA_MS graduates will be skilled at evaluating the impact of various courses of action on multiple stakeholders, including investors, lenders, customers, and the broader community.

Assessment Method: Course-embedded measure (REST 880, REST 590)

Assessment Measures:

These learning outcomes will be achieved by a combination of lectures by faculty and invited guest lecturers, reading of key literature, individual and team projects, and practical involvement in a real estate development capstone experience and or a research project. Course embedded measures will include an exam administered every Spring in the capstone course (REST 570), writing assignments embedded in REST 590 and REST 570, and a speaking assignment embedded every Spring in BA 817.

Contact
Graduate Council
Program, Option, or Minor Proposal Form

Submit 1 original, signed Graduate Council proposal form and 2 hardcopies of the graduate program proposal document, with a copy of the signed proposal form attached to each proposal copy, to the Office of the Dean of the Graduate School, 211 Kern Building, University Park. For more information about the process, see the Overview of the Graduate Council Curricular Review Process.

The Program Proposal Procedures provide guidance for the development of a graduate program proposal. If you have questions regarding the preparation of a graduate program proposal or how to complete this Graduate Council proposal form, contact the Office of the Dean of the Graduate School.

College/School: Smeal College of Business
Department or Instructional Area: Supply Chain Management

New Graduate Program, Option, or Minor: Add

Designation of new graduate program: ________________________________
Classification of Instructional Programs (CIP) Code: ____________________
Designation of new graduate option: ________________________________
Designation of new graduate minor: ________________________________

Penn State Graduate School

Indicate effective semester:
First semester following approval
Second semester following approval

JUN 5 2019

Existing Graduate Program Option, or Minor: Change

Current designation of graduate program: MPS in Supply Chain Management
Current designation of graduate option: ________________________________
Current designation of graduate minor: ________________________________

New designation of existing graduate program (if changing): Master of Supply Chain Management in Supply Chain Management
New designation of existing graduate option (if changing):
New designation of existing graduate minor (if changing):

Brief description of the change (if not noted above): Change of Title, course changes, and credit changes

Indicate effective semester:
First semester following approval
Second semester following approval

Would like this to be effective Fall 2020.

Submitted by Graduate Program Head
Nicholas Petruzzi
Printed name
Signature
Date: Apr 18, 2019

Noted by College/School Representative to Graduate Council Subcommittee on New and Revised Programs and Courses:
Arvind Rangaswamy
Printed name
Signature
Date: 4/18/2019

Approved by College/School Dean/Chancellor (or Designee):
Steven Huddart
Printed name
Signature
Date: 4/18/19
Recommended by Chair, Graduate Council Subcommittee on New and Revised Programs and Courses:

On Behalf of David Babb ___________________________ Valid Kirwitt ___________________________ Date: 10/8/2019
Printed name Signature

Recommended by Chair, Graduate Council Committee on Programs and Courses:

On Behalf of Timothy McNellis ___________________________ Valid Kirwitt ___________________________ Date: 10/8/2019
Printed name Signature

Noted by Dean of the Graduate School:

On Behalf of Regina Vasilatos-Younken ___________________________ Valid Kirwitt ___________________________ Date: 10/8/2019
Printed name Signature
PROGRAM CHANGE PROPOSAL —
MASTER OF PROFESSIONAL STUDIES IN SUPPLY CHAIN MANAGEMENT

THE PENNSYLVANIA STATE UNIVERSITY — SMEAL COLLEGE OF BUSINESS
DR. DAVID HUFF — CLINICAL PROFESSOR OF SUPPLY CHAIN & INFORMATION SYSTEMS
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      Master of Professional Studies in Supply Chain Management ..................................................... 9
  2) New Program Title ....................................................................................................................... 9
      Master of Supply Chain Management in Supply Chain Management ........................................ 9
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A. Program Change Justification

1. Change the degree title to a Master of Supply Chain Management in Supply Chain Management (Master of Supply Chain Management).

The degree title will be changed from a Master of Professional Studies in Supply Chain Management to a Master of Supply Chain Management in Supply Chain Management. After receiving feedback from the market, The Smeal College of Business feels strongly that this program should not utilize a Master of Professional Studies (MPS) degree designation. The MPS designation for business-related master’s programs puts our programs at a competitive disadvantage. Almost all business schools use the MS designation for many of their professional master’s programs. The MPS designation is never used at other leading business schools. Through discussions with counterparts at other leading business schools, we have learned that these schools often point out to prospective master’s students that Penn State awards an MPS degree and that they aren’t quite sure what that is but assure the prospective students that they will earn an MS degree at their institutions. Many prospective students question whether MPS designated business master’s programs are “real” master’s degrees as the MPS designation is not a recognized business master’s designation. Some prospective students have not selected our programs because of the MPS designation. We strongly believe that the MPS designation puts our business professional master’s programs at a disadvantage nationally and internationally.

Below is a table with a substantial list of very reputable business schools that use Master of Science (MS) for their specialized business master’s programs in this field. Most business schools today do not have functioning traditional research-oriented MS programs and have transitioned from traditional research MS degrees to professional MS degrees. As you can see in the list below, there are many MS degrees in Supply Chain Management at leading competing business schools. If we really wanted to use the most common degree title in use today, it would be an MS degree. However, we realize that use of the MS designation for professional business master’s programs at Penn State is not a likely possibility and instead suggest that Smeal be allowed to use the “Master of” designation for this degree and feel that we have made a strong case for this usage.

While MS is by far the most common professional master’s designation within our business school peer group, the “Master of” designation is also used, but to a lesser extent.

Exceptions to the use of the MS designation occur in other commonly used master’s programs’ titles such as the Master of Accounting, the Master of Finance, and the Master of Business Administration (MBA).

No examples of major business school competitors that use the MPS designation exist. Here is an example of a major business school competitor that uses the MS designation for their professional master’s programs – many additional examples exist and are included in the table below:
Kelley School of Business (Indiana): [https://kelley.iu.edu/programs/online/degrees/index.csh.html](https://kelley.iu.edu/programs/online/degrees/index.csh.html)

Here is an example of a major business school competitor that uses the “Master of” designation for their professional master’s programs. Other examples are included in the table below:

Rutgers: [http://www.business.rutgers.edu/masters](http://www.business.rutgers.edu/masters)

Below is additional research related to masters in supply chain management degree titles.

<table>
<thead>
<tr>
<th>University of Tennessee</th>
<th>Master of Science in Global Supply Chain Management</th>
<th><a href="https://catalog.utk.edu/preview_program.php?catoid=25&amp;poid=11028">https://catalog.utk.edu/preview_program.php?catoid=25&amp;poid=11028</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Michigan State University</td>
<td>Master of Science in Supply Chain Management</td>
<td><a href="https://supplychain.broad.msu.edu/graduate/msscm/">https://supplychain.broad.msu.edu/graduate/msscm/</a></td>
</tr>
<tr>
<td>University of Michigan</td>
<td>Master of Supply Chain Management</td>
<td><a href="https://michiganross.umich.edu/programs/master-of-supply-chain-management">https://michiganross.umich.edu/programs/master-of-supply-chain-management</a></td>
</tr>
<tr>
<td>Georgia Institute of Technology</td>
<td>Master of Science in Supply Chain Engineering</td>
<td><a href="https://www.isye.gatech.edu/academics/masters/supply-chain-engineering">https://www.isye.gatech.edu/academics/masters/supply-chain-engineering</a></td>
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<tr>
<td>Rutgers</td>
<td>Master of Science in Supply Chain Management</td>
<td><a href="http://www.business.rutgers.edu/scmonline">http://www.business.rutgers.edu/scmonline</a></td>
</tr>
<tr>
<td>University of Texas at Dallas</td>
<td>Master of Science in Supply Chain Management</td>
<td><a href="http://jindal.utdallas.edu/isom/operations-scm-programs/ms-scm/">http://jindal.utdallas.edu/isom/operations-scm-programs/ms-scm/</a></td>
</tr>
<tr>
<td>Purdue University</td>
<td>Master of Science in Global Supply Chain Management</td>
<td><a href="http://www.krannert.purdue.edu/masters/programs/global-supply-chain-management/">http://www.krannert.purdue.edu/masters/programs/global-supply-chain-management/</a></td>
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<tr>
<td>Institution</td>
<td>Program Name</td>
<td>Program Website</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>---------------------------------------------------</td>
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<tr>
<td>Indiana University</td>
<td>Master of Science in Global Supply Chain Management</td>
<td><a href="https://kelley.iu.edu/onlineMBA/Online/MSGS">https://kelley.iu.edu/onlineMBA/Online/MSGS</a> CM/page36795.cfm</td>
</tr>
<tr>
<td>Texas Christian University</td>
<td>Master of Science in Supply Chain Management</td>
<td><a href="http://neeley.tcu.edu/MSinSCM/">http://neeley.tcu.edu/MSinSCM/</a></td>
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<tr>
<td>University of Pittsburgh</td>
<td>Master of Science in Supply Chain Management</td>
<td><a href="https://www.katz.business.pitt.edu/academics/master-of-science/ms-scm">https://www.katz.business.pitt.edu/academics/master-of-science/ms-scm</a></td>
</tr>
<tr>
<td>University of Colorado Boulder</td>
<td>Master of Science in Supply Chain Management</td>
<td><a href="http://www.colorado.edu/business/ms/ms-programs/masters-supply-chain-management">http://www.colorado.edu/business/ms/ms-programs/masters-supply-chain-management</a></td>
</tr>
<tr>
<td>Saint Louis University</td>
<td>Master of Science in Supply Chain Management</td>
<td><a href="https://catalog.slu.edu/colleges-schools/business/operations-information-technology-management/supply-chain-management-ms-scm/">https://catalog.slu.edu/colleges-schools/business/operations-information-technology-management/supply-chain-management-ms-scm/</a></td>
</tr>
<tr>
<td>Loyola University Chicago</td>
<td>Master of Science in Supply Chain Management</td>
<td><a href="http://www.luc.edu/quinlan/mba/supply-chain-management-degrees/">http://www.luc.edu/quinlan/mba/supply-chain-management-degrees/</a></td>
</tr>
<tr>
<td>University of Maryland</td>
<td>Master of Science in Supply Chain Management</td>
<td><a href="http://www.rhsmith.umd.edu/programs/ms-supply-chain-management">http://www.rhsmith.umd.edu/programs/ms-supply-chain-management</a></td>
</tr>
<tr>
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</tr>
<tr>
<td>University of Minnesota</td>
<td>Master of Science in Supply Chain Management</td>
<td><a href="https://carlonschool.umn.edu/degrees/master-science-in-supply-chain-management">https://carlonschool.umn.edu/degrees/master-science-in-supply-chain-management</a></td>
</tr>
<tr>
<td>University of Southern California</td>
<td>Master of Science in Global Supply Chain Management</td>
<td><a href="http://www.marshall.usc.edu/msgscm/overview">http://www.marshall.usc.edu/msgscm/overview</a></td>
</tr>
<tr>
<td>Portland State University</td>
<td>Masters in Global Supply Chain Management</td>
<td><a href="https://www.pdx.edu/sba/ms-in-global-supply-chain-management">https://www.pdx.edu/sba/ms-in-global-supply-chain-management</a></td>
</tr>
</tbody>
</table>

2. Increase the flexibility and decrease the duration of the program to better serve working professionals.

In the fall of 2017, the Smeal College hired a marketing firm to conduct a study for the program. The results of the study strongly indicated that potential working professional applicants are looking for flexibility in course scheduling when choosing a Supply Chain Management graduate degree program. They want a program that doesn’t require them to move in lockstep with their entering cohort, but rather allows them to go faster or slower depending on their circumstances, and to be able to take a personal leave for a semester and not have to wait until the following year to rejoin the program. They are also interested in a program that can be completed in less than 2 years.

To increase flexibility in course scheduling, we are reducing the pre-requisite structure of the current program to allow for more course choice in building a student’s schedule. SCM 800 will continue to be the entry course to the program, but SCM 801, SCM 822 and SCM 842 (these courses, with SCM 800, will make-up the proposed revised graduate certificate in SCM) can be taken in any order. The certificate courses will be pre-requisites for the remaining four required courses to complete the full degree, but the remaining courses can be taken in any order.
Additionally, the proposed changes will allow a student who adheres to the recommended schedule of two classes each semester to complete the degree in five semesters instead of six.

To give the student more flexibility in shaping their degree, a second elective was added to the program.

Finally, the proposed changes have been constructed to allow for multiple in-takes to the program in the future, should sufficient demand exist, with minimal need for additional course offerings.

3. Restructure the curriculum so course credits and durations will align with the multiple new additions to the Smeal College of Business portfolio of online graduate programs.

In 2016, the original MPS program was revised to bring it in line with university policy governing the semester calendar as well as to enhance eligibility for students seeking financial aid. However, the resulting program consists of one-, two-, three- and four-credit courses spanning six, eight, four (with a residency) and 14 weeks, respectively. This has created some difficulties for students to always be aware of what courses are running when as well as made administering the program more difficult.

Additionally, in the three years since the current revision was approved, the Smeal College of Business has launched multiple online graduate degree and certificate programs with a modular design, allowing students to mix and match courses between various online Smeal programs to satisfy elective and concentration requirements. Virtually 100% of these courses consist of three credits and run the entire length of the semester.

As such, it is logical that the Master of Supply Chain Management program be revised to fit within this expanded Smeal portfolio. This will allow our program to seamlessly integrate with these other programs. Once the changes are made, it is anticipated that more students from other Smeal programs will choose Supply Chain Management as a concentration, given the reputation of our program.

Thus, all courses currently consisting of four credits will be reduced to three-credit courses. This includes three required courses as well as all current elective courses. These courses already run the full semester, so no changes will be made in that respect. In most cases the material removed will be inserted into another course that is expanding from one or two credits up to three.

As just mentioned, courses currently consisting of one or two credits will either expand to three credits or be removed from the program with the content inserted into another course. These courses will also be extended to run over the full semester.
Finally, SCM 850 will be the new capstone course of the program. This course consists of a multi-week simulation of a supply chain, where student teams make many designs as well as tactical decisions for a supply chain. Several intermediate deliverables and one final deliverable are submitted by the teams.

This program change proposal does not alter the goals of the program. The goals of the degree program are to:

- Design an interdisciplinary curriculum for working professionals who want to earn a graduate degree in Supply Chain Management from a top-ranked school, while continuing their employment
- Create a well-balanced, unified, and complete program, including a culminating experience centered on the preparation and acceptance of a high-quality research project
- Emphasize practical applications of knowledge and analysis techniques for solving problems
- Deliver a high-quality program in a manner that is convenient to working professionals

B. Learning Goals and Objectives

**Global Perspective** – Students will demonstrate their understanding of attributes and risks of global supply chains and international trends that affect both domestic and global supply chains.

**Problem Solving** – Students will demonstrate problem-solving skills through case analysis activities (descriptive) and utilizing analytic techniques (predictive) to maintain efficient supply chain practices.

**Integrative Understanding** – Students will demonstrate their understanding of how cross-functional business skills are necessary for sound business processes.

**Supply Chain Professional Skills** – With a focus on ethical and sustainable behavior, students will demonstrate their ability to be a principled leader as well as a valuable team member.

**Communication Skills** – Students will demonstrate their ability to formulate and articulate supply chain ideas individually and collaboratively in written and presentation form.
C. Comparison of Changes

Old Program Title

Master of Professional Studies in Supply Chain Management

New Program Title

Master of Supply Chain Management in Supply Chain Management

Old Program Structure

SCM 800 is the entry course to the program. SCM 801 can be concurrently taken with SCM 800. SCM 801 is currently a prerequisite for SCM 812, SCM 822 and SCM 842.

New Program Structure

SCM 800 will continue to be the entry course to the program, but SCM 801, SCM 822 and SCM 842 (these courses, with SCM 800, will make-up the proposed revised graduate certificate in SCM) can be taken in any order.
**Old Curriculum Structure**

<table>
<thead>
<tr>
<th>Prescribed Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCM 800: Supply Chain Management (4)</td>
</tr>
<tr>
<td>SCM 801: Supply Chain Performance Metrics and Financial Analysis (1)</td>
</tr>
<tr>
<td>SCM 822: Supply Management (2)</td>
</tr>
<tr>
<td>SCM 842: Manufacturing and Service Operations Planning (2)</td>
</tr>
<tr>
<td>BA 803: Business Ethics (1)</td>
</tr>
<tr>
<td>SCM 812: Demand Fulfillment (2)</td>
</tr>
<tr>
<td>SCM 530: Supply Chain Analysis (3)</td>
</tr>
<tr>
<td>SCM 594: Research Topics (3)</td>
</tr>
<tr>
<td>SCM 850: Supply Chain Design and Strategy (4)</td>
</tr>
<tr>
<td>SCM 860: Supply Chain Transformation and Innovation (4)</td>
</tr>
<tr>
<td>Elective (4)</td>
</tr>
</tbody>
</table>

**New Curriculum Structure**

<table>
<thead>
<tr>
<th>Proposed Curriculum (30 credits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed Courses</td>
</tr>
<tr>
<td>SCM 800: Supply Chain Management (3)</td>
</tr>
<tr>
<td>SCM 801: Supply Chain Performance Metrics and Financial Analysis (3)</td>
</tr>
<tr>
<td>SCM 822: Supply Management (3)</td>
</tr>
<tr>
<td>SCM 842: Manufacturing and Service Operations Management Planning and Demand Fulfillment (3)</td>
</tr>
<tr>
<td>BA 803: Business Ethics Topics absorbed into SCM 822</td>
</tr>
<tr>
<td>SCM 812: Demand Fulfillment Topics absorbed into SCM 842</td>
</tr>
<tr>
<td>SCM 530: Supply Chain Analysis (3)</td>
</tr>
<tr>
<td>SCM 594: Research Topics (3)</td>
</tr>
<tr>
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<td>Elective (3)</td>
</tr>
</tbody>
</table>
D. Revised Bulletin

SUPPLY CHAIN MANAGEMENT

Graduate Program Head
Nicholas Petruzzi

Program Code
SCM

Campus(es)
World Campus (M.P.S. /MSCM)

Degrees Conferred
Master of Professional Studies (M.P.S.)
Master of Supply Chain Management (MSCM)

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm? searchType=fac&prog=SCM)

The Master of Supply Chain Management in Supply Chain Management (MPS/SCM) Professional Studies in Supply Chain Management (MPS/SCM) is awarded to students who demonstrate mastery of the knowledge, problem-solving competencies, and leadership skills that are critical to leading business transformation through integrated supply chain planning and execution. The program emphasizes problem-based learning coupled with integrative, collaborative learning experiences to develop the requisite knowledge, skills, and abilities for effective supply chain management. Instruction is delivered online and in a short residency course at an on- or off-campus location, so that working professionals can complete the degree as part-time students working largely or entirely, off campus.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 Admissions (http://gradschool.psu.edu/graduate-education-policies).

Students applying to the MPS/SCM degree program must be admitted by both the MPS/SCM program and the Graduate School at The Pennsylvania State University.

Admission to the graduate program in Supply Chain Management requires:

- A completed Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply) for graduate study, including nonrefundable application fee
- A current resume, along with a statement of professional experience and goals. This statement of approximately two pages must describe the applicant’s professional goals, experience, and responsibilities. The statement must also indicate why the applicant is applying to the MPS/SCM program at Penn State
- One letter of recommendation relevant to the applicant’s professional capabilities, preferably from the employee's immediate supervisor, which should address the applicant’s readiness for graduate study
- Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)
- An undergraduate GPA of at least 3.0 on a 4.0 scale, or grade average of “B” or better in graduate courses completed since the first bachelor’s degree, with at least 6 credits of graduate courses completed to qualify under this option. Applicants with an undergraduate GPA below 3.0 may be admitted in limited circumstances at the discretion of the program, where the applicant demonstrates an exceptional record of professional achievement. In such circumstances, the program may require, as a condition of admission, completion of course work to make up deficiencies or fill in gaps in prior education.
Official Graduate Management Admission Test scores reported directly from the testing center to Penn State. **Highly qualified applicants may request a test waiver if at least one of the following conditions applies:**

- Applicants with at least 5 years of relevant, post-baccalaureate work experience.
- Penn State Smeal College of Business alumni with at least two years of relevant work experience.
- Students currently pursuing the Penn State Graduate Certificate in Supply Chain Management through Penn State World Campus.
- Students who hold a master’s degree from an AACSB-accredited business school.

A committee of SC&IS Department faculty meet periodically to review applications and identify applicants qualified for admission. Admissions decisions are based on a review of a complete admission portfolio, including:

- the application,
- the statement of professional experience and goals,
- the current resume,
- official transcripts from all post-secondary institutions attended,
- the letter of recommendation, and
- the GMAT scores.

## Degree Requirements

**Master of Professional Studies (M.P.S.) Master of Supply Chain Management (MSCM)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Students earn the [professional MPS/SCM/SCMMSCM](http://gradschool.psu.edu/graduate-education-policies) degree by successfully completing a minimum of 30 credits including **26/24** credits of required courses and **46** credits of approved electives.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCM 530</td>
<td>Supply Chain Analysis</td>
<td>3</td>
</tr>
<tr>
<td>SCM 800</td>
<td>Supply Chain Management</td>
<td>34</td>
</tr>
<tr>
<td>SCM 801</td>
<td>Supply Chain Performance Metrics and Financial Analysis</td>
<td>13</td>
</tr>
<tr>
<td>SCM 812</td>
<td>Demand Fulfillment</td>
<td>2</td>
</tr>
<tr>
<td>SCM 822</td>
<td>Supply Management</td>
<td>23</td>
</tr>
<tr>
<td>SCM 842</td>
<td>Manufacturing and Service Operations Planning</td>
<td></td>
</tr>
<tr>
<td>SCM 594</td>
<td>Research Topics</td>
<td>43</td>
</tr>
<tr>
<td>SCM 860</td>
<td>Supply Chain Design and Strategy</td>
<td>43</td>
</tr>
<tr>
<td>BA 803</td>
<td>BUSINESS ETHICS</td>
<td>1</td>
</tr>
<tr>
<td><strong>Electives</strong></td>
<td></td>
<td><strong>46</strong></td>
</tr>
</tbody>
</table>

**Culminating Experience**
Students must complete a culminating supply chain simulation multi-stage exercise for the degree, while enrolled in the capstone course, SCM 850. The simulation: high-quality research project as the culminating experience for the degree, while enrolled in SCM 594. The research project demonstrates the student's ability to apply advanced supply chain management knowledge to a supply chain-related problem or situation in a way that makes a substantial contribution to the student's professional development.

The program requires a cumulative grade point average of at least 3.00 and no course grade below a C. All requirements for the professional MPS/SCM MSCM degree, including acceptance of the research project must be met within eight years of admission to degree status. Students are expected to make continuous progress toward the degree. Leaves of absence, however, may be granted under exceptional circumstances on a case-by-case basis, at the discretion of the program.

Credits earned at other institutions but not used to earn a degree may be applied toward the requirements for a graduate degree, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/ transfer-credit).

Student Aid

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Supply Chain Management (SCM) Course List (https://bulletins.psu.edu/university-course-descriptions/graduate/scm)

Contact

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(814) 865-0073

Program Website

View (http://supplychain.smeal.psu.edu)