ISEM Master's Program Orientation

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HTTPS://WWW.HARRISBURGU.EDU/PROGRAMS/MS-INFORMATION-SYSTEMS-ENGINEERING-AND-MANAGEMENT/

Welcome to HU and the Information System Engineering and Management (ISEM) Program!

So…what is “ISEM”?

- “**I**nformation **S**ystems **E**ngineering and **M**anagement”
- A 2-Year, 12-course, 36-credit hour, SEVP-compliant Master’s Program (MS in ISEM) aimed at developing technical leaders
- Flexible and interdisciplinary, emphasizing technical, engineering and management business aspects of creating and deploying smart digital enterprises
- Plus an available PhD Program with two (2) study paths
  - Path 1: Traditional PhD or
  - Path 2: (New Fall 2024) Doctor in Engineering (D.Eng)
- Recent new additions:
  - 3 New Courses (available Fall 2024)
  - 4 “Concentrations”
    - Individualized (student can take any Elective)
    - AI for Business (available Fall 2024)
    - Cloud Computing for Business (available Fall 2024)
    - Blockchain and Cryptocurrency (available Fall 2024)
  - 12 hour non-degree Certificate in “Blockchain and Cryptocurrency” studies

Overview

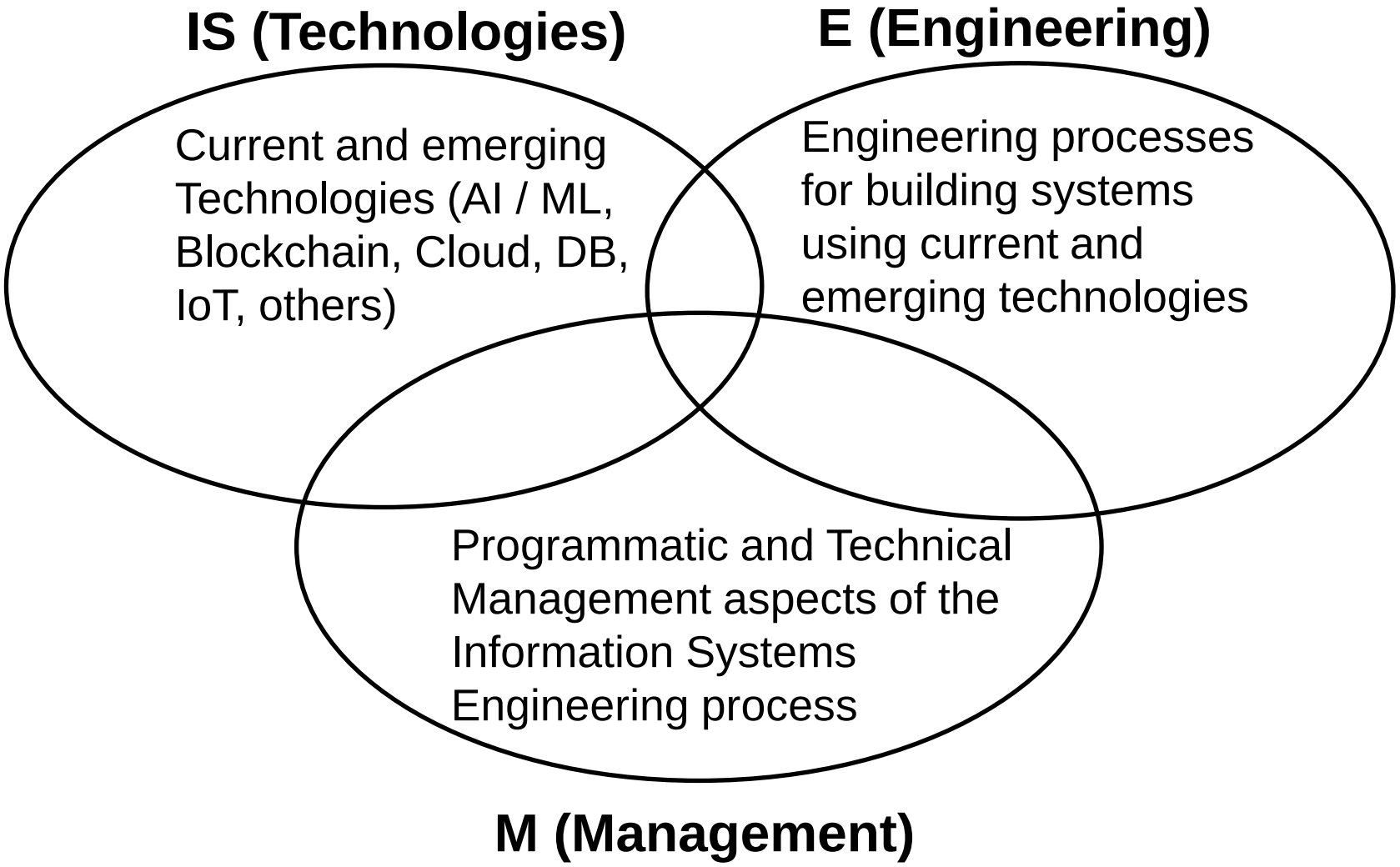
ISEM offers the following experience, related to enterprise digital transformation:

- A bridge between current and emerging technologies, including Artificial Intelligence (AI), Machine Learning (ML), Cloud Computing, Blockchain, Management Science, IoT and Industry 4.0
- An understanding of the technical and management aspects of the complex information system development process
- A program designed to educate leaders and managers on how to:
  - Work with Stakeholders
  - Understand business problems
  - Define requirements for addressing Stakeholder problems
  - Then plan, architect, design, integrate, test, deploy and manage the next generation of smart digital enterprises

Three Pillars of the Program

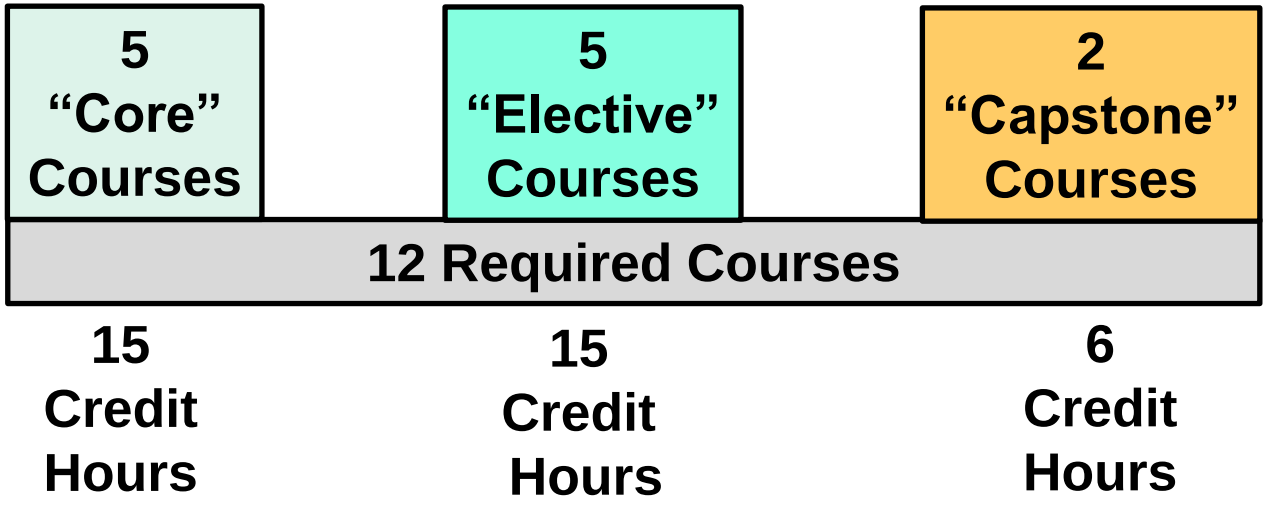
- **Information Systems Technologies**: A primary focus is the study of current and emerging technologies and their applications. Students in ISEM work individually and in teams to gain valuable experience in a range of highly relevant and immediately applicable skills that include: predictive and generative Artificial Intelligence (AI), Machine Learning (ML), Deep Learning, Big Data, Cloud Computing, Blockchains, Business Intelligence, Internet of Things (IoT) and Industry 4.0. Courses evolve to keep up with emerging technologies.
- **Systems Design**: Rather than focus on individual components, students learn to think broadly and gain a range of perspectives and skills, focusing on "systems thinking" and system integration. Significant areas of study include development of enterprise architectures that optimize the use of people, processes, and technologies across a range of environments, industries, and organizational hierarchies.
- **Management**: Students learn to apply the individual skills and unique perspectives they acquire to solve complex problems and apply strategic decision-making across corporations, governments, and other institutions. ISEM Management and Management Science courses focus on business strategies, entrepreneurship, planning integration, security, governance, global enterprises and agile enterprises.

ISEM Masters Program Perspective

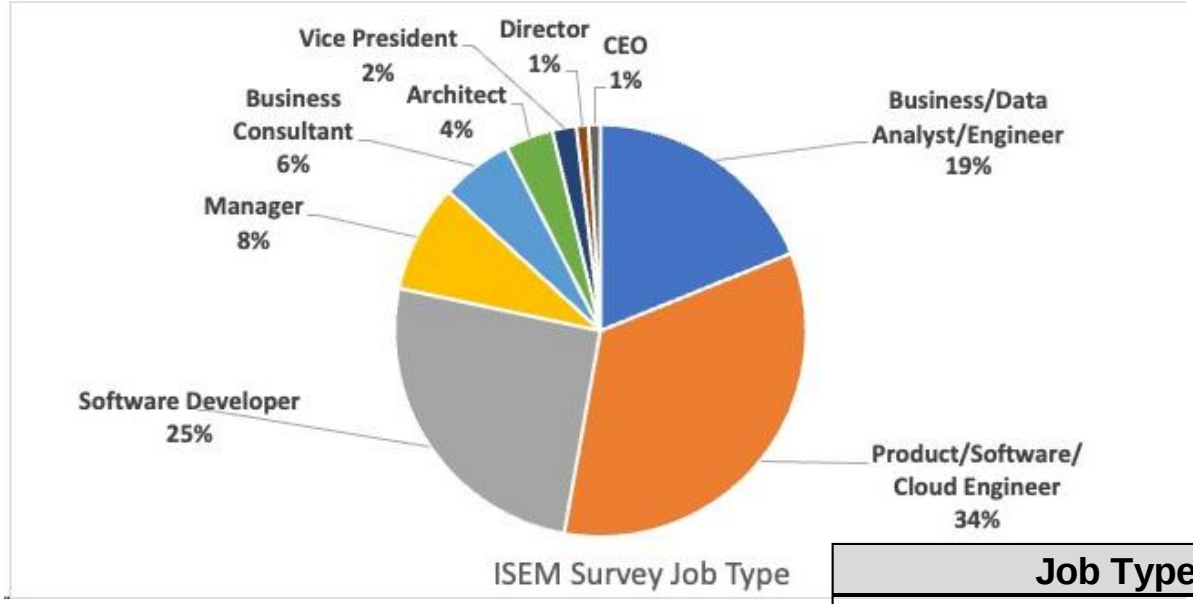


Overview - ISEM Master's Program

- A 36 credit hour program
  - 12 Courses total, 3 Credit Hours per Course
  - Typically 2 courses / semester (maximum 4 is allowed)
  - Six (6) semesters (at 2 courses / semester)
- Course Requirements:



Surveyed ISEM Alumni Jobs (100 total)



Job Type	Count	% of Total
Business/Data Analyst/Engineer	20	19%
Product/Software/Cloud Engineer	36	34%
Software Developer	27	25%
Manager	9	8%
Business Consultant	6	6%
Architect	4	4%
Vice President	2	2%
Director	1	1%
CEO	1	1%
Total:	***106***	***100%***

ISEM Graduates are found working in high demand roles at many top organizations.

Job / Salary Aspiration

Based on a recent Survey:

Occupation	Avg Salary
CEO	246,440
Computer and information Systems Managers	122,860
Computer and Information Research Scientist	155,880
Computer Systems Analyst	107,530
Computer and information Analyst	110,550
Information security Analyst	119,860
Network Architect	129,490
Database Architects	102,530
Software Developers	132,930
Computer Programmers	102,790
Software Q&A	105,750
Data Scientist	115,240

ISEM Course Path ("1 Year Core, 1 Year Electives")

Note: All ISEM students entering Program select upon Admission an incoming Concentration from list of five (5). This can be changed only within student's first 24 credit hours by a student-initiated "Program Change Form".

Yr.	Sem.	Semester Course 1	Semester Course 2	Hrs.
1	1	**(Core) ISEM 500**	**(Core) MGMT 510**	6
	2	**(Core) ISEM 540**	**(Core) ISEM 530 course**	6
	3	**Pick 1 "Core" course from list: ISEM 502, ISEM 534, ISEM 551, ISEM 570, MGMT 511**		3
		Core" courses now complete. Proceed to selected "Concentration" Courses.		
		"Non-Individualized" Concentration: Pick "Concentration Course 1" from list: ISEM 503, ISEM 547, ISEM 574	**"Individualized" Concentration: Pick 1 Elective courses** (Elective 1 of 5)	3
2	4	**"Individualized" Path:** Elective 2 of 5 **"Non-Individualized ":** Concentration Course 2	**"Individualized" Path**: Elective 3 of 5 **"Non-Individualized":** Concentration Course 3	6
	5	**"Individualized" Path:** Elective 4 of 5 **"Non-Individualized"**: Concentration Course 4	**(Capstone)** GRAD 695 (in accordance with Concentration)	6
	6	**"Individualized" Path**: Elective 5 of 5 "**Non-Individualized"**: Concentration Course 5	**(Capstone)** ISEM / GRAD 699 (in accordance with Concentration)	6
	Key:	**Core Courses** **Concentration Course**	**Total:**	**36**

ISEM Graduate Courses

- ISEM has a large catalog of available courses
- Primary goal: Educate students on how to be technical leaders in their organization, with a comprehensive understanding of technologies, processes and various aspects of management
- Most authoritative source of course offerings is the "Graduate Course Catalog", found at the following URL:

Harrisburg University of Science and Technology - Acalog ACMS™

Note: The Graduate Course Catalog is updated every Spring. Take care that you are viewing the latest Catalog.

Concentrations

- Upon entering ISEM, each student selects a Concentration. The *default* Concentration is the “Individualized” Concentration.
- A student remains in a selected Concentration unless a program change form is executed before 24 credit hours have been taken. A change in Concentration cannot extend the length of a student’s Master’s studies.
- A student must commit to taking courses and executing a Capstone Project in their selected Concentration topic area.

PROGRAM CONCENTRATIONS

Upon entry to ISEM program, each student picks one of available “Concentrations”. A student will remain in that chosen Concentration unless they switch to a different Concentration before 24 Credit Hours have been accomplished. ISEM Concentrations are:

		Course Structure			
No.	**Concentration**	**Core**	**Electives**	**Capstone (2 semesters)**	**ISEM Faculty Advisors**
1	Artificial Intelligence (AI) for Business	5	3 Concentration + 2 Elective Courses	In AI Field of Study	Dr. Siamak Aram
2	Cloud Computing for Business	5	3 Concentration + 2 Elective Courses	In Cloud Computing Field of Study	Dr. Siamak Aram
3	Blockchain and Cryptocurrency	5	3 Concentration + 2 Elective Courses	In Blockchain Field of Study	Prof. Tom Plunkett
4	Individualized	5	Any 5 HU Graduate Electives	In ISEM-related Field of Study	Dr. Robert Pittman

A Word About Concentration Course Sequences

Concentration Course sequences across semesters can vary depending on the following factors. Your faculty advisor can navigate you through these impacts:

- If you take ISEM 501, it will slightly modify the sequence of subsequent courses
- All Core Courses are taught in both “Regular” *and* “Late” semesters. However, you may see a slightly different order in semester 3 and semester 4 Concentration courses, dependent on whether you are proceeding through ISEM in a “Regular” or “Late” course sequence.

“Individualized” Concentration Course Sequence (available now)

Note: **All** ISEM students entering Program select upon Admission an incoming **Concentration** from a list of five (5). This can be changed only within they student’s first 24 credit hours by a student-initiated “Program Change Form”.				
Yr.	**Sem.**	**Semester Course 1**	**Semester Course 2**	**Hrs.**
1	**1**	**(Core) ISEM 500**	**(Core) MGMT 510**	6
	2	**(Core) ISEM 540**	**(Core) ISEM 530 course**	6
	3	**Semester 3: Pick 1 “Core” course from list: ISEM 502, ISEM 534, ISEM 551, ISEM 570, MGMT 511**		3
		Semester 3: “Individualized” Path. (Elective 1 of 5)		3
2	**4**	**“Individualized” Path:** Elective 2 of 5	**“Individualized” Path**: Elective 3 of 5	6
	5	**“Individualized” Path:** Elective 4 of 5	**(Capstone)** GRAD 695	6
	6	**“Individualized” Path**: Elective 5 of 5	**(Capstone)** ISEM / GRAD 699	6
	Key: **Core Courses** **Concentration Coursed**		**Total:**	**36**

Upon completion of “Core” courses in Semester 3, student can then take any five (5) applicable University graduate courses. This is the most flexible Concentration.

Note that if the student starts with ISEM 501 in Semester 1, you will have a slightly different course sequence. Your faculty advisor will explain.

"AI for Business" Concentration Course Sequence (available Fall 2024)

Note: **All** ISEM students entering Program select upon Admission an incoming **Concentration** from a list of five (5). This can be changed only within they student's first 24 credit hours by a student-initiated "Program Change Form".				
Yr.	**Sem.**	**Semester Course 1**	**Semester Course 2**	**Hrs.**
1	**1**	**(Core) ISEM 500**	**(Core) MGMT 510**	6
	2	**(Core) ISEM 540**	**(Core) ISEM 530 course**	6
	3	**Semester 3: Pick 1 "Core" course from list: ISEM 502, ISEM 534, ISEM 551, ISEM 570, MGMT 511**		3
		Semester 3: ISEM 503 (Concentration Course 1 of 5)		3
2	**4**	**ISEM 564** (Concentration Course 2 of 5)	**GRAD Elective (**suggest **ISEM 582** if available**)** (Concentration Course 3 of 5)	6
	5	**ISEM 505** (Concentration Course 4 of 5)	**(Capstone) GRAD 695** (in accordance with Concentration)	6
	6	**GRAD Elective) (**suggest **ISEM 565** if available**)** (Concentration Course 5 of 5)	**(Capstone) ISEM / GRAD 699** (in accordance with Concentration)	6
	Key:	**Core Courses** **Concentration Coursed**	**Total:**	**36**

Upon completion of "Core" courses in Semester 3, student takes a focused set of AI-related courses. Student will earn both a diploma and a Certificate in this Concentration upon completion of all courses and execution of their Capstone in a related topic.

Note: Concentration Course sequence in semesters 4 and 5 may be slightly modified depending on whether you took ISEM 501 in Semester 1 or are proceeding through ISEM in the "Regular" or "Late" semester Course sequence. Your faculty advisor will explain.

"Blockchain and Cryptocurrency" Concentration Course Sequence

(available Late Fall 2024)

Note: All ISEM students entering Program select upon Admission an incoming Concentration from a list of five (5). This can be changed only within they student's first 24 credit hours by a student-initiated "Program Change Form".

Yr.	Sem.	Semester Course 1	Semester Course 2	Hrs.
1	1	**(Core) ISEM 500**	**(Core) MGMT 510**	6
	2	**(Core) ISEM 540**	**(Core) ISEM 530 course**	6
	3	**Semester 3: Pick 1 "Core" course from list: ISEM 502, ISEM 534, ISEM 551, ISEM 570, MGMT 511**		3
		Semester 3: ISEM 578 (Concentration Course 1 of 5)		3
2	4	**ISEM 576** (Concentration Course 2 of 5)	**GRAD Elective** (Concentration Course 3 of 5)	6
	5	**ISEM 574** (Concentration Course 4 of 5)	**(Capstone) GRAD 695** (in accordance with Concentration)	6
	6	**GRAD Elective** (Concentration Course 5 of 5)	**(Capstone) ISEM / GRAD 699** (in accordance with Concentration)	6
	Key:	**Core Courses** **Concentration Courses**	**Total:**	**36**

Upon completion of "Core" courses in Semester 3, student takes a focused set of Blockchain and Cryptocurrency-related courses. Student will earn both a diploma and a Certificate in this Concentration upon completion of all courses and execution of their Capstone in a related topic.

Note: Concentration Course sequence in semesters 4 and 5 may be slightly modified depending on whether you took ISEM 501 in Semester 1 or are proceeding through ISEM in the "Regular" or "Late" semester Course sequence. Your faculty advisor will explain.

"Cloud Computing for Business" Concentration Course Sequence

(available Fall 2024)

Note: <u>All</u> ISEM students entering Program select upon Admission an incoming <u>Concentration</u> from a list of five (5). This can be changed only within they student's first 24 credit hours by a student-initiated "Program Change Form".

Yr.	Sem.	Semester Course 1	Semester Course 2	Hrs.
1	1	**(Core) ISEM 500**	**(Core) MGMT 510**	6
	2	**(Core) ISEM 540**	**(Core) ISEM 530 course**	6
	3	**Semester 3: Pick 1 "Core" course from list: ISEM 502, ISEM 534, ISEM 551, ISEM 570, MGMT 511**		3
		Semester 3: ISEM 536 (Concentration Course 1 of 5)		3
2	4	**ISEM 564** (Concentration Course 2 of 5)	**GRAD Elective (**suggest **ISEM 503** if available**)** (Concentration Course 3 of 5)	6
	5	**ISEM 582** (Concentration Course 4 of 5)	**(Capstone) GRAD 695** (in accordance with Concentration)	6
	6	**GRAD Elective (**suggest **ISEM 533** if available**)** (Concentration Course 5 of 5)	**(Capstone) ISEM / GRAD 699** (in accordance with Concentration)	6
	Key:	**Core Courses** **Concentration Courses**	**Total:**	**36**

Upon completion of "Core" courses in Semester 3, student takes a focused set of database-related courses. Student will earn both a diploma <u>and</u> a Certificate in this Concentration upon completion of all courses and execution of their Capstone in a related topic.

<u>Note</u>: Concentration Course sequence in semesters 4 and 5 may be slightly modified depending on whether you took ISEM 501 in Semester 1 or are proceeding through ISEM in the "Regular" or "Late" semester Course sequence. Your faculty advisor will explain.

Certificate in Blockchain and Cryptocurrency

- 12-semester hour Certificate Program
- Available as a *non-degree* option
- Four (4) Courses:
  - ISEM 574 – Bitcoin Blockchain
  - ISEM 575 – Ethereum Blockchain
  - ISEM 576 – Cryptocurrency and Regulation
  - ISEM 578 – Decentralized Finance
- Yields a digital credential upon completion

Affiliated ISEM Relationships

Looking ahead: ISEM is actively engaged in developing the following affiliated relationships:

- HU “4+1” streamlined “BS-to-MS” 5-year path to an ISEM Master’s degree
- “Bachelors-to-PhD” Pathway
  - For students entering HU with a BS degree and intent on achieving a PhD degree

ISEM Doctoral Programs

ISEM PhD Program – Two Offered Programs

- Doctor of Philosophy (PhD)
  - Contribute to **new theories and concepts or novel applications of existing theories to a discipline or area of professional practice**
  - Results in a terminal degree for *researchers and academicians* who will add to the body of knowledge in ISEM.
- Doctor of Engineering (D.Eng) – New and open but not yet "CPT" accredited
  - Devise solutions for **new complex private, public, national, or global ISEM-related problems resulting in a terminal degree that produces *practitioners***
  - *Industry Researchers*, *CTO*, etc. who can plan, implement, and manage the advanced technology-driven public and private organizations of today and tomorrow.

Differences Between PhD and D.Eng

	Ph.D.	D.Eng.
Focus	Advancing knowledge	Practice and application
Usual career timing	Open to all levels including early-career	Mid-career
Employment goal	Academic career, research and technical leadership in industry or public sector	Technical leadership in industry or the public sector, research and academic career
Final product from program	Dissertation, algorithms and solutions, refereed journal publications	Complex project solution complete with testing and proof of usability

Programs Details

- Intake: Fall, Spring and Summer
- Targets the broader areas of ISEM including:
  - AI/ML, Blockchain, Technology Management, operations management, Smart Cities, Industry 4.0, healthcare, and all areas of supply chains
- Designed for those on a Curricular Practical Training (CPT) program
- Length: Approximately 3.5 – 4 years (variable)
  - Recent PhD Grad completed in 5 years

Admission Requirements

PhD

- Resume.
- Minimum GPA: 3.30.
- GRE score in the 65th percentile or above in the Quantitative portion.
  - *waived for a candidate with a Master's Degree from Harrisburg University*
- Evidence of research potential.
  - Any key published articles.
  - Students that are finishing their master's thesis may submit a summary of their thesis indicating the key findings and areas they wish to further pursue in their PhD.
  - Short research proposal.
- Two letters of recommendation .

D.Eng

- Resume.
- Minimum GPA: 3.30
- GRE score in the 65th percentile or above in the Quantitative portion.
  - *waived for a candidate with a Master's Degree from Harrisburg University*
- A research proposal for an applied problem in ISEM, outlining the key issues and possible solution approaches to be explored.
- At least 2 years of full-time working experience beyond a Master's degree is expected, but not mandatory.
- Two letters of recommendation.
- A letter of support either from an employer or sponsoring organization is recommended and preferred.
- A co-advisor from the employer or sponsoring organization is recommended and preferred.

Complete the application online
at www.HarrisburgU.edu/Apply

Doctoral Admission Requirements

Common to <u>both</u> PhD and D.Eng:

- Resume
- Minimum GPA: 3.30
- GRE Score: 65th Percentile or above in Quantitative portion
  - <u>Note</u>: Waived for a candidate with a Master's degree from HU

Complete application online at:
www.HarrisburgU.edu/Apply

PhD	D.Eng

• Evidence of research potential.
  ○ Any key published articles
  ○ Students finishing their Master's thesis may submit a summary of their thesis, indicating the key findings and areas they wish to further pursue in their PhD.
  ○ Short research proposal.
• Two (2) letters of recommendation .
	• A research proposal for an applied problem in ISEM, outlining key issues and possible solution approaches to be explored.
	• At least 2 years of full-time working experience beyond a Master's degree is expected, but not mandatory.
	• Two letters of recommendation.
	• A letter of support either from employer or sponsoring organization is recommended and preferred.
	• Co-advisor from employer or sponsoring organization is recommended and preferred.

Doctor of Philosophy (PhD) in ISEM

- Traditional research-oriented Doctorate of Philosophy
- Intended for those interested in a career in academia or industry research leadership positions, with a potential pathway to CTO/CEO roles

Requirements for Graduation

- Complete BREADTH Courses (9 TO 21 SEMESTER HOURS) (SH)
- Complete DEPTH Courses (9 SH)
  - MILESTONE 1: Complete the Qualifying Exam (QE)
- Complete the Doctoral Research Seminar (6 SH)
  - MILESTONE 2: Successful Defense of Dissertation Proposal
- Complete the Dissertation with novel research (18 – 36 SH)
  - MILESTONE 3: Successful Defense of Dissertation

Doctor of Engineering (D.Eng) in ISEM

- Solution-focused research for an approved complex applied problem
- Intended for those primarily interested in a career in industry research leadership positions with a potential pathway to CTO/CEO roles

Requirements for Graduation

- MILESTONE 1: Proposal to research and solve a complex problem
- Complete BREADTH Courses (9 - 12 SH)
- Complete DEPTH Courses (9 – 12 SH)
- Complete the Doctoral Research Seminar (6 – 12 SH)
  - MILESTONE 2: Successful Defense of Dissertation Proposal
- Complete Dissertation by successfully researching and solving the identified problem (12 – 18 SH)
  - MILESTONE 3: Successful Defense of Dissertation

How to Prepare for the ISEM PhD Program while in the ISEM Master's Program

- Note that Participation in ISEM Masters Program is not an automatic entry point into the ISEM PhD Program.
- Competitive - student must do very well in Master's Program studies
- Selective - student must apply and agree to be interviewed.
- To best prepare:
  - Complete and do very well in all ISEM "Core" Courses
  - 2-semester Capstone project should be in your anticipated area of Doctoral study. You can discuss this with your ISEM Advisor.
  - Successfully take these ISEM Master's courses:
    - ISEM 530 Systems Engineering Principles
    - ISEM 503 Artificial Intelligence
    - GRAD 509 Research Methods
    - Capstone (GRAD 695 + GRAD 699) in proposed study area

FOR MORE INFORMATION ON ISEM PHD PROGRAM OFFERINGS, CONTACT:

PROFESSOR AMAR RAMUDHIN
DOCTORAL PROGRAM LEAD FOR INFORMATION SYSTEMS ENGINEERING AND MANAGEMENT

aramudhin@harrisburgu.edu

Thank you!

For additional ISEM Master's Program Information or for answers to specific questions, please:

- Consult the HU ISEM Web Link
- Review the current version of "Graduate Catalog: Master and Doctorate Degrees"
- Students can talk to individual ISEM course instructors or assigned Advisor
- If you still need assistance, contact the ISEM Academic Program lead via e-mail:

Dr. Robert Pittman
RPittman@Harrisburgu.edu