

Communications Software Development for Distributed Energy Resources

Specialized Certificate

The Field of Communications Software Development for Distributed Energy Resources (DER)

Current hiring reflects a “boots on the ground” need for installers, electricians, and software developers. Reporting also reflects a strong need for project management, administrative, and electrical engineering skills, which the Distributed Energy Resources (DER) industry is not finding in candidates. Along with future job growth, the DER industry is seeing an increased need for operations and maintenance personnel, while electricians and solar installers remain the top need over the next five years. IT/OT for solar and storage sites, analytics driven operations and maintenance, and communication strategies and protocols are the top anticipated skillsets DER industry employers will be seeking. Industry experts anticipate this need to continue over the next five years due to the industries implementation of smart inverters, energy storage deployment, and grid interconnection.

The Distributed Energy Resources industry anticipates a continued growth across the United States

Job Prospects

The program is designed to train individuals seeking to enter and advance in the field of software development, testing, IT/OT, and cybersecurity in the fields of renewable and distributed energy resources. Due to the funding requirements of our Department of Energy grant, military veterans are particularly encouraged to participate in this program

Program Overview

Our certificate in Communication Software Development for Distributed Energy Resources (DER) addresses the shortage of professionals in the technology field of Renewable Energy, DER, and related professional standards and specifications.

In the energy space industries, commercial areas, large buildings, municipalities, and communities are facing three main challenges: costs, security of supply and CO₂ reduction. With the help of local distributed energy solutions, it is possible to turn these challenges into long-term calculable variables – across all businesses and industrial sectors. The solutions utilize an optimized mix of distributed energy resources (DER) such as renewable energy, combined heating and power stations, or storage systems, supported by sophisticated energy management.

Track I: SunSpec Modbus

SunSpec Modbus is a data communications specification for interoperability between PV system components (and the system controller). The key concept here is interconnection/communication between solar equipment. Every system requires one of these communication sub systems to operate and comply with IEEE 1547 – 2018 requirements. SunSpec Modbus is the most popular standard protocol used in these sub systems. Students will understand the theory of operation for SunSpec Modbus and how to apply the technology to PV communication sub system development. They will be prepared to obtain software development roles in the DER industry where they will be developing these sub systems.

Track II: IEEE 2030.5

IEEE 2030.5 – 2018 is a data communication specification for interconnection between Distributed Energy Resources Systems equipment and the energy grid infrastructure. The key concept illustrates a network of solar storage equipment and the larger energy grid. DER systems must be able to communicate with the network operator to comply with regional interconnection requirements, such as the utility the DER system connects with. Students will understand the theory of operation for IEEE 2030.5 - 2018 and how to apply the technology in DER system-to-network-operator scenarios. They will be prepared to obtain software development roles in the DER industry where they will be developing these solutions.

Program Audience

Our program is designed for those with minimal experience with electric power and interest in breaking or transitioning into the field. In the program, you will learn to speak the language of and perform substantial tasks within the electric grid and power system network. Any engineering degree, preferably a BSEE, is required for entrance into the program.

Program Details

Prerequisites

Any engineering degree, preferably a BSEE, is required for entrance into the program. Other relevant knowledge and experience will be evaluated separately at the application point

Length

Most students complete the program in just over a year by taking one course per quarter for five consecutive quarters. You have up to five years to complete all requirements for the certificate.

Cost

All courses in this program are \$895. Each, with the exception of the course ECE-40312 Distributed Energy Resources (DER) Communication Installation Considerations which is \$295. The total estimated cost of the program is \$3,970. which includes the \$95 certificate fee. Please note that all fees are subject to change and do not include books. This is an *estimate* of the cost of the program, which may vary based on a variety of factors. This estimate does not include textbooks, parking, transportation, or personal expenses. *All estimated costs are subject to change*; current fees are listed on [our website](#).

Requirements

There are three required courses and two elective courses from either track needed to complete the Communications Software Development for DER program. You may take the required courses in any order although preference is given to the planned course offerings by quarter for this certificate as listed below. Please refer to the certificate page to verify available sections when you are ready to enroll in any course in this program. Once enrolled in the certificate, visit myextension.ucsd.edu to track your progress and view your required and elective courses. All courses applied to the certificate must be completed within five years from the quarter when you enrolled in the certificate, or the quarter in which you took your first course in the program, whichever is earlier.

Required Courses (all three are required).					
TITLE & COURSE NUMBER	UNITS	FALL	WINTER	SPRING	SUMMER
Introduction to Distributed Energy Resources in the Electric Grid ECE-40300	3.0	Online	Online	Online	Online
Introduction to Cybersecurity in the Smart Energy Environment ECE-40299	3.0	Online	Online	Online	Online
Distributed Energy Resources (DER) Communication Installation Considerations ECE-40312	1.0	To Be Scheduled	To Be Scheduled	To Be Scheduled	To Be Scheduled
Electives (Both courses from one of the tracks below are required)					
Track I: SunSpec Modbus					
TITLE & COURSE NUMBER	UNITS	FALL	WINTER	SPRING	SUMMER
Implementation of SunSpec Modbus ECE-40307	3.0	Online	Online	Online	Online
SunSpec Modbus Network Design and Implementation ECE-40310	3.0	To Be Scheduled	To Be Scheduled	To Be Scheduled	To Be Scheduled
Track II: IEEE 2030.5					
TITLE & COURSE NUMBER	UNITS	FALL	WINTER	SPRING	SUMMER
Designing and Installing IEEE 2030.5 Distributed Energy Resources (DER) Networks ECE-40309	3.0	To Be Scheduled	To Be Scheduled	To Be Scheduled	To Be Scheduled
Designing IEEE 2030.5 Distributed Energy Resources (DER) Interfaces ECE-40311	3.0	To Be Scheduled	To Be Scheduled	To Be Scheduled	To Be Scheduled

Frequently Asked Questions

About the Certificate

How do I apply to the certificate program?

STEP 1: If you have a [My Extension](#) student account, skip to Step 2. If you do not have a [My Extension account](#), go to myextension.ucsd.edu, click "Create an account" on the right side of the page, and follow the instructions to create an account. Once you have a My Extension account, continue to Step 2.

STEP 2: Click on the "Apply Now" button on [the certificate page](#). Complete the required fields on the application. Then click the "Save" button. Once you have saved the application, the "Submit" button will appear. Click the "Submit" button to submit your application for review and consideration. Once submitted, your application cannot be changed. You can track the progress of your application at [My Extension](#).

Is there an application fee for the certificate program?

Current application or certificate enrollment fees, if any, are listed under the "Apply Now" button on [the certificate page](#) on [our website](#).

Can I register for the certificate program at any time?

Yes, you may enroll in the program at any time. However, it is recommended that you enroll as soon as possible. The program curriculum may be updated at any time; if certificate requirements change, you must adhere to the curriculum *at the time of your enrollment into the certificate*. Enrolling in the certificate also gives you access to quarterly, personalized enrollment reminders from the program manager.

Can this certificate program be completed online?

This program can be completed completely online only.

How long do I have to complete the certificate?

You officially have five years from when you begin taking courses in the program to complete all requirements for the certificate.

Can I complete both tracks in the certificate?

Students who wish to complete both tracks need to complete 1 of the tracks and pay the \$95 certificate fee. Upon completion of their first track, students can complete the second track. When they complete the second track, they simply contact Student Services at unex-reg@ucsd.edu and request that their certificate be updated to reflect both tracks in this program. Students will be required to show proof of destruction of their original certificate, pay an addition fee of \$25. Once these steps are completed, Student Services will issue a new certificate with the program title and both awarded tracks.

Is this certificate program open to non-California residents?

Yes, the program is open to non-California residents, including non-US residents. The tuition is the same for all students. If you have questions about how enrolling in courses may or may not affect your visa status, please contact our International Department at ipinfo@ucsd.edu or (858) 534-6784.

If I work full-time, will I still be able to complete this program?

Yes. Our programs are designed to be working-student friendly and most of our students are working professionals. The courses are typically three units, which amounts to approximately 30 hours of class time.

Will I get any hands-on experience in the program?

Most courses combine theory with hands-on exercises.

Is the program accredited?

UC San Diego is accredited by the Western Association of Schools and Colleges (WASC). UC San Diego Division of Extended Studies — like all other UC San Diego schools, colleges, and departments — is accredited by WASC through the University. All courses and certificate programs offered by UC San Diego Division of Extended Studies have been developed and are administered in accordance with Division of Extended Studies policy and the regulations of the Academic Senate of the University of California.

Will this program prepare me for a certification exam?

This program is not aligned with any one certification exam. Our programs are designed to provide students with knowledge that will make them valuable in the workforce.

How do I get my certificate once I have completed the program requirements?

When you have paid your certificate fee and successfully completed all program requirements, you will need to request an audit by Student Services. To request an audit:

- In your [My Extension](#) account, click on "My Course."
- On the right side of the page under "My Certificates," click on the name of the certificate
- On the right side of the page under "Tools," click on "Request Certificate Audit"
- Complete and submit the form that appears

Once you have formally submitted your audit request, your certificate will be mailed to the address we have on file for you within ten business days.

Do you provide job or internship placement?

Participants in this SunSpec Cyberguardians program will be granted access to the Cyberguardians Career Center where they can view, post, and apply to active job listings. To learn more please visit the [SunSpec Cyberguardians Career Center](#).

Is financial aid available?

- UC San Diego Division of Extended Studies offers continuing education loans through UC Approved Lenders. Each institution offers low competitive interest rates and flexible payment options. You are also encouraged to contact your personal financial institution about possible lending solutions. Direct links to UC Approved Lenders can be found on our website's [Financial Resources](#) page. The Employment Development Department (EDD) provides a comprehensive range of employment and training services in partnership with state and local agencies/organizations. More information is available on their website at edd.ca.gov
- Career Centers Located throughout San Diego County offer their communities comprehensive employment and training services benefiting both business and job seekers. More information is available on their website at workforce.org
- Please click [here](#) for information about Veteran's Benefits
- Free Application for Federal Student Aid (FAFSA) funds are limited to degree programs only and cannot be used for courses or certificate fees at UC San Diego Division of Extended Studies

About the Courses

When does course enrollment open for each quarter?

Our classes post to [our website](#) and become open for enrollment approximately two months prior to the new quarter starting. If you would like to get an email reminder you can sign up for our newsletter(s) in [My Extension](#), under the "Preferences" tab.

When should I enroll in a course?

We recommend enrolling as soon as possible, as occasionally classes will reach capacity.

Once I have enrolled in a course, when will I get online access to it?

If you have enrolled at least three days before the course begins, you will have access starting on the first day of class. You should receive an email from Student Services with instructions for how to login to the course. If you have enrolled on or after the start date of the course, you will have access to the course within one business day.

When does enrollment for a course close?

Enrollment in a course may be closed for one or more of the following reasons:

- The course is at capacity. If the course is at capacity, you will only be able to join the waitlist. If space becomes available in the course, students on the waitlist are contacted in the order they joined the waitlist.
- The course has progressed to a point where students will no longer be able to make-up missed work and be successful in the course.
- The course is cancelled due to low enrollments.

For all three of these reasons, we recommend students enroll early in the courses they are interested in.

When is the refund deadline for courses?

The refund deadline for courses in this program is typically one week after the start of the course. This allows you to enroll in a course and participate in the course for approximately one week to determine if the course is a good fit. Then, if needed, either you may either transfer your enrollment to a different course or submit a drop request. The exact refund deadline for each section is listed in the section notes.

What are the grading options for courses?

You can take courses for one of three options: Letter Grade, Pass/No Pass, or Not for Credit. If you are taking a course towards a certificate you *must* complete your courses for credit (Pass/No Pass or Letter Grade) and receive a C- or higher under either grading option. Grades below a C-, No Pass, and Not for Credit will *not* count towards certificate requirements.

How will I receive my final grade?

Once the course is completed, the instructor has 10 working days to submit your grades. After the grades have been posted, you can view and print them via [My Extension](#), your online education management portal. Please contact Student Services at 858-534-3400 or unex-reg@ucsd.edu if you experience any issues with logging in.

What kind of credit do I earn?

The courses in this program are post-baccalaureate, professional-level, credit bearing courses. Credit earned in these courses may lead to the award of a formal certificate by UC San Diego Division of Extended Studies or may be applied toward an academic degree or professional credential, *subject to the approval of the receiving institution*.

If you wish to transfer credit, it is your responsibility to confer with the receiving institution before enrolling, as each individual academic institution decides whether to accept Division of Extended Studies credits.

Are courses transferrable?

UC San Diego Division of Extended Studies is not a degree granting institution. However, many UC San Diego Division of Extended Studies courses can be transferred to other colleges or universities. The transferability of credit is determined solely by the *receiving* institution. You should discuss how your individual courses will transfer with the Office of the Registrar at the receiving institution *prior to enrolling*.

Can I take a course without registering for the certificate?

Yes, you may take any course in this program without registering for the certificate, provided you have fulfilled all prerequisites for the course.

How long is each course?

Three-unit courses run for approximately 9-10 weeks. For exact course dates of upcoming sections, visit the webpage of the course you are interested in taking on [our website](#).

When is each course offered?

Please visit the course page on [our website](#) to see when courses are typically offered. You can also see a full program schedule by clicking on the "View Schedule" button under the "Courses" section on [the certificate page](#) or on [page 3 of this document](#).

How can I get more information on the specific courses?

Please email unexengr@ucsd.edu to request specific course syllabi.

How many hours can I expect to spend studying outside of class time?

Each student has their own learning style so this can vary greatly. As a rule of thumb, expect to spend an average of two hours studying for every hour you spend in-class.

How are the online courses formatted?

Online courses are asynchronous with prerecorded lectures, corresponding PowerPoints, and subsequent materials as provided by the instructor. They have a start and end date, but all the lessons are uploaded to our online Learning Management System, so that you can learn at your own pace. However, please be aware that you may have weekly assignments, quizzes and/or tests that are due on specific dates. To access your online course, first login to your [My Extension](#) account, next select "My Courses" from the menu. From your list of courses, select the course you would like to access, and click the link that appears in the "Location" section. You will then be redirected to the Learning Management System (LMS) where your course is located.

We are currently using Canvas as our (LMS) for all our online courses. While students do not get access to their respective courses until the first day of the course, we encourage students who are new to Canvas to click on the following link to Canvas and [Take a Free Tour of Canvas](#).

For online course, will I ever need to attend in person?

The online courses in this program are offered entirely online. All course requirements, including lectures, tests, quizzes, and assignments will be completed online. You will not be required to attend in person.

What if I am having trouble with my Learning Management System or My Extension?

Please contact Student Services at (858) 534-3400 or unex-reg@ucsd.edu if you experience any issues logging in to any of our systems.

What are the instructors' credentials?

The program courses are taught by seasoned professionals and overseen by an advisory board of leaders in the field. You can view the advisor list under the "Advisors" section on [the certificate page](#). You can find information about a course instructor, including a biography and credentials, on the course page.

What are the required textbooks for a course?

Instructors will post the current text requirements and recommendations on the course page on [our website](#). Please note the textbooks requirements are subject to change quarterly. An instructor may require different books, even if they are teaching the same course in the same quarter. Always check the textbook requirements *for the section in which you are enrolling*.

Will I be able to order the required textbooks before the class begins?

Yes, you can order the book(s) any time after enrolling in the course. You may order books through UC San Diego Bookstore (main campus) or online retailers, such as Amazon.com.

After I enroll in a course, how can I retrieve a receipt or enrollment verification for my records?

Login to your [My Extension](#) account and select "Documents" as the top of the page.

How will I receive my final course grade?

Once the course is completed, the instructor has 10 business days from the end-date of a course to submit your grades. Once grades have been posted, you can view and print them from your [My Extension](#) account.

What if I am having trouble with Canvas or My Extension?

Please contact Student Services at (858) 534-3400 or unex-reg@ucsd.edu if you experience any issues logging in to any of our systems.

Can I get a copy of my receipt?

Yes, please login to the [My Extension](#) website and select 'Documents' as the top of the page. Please contact Student Services at 858-534-3400 or unex-reg@ucsd.edu if you experience any issues with logging in.

For More Information

For program specific questions, please visit [the certificate page](#) on [our website](#) or contact a program representative at unexenr@ucsd.edu or (858) 534-9152. For administrative questions, please contact our Student Services Department at unex-reg@ucsd.edu or (858) 543-3400.