Engineering OL Notes

What computer do students need?

information on the World Campus website that is specifically for our engineering programs:  <https://www.worldcampus.psu.edu/great-valley-programs-technical-requirements>

We do stress that students should NOT use a MAC as it is not supported, and students have difficulty with submissions.

Are the programs STEM designated?

All engineering programs, inc. MEM are STEM designated.

How do your programs fair in the rankings?

Great, please visit: http://www.usnews.com/education/online-education/engineering/rankings

I have transfer credits from another school, will you evaluate them?

Yes. The most you can transfer in is 9 credits, they must be within the last 5 years, you must have received a grade of B or better, and the course must be substantially similar to courses in the program (a course syllabus is usually required).

My company only pays a certain amount each year, can I take more than 2 years to complete this degree? (Anticipates multiple stop outs)

This is not an uncommon problem.  However, it means you'll want to take loans or pay out of pocket for the remainder as students are required to enroll continuously and complete their degree in 2 years. That said, you are allowed to take 1 break during the program as we understand that job or personal issues may arise, but if you anticipate needing multiple breaks over the two years, this may not be the best fit for you.

Will my diploma say ‘online’ or look different than others at PSU?

No, World Campus does not appear on the transcript. The school issuing the degree is Penn State University—School of Graduate Professional Studies. Students who take classes online have the same looking transcript and diplomas as those who are in residence.

If I apply and the cohort fills, do I have to reapply for the next start date?

No, if the cohort fills, we will ask if you would like to start in the next available start date.

Are there opportunities for individual research with the faculty?

Not in the online program. In our residential program in suburban Philadelphia, you can do that.

I may be moving to Philadelphia, can I go back and forth between online and in residence programs?

We can help you move from online to resident instruction (evening classes 2 nights/week from 6-9pm) but we cannot guarantee that you can rejoin your cohort. The same faculty teach in both programs.

Is there a contact at PSU for those in the military?

**Military Admissions Counselors** wdmilitary@outreach.psu.edu

Are exams proctored?

No. We will not ask you to take a proctored exam. You will mostly be doing projects, answering problems, posting to discussion boards, doing group work, etc. There are few timed exams, none of which ask you to go take them anywhere special or with a proctor.

Will I be expected to come to PA?

No, there is no expectation of residency.

I have financial aid questions.

Your questions about financial aid need to be directed to the World Campus Office of Student Aid at [studentaid@outreach.psu.edu](mailto:studentaid@outreach.psu.edu) . You can also visit the World Campus web page for student aid at <http://www.worldcampus.psu.edu/tuition-and-financial-aid>.

What kind of time commitment is involved?

Going to graduate school is like having a part-time job. Each class will vary but plan on 15-20 hours of work per week.

**SYSEN questions**

What is SYSEN?

For us, systems is an engineering degree with significant math components so typically students in that program usually come from engineering undergraduate programs with several semesters of calculus and differential equations. Systems engineers design and develop large scale heterogeneous engineered systems involving electrical, mechanical, computer, aerospace, etc.  Many of our students are employed as government contractors (Boeing, Lockheed) or are active military. It is a two-year lock step program where you travel with the same 29 students through the entire curriculum.

Interest in SYSEN but lacks math

You can take calculus I and II at your local community college or Part 3 of this series covers Calculus 2 topics. Here is the link: [https://www.coursera.org/learn/integration-calculus](https://nam10.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.coursera.org%2Flearn%2Fintegration-calculus&data=04%7C01%7Cach14%40psu.edu%7C2f0b17346ce24da8716b08d994a56c60%7C7cf48d453ddb4389a9c1c115526eb52e%7C0%7C0%7C637704260466653203%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C1000&sdata=BLuw%2BNyIcT%2FsXYs%2FTGXMEyKtqZXIvghyhSqji%2BsvnEM%3D&reserved=0)  You must show successful proof the completion/a certificate from Coursera.

In discrete-time simulation (SYSEN 532), Simio software is used. In continuous-time simulation (SYSEN 534), Vensim software is used.

INCOSE

We have an Academic Equivalency agreement with INCOSE. This agreement includes courses recognized as equivalent to the certification knowledge exam, fulfilling a requirement for INCOSE Associate Systems Engineering Professional (ASEP), Certified Systems Engineering Professional (CSEP) certification and Expert Systems Engineering Professional (ESEP). Under this agreement, students in the Master of Engineering in Systems Engineering program, or those enrolled in graduate certificates in systems engineering, who excel in courses assessed for Academic Equivalence (AcEq) can bypass the certification knowledge exam when applying for ASEP, CSEP and ESEP Certification through INCOSE.

The courses that cover the ASEP exam include SYSEN 520 (Systems Engineering), SYSEN 522 (Systems Verification Validation and Testing), and SYSEN 880 (Systems Architecture and Models). All three courses are offered online so students can take these courses fully remote. These courses are offered in Spring, Summer, and Fall semester regularly but we need to check the availability in these courses as seats are reserved for degree program students. Students may sign up to the courses as a non-degree student. If they decide to do that, we suggest that they send a CV and transcript for review before applying as a non-degree student.  We also have stackable certificates that cover these courses if students do not want to commit to the full degree.

 Is Model Based Systems Engineering (MBSE) an area of focus?

We have a course dedicated to Model based systems engineering. In SYSEN 880 System Architecture and Models course, students learn SySML and apply it to development of system architecture.

The modeling and simulation courses (SYSEN 532 and SYSEN 534) focus on application of discrete-modeling and continuous modeling for analysis of complex systems. Simio software is used for discrete-modeling and simulation. Optimization problems are covered in this course (SYSEN 532). VenSim software is used for continuous modeling and simulation. System dynamic models of various complex systems are analyzed in this course. Software used do not require programming knowledge. The courses provide necessary material and support for students to learn the software and apply it to different system problems. We have another course, Decision and Risk Analysis (SYSEN 536) which uses Excel based software to model decision trees and conduct risk analysis.

What is the final class like?

The capstone is a group project that spans the last 4 courses of the program. Students are provided a statement of work from which they must devise the requirements, design the architecture, management plan, and then design a solution including developing analytical models of subcomponents, trade studies/simulations, etc. Teams write this up as a report.

What software packages that will be used in the curriculum?

Simio simulation software, MS Office Excel, Minitab, MATLAB Simulink, and Eclipse-Papyrus (SySML extension)

**MEM questions**

What if I lack the math prerequisite?

Take calculus I at your local community college or both of these:

[https://www.coursera.org/learn/single-variable-calculus](https://nam10.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.coursera.org%2Flearn%2Fsingle-variable-calculus&data=05%7C02%7Cach14%40psu.edu%7C60a7c9f10cc4492311b108dd479c476a%7C7cf48d453ddb4389a9c1c115526eb52e%7C0%7C0%7C638745458707781766%7CUnknown%7CTWFpbGZsb3d8eyJFbXB0eU1hcGkiOnRydWUsIlYiOiIwLjAuMDAwMCIsIlAiOiJXaW4zMiIsIkFOIjoiTWFpbCIsIldUIjoyfQ%3D%3D%7C0%7C%7C%7C&sdata=l0cUnyDrpV4qWKQW%2FUAFcqf4%2BxxlASmhlW6a8D6G6eI%3D&reserved=0)

[https://www.coursera.org/learn/differentiation-calculus](https://nam10.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.coursera.org%2Flearn%2Fdifferentiation-calculus&data=05%7C02%7Cach14%40psu.edu%7C60a7c9f10cc4492311b108dd479c476a%7C7cf48d453ddb4389a9c1c115526eb52e%7C0%7C0%7C638745458707811198%7CUnknown%7CTWFpbGZsb3d8eyJFbXB0eU1hcGkiOnRydWUsIlYiOiIwLjAuMDAwMCIsIlAiOiJXaW4zMiIsIkFOIjoiTWFpbCIsIldUIjoyfQ%3D%3D%7C0%7C%7C%7C&sdata=VKLHDv1pRSMLl%2BwO5K1bG9x10fzW3KgfHzWKxRtr0SU%3D&reserved=0)

Is the curriculum math intensive, writing intensive, or more hands on projects?

All of the above. Several of the courses are mathematical and analytical, while others are reading and writing intensive. There are several hands-on projects, including the capstone.

What courses focus on communication?

Creativity and Problem Solving is about how to work with and communicate with others who think differently and communicate differently than you do. There is no other course that directly focuses on communication. Organizational behavior (MNGMT 511) and Negotiations (BADM 828) cover conflict resolution and negotiation techniques.

Is the curriculum theory based or is it more applied which can be used in industry?

It is a mix of theory and practice.

What is the capstone like?

The capstone is a one semester group project where students bring together the concepts, theories, and techniques learned throughout the program in the examination of case studies in engineering management and strategy through participatory learning using the case method. In addition, students complete an engineering management project. Students are strongly encouraged to solicit project ideas, and a suitable industrial supervisor from their place of employment to ensure that the problem they take on is grounded in the reality of engineering management.

**What capstone projects have been done?**

We don’t publish capstone projects, but students have worked on are online shopping or ecommerce system, web-based gaming system, web-based restaurant management system, etc. Most projects require students leverage standard software engineering practices they have learned in their core courses (project management, requirements engineering, software testing, software architecture, software design, and software construction) to create a fully functional software product. Practices that are critical when building this product include requirements, architecture and design at the start of the project, and version control, continuous integration, continuous deployment, and automated testing as the product is being constructed. Progress on the project is communicated via progress boards and burnup / burndown charts.

How do you accept the ELIM minor?

We can accept all ELIM courses. you can complete the ELIM classes while working on the MEM program. 3 of our courses are replaced by ELIM courses. One of our courses is accepted by ELIM program. The Engineering Leadership & Innovation Management minor courses are offered every fall, spring, and summer semester. They run the full regular semester which is 15 weeks (plus finals week) in the fall and spring semesters and 12.5 weeks (plus finals ‘days’) in the summer semesters.

How is PSU different than Georgia Tech or Texas, which are only $10k?

They don’t talk about class size and the level of interaction with faculty, but they don’t suggest that the programs are in a different learning model. Our classes are around 25 students and there are no Teaching Assistants (TAs). Our faculty are very engaged with the student and course.

**SWENG questions**

I have no software experience. Can I take this program?

Most students in this program have experience—either learned on the job or formally as an undergraduate. Without formal classes in computing and software, we would want to see some classes to demonstrate understanding of the basics of developing software – Operating System Design, Data Structures and Algorithms. I recommend completing the following Penn State classes to satisfy the admission requirements and learn the computer science basics: CMPSC 131 and 132 **OR** IST 140, 242 and 311. You can take these classes as a non-degree student. To register, contact World Campus at [registration@worldcampus.psu.edu](mailto:registration@worldcampus.psu.edu) or call them at 800-252-3592.

What happens in the software program?

Students acquire comprehensive skills in modern software development and design through courses in software construction, design, and architecture. They are encouraged to design, develop, and deploy their solutions in the public cloud, for instance using the microservices architectural pattern. Students engage in full-stack software development, culminating in a capstone project where they create fully functional software products.

These projects frequently utilize technologies such as React and Angular for the front-end, and Node.js for the backend. Complexity, security, scalability, and user-friendliness are central to many of these projects. For example, students might create an intelligent system that uses machine learning models on large volumes of unstructured data to display insights on a dashboard, addressing complexity, scalability, and security.

Most courses in the program use Java or Python as programming languages. GitHub is used for version control, CI/CD, and automated testing, while Jira is employed for project management.

What kind of grades do I have to get?

If you don't get a C, the credits don't count, and you will have to retake it. A 3.0 GPA is needed to graduate.

What programming will I learn?

We don’t teach operating systems/languages/databases per se but expect students to have enough programming background so they can pick up the use of any technology fairly independently. Programming languages that are typically used in various courses include C/C++, Java, and Python. Oracle is the database management system. Operating systems include UNIX (Linux) and Windows. Some significant software development paradigms we teach include object-oriented analysis and design, pattern-oriented design, and architecture-centric software engineering. The capstone offers the opportunity for students to apply these development paradigms to any technology stack of their choice (such as those used for developing web-based, distributed, mobile, cloud-based, and big data apps).

What programming language do I need to know?

We do not dictate use of a particular language. Any you currently use is fine.

Do you teach programming?

If you are looking to develop programming skills, or proficiency in some technology stack, this is not the right program for you.

What is this program about?

We assume that students have background in programming and are interested in learning how to "engineer" software systems. The program will:  
  
(1) Give you a broad overview on what is involved in engineering a software system (SWENG 861: Software Construction)  
(2) Take a deeper dive into how to build the right system (SWENG 586: Requirements Engineering)  
(3) Teach you how to do high-level design (SWENG 587: Software Systems Architecture), low-level design of a system (SWENG 837: Software Systems Design), pattern-oriented design (SWENG 585), database design (INSC 521: Database Design Concepts), user interface design (SWENG 826: Applied HCI) and design for security (INSC 561: Web Security and Privacy)  
(4) Teach you verification and validation techniques, i.e., verify that she is building the system right and validate that she has built the right system (SWENG 581: Software Testing)  
(4) Help you understand how software projects are monitored and managed (SWENG 505: Software Project Management)  
  
The capstone experience (SWENG 864: Software Engineering Studio) at the end of the program can give you an opportunity to apply all of what she learns in these courses to develop a fully functioning product. This is a 6-credit 14-week course where you will be given the freedom to explore a technology stack of her choice that you are deeply interested in mastering.

**CTAP (Homeland Security Cyber Threat Analytics and Prevention option)**

What background do I need?

Some IT background will be very useful. Basics of IT will be sufficient, including at least one undergraduate programming course or some work experience in the IT field. Once you have your application submitted, we will determine if you would need a prerequisite course that helps you get some basic training in IT.