

**APPROVED PROVIDERS FOR the NABCEP® PV ENTRY LEVEL CERTIFICATE  
OF KNOWLEDGE EXAM**

*Please Note: This list is in alphabetical order **BY STATE/Territory***

**There are currently:  
3,013 NABCEP Entry Level Certificate Holders  
109 Providers of the Certificate of Knowledge Exam**

*Please contact your local provider(s) for more information about any course listed below.*

FACILITY/INSTITUTION	COURSE NAME(S)
<p><b>ARIZONA – Tempe</b></p> <p><b>Rio Salado College</b> 2323 West 14<sup>th</sup> Street, Tempe, AZ, 85281</p> <p><b>Contact:</b> Donna Marie Bertault <b>E-mail:</b> <a href="mailto:donna@eRenewableResource.com">donna@eRenewableResource.com</a> <b>Tele.</b> (480) 446-0400</p> <p><a href="http://www.eRenewableResource.com">www.eRenewableResource.com</a></p>	<p><b>PV100: Photovoltaic Design &amp; Installation</b></p> <p>Our workshop is designed for people who have the desire to acquire solar installation skills.</p> <p>Available in a 5 day intensive session as well as monthly evening courses, this workshop will provide an overview of the basic PV system applications as well as teach the technical skills necessary to design and safely install solar-electric systems. The intensive workshop includes 4 days of classroom lecture and 1 day of hands-on installation lab. Evening courses are 2 nights per week for one month with 1 day of hands-on installation lab.</p> <p>Participants will learn the fundamental concepts required for working safely with PV systems, and will design residential-sized, code compliant, batteryless grid-tied as well as stand-alone systems.</p> <p>The goal of this session is to create a fundamental understanding of the core concepts necessary to work with both residential and commercial PV systems while preparing our students to take the NABCEP PV Entry Level "Certificate of Knowledge" Exam.</p>
<p><b>ARIZONA – Tucson</b></p> <p><b>Pima Community College – East Campus</b> 8181 E. Irvington Rd. Tucson, AZ 85709 <b>Contact:</b> Tom Tomasky – Division Dean <b>e-mail:</b> <a href="mailto:ttomasky@pima.edu">ttomasky@pima.edu</a> <b>Tele.</b> (520) 206-7694</p> <p><a href="http://www.pima.edu">www.pima.edu</a></p>	<p><b>ENV 198T1:</b> Introduction to photovoltaic (solar) energy. Includes practical history, applications and installation of PV energy systems in residential and light commercial buildings (not intended to replace NEC or UBC electrician standards or guidelines). Designed for students seeking employment within the solar industry or installation skills for use in their own home. 4 credit hours, lecture and lab.</p>
<p><b>ARIZONA – Tucson</b></p> <p><b>Pima Community College – West Campus</b> 2202 W. Anklam Road Tucson, AZ 85709 <b>Contact/Instructors:</b> Lazaro Hong, Ph.D, Chien-Wei Han, Ph.D <b>e-mail:</b> <a href="mailto:Lazaro.Hong@pima.edu">Lazaro.Hong@pima.edu</a>,</p>	<p><b>TEC 198T5:</b> Photovoltaic Installation Training: Introduction to photovoltaic energy and photovoltaic (PV) systems installation. Includes markets and applications, safety basics, electricity basics, energy efficient appliances, solar energy fundamentals, PV materials, module fundamentals, concentrators, system components, system sizing, electrical design, mechanical design and performance analysis and troubleshooting. 3 credit hours, lecture and lab. Traditional classroom with heavy hands-on component.</p>

<p><a href="mailto:Chien.Han@pima.edu">Chien.Han@pima.edu</a>  <b>Tele.</b> (520) 206-6603</p> <p><a href="http://www.pima.edu">www.pima.edu</a></p>	<p><b>(Please note: Exam given at East Campus)</b></p>
<p><b>ARIZONA – Tucson</b></p> <p><b>Tucson Electrical Joint Apprenticeship &amp; Training Program</b>  1665 E. 18<sup>th</sup> Street, Suite 107  Tucson, Arizona 85719  <b>Contact:</b> Karen King, Training Director  <b>Tele.</b> (520) 790-4690</p> <p><a href="http://www.ibew570.org">www.ibew570.org</a></p>	<p><b>Photovoltaic Systems Class: Apprenticeship training:</b>  Introduction to photovoltaic systems; solar radiation; site surveys and preplanning; system components and configurations; cells, modules and arrays; batteries; charge controllers; inverters; mechanical integration; electrical integration; utility interconnection; permitting &amp; inspection. Traditional hands-on application and course curriculum. Held on Saturdays.</p>
<p><b>CALIFORNIA – Aptos</b></p> <p><b>Cabrillo College</b>  6500 Soquel Drive  Aptos, CA 95003  <b>Contact/Instructor(s):</b> Chuck Mornard, Joe Jordan, Steve Murphy  <b>e-mail:</b> <a href="mailto:chmornar@cabrillo.edu">chmornar@cabrillo.edu</a>  <b>Tele.</b> (831) 423-2824</p>	<p><b>Photovoltaic Design &amp; Installation - CEM162PD</b></p> <p>This is a “hands-on” course for training students and preparing them for field work.</p>
<p><b>CALIFORNIA – Calexico</b></p> <p><b>CCAC International Polytechnic Institute</b>  2320 M.L. King  Calexico, CA 92231  <b>Contact:</b> Enrique G. Alvarado  <b>e-mail :</b> <a href="mailto:alvaradoeg@ccac-vtc.org">alvaradoeg@ccac-vtc.org</a>  <b>Tele. (760) 357-2995</b></p>	<p><b>Electrical – 900 hours</b></p> <p>This 900 hour Electrical course has recently been upgraded to include all 10 skills sets identified on the NABCEP Learning Objectives. (PV markets &amp; applications, PV system electrical design, mechanical design, etc. )</p>
<p><b>CALIFORNIA – Carlsbad</b></p> <p><b>Applied Professional Training, Inc.</b>  5751 Palmer Way, Suite D.  Carlsbad, CA 92010</p> <p><b>Contact:</b> Jeff Fairbanks  <b>e-mail:</b> <a href="mailto:jfairbanks@aptc.edu">jfairbanks@aptc.edu</a>  <b>Tele.</b> 800.431.8488</p> <p><a href="http://www.aptc.com">www.aptc.com</a></p>	<p><b>Basic Photovoltaic Design and Installation:</b> Our courses cover the basics of PV applications and markets, basic to advanced electricity theory, in depth NEC codes, standards, installation scenarios of various types and various roofing materials. The courses teach individuals all phases of PV usage as it relates to system design, electrical design, mechanical layout &amp; design, reading of blueprints and equipment specs. They cover the various types of modules and inverters, their usages, how to perform site evaluation, how to troubleshoot a system, the maintenance of systems and the safety basics for the field and systems.</p>

<p><b>CALIFORNIA – Fremont</b></p> <p><b>Boots on the Roof (a div. of Unitek Education)</b>  4670 Auto Mall Pkwy  Fremont, CA 94538  <b>Contact:</b> Steve Watkins  <b>email :</b> <a href="mailto:steve@bootsontheroof.com">steve@bootsontheroof.com</a>  <b>Tele.</b> (888) 893-0367</p> <p><a href="http://www.bootsontheroof.com">www.bootsontheroof.com</a></p>	<p><b>Pending Course Description</b></p>
<p><b>CALIFORNIA – Hopland</b></p> <p><b>The Solar Living Institute</b>  13771 S. Highway 101  Hopland, CA, 95449</p> <p><b>Contact:</b> Mike Stykowski, Renewable Energy Education Manager  <b>Email:</b> <a href="mailto:mike.stykowski@solarliving.org">mike.stykowski@solarliving.org</a>  <b>Tele.</b> (707) 472-2458</p>	<p><b>PV 200: PV Design and Installation Intensive.</b> This dynamic course is an excellent five day intensive workshop that will immerse you in the ever-expanding PV market. This course will prepare you for the NABCEP entry level certificate of knowledge and give you practical hands-on labs to fully understand PV systems. The course covers both on and off grid PV with an emphasis on grid tied residential systems. We take care to cover every aspect of PV design installation; energy efficiency, safety, electricity basics, PV Modules, new PV Technology, Inverters, Mounting Systems, Components (BOS) and Sizing, PV Electrical and Mechanical design, Performance Analysis and Troubleshooting, and Economics of PV. This course is particularly good for those seeking employment in the PV field, but will give the homeowner a great education in PV fundamentals.</p>
<p><b>CALIFORNIA – Huntington Beach</b></p> <p><b>Golden West College</b>  15744 Goldwest Street  Huntington Beach, CA 92647  <b>Contact/Instructor(s):</b> Mr. Tom Hersh, Professor  <b>e-mail :</b> <a href="mailto:thersh@gwc.cccd.edu">thersh@gwc.cccd.edu</a>  <b>Tele.</b> (714) 895.8224</p> <p><a href="http://www.goldenwestcollege.edu">http://www.goldenwestcollege.edu</a></p>	<p><b>Engineering Tech / Env Studies 162 – Photovoltaic Systems (spring)</b></p> <p><b>Engineering Tech / Env Studies 170 – Renewable Energy (fall)</b></p> <p>The above two courses deal with solar thermal and solar photovoltaic systems. They both contain theory and hands-on exercises and presentations. The courses cover installation procedures, local building permitting procedures, safety practices, National Electrical Code emphasis on Article 690, theory of PV devices, manufacturing, mechanical assembly and installation. Students participate in actual installation techniques on mock roofs, as well as field trips to actual installations of PV systems.</p>
<p><b>CALIFORNIA – Laguna Hills</b></p> <p><b>Allied Business Schools</b>  22952 Alcalde Drive  Laguna Hills, CA 92653</p> <p><b>Contact:</b> Ryan Price – Director of Admissions  <b>Tele.</b> (888) 501-7686</p> <p><a href="http://www.training4green.com">www.training4green.com</a></p>	<p><b>Introduction to Photovoltaic Systems -</b> Students learn the fundamentals of electricity and solar energy, including how to calculate simple circuit values and predict solar position using a variety of tools and techniques. These concepts are then applied to all the considerations needed in site evaluation, including load (electrical demand) analysis as well as decisions among several types of PV system configurations and mountings. System sizing and the mechanical and electrical integration for both stand-alone and grid-interactive PV installations are covered in detail. Performance analysis and issues, along with troubleshooting techniques, are important parts of this</p>

	<p>material.</p> <p>Completion of this course will give students a thorough understanding of photovoltaic systems and their applications, as well as all the basics for designing, installing, and maintaining them. Students will be prepared to take the North American Board of Certified Energy Practitioners (NABCEP) Entry Level Certificate of Knowledge examination.</p>
<p><b>CALIFORNIA – Los Angeles</b></p> <p><b>East Los Angeles Skills Center</b>  Los Angeles Unified School District  3921 Selig Place  Los Angeles, CA 90031  <b>Contact/Instructor(s):</b> Brian Hurd, Bob Bower  <b>Email:</b> <a href="mailto:bhhurd@sbcglobal.net">bhhurd@sbcglobal.net</a>  <b>Tele.</b> (323) 224-5970</p>	<p><b>Photovoltaic Installer: Certification Preparation:</b>  Participants will receive instruction in solar electrical theory, PV safety, related vocabulary and terminology, types of PV systems, basic load analysis, system sizing, components and hardware, code issues, rebates and incentives, basic cost estimating, net metering laws and employment opportunities in the industry.</p>
<p><b>CALIFORNIA – Los Angeles</b></p> <p><b>Los Angeles Trade Technical College</b>  400 West Washington Blvd.  Los Angeles, CA 90015  <b>Contact/Instructor(s):</b> Dave Robinson, William Elarton  <b>Email:</b> <a href="mailto:robinsds@lattc.edu">robinsds@lattc.edu</a> , <a href="mailto:elartowd@lattc.edu">elartowd@lattc.edu</a>  <b>Tele.</b> (213) 763-3700</p> <p><a href="http://www.lattc.edu">www.lattc.edu</a></p>	<p><b>ECONMT 105: Fundamentals of Solar Electricity</b>  (Traditional classroom lecture with demonstrations)</p> <p><b>ECONMT110: Renewable Energy Systems</b>  (Traditional classroom lecture with demonstrations)</p> <p><b>ECONMT205: Solar Energy Installation &amp; Maintenance</b> (hands-on lab where students will install and troubleshoot operational systems)</p>
<p><b>CALIFORNIA – Los Angeles</b></p> <p><b>New Technology Training Center</b>  3171 Casitas Ave, Suite 145  Los Angeles, CA, 90039</p> <p><b>Contact:</b> Hamid Kowsari, President  <b>Email:</b> <a href="mailto:ntti@newtechtrain.com">ntti@newtechtrain.com</a>  <b>Tele.</b> (818) 247-0989</p> <p><a href="http://www.newtechtrain.com">www.newtechtrain.com</a></p>	<p><b>Alternative Energy Practitioner:</b> (100 hour program with traditional classroom lecture plus hands-on exercises). This program is designed to provide a rigorous foundation of knowledge and skills for entry level PV installers. It covers basic mathematics and electrical circuit theory; solar fundamentals, PV components, and PV system design and performance simulation. We will make use of on-line tools to aid electrical and mechanical system design and system simulation. PV system design will include mechanical and electrical issues. There will be a section on NEC-compliant design including wire ampacity, grounding, component listing, interconnection and labeling; and a section on how to work with tools and OSHA workplace safety. The program will be organized around four critical tasks: (1) Sizing Systems to meet customer objectives, (2) the Site Survey, (3) Detailed System Design and Simulation, and (4) System Installation and Troubleshooting.</p>

<p><b>CALIFORNIA – Newark</b></p> <p><b>Ohlone College</b> 39399 Cherry Street, Newark, California 94560</p> <p><b>Contact:</b> Narinder Bansal <b>Email:</b> <a href="mailto:nbansal@ohlone.edu">nbansal@ohlone.edu</a></p> <p><b>Tele.</b> (510) 742-2360</p>	<p><b>ENVS 104 PV Installation and Design</b> is a beginning course in Solar Electricity. Students learn the basics of AC and DC electricity and practice wiring series, parallel, and series-parallel circuits using small solar modules, analogue and digital meters. Students learn the three major types of residential PV systems—utility interactive, interactive with battery backup, and stand alone. They are given hands-on practice wiring up stand alone systems; they also wire and install a complete 300 volt DC utility interactive system. Students also learn the process of engineering all three types of systems. For their final project students size a residential system, choose components, and produce a three line diagram of their designs. Safety is a major element of this course. Students study and practice proper procedure for wiring up systems that are over 300 volts DC using full-sized solar modules that are wired in strings of up to eight 24 volt modules.</p>
<p><b>CALIFORNIA – Novato</b></p> <p><b>Marin Community College District – College of Marin</b> 1800 Ignacio Blvd. Novato, CA 94949</p> <p><b>Contact:</b> Laurie Loeffler <b>Email:</b> <a href="mailto:laurie.loeffler@marin.edu">laurie.loeffler@marin.edu</a> <b>Tele.</b> (415) 457-8811 ext. 8108</p>	<p><b>ELEC 139 Solar Installation and Integration:</b> This course is designed as an intro course targeted to entry-level installers with the intent to provide a foundation of skills in trades involved in solar installation. The course is separated into 3 distinct areas: Electrical Theory and Practice, Photovoltaic Theory and Integration, and Building Trade Skills. The program will be a balance of theory, practice and real world examples.</p>
<p><b>CALIFORNIA – Oakland</b></p> <p><b>The English Center</b> 66 Franklin St, Suite 300; Jack London Square Oakland, CA, 94607</p> <p><b>Contact:</b> Michael Goldberg <b>Email:</b> <a href="mailto:operations@englishcenter.edu">operations@englishcenter.edu</a> <b>Tele.</b> (510) 836-6700 ext. 104</p>	<p><b>Basic Photovoltaic Design and Installation:</b> An introductory course in the study of solar photovoltaic (PV) cells, modules, and system components; electrical circuits; PV system design and sizing for use on homes; and solar electric products and applications. The course includes classroom and lab hours providing a general knowledge of the principles of solar electricity, the mechanics and engineering of solar power systems; how to work with tools, how to install solar panels; health and safety issues and requirements pertinent to the solar workplace (OSHA and NEC requirements) and hands-on installation of a grid-tied system</p>
<p><b>CALIFORNIA – Oakland</b></p> <p><b>Meritt College</b> 4022 Piedmont Ave. Oakland, CA 94611</p> <p><b>Contact/Instructor(s):</b> Dr. Sean White <b>Email:</b> <a href="mailto:seantruce@yahoo.com">seantruce@yahoo.com</a> <b>Tele.</b> (925) 482-4176 <a href="http://www.peralta.edu">www.peralta.edu</a> , <a href="http://www.rttc.us">www.rttc.us</a> (newslink)</p>	<p><b>Envmt 48NL: Photovoltaic Design &amp; Installation:</b> Introduction to PV design and installation: solar PV cells, modules and system components; electrical circuits; PV system design and sizing for use in homes; solar electric products and applications; energy conversion from sunlight to electricity.</p>

<p><b>CALIFORNIA – Oceanside/ Cardiff</b></p> <p><b>MiraCosta College</b> Department of Community Services and Business Development</p> <p>1 Barnard Drive                      3333 Manchester Ave. Oceanside, CA, 92056      Cardiff, CA 92007</p> <p><b>Contact:</b> Linda Kurokawa, Director <b>Email:</b> <a href="mailto:lkurokawa@miracosta.edu">lkurokawa@miracosta.edu</a> <b>Tele.</b> 888.895.8186</p> <p><b>Instructor:</b> Burt Price <b>Email:</b> <a href="mailto:bprice@ameriskillstech.com">bprice@ameriskillstech.com</a></p> <p><a href="http://www.miracosta.edu/community">www.miracosta.edu/community</a> <a href="http://www.ameriskillstech.com">www.ameriskillstech.com</a></p>	<p>ONE WEEK Entry Level Course for Solar Photovoltaic (PV) Installation &amp; Design. Our specialized course curriculum provides the novice, or the experienced Electrical Contractor, with the required knowledge and skills mandatory for proper solar PV system installations. We cover ALL the NABCEP required outline material with heavy emphasis in basic electricity, site evaluations, sizing the PV system properly, safety, balance of system (BOS) equipment, trouble shooting, Grid Tied and Stand Alone systems. NEC codes are reviewed and “Hands-on” training is provided. In addition, the student will be given up to date information regarding the market conditions in the Solar industry, job activities and web sites for solar professional use. Our Small Wind Energy Systems class covers NABCEP’s Small Wind Task Analysis guidelines and offers an excellent opportunity to gain knowledge for hybrid Solar PV systems. We will teach you how to “APPLY” the knowledge NABCEP wants you to learn!</p>
<p><b>CALIFORNIA – Pasadena</b></p> <p><b>Pasadena City College</b> Engineering and Technology Division 1570 E Colorado Blvd Pasadena, CA 91106</p> <p><b>Contact/Instructor(s):</b> Sam Abedzadeh <b>Email:</b> <a href="mailto:sxabedzadeh@pasadena.edu">sxabedzadeh@pasadena.edu</a> <b>Tele.</b> (626) 585-7274 / (626) 585-7267</p> <p><b>Pasadena.edu</b></p>	<p><b>Basic PV Design and Installation Program covers:</b></p> <p><b>Introduction to Photovoltaic Systems:</b> Intro to PV terminology, concepts, vocabulary, techniques and safety. Application and benefits of different PV systems. PV system sizing and cost estimating.</p> <p><b>Photovoltaic Theory and Installation Techniques:</b> Solar electricity fundamentals, PV safety, site analysis, PV system sizing and design. Product installation, troubleshooting, net metering laws and NEC requirements for PV systems.</p>
<p><b>CALIFORNIA – Pleasant Hill</b></p> <p><b>Diablo Valley College</b> 321 Golf Club Road Pleasant Hill, CA 94523</p> <p><b>Contact/Instructor(s):</b> Tom Chatagnier <b>E-mail:</b> <a href="mailto:tchatagnier@dvc.edu">tchatagnier@dvc.edu</a> <b>Tele.</b> (925) 685-1230, Ext. 2522</p>	<p><b>Photovoltaic System Design and Installation (AET 130):</b> Course includes site evaluations using the solar pathfinder, photovoltaic module characteristics and specifications, inverter characteristics and specifications, design and installation methods, the NEC related to PV systems. The course includes many hands-on activities setting up Sunny Boy and Xantrex inverters and top-of-pole and tracker configurations. Includes off-grid systems.</p>
<p><b>CALIFORNIA – Sacramento</b></p> <p><b>American River College</b> Electronics Technology/Energy 4700 College Oak Drive Sacramento, CA 95814</p> <p><b>Contact/Instructor:</b> Fred Evangelisti, Professor <b>E-mail:</b> <a href="mailto:evangef@arc.losrios.edu">evangef@arc.losrios.edu</a> <b>Tele.</b> (916) 484-8675</p> <p><a href="http://www.arc.losrios.edu/~electron">www.arc.losrios.edu/~electron</a></p>	<p>Students will earn a <i>Solar Photovoltaic Installation Certificate</i> when they complete the five courses outlined below:</p> <ul style="list-style-type: none"> <li>• <b>Electronics 302:</b> Principles of Electricity and Electronics (108 hrs)</li> <li>• <b>Energy 140/299:</b> Electrical Applications for Solar Installers (108 hrs)</li> <li>• <b>Energy 141:</b> Electrical &amp; Mechanical Applications for Solar Installers (108 hrs)</li> <li>• <b>Energy 142:</b> Review and Preparation for the NABCEP Entry Level Certificate of Knowledge Exam (32 hrs)</li> <li>• <b>Energy 143:</b> Design, Installation and</li> </ul>



	<p>Troubleshooting of Solar PV Systems (108 hrs)  The sequence of classes is: Electronics 302, Energy 140/299, and then Energy 141 and 142 are taken concurrently. The students will be eligible to take the NABCEP C.O.K. exam after these four classes are completed. The capstone class for the entire certificate program is Energy 143 which includes advanced system design and troubleshooting.</p>
<p><b>CALIFORNIA – San Bruno</b></p> <p><b>Skyline College</b>  3300 College Drive  San Bruno, CA 94066  <b>Contact:</b> Mike Williamson Dean Science, Math and Technology Division  <b>Email:</b> <a href="mailto:williamsonm@smccd.edu">williamsonm@smccd.edu</a>  <b>Tele.</b> (650) 738-4221</p> <p><a href="http://www.skylinecollege.edu">www.skylinecollege.edu</a></p>	<p><b>ELEC 410 Introduction to Solar Installation and Integration:</b> This is an introductory course targeted to junior-level photovoltaic installers to provide a foundation of skills necessary in solar installation. Topics include electrical theory and practice, PV theory and integration and building trades skills.</p> <p>This course is composed of traditional classroom, electronics and solar labs. The college has a dedicated solar classroom with inverters, panels and roofs to teach installation techniques. Minimum 48 hrs lecture and 16 hrs lab work.</p>
<p><b>CALIFORNIA – San Francisco</b></p> <p><b>City College of San Francisco</b>  1400 Evans Avenue  San Francisco, CA 94124  <b>Contact:</b> Clifford M. Parsley  <b>E-mail:</b> <a href="mailto:cparsley@ccsf.edu">cparsley@ccsf.edu</a>  <b>Tele:</b> (415) 550-4449</p> <p><a href="http://www.ccsf.edu">www.ccsf.edu</a></p>	<p><b>Photovoltaic Installation, Entry Level:</b> This course is an introduction to the planning, installation and maintenance of Solar Photovoltaic Systems. It includes hands-on installation of PV systems and associated safety issues. Traditional classroom instructions, 2 hours lectures and 3 hours lab per week for 17.5 weeks.</p>
<p><b>CALIFORNIA – San Jose</b></p> <p><b>Metropolitan Education District</b>  Central County Occupational Center  760 Hillsdale Avenue  San Jose, CA 95136</p> <p><b>Contact:</b> Scott Hall  <b>E-mail:</b> <a href="mailto:shall@metroed.net">shall@metroed.net</a>  <b>Tele:</b> (408) 723-4222</p> <p><b>Instructor:</b> Jeff Ritchey</p> <p><a href="http://www.metroed.net">www.metroed.net</a></p>	<p><b>Solar Applications &amp; Installation:</b> This course is designed to provide the learner with a broad view of solar installation. Students will receive hands-on training on the practical details of installing photovoltaic (PV) electric solar. The training provided will teach the skills necessary for an individual to work in the position of a general installer for a commercial PV solar installer. Students will be taught the basic thought process behind an installation, understanding solar terminology, and making correct decisions on location and installation of panels. Students will also learn to work in a safe manner regarding electrical and roof installation applications. In addition, students will learn solar array layout, attaching standoffs, racking, running conduit for electrical lines, and other techniques for efficient installation.</p>
<p><b>CALIFORNIA – San Jose</b></p> <p><b>Community Alliance for Career Training and Utility Solutions</b>  88 South Third Street  San Jose, CA 95113  <b>Contact:</b> Derrick Chapman  <b>E-mail:</b> <a href="mailto:dc@GreenCactus.org">dc@GreenCactus.org</a></p>	<p><b>Renewable Energy Technician:</b> Renewable energy systems including solar, wind, PV. Blueprint reading, safety and accident prevention, wiring methods, electrical fundamentals and basic theory, AC/DC. Maintaining and troubleshooting a PV system.</p> <p>Courses will be taught in a traditional classroom. Some courses will be offered online or simulcast. A course lab will also be offered off-site.</p>

<p><b>Tele:</b> (818) 687-1323</p>	
<p><b>CALIFORNIA – San Jose</b></p> <p><b>San Jose City College</b>  2100 Moor Park Ave.  San Jose, CA 95128  <b>Contact/Instructor(s):</b> Matthew Welch  <b>e-mail:</b> <a href="mailto:mwelthyone@yahoo.com">mwelthyone@yahoo.com</a>  <b>Tele.</b> (408) 206-9704</p> <p><a href="http://www.sjcc.edu">www.sjcc.edu</a></p>	<p><b>Solar 102: Introduction &amp; Photovoltaic Installation:</b>  This course introduces the student to solar photovoltaic (PV) power systems and their installation. Upon successful completion the student will have a rudimentary knowledge for an entry level position in the field. The lab will provide hands-on experience with a variety of systems encountered in the industry. This course was developed at industry request as part of an IDRC grant collaborative. Homework will include conducting research on the Internet for solar equipment specifications. There will also be exercises requiring Internet-based solar industry calculators for determining solar electric system performance and for system design.</p>
<p><b>CALIFORNIA – San Mateo</b></p> <p><b>College of San Mateo</b>  1700 West Hillsdale Blvd.  San Mateo, CA 94402  <b>Contact/Instructor(s):</b> Thomas Diskin  <b>e-mail:</b> <a href="mailto:diskin@smccd.edu">diskin@smccd.edu</a>  <b>Tele.</b> (650) 574-6133</p> <p><a href="http://www.collegeofsanmateo.edu">www.collegeofsanmateo.edu</a></p>	<p><b>Introduction to Alternative Energy Systems for Home and Business Applications:</b> This course covers the basics of electricity, load analysis, system sizing, and the components involved in off-grid and utility inter-tie PV, wind generation and hydroelectric alternative energy systems. Included will be the wiring of a PV system and demonstration of wind generation and hydroelectric systems. Information will also be provided on the California rebate process and installer certification requirements for home-based alternative energy systems. Students will have the opportunity to design their own site-specific system.</p>
<p><b>CALIFORNIA – Santa Monica</b></p> <p><b>Santa Monica College</b>  1900 Pico Blvd.  Santa Monica, CA 90405  <b>Contact/Instructor(s):</b> Larry W. McLaughlin, Rod Bergen  <b>e-mail:</b> <a href="mailto:rodbergen@jps.net">rodbergen@jps.net</a>  <b>Tele.</b> (310) 434-4199</p> <p><a href="http://www.smc.edu">www.smc.edu</a></p>	<p><b>Introduction to Solar Energy Systems:</b> Students will gain an understanding of the principles applied to solar photovoltaic and thermal systems. The basic electrical theory and calculations of electrical/capacity requirements for PV systems will be reviewed. Thermal properties, materials, and heat transfer strategies for thermal systems will also be reviewed. Topics will include materials and manufacturing, system components, codes and safe installation procedures. Students will examine the economic, regulatory and infrastructure issues affecting the adoption of solar technologies as well as their potential in solving energy and environmental problems.</p> <p><b>Advanced Solar Photovoltaic Systems and Installation.</b> This competency-based course will prepare students for entry-level employment in the solar photovoltaic (PV) industry and for potential follow-on training in system design. Successful participants will also be qualified to take the NABCEP Entry level exam. Combining theory and hands-on application, this course will include basic electricity, electricity fundamentals in solar PV systems, PV safety, site analysis, PV system sizing and design, components and equipment, product installation, troubleshooting, net metering laws, local codes, and National Electrical Code (NEC) PV requirements.</p>



<p><b>COLORADO, Carbondale</b></p> <p><b>Solar Energy International</b>  76 2<sup>nd</sup> Street  Carbondale, CO 81623  <b>Contact/Instructor(s):</b> Kathy Swartz  <b>e-mail:</b> <a href="mailto:kswartz@solarenergy.org">kswartz@solarenergy.org</a> .  <b>Tele.</b> (970) 963-8855</p> <p><a href="http://www.solarenergy.org/">http://www.solarenergy.org/</a></p>	<p><b>PV Design and Installation</b>  (Both <b>Online</b> and hands-on courses are available)  <i>Note: Exam for online course must be taken with Approved Provider</i></p> <p><a href="http://www.solarenergy.org/">http://www.solarenergy.org/</a></p>
<p><b>COLORADO - Denver</b></p> <p><b>Denver Joint Electrical Apprenticeship &amp; Training Committee</b>  5610 Logan Street  Denver, CO 80216  <b>Contact/Instructor(s):</b> Rory Berumen, Mary Broderick  <b>e-mail:</b> <a href="mailto:Berumen@comcast.net">Berumen@comcast.net</a>  <b>Tele.</b> 303-295-1903</p>	<p><b>Installing Photovoltaic Systems:</b> This 48 hour course covers fundamentals, design, and installation of PV systems, and involves hands-on work. This program is intended for electricians, contractors, utilities and engineers, with an overall goal of developing system knowledgeable professionals to help ensure success of PV installations. The format includes both classroom instruction and student-interactive exercises involving the complete step-by-step process of designing, installing and commissioning PV systems.</p>
<p><b>COLORADO, Lakewood</b></p> <p><b>Red Rocks Community College</b>  13300 W. 6<sup>th</sup> Ave,  Lakewood Colorado 80228</p> <p><b>Contact:</b> Larry Snyder, Coordinator, Renewable Energy Technology; Construction Technology.  <b>e-mail:</b> <a href="mailto:Larry.Snyder@rrcc.edu">Larry.Snyder@rrcc.edu</a>  <b>Tele.</b> (303) 914-6306</p> <p><a href="http://www.rrcc.edu">www.rrcc.edu</a></p>	<p>Red Rocks offers a Program in Renewable Energy Technology consisting of the following: (for further info, go to <a href="http://www.rrcc.edu">www.rrcc.edu</a> )</p> <p>ENY 101 Introduction to Energy Technologies 3 credits  ENY 102 Building Energy Audit 3 credits  ENY 120 Solar Thermal System Install 4 Cts  ENY 130 Solar Photovoltaic's Grid-tie 2 Cts  ENY 131 Advanced Solar Photovoltaics 2 Cts  ENY 134 NABCEP Entry Level Prep 1 Ct  HVA 105 Basic Electricity 4 Credits  OSH 127 10-HR Construction Industry Standards 1 Credit  EIC 110 Electrical Installations I 4 credits  EIC 120 Electrical Installations II 4 credits  EIC 130 National Electrical Code I 4 Cts  EIC 135 National Electrical Code II 4 Cts  HVA 132 AC&amp;R Controls 4 Cts  HVA 162 Heating Controls 4 Cts  PLU 101 Piping Skills 4 Cts  CON 105 Construction Technology 4 Cts  HVA 141 Sheet Metal Fabrication 2 Cts</p> <p>The minimum classes an average student would need to take to sit for the NABCEP PV exam would be:</p> <ul style="list-style-type: none"> <li>• OSH 127 OSHA 10 hour construction card certification</li> <li>• HVA 105 Basic electricity</li> <li>• ENY 130 &amp; 131 Solar PV classes</li> <li>• ENY 134 NABCEP prep class</li> </ul> <p>or show that they have these skills.</p>
<p><b>COLORADO, Littleton</b></p>	<p>The following sequence of classes is offered. Students can complete the program in approximately 5 months:</p>

<p><b>Arapahoe Community College</b> Main Campus 5900 South Santa Fe Drive P.O. Box 9002 Littleton, CO 80160 <b>Contact/Instructors:</b> Tony Wanek, Ken Thames. <b>Email:</b> <a href="mailto:troy@solarenergyenvironments.com">troy@solarenergyenvironments.com</a> , <a href="mailto:thamessolar@earthlink.net">thamessolar@earthlink.net</a> <b>Tele.</b> (303) 734-3701</p> <p><a href="http://www.coloradotraining.com">www.coloradotraining.com</a> <a href="http://www.arapahoe.edu">www.arapahoe.edu</a></p>	<ul style="list-style-type: none"> <li>• Understanding Solar Energy (1 class)</li> <li>• Electrical Basics (5 classes)</li> <li>• PV Systems 1 (5 classes – 2 solar installations required)</li> <li>• PV Systems 2 (5 classes – 2 solar installations required)</li> </ul> <p>A total of 4 solar installations are coordinated with a solar contractor. We provide a checklist for each class as an assessment of hands-on experience.</p> <p>A Solar Thermal sequence will also be offered spring 2009.</p>
<p><b>CONNECTICUT, North Haven</b></p> <p><b>Gateway Community College</b> 88 Bassett Road North Haven, CT 06473 <b>Contact:</b> Dr. David N. Cooper, Dean, Corporate and Continuing Education Department. <b>Email:</b> <a href="mailto:dcooper@gwcc.commnet.edu">dcooper@gwcc.commnet.edu</a> <b>Tele.</b> (203) 285-2426</p> <p><a href="http://www.gwcc.commnet.edu">www.gwcc.commnet.edu</a></p>	<p><b>Solar Photo Voltaic Installer Training:</b> Classroom and laboratory components include demonstration of electrical concepts, electrical experiments, and skill practice exercises installing PV components. Students will learn solar energy concepts, basic processes and mechanical operations of PV devices, system sizing, building codes and underwriting issues, load determination and system performance, mounting structure considerations, interconnection requirements, PV energy storage, and net metering.</p> <p>Students who complete the program will learn the fundamentals of how to properly site a system, how to design the right system, and how to cost grid tied and battery storage systems. Students will obtain a practical understanding of long-term system costs and will obtain current information on state and federal rebates and tax incentive programs.</p>
<p><b>FLORIDA, Cocoa</b></p> <p><b>University of Central Florida</b> Florida Solar Energy Center 1679 Clearlake Road Cocoa, FL 32922 <b>Contact/Instructor:</b> Stephen Barkaszi, PE <b>Email:</b> <a href="mailto:barkaszi@fsec.ucf.edu">barkaszi@fsec.ucf.edu</a> <b>Tele.</b> (321) 638-1473</p> <p><b>To register go to:</b> <a href="http://www.fsec.ucf.edu">www.fsec.ucf.edu</a> and search on “PV course”</p>	<p><b>Installing PV Systems:</b> This week-long course covers the design and installation of photovoltaic (PV) systems and involves actual hands-on work with PV systems and equipment. This program is intended for contractors, utility service personnel, engineers and other practitioners with an overall goal of developing “system-knowledgeable” professionals to help ensure the safety and quality of PV system installations. The course is offered the first full week of each month. FSEC has offered PV training courses of this nature for over 25 years.</p>
<p><b>FLORIDA, Gainesville</b></p> <p><b>Gainesville Electrical Joint Apprenticeship &amp; Training Committee</b> 113 NW 3rd Avenue, #211 Gainesville, FL, 32601 <b>Contact/Instructor:</b> John Gurski <b>Email:</b> <a href="mailto:John@SullivanSolarPower.com">John@SullivanSolarPower.com</a> <b>Tele.</b> (352) 258-5957</p>	<p><b>Photovoltaic Installation and Design:</b> this course introduces students to photovoltaic design, both mechanical and electrical. The course follows the PV systems textbook developed by ATP and the NJATC. Each class will also have a hands-on installation project through the IBEW.</p> <p>The course will consist of a total of 48 hours of traditional teaching and 48 hours of hands-on installation training.</p> <p>The course is four-months in duration and is offered</p>

<p><a href="http://www.Gainesvillejatc.org">www.Gainesvillejatc.org</a></p>	<p>twice a year starting in spring/fall.</p>
<p><b>FLORIDA, Jacksonville</b></p> <p><b>Jacksonville Electrical JATC</b> 4951 Richard street, Jacksonville, FL, 32207</p> <p><b>Contact:</b> James Nolan, Training Director <b>E-mail:</b> <a href="mailto:jnolan@jaxaet.org">jnolan@jaxaet.org</a> <b>Tele.</b> (904) 737-7533</p> <p><a href="http://www.jaxaet.org">www.jaxaet.org</a></p>	<p>This Jacksonville Electrical JATC course provides an overview of photovoltaic systems and is open to NECA/IBEW contractors, journeymen, instructors and apprentices. Topics include an Introduction of PV Systems and Applications, Solar Radiation, Site Surveys and Preplanning, System Components and Configurations. The course will cover Cells, Modules and Arrays, Along with Battery Principals, Types and Systems. Additional topics will include Charge Controllers, Inverters, System Sizing, Mechanical Integration, Electrical Integration, Utility Interconnection, Permitting and Inspection, Commissioning, Maintenance and Troubleshooting. The final topic is the Economic Analysis covering Incentives and Cost Analysis for an installed Photovoltaic System.</p>
<p><b>FLORIDA, Key West</b></p> <p><b>Florida Keys Community College</b> 5901 College Road Key West, Florida 33040 <b>Contact/Instructors:</b> Cathy Torres, Douglas Gregory <b>Email:</b> <a href="mailto:Cathy.Torres@fkcc.edu">Cathy.Torres@fkcc.edu</a> or <a href="mailto:drg@ufl.edu">drg@ufl.edu</a> <b>Tele.</b> (305) 809-3250 or (305) 292-4501</p> <p><a href="http://www.FKCC.edu">www.FKCC.edu</a></p>	<p><b>Intro to PV Design &amp; Installation: Review of PV</b> history and industry needs. Course follows ATP PV Systems text supplemented with FSEC course material, and the SEI and Messenger/Ventre PV Systems textbooks. Emphasis on NEC &amp; OSHA safety plus the ASCE 7-05 wind loading requirements. Targeted to tradespeople, inspectors &amp; others interested in the details of installation requirements. Course is 32 hours of classroom over a 4 week period, plus an 8 hour hands-on laboratory installing a bimodal PV system.</p>
<p><b>FLORIDA, Winter Garden</b></p> <p><b>Westside Technical Center/ Orange County Public Schools</b></p> <p>955 East Story Road Winter Garden, Florida 34787 <b>Contact:</b> Dr. Jody Newman <b>Email:</b> <a href="mailto:bryantj6@ocps.net">bryantj6@ocps.net</a> <b>Tele.</b> (407) 905-2009</p> <p><a href="http://www.westside.ocps.net">www.westside.ocps.net</a></p>	<p><b>Basic Solar Installation</b> Westside Tech offers basic solar photovoltaic instruction for those seeking entry level training to become a solar installer. This course provides training in basic electrical principles and terminology focusing on electrical current flow and types of installation (students will learn to relate the three quantities of electrical current flow, identify series/parallel installation, explain the results of each installation, draw a series/parallel circuit and show the effect on current voltage and resistance); factors relative to site selection (conducting site surveys, evaluating roof accessibility/condition/age, shading/exposure), Hardware installation (proper selection of tools, lay out of mounting site, sealing techniques, mounting sequence), Maintaining and troubleshooting a system, and Panel Installation/Connections. Students will also be provided the opportunity to complete on-site solar photovoltaic practical application projects.</p>
<p><b>HAWAII, Kaneohe</b></p> <p><b>Hawaii Pacific University</b></p>	<p><b>Photovoltaic Systems Design (ENVS 3803):</b> This course provides an intro to photovoltaic systems design. Students learn the fundamental principals of solar energy, PV modules and</p>

<p>45-045 Kamehameha Highway Kaneohe, HI 96744-5297 <b>Contact/Instructor(s):</b> Dr. Stephen Allen <b>Email:</b> <a href="mailto:sallen@hpu.edu">sallen@hpu.edu</a> <b>Tele.</b> (808) 236-3500</p>	<p>how to design a safe, code-compliant PV system. Preparing a PV system design is a key component of the course. Case studies will also be examined. The course provides the skills suitable for a supervised, entry level position in the photovoltaic industry.</p>
<p><b>ILLINOIS, Alsip</b></p> <p><b>IBEW – NECA Technical Institute</b> 6201 West 115<sup>th</sup> Street Alsip, IL 60803 <b>Contact/Instructor(s):</b> Harry Ohde <b>Email:</b> <a href="mailto:hohde@in-techonline.org">hohde@in-techonline.org</a> <b>Tele.</b> (708) 389-1340</p>	<p><b>Theory and Installation Techniques of Photovoltaic Systems:</b> Classroom and hands-on exercises involving the complete step-by-step process of installing and commissioning various PV systems and related equipment. An emphasis is placed on code compliance and load calculations.</p>
<p><b>ILLINOIS, Carterville</b></p> <p><b>John A. Logan College- Department of Continuing Education</b> 700 Logan College Road Carterville, IL, 62918</p> <p><b>Contact:</b> Barry Hancock, Associate Dean for Continuing Education <b>Email:</b> <a href="mailto:barryhancock@jalc.edu">barryhancock@jalc.edu</a> <b>Tele.</b> (618) 985-2828 ext. 8202</p> <p><b>Instructor:</b> Auer Beck</p> <p><a href="http://www.jalc.edu">www.jalc.edu</a></p>	<p>John A. Logan College offers two solar design and installation courses. The Beginning course is an <b>introduction to photovoltaic systems</b>, design, and procedures commonly practiced in the photovoltaic industry and trade. The course is primarily intended for those with a construction and construction management background who seek to become skilled photovoltaic installers, electricians, or designers. The <b>Advanced Solar Design and Installation</b> course provides detailed instruction in the design and installation of photovoltaic systems with practical, hands-on practice. Those who successfully complete the advanced course will have the knowledge and skill sets required for entry level positions within the renewable energy industry and will be able to converse with solar energy professionals. The final examination for the advanced course is the examination for the <b>North American Board of Certified Energy Practitioners PV Entry Level Certificate of Knowledge</b>. Contact Aur Beck at <a href="mailto:tech@aessolar.com">tech@aessolar.com</a>.</p>
<p><b>ILLINOIS, Kankakee</b></p> <p><b>Kankakee Community College- Technology Division, Electrical Technology Program</b> 100 College Drive Kankakee, IL, 60901</p> <p><b>Contact/Instructor:</b> Timothy Wilhelm, Program Coordinator and Professor</p>	<p>Kankakee Community College (KCC) offers a Renewable Energy Technology (RET) study-track within its Electrical Technology Program. This RET study-track includes four RET courses, approved by the Illinois Board of Higher Education: ELTR1223, Survey of Renewable Energy Technology; ELTR2314, Solar-Thermal Technology; ELTR2324, Small-Wind Energy Technology; and, ELTR 2334, Solar-Photovoltaic Technology.</p> <p>KCC is an approved Service Provider of the NABCEP</p>

<p><b>Email:</b> <a href="mailto:twilhelm@kcc.edu">twilhelm@kcc.edu</a>  <b>Tele.</b> (815) 802-8864</p> <p><a href="http://www.kcc.edu">www.kcc.edu</a></p>	<p>PV Entry Level Certificate of Knowledge (COK) Exam, and students who complete ELTR2334 will be able to take PV COK Exam here at the KCC Testing Center.</p> <p>KCC Solar-PV course meets for 5 hours per week, for 16 weeks and involves traditional classroom lecture sessions, and hands-on experience with real-world PV-system hardware. ELTR2334 was developed by, and is taught by, Tim Wilhelm. Tim has been a RET professional for over 30 years. He is SunWize Technologies' first dealer, he's an early NABCEP Certificant, and he's a Registered Professional Engineer: <a href="mailto:twilhelm@kcc.edu">twilhelm@kcc.edu</a> or 815-802-8864.</p>
<p><b>INDIANA – Fort Wayne</b></p> <p><b>Fort Wayne Electrical Joint Apprenticeship Training Center</b>  138 Chambeau Road  Fort Wayne, IN 46805  <b>Contact/Instructor(s):</b> Gregory L. Fuller  <b>e-mail:</b> <a href="mailto:s.emmons1@verizon.net">s.emmons1@verizon.net</a>  <b>Tele.</b> (260) 483-6257</p>	<p><b>Photovoltaic Systems Class:</b> The course consists of a minimum of 40 hours classroom training using the textbook and resource guide presentation developed by ATP and the NJATC. It is followed by the installation of a 30 panel system.</p> <p>Our training center is both a JATC and a DOL approved apprenticeship.</p>
<p><b>LOUISIANA - Baton Rouge</b></p> <p><b>Baton Rouge Community College</b>  201 Community College Drive  Baton Rouge, LA, 70806  <b>Contact:</b> Will Seaman, Program Director of the Economic Development Division  <b>Tele.</b> (225) 216-8436  <b>Email:</b> <a href="mailto:seamanw@mybrcc.edu">seamanw@mybrcc.edu</a> ;  <a href="mailto:justin@gulfsouthsolar.com">justin@gulfsouthsolar.com</a></p>	<p><b>Solar Panel Design and Installation Course:</b> Students taking this course will learn up-to-date information in regards to solar panel design and installation; and potential tax rebates offered at the state and federal level. The course is taught by industry professionals that bring actual field and business knowledge to the learning experience. The course utilizes the Solar Energy International text, <i>Photovoltaics: Design and Installation Manual</i>; information from the Florida Solar Energy Center; and follows the learning objectives for the NABCEP Entry Level Certificate Program. Class time is 45 hours which is broken up into two settings: classroom and hands-on lab. During lab time, students will do actual installation of various solar panel systems in a state of the art training facility. Students who successfully complete all course hours will be offered the NABCEP Entry Level Certificate of Knowledge Exam as a part of the course. Textbooks are included.</p>
<p><b>LOUISIANA - Louisiana Community and Technical College System</b></p> <p><b>Region 1 – Jefferson Campus</b>  <b>Region 4- Lafayette Campus</b></p> <p><b>Louisiana CleanTech Network</b>  1314 4<sup>th</sup> Street  Kenner, LA 70062  <b>Contact:</b> Mr. Stephen Shelton, Executive Director; Janet Lee Hughes, instructor  <b>e-mail:</b> <a href="mailto:sshelton@LaCleanTech.net">sshelton@LaCleanTech.net</a>;</p>	<p><b>Solar Installer Training – Entry Level Solar Electric Systems:</b> The courses follow the SPQ standards and NABCEP task analysis including recommended safety procedures, system design, electrical code and industry standard practices. The focus is to provide trainees with real life solar site specific knowledge. Hands-on training covers implementing the task analysis in the field with site analysis, mechanical and electrical design based on specific site conditions, site specific safety issues and construction issues, using tools and testing equipment, best practice construction skills and specific site code and inspection issues. 48 hours of instruction including classroom, hand-on labs, hands-on installations.</p>



<p><a href="mailto:janetleehughes@gmail.com">janetleehughes@gmail.com</a>  <b>Tele.</b> (504) 343-4638</p> <p><a href="http://www.LaCleanTech.net">www.LaCleanTech.net</a></p>	
<p><b>MAINE, Fairfield</b></p> <p><b>Augusta Electrical Joint Apprenticeship &amp; Training Committee</b>  176 Main St.  Fairfield, Maine 049372  <b>Contact/Instructor(s):</b> Christopher Trider,  Training Director  <b>Email:</b> <a href="mailto:chris@ibew1253.org">chris@ibew1253.org</a>  <b>Tele.</b> (207) 453-0135  <a href="http://www.ibew1253.org/JATC.htm">www.ibew1253.org/JATC.htm</a></p>	<p><b>Photovoltaic Power Systems – Design, Installation &amp; Maintenance:</b>  The course consists of 60 contact hours and is a combination of lecture and classroom plus hands-on installation of a system installed on a simulated roof in the training facility then interconnected to a mock service. Students will actually install the system and tie it into the service equipment provided for utility provided power. Grid-tied systems shall be compared to stand-alone systems with a strong focus on service interconnection.</p>
<p><b>MAINE, Fairfield</b></p> <p><b>Kennebec Valley Community College</b>  92 Western Avenue  Fairfield, ME 04937  <b>Contact/Instructor(s):</b> Greg Fletcher  <b>e-mail:</b> <a href="mailto:gletcher@kvcc.me.edu">gletcher@kvcc.me.edu</a>  <b>Tele.</b> (207) 453-5000  <a href="http://www.kvcc.me.edu">www.kvcc.me.edu</a></p>	<p><b>Introduction to Photovoltaics</b> (as part of the Energy Conservation &amp; Management course)</p> <p><b>PV Installation Workshop</b> (non-credit) through Continuing Education Division.</p>
<p><b>MARYLAND, Frostburg</b></p> <p><b>Frostburg State University</b>  101 Braddock Road  Frostburg, MD 21532-1099  <b>Contact:</b> Oguz A. Soysal, Hilkat S. Soysal,  Program Directors  <b>e-mail:</b> <a href="mailto:renewable@frostburg.edu">renewable@frostburg.edu</a>  <b>Tele.</b> (301) 687-7079</p> <p><a href="http://www.frostburg.edu/renewable">http://www.frostburg.edu/renewable</a></p>	<p><b>Residential Photovoltaic System Design, Installation, and Maintenance:</b>  Frostburg State University is offering an education program on design, installation, and maintenance of residential electric generation systems using photovoltaic (PV) solar modules and/or small wind turbines.</p> <p>This is an 8-week online course supported by on-site 3-day instruction and hands-on training. During every week of the online part, instructional materials will be posted on the course web site. The participants will have the flexibility to review the course materials and check their understanding at their own pace and schedule.</p> <p>A 3-day hands-on instruction and training will be held in the Compton Science Center at Frostburg State University.</p>
<p><b>MARYLAND, Lanham</b></p> <p><b>JATC Local 26</b>  4371 Parliament Place, Suite A  Lanham, MD 20706-6945  <b>Contact:</b> Thomas C. Myers  <b>e-mail:</b> <a href="mailto:Tmyers@jatc26.org">Tmyers@jatc26.org</a>  <b>Tele.</b> 301-429-6945</p>	<p><b>Renewable energy Theory and Application:</b> This course is an introduction to renewable energies for our journeymen and apprentices. Of the 14 sessions of classroom instruction, one-half will concentrate on photovoltaic theory and principle and the balance will be an intro into other renewable and leading edge technologies that will affect the electrical trade in the future</p>
<p><b>MARYLAND, Odenton</b></p>	<p><i>Intensive two-day PV Entry Level course</i> designed to</p>



<p><b>IEC Chesapeake Apprenticeship &amp; Training, Inc</b>  P.O. Box 147  1424 Odenton Road, Suite 2B  Odenton, MD 21113  <b>Contact:</b> Grant Shmelzer  <b>Phone:</b> (800) 470-3013  <b>Website:</b> <a href="http://www.iec-chesapeake.com">www.iec-chesapeake.com</a></p>	<p>prepare individuals with basic level of electrical knowledge and general understanding of photovoltaics for the North American Board of Certified Energy Practitioners (NABCEP) <i>Entry Level Certification</i>. This 2 day class will cover the Task Analysis as provided by NABCEP and will conclude with the Entry Level examination. The Entry Level Certification will be granted to those who successfully participate in the course and pass the two hour, 60 question exam to be administered at the end of the course. Due to the amount of information to be covered, classes will be limited in size. Class information will be <i>compact and fast paced</i>. Students will be assigned an assignment after the first day of class for review during the second day.</p> <p>Prerequisites include: understanding of general electrical terms and concepts (voltage, amperage, difference between power and energy), describe the use of a digital multi-meter, calculate simple circuit calculations and describe general safety procedures when working with electric systems.</p> <p>Price includes: 2 Day Review Course, NABCEP test fees, Lunch &amp; Refreshments &amp; Copy of "Photovoltaic Systems" from ATP Publishers</p>
<p><b>MASSACHUSETTS, Boston</b></p> <p><b>Benjamin Franklin Institute of Technology</b>  Dept. of Electrical Technology  41 Berkeley Street  Boston, MA 02116  <b>Contact:</b> John J. Murphy, Chair  <b>e-mail:</b> <a href="mailto:jmurphy@bfit.edu">jmurphy@bfit.edu</a>  <b>Tele.</b> (617) 423-4630  <a href="http://www.Bfit.edu">www.Bfit.edu</a></p>	<p><b>EL243: Photovoltaic Design and Installation:</b> This 4 credit course introduces students to the basic principles of photovoltaics. Topics will focus on site selection, panel types, storage centers, system design, and system application. Upon course completion, students will be able to install basic systems in accordance with the National Electrical Code, OSHA and BOCA. Traditional classroom setting including a combination of lecture and lab hours.</p>
<p><b>MASSACHUSETTS, Brockton</b></p> <p><b>Massasoit Community College</b>  Dept. of Workforce Development &amp; Community Education</p> <p>One Massasoit Blvd  Brockton, MA 02302  <b>Contact:</b> Elaine Stewart, Dean  <b>e-mail:</b> <a href="mailto:estewart@massasoit.mass.edu">estewart@massasoit.mass.edu</a>  <b>Tele.</b> (508) 588-9100 ext. 1560  <a href="http://www.massasoit.mass.edu">www.massasoit.mass.edu</a></p>	<p><b>Solar (PV) Technology – Level I:</b>  This 60-hour non-credit course provides the theoretical and technical knowledge necessary for a fundamental understanding of photovoltaic (PV) solar electric technology. It targets workers engaged in trades occupations, such as electricians, plumbers, construction workers, as well as individuals interested in learning more about PV technology. Basic PV history, terminology, safety and theory will be presented, as well as the current PV market and its position in the clean energy industry. Participants will acquire technical skills, such as basic electricity theory, solar energy measurement and conversion, system measurement and design, plus system output, analysis and troubleshooting. The course of study covers the learning objectives of the North American Board of Certified Energy Practitioners (NABCEP) and will prepare those interested to sit for the industry-recognized NABCEP Entry Level Certificate of Knowledge Exam. Interested participants must possess strong skills in basic algebra and calculations.</p>

<p><b>MASSACHUSETTS, Greenfield</b></p> <p><b>Greenfield Community College</b>  One College Drive  Greenfield, MA 01301  <b>Contact Instructor(s):</b> Richard Gottlieb  <b>Email:</b> <a href="mailto:sunnysde@sover.net">sunnysde@sover.net</a>  <b>Tele.</b> (802) 254-4670</p>	<p><b>* Introduction to Photovoltaic (Solar Electric) Technology:</b> Designed for a person with a strong personal interest in PV technology as well as those considering a career in solar electric technology, this course will give a student the theoretical basis for understanding the various types of solar electric systems. It will cover the history of solar electricity, current markets and industry status, basic electrical theory, and other considerations necessary for solar electric systems. Detailed study of system components as well as the proper and safe electrical interconnection of these components will include hands-on training exercises and experiments. Local visits to PV related facilities and assembly of real world systems examples will reinforce classroom learning.</p> <p><b>* Photovoltaic (Solar Electric) Installation.</b> This course is designed for photovoltaic installers. Students will develop the knowledge and practical skills needed to install utility-connected and off-grid PV systems. Study of electrical load analysis, system and component design and sizing, system siting, shading, electrical and mechanical system configuration, safety and electrical and building code compliance will be supplemented with hands-on system installation.</p>
<p><b>MASSACHUSETTS, Hudson</b></p> <p><b>AltE University</b>  43 Broad Street,  Hudson, MA, 01749</p> <p><b>Contact:</b> Kristen Ferguson, Education Programs Manager  <b>Email:</b> <a href="mailto:workshops@alteuniversity.com">workshops@alteuniversity.com</a>  <b>Tele.</b> (877) 878-406</p> <p><a href="http://workshops.altestore.com/">http://workshops.altestore.com/</a></p>	<p>The AltE U <b>Basic (PV 301) and Intermediate PV Design &amp; Installation (PV 302)</b> courses together are designed to provide a solid foundation for potential PV installers in five days (35 NABCEP hours). The hands-on lab components of the course reinforce the lecture concepts and include: site assessment; module wiring; module mounting; inverter wiring and visits to working PV systems. The class will cover both stand-alone (battery-based) systems and utility-interactive (grid-tied) systems. Topics include: working safely; site assessment; components and sizing; inverter string sizing; installation techniques and the National Electrical<sup>®</sup> Code. AltE U is proud to be an accredited Institute of Sustainable Power (ISP) Training Program provider.</p> <p>For more information: <a href="http://workshops.altestore.com/">http://workshops.altestore.com/</a></p>
<p><b>MASSACHUSETTS, Springfield</b></p> <p><b>Center for Business and Technology,  Springfield Technical Community College</b>  1 Federal Street, Bldg. 101-R  Springfield, MA 01105</p> <p><b>Contact:</b> Mary Breeding, Asst. Vice President  <b>Tele:</b> (413) 755-4501  <b>Tele:</b> (413) 755-4225  <b>Fax:</b> (413) 755-6319  <a href="mailto:breeding@stcc.edu">breeding@stcc.edu</a></p> <p><b>Instructor:</b> Michael D Kocsmiersky</p>	<p><b>ZTEC-018 -PHOTOVOLTAIC PRACTITIONER CERTIFICATE PROGRAM:</b> This course is designed for Architects, Engineers, Electricians, General Contractors and those interested in developing a career in Photovoltaics. The course instructor, Michael Kocsmiersky, brings many years of experience in the field and guest lecturers from the Utility and PV industry will discuss grid capacity interaction and PV component development.</p> <p>This course will provide a comprehensive coverage of stand alone, utility interactive, and dedicated load applications for solar electricity. Participants will gain a detailed understanding of the types of photovoltaic (PV) cells and modules, the design of various PV Direct Current Source Circuits and their associated power electronics and switchgear. Proper metering of solar</p>

	<p>production as well as monitoring, storage and data acquisition systems specific to the technology will be reviewed in depth. The course will include sessions on solar resource analysis and modeling site specific production. Several sessions will review structural and mechanical code requirements and best practices for mounting PV arrays. Case studies will illustrate electrical integration into existing buildings and efficient incorporation into new construction. Particular emphasis will be placed on safe installation practices, interconnection requirements, jurisdictional permitting, and utility notifications. The STCC Technology Park 30 kW PV system will be utilized for field demonstration lessons. Two optional Saturday field trips will be scheduled, the first to a PV manufacturing plant and the second to a working hybrid residential PV system.</p>
<p><b>MASSACHUSETTS, West Barnstable</b></p> <p><b>Cape Cod Community College</b>  2240 Iyannough Road  West Barnstable, MA 02668  <b>Contact:</b> Sarah Griscom, Clean Energy Program Coordinator  <b>E-mail:</b> <a href="mailto:sgriscom@capecod.edu">sgriscom@capecod.edu</a>  <b>Tele:</b> (508) 362-2131 ext. 4796</p> <p><b>Environmental Technology Certificate Photovoltaic Technology</b></p> <p>The Environmental Technology certificates are a collaborative partnership among Cape Cod Community College, Massachusetts Maritime Academy and University of Massachusetts - Dartmouth, for persons seeking to acquire skills and knowledge in eight environmental fields: Coastal Zone Management, Environmental Site Assessment, Geographic Information Systems, Photovoltaic Technology, Small Wind Technology, Solar Thermal Technology, Wastewater Management, and Water Supply. Students may need to travel to each of the three schools in order to complete all the courses in any certificate program.</p>	<p><b>Environmental Technology Certificate Photovoltaic Technology</b></p> <p><b>Overview</b>  This certificate provides a solid understanding of photovoltaic technology, site analysis, system design, and installation methods. Students completing ENV173 and ENV178 are qualified to take the North American Board of Certified Energy Practitioners Entry Level Photovoltaic Certificate of Knowledge Exam. This certificate appeals to anyone interested in learning more about solar energy and applying that knowledge to their home, business, or career.</p> <p><b>Career Outlook</b>  The “clean energy cluster” is a large and fast growing segment of the Massachusetts economy. Solar energy represents a significant portion of the cluster and its projected growth. A person with this certificate has basic knowledge of photovoltaic systems, suitable for a supervised, entry level position with a dealer/installer, or other PV industry company or organization. Professionals in building trades can gain the knowledge necessary to expand their services to include photovoltaic system design, consulting, specification, and installation. A wide range of additional career opportunities are available within the clean energy cluster for students with degrees in a variety of fields, such as science, engineering, business, law, political science, and communications.</p> <p><b>Program Outcomes</b>  Upon completion of the Photovoltaic Technology Certificate, students are able to:</p> <ul style="list-style-type: none"> <li>*Conduct a basic home energy audit and make energy efficiency and conservation recommendations.</li> <li>*Conduct a solar energy site assessment and quantify the amount of solar energy available at a particular site.</li> <li>* Properly site, size, and design a residential scale photovoltaic system for both on and off grid applications.</li> <li>* Accurately explain the benefits and limitations of photovoltaic systems.</li> <li>*Conduct an economic and environmental assessment of</li> </ul>

<p><b>MASSACHUSETTS, Worcester</b></p> <p><b>Quinsigamond Community College</b>  670 West Boylston Street  Worcester, MA 01606  <b>Contact/Instructor:</b> Mary Knittle  <b>E-mail:</b> mknittle@qcc.mass.edu  <b>Tele.</b> (508) 751-7904  <a href="http://www.qcc.mass.edu">www.qcc.mass.edu</a>  <a href="http://cce.qcc.mass.edu">http://cce.qcc.mass.edu</a></p>	<p>proposed photovoltaic systems.</p> <p><b>PV Installer Boot Camp</b></p> <p>This 40-hour Boot Camp covers the PV system concepts required by entry-level designers, installers, sales consultants, estimators and inspectors. The boot camp is instructor-led and is geared to individuals wishing to take the industry-standard exam for entry-level solar professionals: the <a href="#">NABCEP Entry Level Certificate of Knowledge of PV Systems</a>. The boot camp instruction includes lecture presentations with hands-on exercises.</p>
<p><b>MICHIGAN, Chelsea</b></p> <p><b>Ann Arbor Eletrical JATC</b>  13400 Luick Dr.  Chelsea, MI, 48118</p> <p><b>Contact:</b> Jeffrey Grimston, Training Director  <b>Email:</b> jatcgrim@aol.com  <b>Tele.</b> (734) 475-1180</p> <p><b>Instructor:</b> Robert Kosky</p> <p><a href="http://www.aaejatc.org">www.aaejatc.org</a></p>	<p>The course offered by the Ann Arbor Electrical JATC is based on the text <a href="#">Photovoltaic Systems</a> by Jim Dunlop. The course starts with a discussion of semiconductor materials that are used to manufacture PV cells including manufacturing techniques and concerns. Sun-earth relationships and how they affect the gathering of solar radiation make up the basics of array orientation and explain the reason for site surveys. Site survey techniques, tools, test equipment, and forms are described and applied to teach the student how to gather the data needed to start the design of a PV system. System configurations and components are discussed and compared to the National Electrical Code requirements for each type of system. System sizing, mechanical integration, electrical integration, utility interconnection, permitting and inspection, commissioning, maintenance, troubleshooting, and economic analysis form the balance of the course.</p>
<p><b>MICHIGAN, Iron Mountain</b></p> <p><b>Iron Mountain Kingsford JATC</b>  205 E. Fleshiem Street  Iron Mountain, MI 49801  <b>Contact:</b> Sue Nanninga  <b>Email:</b> suenanninga@yahoo.com  <b>Tele.</b> (906) 779-1505</p>	<p><b>Photovoltaic Seminar (workshop)</b> Note: These are journeyman level training courses which will be offered only to persons with an extensive amount (4 or more years) of electrical experience. The courses will cover: Loads, site surveys, system sizing, inverter and string sizing, support systems, module testing, mounting, cabling, grounding, hardware, combiner boxes, string OCPD, utility requirements, net metering, commissioning, data acquisition, electrical code, and safety. The NEC requirements will also be covered and some additional hands-on experience.</p> <p>The seminar is based upon different learning stations, in addition to lectures. Each learning station covers specific topics with each participant cycling through each station. The Presenter is experienced in PV and electrical installation and will present material developed by experts in the field. The NJATC Photovoltaic Systems book will be used for reference.</p>
<p><b>MICHIGAN, Traverse City</b></p> <p><b>Northwestern Michigan College</b>  NMC-EES  1701 E. Front St.  Traverse City, MI 49686</p>	<p><b>Photovoltaic (Solar) Electric Systems One-week intensive – NABCEP Entry Level:</b> Learn the fundamentals of PV system design and installation in this 40-hour workshop designed for those interested in the expanding PV industry. In NMC's state-of-the-art Energy Demonstration Center you will gain a technical foundation in stand-alone and grid-tied code compliant solar electric systems.</p>

<p><b>Contact: Bill Queen, Carol Evans</b>  <b>Email: <a href="mailto:BQueen@nmc.edu">BQueen@nmc.edu</a></b>  <b>Tele. (231) 995-1701</b></p> <p><a href="http://www.nmc.edu/ees">www.nmc.edu/ees</a></p>	<p>The course content will follow NABCEP's learning objectives for the Entry Level exam.</p>
<p><b>MICHIGAN, Warren</b></p> <p><b>Detroit JATC</b>  2277 E. 11 Mile Road, Suite 1  Warren, MI 48092  <b>Contact: Thomas W. Bowes</b>  <b>Email: <a href="mailto:tomb@det-ejatc.org">tomb@det-ejatc.org</a></b>  <b>Tele. (586) 751-6600</b></p>	<p><b>Photovoltaic Systems (course) Photovoltaic Seminar (workshop)</b>  Note: These are journeyman level training courses which will be offered only to persons with 4+ years' electrical experience. Courses cover loads, site surveys, system sizing, inverter and string sizing, support systems, module testing, mounting, cabling, grounding, hardware, combiner boxes, string OCPD, utility requirements, net metering, commissioning, data acquisition, electrical code, and safety.</p>
<p><b>MINNESOTA, Cloquet</b></p> <p><b>Fond du Lac Tribal &amp; Community College</b>  2101 14<sup>th</sup> St.  Cloquet, MN 55720  <b>Contact: Kevin Maki</b>  <b>Email: <a href="mailto:klmaki@fdltcc.edu">klmaki@fdltcc.edu</a></b>  <b>Tele. (218) 260-5309</b></p> <p><a href="http://www.fdlcc.edu">www.fdlcc.edu</a></p>	<p><b>Entry Level Photovoltaics:</b> Entry level education in photovoltaic energy to train technicians and prepare them for the NABCEP Entry Level Certificate Exam. In the near future our institution plans to grow our PV program to be able to offer intermediate and advanced training in PV.</p> <p>We offer an AA degree for Electrical Utility Techs, a one year Clean Energy Tech Certificate and we are expanding to develop a 4 year sustainable degree.</p>
<p><b>MINNESOTA, Duluth</b></p> <p><b>Lake Superior College</b>  2101 Trinity Rd.  Duluth, MN 55811  <b>Contact/Instructor(s): Mary Roe</b>  <b>Email: <a href="mailto:mroe@charter.net">mroe@charter.net</a></b>  <b>Tele. (218) 260-9920</b></p> <p><a href="http://www.lsc.cc.mn.us/">www.lsc.cc.mn.us/</a></p>	<p><b>Entry Level Photovoltaics</b></p> <p>Entry level education in photovoltaic energy to train technicians and prepare them for the NABCEP Entry Level Certificate Exam.</p>
<p><b>MINNESOTA, Minneapolis</b></p> <p><b>Minneapolis Electrical JATC</b>  13100 Frankfort Parkway NE  St. Michael, MN 55376  <b>Contact/Instructor(s): Daryl Thayer</b>  <b>Email: <a href="mailto:daryl_solar@yahoo.com">daryl_solar@yahoo.com</a></b>  <b>Tele. (612) 229-4381</b></p>	<p><b>Solar Electric Basic:</b> Teaches principles of photovoltaic electrical theory, system design and installation. Also electrical-optical-thermal performance of PV cells &amp; modules, system types and components, mounting PV arrays and related code.</p> <p><b>Solar Electric Advanced:</b> Covers the NEC issues in solar installation and focuses on the utility grid interactive PV systems. Topics include safety, AC/DC grounding, wiring methods, inverter use and selection.</p>
<p><b>MINNESOTA, St. Paul</b></p> <p><b>St. Paul Electrical JATC, IBEW Local 110</b>  1330 Conway Street  St. Paul, MN, 55106</p> <p><b>Contact/Instructor(s): Edward Nelson,</b></p>	<p><b>Solar Course:</b> Students in this course will learn the fundamental solar theory of the conversion of light energy into electrical energy. Topics covered but not limited to include module construction, definitions, site selection, sizing arrays, BOS (Balance of system) equipment, system installation, NEC (National Electrical Code) rules and troubleshooting. Both battery and grid connected systems are covered in detail.</p>



<p>Assistant Training Director  <b>Email:</b> ENelson@ibew110.org  <b>Tele.</b> (651) 772-8773</p>	<p>Lab time will include actual mounting of support system and modules on two different roof covering, grid tie connection to premise wiring and troubleshooting techniques. Students will also use a SunEye to determine the best location for the array.</p> <p>Upon completion of the course the students will be prepared to take NABCEP's entry level certificate test.</p>
<p><b>MINNESOTA, St. Paul</b></p> <p><b>St. Paul College, division of Customized Training and Consulting</b>  317 Marshall Ave  St. Paul, MN, 55102</p> <p><b>Contact:</b> Dave Baker, Project Director  <b>Email:</b> dave.baker@saintpaul.edu  <b>Tele.</b> (651) 846-1583</p> <p><b>Instructor:</b> Daryl Thayer</p> <p><a href="http://training.saintpaul.edu">http://training.saintpaul.edu</a></p>	<p><b>Pending Course Description</b></p>
<p><b>Montana, Missoula</b></p> <p><b>University of Montana – College of Technology</b>  Department of Applied Computing and Electronics  909 South Ave W  Missoula, MT, 59801</p> <p><b>Contact:</b> Ashley Preston, Program Director  <b>Email:</b> <a href="mailto:Ashley.preston@umontana.edu">Ashley.preston@umontana.edu</a>  <b>Tele.</b> (406) 243-7915</p> <p><b>Instructor:</b> Jeff Wongstrom</p> <p><a href="http://www.cte.umt.edu">www.cte.umt.edu</a></p> <p><a href="http://ace.cte.umt.edu/programs/energy.html">http://ace.cte.umt.edu/programs/energy.html</a></p>	<p><b>Pending Course Description</b></p>
<p><b>NEVADA, Las Vegas</b></p> <p><b>Southern Nevada Electrical JATC</b>  62D Legion Way  Las Vegas, NV 89110  <b>Contact/Instructor(s):</b> Chris Brooks, Robert</p>	<p><b>Photovoltaics Level I:</b> An introductory class on solar photovoltaics. Topics discussed are: components of a solar system, how and what constitutes the solar power industry, safety, plus hands-on lab time.</p>



<p>Buntjer, Guy Snow  <b>e-mail:</b> Madison Burnett, <a href="mailto:mburn93784@aol.com">mburn93784@aol.com</a>  <b>Tele.</b> (702) 459-7949</p>	
<p><b>NEVADA – Reno</b></p> <p><b>Northern Nevada Electrical Joint Apprenticeship &amp; Training Committee</b>  4635 Longley Lane, Suite 108  Reno, NV 89502  <b>Contact/Instructor(s):</b> Alan Darney  <b>e-mail :</b> <a href="mailto:401jatc@sbcglobal.net">401jatc@sbcglobal.net</a>  <b>Tele. (775) 358-4301</b></p>	<p><b>Solar Photovoltaics I:</b> This course covers the principals of photovoltaics and how to effectively incorporate PV systems into stand-alone or interconnected electrical systems. The course will discuss system advantages and disadvantages, site evaluation, component operation, system design and sizing, installation requirements and recommended practices. There are hands-on activities associated with many elements of the course.</p>
<p><b>NEW HAMPSHIRE, Laconia</b></p> <p><b>Lakes Region Community College</b>  379 Belmont Road  Laconia, NH 03246  <b>Contact/Instructor(s):</b> Wes Golomb, Mark Weissflog  e-mail: <a href="mailto:wgolomb@ccsnh.edu">wgolomb@ccsnh.edu</a>  <a href="mailto:mweissflog@kwmanagement.com">mweissflog@kwmanagement.com</a>  <b>Tele. (603) 524-3207 ext. 763</b></p>	<p><b>Entry Level Solar Photovoltaic Installation:</b> This course covers the ten NABCEP Learning Objectives. The course uses “PV Systems” as a text. Mark Weissflog, NABCEP PV Certified Installer, is the instructor.</p> <p>There are ten 3-hour classroom meetings and two 8-hour days of field work which include a PV installation.</p>
<p><b>NEW MEXICO – Santa Fe</b></p> <p><b>Santa Fe Community College</b>  6401 Richards Ave.  Santa Fe, NM 87508  <b>Contact Director of Workforce Development:</b>  Lou Schreiber  <b>e-mail:</b> <a href="mailto:lschreiber@sfcnm.edu">lschreiber@sfcnm.edu</a>  <b>Tele. (505) 428-1617</b></p> <p><a href="http://www.sfcnm.edu">www.sfcnm.edu</a></p> <p><i>Santa Fe Community College also offers a 23 credit hour Solar Energy Certificate Series, the outline of which is given below. The completion of ENVR 221 allows a student to take the NABCEP Entry Level Certificate of Knowledge Exam</i></p> <p>This certificate provides students with the skills required to design, plan, install and troubleshoot photovoltaic solar electric energy systems. The certificate will also include a foundation in AC and DC electricity, grid tie applications, and an introduction to solar thermal systems. Students will acquire skills needed to seek entry- and mid-level positions within the solar industry or apply solar energy skills and knowledge to the green building sector.</p> <p><i>Core Requirements (23 credit hours)</i>  <b>ENVR 112</b> Introduction to Sustainable Energy Technologies  <b>ENVR 113</b> Instrumentation and Controls Lab</p>	<p>Non-credit Solar Theory and Installation Series: (4-day series – NABCEP approved)  * <b>Introduction to Renewable Electrical Energy Systems:</b> Topics include: renewable energy systems; solar/PV; wind and water systems; existing technologies; history; cost per watt-hr vs. conventional power; application; electrical energy production; wind farms; solar electrical power plants; work possibilities in the field.  <b>Date: May 2, 2009</b></p> <p>* <b>Theory and Application of Solar/Wind Technology:</b> Topics include: electrical theory; AC/DC; volts; amps; amp-hours; types and design of PV systems; stand-alone systems; grid-tie systems with batteries; components; solar panels; wind generators; water generators; racks; tracking devices; charge controllers; inverters; net metering. <b>Date: May 9, 2009</b></p> <p>* <b>System Installation and Troubleshooting:</b> Topics include: demand and load calculations; system sizing and layout; choosing components by size and brand; National Electrical Code (NEC); local and state code; cable and conductor types and identification; wire sizing formulas; assembly of a simple generic PV system from a solar panel to charge controller to battery bank and inverter with appropriate disconnects; system failure troubleshooting; and a tour of the 800-watt grid-tied PV system at SFCC. <b>Date: May 16, 2009</b></p> <p><b>System Demonstration and Analysis</b>  <b>Date: May 23, 2009</b>  Field Trip to several different types of Photovoltaic installations for demonstration and analysis of different</p>

<p>ENVR 122 Energy Efficiency and Management  ENVR 114L Electrical and Mechanical Fundamentals  <b>ENVR 221 Design and Installation of Photovoltaic Systems I</b> <i>NABCEP Entry Level Certificate of Knowledge Exam offered after completion of this course</i>  ENVR 222 Design and Installation of Photovoltaic Systems II  ENVR 225 Design and Installation of Solar Hot Water Systems  ENVR 227 National Electrical Code</p>	<p>systems.</p>
<p><b>NEW YORK, Canton</b></p> <p><b>SUNY, Canton</b>  Alternative &amp; Renewable Energy Systems  CSOET, NN105  Canton, NY 13617  <b>Contact/Instructor:</b> Matthew Bullwinkel  <b>Email:</b> bullwinkel@canton.edu  <b>Tele.</b> (315) 386-7411</p> <p><a href="http://www.canton.edu/csoet/alt_energy/">http://www.canton.edu/csoet/alt_energy/</a></p>	<p><b>AREA 323 Photovoltaic Systems</b></p> <p>This is an on-line course using Dunlop's "Photovoltaic Systems" as text.</p> <p>Course examines the direct conversion of solar energy to electricity. Topics include photovoltaic (PV) cell physics, types of PV cells, PV system components, and PV energy storage.</p> <p>PRE-REQUISITES: MECH 225, Introduction to Thermodynamics or permission of instructor.</p>
<p><b>NEW YORK, Farmingdale</b></p> <p><b>Farmingdale State University of New York</b>  2350 Broadhollow Road  Farmingdale, NY 11735  <b>Contact/Instructor:</b> Prof. Y. Dathatri, Dr. Gay E. Canough  <b>Email:</b> <a href="mailto:dathatyn@farmingdale.edu">dathatyn@farmingdale.edu</a>  <a href="mailto:gec@etmsolar.com">gec@etmsolar.com</a>  <b>Tele.</b> (631) 420-2450</p>	<p><b>Design, Installation and Maintenance of Grid Connected PV Systems:</b> Offering:</p> <ul style="list-style-type: none"> <li>*Workshops on Photovoltaic Systems</li> <li>*Workshops on Solar Thermal Systems</li> <li>*Marketing of Solar Products &amp; Systems</li> <li>*Advanced PV Systems including case studies</li> </ul> <p>Workshops are offered in a traditional classroom setting with associated lab and hands-on work.</p>
<p><b>NEW YORK – Kingston</b></p> <p><b>SUNY Ulster</b>  Business Resource Center  One Development Court  Kingston, NY 12401  <b>Contact Program Coordinator:</b> Barbara Reer  <b>e-mail:</b> <a href="mailto:ReerB@sunyulster.edu">ReerB@sunyulster.edu</a>  <b>Tele.</b> (845) 802-7171  <a href="http://www.sunyulster.edu">www.sunyulster.edu</a></p>	<p><b>Photovoltaics (PV) Installer's Course:</b> Learn the basics of how to site, design and install photovoltaic (PV) systems. This course includes sizing systems for both grid-connected and off-grid PV systems. Learn about solar resources, the problems associated with shading and what is the best orientation and tilt for PV arrays. Discuss the basic sizing and design of systems to serve a given electrical load. Learn safety procedures for installers and study the electrical code for PV systems in detail. Study various mounting systems for PV arrays and how they affect roof. Actually install a PV system.</p> <p><b>Advanced Photovoltaics Systems:</b> This course is geared toward PV installers and engineers who have experience with photovoltaic systems. The basics of PV will not be covered. Topics discussed will include the future of solar energy systems, review of formulas needed to size PV, how to design a PV system with battery backup, PV mounting systems, calculating wind load, weight load on roofs, mounting, safety on roofs, calculating system efficiency, wire sizing, performance monitoring, shading analysis, troubleshooting and complying with NYSERDA forms and regulations.</p>
<p><b>NEW YORK, Latham</b></p>	<p><b>Photovoltaic Systems:</b> Traditional classroom and hands-on learning.</p>

<p><b>Tri-City Joint Apprenticeship Training &amp; Committee</b>  428 Old Niskayuna Road  Latham, NY 12110  <b>Contact/Instructor(s):</b> Richard Cataldo, Ed Knott  <b>email:</b> <a href="mailto:trick@nycap.rr.com">trick@nycap.rr.com</a>  <b>Tele.</b> (518) 785-5167</p>	
<p><b>NEW YORK, NYC (Bronx)</b></p> <p><b>Center for Sustainable Energy  Bronx Community College</b>  City University of New York  West 181<sup>st</sup> Street  Bronx, NY 10453  <b>Contact:</b> Jill Cotter  <b>e-mail:</b> <a href="mailto:Jill.Cotter@bcc.cuny.edu">Jill.Cotter@bcc.cuny.edu</a>  <b>Tele.</b> (718) 289-5100 ext. 3733  <a href="http://www.csebcc.org">www.csebcc.org</a> for this and other Renewable Energy courses offered at Bronx Community College.</p>	<p><b>PV Installation Training Workshop</b></p> <p>The Center for Sustainable Energy is a NABCEP recognized provider of PV education. It offers a 40 hour installation course open to the general public, electricians, architects, novice installers and engineers. The course includes the latest photovoltaic technologies, cost analysis, sizing, building/zoning code issues, solar installation site visits and a hands-on lab with PV and inverter technology and mounting methods. The Center also offers a two session Math/Electricity Basics class for students who need to brush up on basic electricity concepts that are at the heart of solar installations.</p>
<p><b>NEW YORK, Port Ewen</b></p> <p><b>Ulster County BOCES</b>  P.O. Box 601  Route 9W  Port Ewen, NY 12466  <b>Contact:</b> Virginia Carrig  <b>e-mail:</b> <a href="mailto:vcarrig@mhrinc.org">vcarrig@mhrinc.org</a>  <b>Tele.</b> (845) 331-5050 ext 2220 or 2209</p>	<p>* <b>Photovoltaic Training for Skilled Tradespeople:</b> This course is designed to train electrical contractors and other skilled trades' people in solar PV installation and repair for residential and commercial use. This hands-on course will focus on PV theory, design, installation and troubleshooting. Prerequisite: A complete understanding of AC/DC theory. (40 hrs, 26 lecture, 14 at an actual job site)  * <b>Introduction to PV Technology:</b> Designed for a person with a strong personal interest in PV technology as well as those considering a career in solar electric technology, this course will give a student the theoretical basis for understanding the various types of solar electric systems. It will cover the history of solar electricity, current markets and industry status, basic electrical theory, and other considerations necessary for solar electric systems. Detailed study of system components as well as the proper and safe electrical interconnection of these components will include hands-on training exercises and experiments. (40 hrs, 24 lecture, 16 lab)  * <b>PV Installer Course:</b> In this course, students will develop the knowledge and practical skills needed to install utility-connected and off-grid PV systems. Study of electrical load analysis, system and component design and sizing, system siting, shading, electrical and mechanical system configuration, safety and electrical and building code compliance will be supplemented with hands-on system installation. (40 hrs, 24 lecture, 16 lab)</p>
<p><b>NEW YORK, Syracuse</b></p> <p><b>SUNY College of Environmental Science and</b></p>	<p><b>SPARE (Solar Power as Renewable Energy) Photovoltaic Installer and Maintenance Training:</b>  This is a traditional classroom style, 4-day course from 8am – 5pm covering the basics of how to site, design</p>

<p><b>Forestry (SUNY-ESF)</b>  221 Marshall Hall  1 Forestry Drive  Syracuse, NY 13210  <b>Contact Coordinator:</b> Emily Gillis  <b>Tele.</b> (315) 470-6817</p> <p><a href="http://www.esf.edu/outreach">www.esf.edu/outreach</a></p>	<p>and install grid-connected and off-grid PV systems. Some topics: the solar resource: problems associated with shading, best orientation and tilt for PV arrays. Discussions of basic sizing and design of systems to serve a given electrical load. Safety practices for installers including study of the electrical code for PV systems in some detail. Study of various mounting systems for PV arrays and how they affect roofs. We will build a working PV system on the lawn.</p>
<p><b>NEW YORK, Troy</b></p> <p><b>Hudson Valley Community College</b>  80 Vandenberg Avenue  HVCC – HRC 450 East  Troy, NY 12180  <b>Contact/Instructor(s):</b> Marlene J. LaTerra,  Coordinator, Workforce Development Institute  <b>e-mail:</b> m.lattera@hvcc.edu  <b>Tele.</b> (518) 629-4238</p>	<p><b>Hudson Valley’s Photovoltaic Installation Certificate program</b> provides the training students need to enter the growing industry of solar panel installation and maintenance. The New York State Energy Research and Development Authority (NYSERDA) worked with Hudson Valley to develop the program as the agency anticipates a high demand for qualified PV installers with hundreds of PV systems expected to be installed in the upcoming years.</p> <p>The 21-credit hour program consists of required and elective courses in the Electrical Construction and Maintenance A.O.S. degree program. These courses include a basic AC/DC electricity course and residential and commercial construction wiring courses which serve as a foundation for two courses in PV theory and practice.</p> <p>Both the established journeyman electrician looking for advancement and the potential student interested in the renewable energy field can benefit from the Photovoltaic Installation program.</p> <p><b>ECMN 210: Photovoltaic Systems Theory and Design (4 credits)</b></p> <p><b>ECMN 211: Photovoltaic Systems Installation and Maintenance (4 credits)</b>  *****</p> <p>Note: contact <b>Workforce Development</b> to register for the following course: (518) 629-7338 or (518) 629-4827.</p> <p><b>PV (Photovoltaic-Solar) Certificate of Knowledge Exam Preparation:</b> This is a 40-hour credit-free course designed for individuals who are interested in learning the fundamentals of photovoltaic (PV) system design and installation. The course curriculum is designed to comply with NABCEP’s “Learning Objectives” for the entry level exam. Topics Covered: PV Market and Applications; Electricity and Safety Basics; Solar Energy Fundamentals; Hands-On Solar Workshop; System Components; PV System Sizing; PV System Mechanical and Electrical Design; Performance Analysis &amp; Troubleshooting; Course Review &amp; Test Preparation. contact <b>Workforce Development</b> to register for this course: (518) 629-7338 or (518) 629-</p>

	4827.
<p><b>NEW YORK, Watertown</b></p> <p><b>Electrical JATC of Watertown, NY</b></p> <p>25001 Water Street Watertown, NY 13601 <b>Contact:</b> Bruce Rosbrook, Training Director <b>E-mail:</b> brosbroom@ibew910.org <b>Tele.</b> (315) 782-1675</p> <p><a href="http://www.ejatcofwatertown.org">www.ejatcofwatertown.org</a></p>	<p><b>Pending Course Description</b></p>
<p><b>NEW YORK, Wellsville</b></p> <p><b>Alfred State College</b></p> <p>2530 S. Brooklyn Ave Wellsville, NY 14985 <b>Contact:</b> Craig Clark <b>E-mail:</b> clarkcr@alfredstate.edu <b>Tele.</b> (607) 587-3101</p> <p><a href="http://www.alfredstate.edu">www.alfredstate.edu</a></p>	<p><b>PV (Photovoltaic-Solar) Installation &amp; Design:</b> This is a 40-hour credit-free theory and hands-on installation course where you will learn solar site analysis and installation of photovoltaic systems. This course is to lead a student to understand photovoltaic systems and their components and its integration into the electrical systems of grid-tie or off-grid homes. The course curriculum is designed around the NABCEP's "Learning Objectives" for the entry-level exam. Topics covered: PV Market and Applications; Electricity and Safety Basics; Solar Energy Fundamentals; Hands-On Solar Workshop; System Components; PV System Sizing; PV System Mechanical and Electrical Design; and Performance Analysis &amp; Troubleshooting.</p>
<p><b>NORTH CAROLINA, Boone</b></p> <p><b>Appalachian State University</b> Department of Technology Boone, NC 28608 <b>Contact/Instructor(s):</b> Dennis Scanlin <b>email:</b> <a href="mailto:scanlindm@appstate.edu">scanlindm@appstate.edu</a> <b>Tele.</b> (828) 262-6361</p>	<p><b>Photovoltaic System Design and Construction:</b> The course will provide a comprehensive overview of the history and contemporary trends in PV technology. Students will learn how to design a complete system and how to safely construct a safe and code compliant system. Traditional classroom with hands-on lab activities and some field work.</p>
<p><b>NORTH CAROLINA, Pittsboro</b></p> <p><b>Central Carolina Community College</b> 764 West Street Pittsboro, NC 27312 <b>Contact/Instructor(s):</b> David DelVecchio,</p>	<p><b>Introduction to Photovoltaic Systems – Training in Active Solar Power for your Home &amp; Business:</b> Successful completion of this course will prepare one to describe and explain the properties and uses of photovoltaic systems and components. Recognize and use various components necessary for completion of a PV system. Perform site assessments for the proper</p>

<p>Laura Lauffer  <b>email:</b> <a href="mailto:solarseed.david@gmail.com">solarseed.david@gmail.com</a> ,  <a href="mailto:llauffer@cccc.edu">llauffer@cccc.edu</a>  <b>Tele.</b> (919) 542-6495 Ext. 228   <a href="http://www.cccc.edu">www.cccc.edu</a></p>	<p>installation of a PV system. Possess basic knowledge of PV systems, suitable for a supervised, entry level position with a dealer/installer or other PV industry company.</p>
<p><b>NORTH CAROLINA, Raleigh</b>   <b>North Carolina Solar Center</b>  North Carolina State University  Campus Box 7401  Raleigh, NC 27695  <b>Contact/Instructor(s):</b> Maria O’Farrell  <b>e-mail:</b> <a href="mailto:maria_ofarrell@ncsu.edu">maria_ofarrell@ncsu.edu</a>  <b>Tele.</b> (919) 513-0775</p>	<p><b>Renewable Energy Technologies I: Electric Generation with Photovoltaic Systems</b>   Classroom sessions for 3-4 days interspersed with outside demonstrations. One day is devoted to an installation class. There is an afternoon for software applications.</p>
<p><b>OHIO – Cincinnati</b>   <b>Cincinnati State Technical &amp; Community College</b>  10100 Reading Rd Campus  Cincinnati OH 45241  <b>Contact/Workforce Development Center Business Manager:</b> Larry Chervený  <b>e-mail:</b> <a href="mailto:larry.chervený@cincinnatiastate.edu">larry.chervený@cincinnatiastate.edu</a>  <b>Tele.</b> (513) 569-1497   <b>Cincinnati State Technical &amp; Community College</b>  3520 Central Parkway Campus  Cincinnati, OH 45223  <b>Contact/Instructor:</b> Larry Feist  <b>e-mail:</b> <a href="mailto:larry.feist@cincinnatiastate.edu">larry.feist@cincinnatiastate.edu</a>   <a href="http://Cincinnatiastate.edu">Cincinnatiastate.edu</a></p>	<ul style="list-style-type: none"> <li>• <b>Electronic Devices: Renewable Energy Systems:</b> (40 contact hours/ 3 credit hours) An overview of electronic devices used in renewable energy systems. Topics include binary circuits, analog to digital and digital to analog conversion, magnetic, generators, batteries, power efficiencies, and data collection programming.</li> <li>• <b>Photovoltaic Systems:</b> (40 contact hours/ 2 credit hours) An overview of solar photovoltaic systems. Topics include PV applications, solar electric fundamentals, system components, sizing systems, system designs, performance analysis and troubleshooting, along with hands-on system installation.</li> </ul> <p><b>Both classes are instructor led with approximately half lecture and half lab.</b></p>
<p><b>OHIO – Nelsonville</b>   <b>Hocking College</b>  3301 Hocking Parkway  Nelsonville, OH 45764  <b>Contact:</b> Jerrold Hutton  <b>e-mail:</b> <a href="mailto:hutton_j@hocking.edu">hutton_j@hocking.edu</a>  <b>Tele.</b> (740) 753-7035</p>	<p><b>Entry Level Photovoltaic System Installation Training Course:</b> This 5 day (40 hour) workshop includes 3 days classroom instruction and 2 days of actual installation work. You can also earn 1 college credit.</p>
<p><b>OHIO – Nelsonville</b>   <b>Tri-County Career Center</b>  15676 State Route 691  Nelsonville, Ohio 45764  <b>Contact/Instructor(s):</b> Dave Gehlauf</p>	<p><b>Introduction to Solar Power:</b> Traditional classroom with hands-on experience in a lab setting. We also have access to two working solar installations at Hocking College in Nelsonville, Ohio.</p>



<p><b>e-mail :</b> <a href="mailto:tj-dgehlau@seovec.org">tj-dgehlau@seovec.org</a>  <b>Tele. (740) 753-3511</b></p>	
<p><b>OHIO – Toledo</b></p> <p><b>Owens Community College</b>  Tracy Road  P.O. Box 10,000  Toledo, OH 43699-1947  <b>Contact/Instructor(s):</b> Joe Peschel, John Witte  <b>e-mail:</b> <a href="mailto:joseph_peschel@owens.edu">joseph_peschel@owens.edu</a>  <b>Tele. (567) 661-7163</b></p> <p><a href="http://www.owens.edu">www.owens.edu</a></p>	<p><b>Photovoltaic Principles and Applications Training Program:</b> This 5 day training program for PV installers/integrators includes classroom and hands-on workshop. The course covers the basics in electricity, the characteristics of PV systems and theory and includes system sizing and construction, codes and standards, siting and design, battery safety, interconnection safety, troubleshooting, and maintenance. The workshop will include the design and installation of a grid-tied PV system. Installation practices of project management, adapting mechanical and electrical design, and system commissioning will also be discussed. Various inverters, PV modules, batteries and data information systems will be installed and operated.</p>
<p><b>OHIO– Toledo</b></p> <p><b>Oregon Career &amp; Technology Center-  Department of Adult Education &amp; Workforce  Development</b>  2424 Seaman Street  Toledo, OH, 43605</p> <p><b>Contact/Instructor:</b> Sandra Stroshine  <b>E-mail:</b> <a href="mailto:ore_aca_sst@nwoca.org">ore_aca_sst@nwoca.org</a>  <b>Tele. (419) 697-3450</b></p> <p><a href="http://www.oregonctc.org">www.oregonctc.org</a></p>	<p><b>Green Energy, Electrical &amp; Environmental Specialist</b>  This is a 21 week hands-on course for those wishing to gain employment in the installation field of Photovoltaics, Small &amp; Medium Size Wind Turbines and Geothermal Systems. The course includes the following topics; Solar Heat &amp; Electric Systems, Small &amp; Medium Wind Systems, Alternative Fuels, Geothermal Systems, LEED Rating System, Green Building Materials, Green Building Construction, Green Building Mechanical Systems, Environmental Science, Basic Electricity, Basic Math, 10 Hr. General Industry OSHA, First Aid/ CPR-AED, 2 Week Job Shadow. Participants will be eligible to sit for the NABCEP Entry Level Certificate of Knowledge (COK) Exam and the Green Mechanical Certification Exam from HVAC Excellence.</p>
<p><b>OHIO – Warrensville Heights</b></p> <p><b>The Green Academy and Center for  Sustainability  @ Tri-C Corporate College</b>  Division of Cuyahoga Community College  4400 Richmond Rd  Warrensville Hts., OH 44128  <b>Contact:</b> Leo Russo  <b>E-mail:</b> <a href="mailto:leo.russo@tri-c.edu">leo.russo@tri-c.edu</a>  <b>Tele. (216) 987-2864</b></p>	<p><b>PV Basics:</b> The workshop series will focus on the design and installation of solar electric technology systems, targeting electricians, contractors, related trades and union members, facility managers, renewable energy installers, and anyone interested in learning how to install and use solar electric technologies. Sessions cover the basics of solar electric technologies, solar resource fundamentals, applications and system components, an overview of the codes and standards associated with these technologies; information on grants, incentives, codes, and loans. The workshop series also serves as an excellent primer for the 40-hr NABCEP solar electric training.</p> <p><b>PV Certificate Course -</b> The NABCEP Entry Level Certificate Program is designed for those individuals who want to gain the knowledge necessary to successfully sit for the test. This course not only prepares the student for a career in photovoltaics and the NABCEP Entry Level exam, but also prepares the student to start their own solar installation business and enter the growing green economy.</p>

<p><b>OREGON – Bend</b></p> <p><b>Central Oregon Community College</b> Continuing Education Dept. 2600 NW College Way Bend, OR 97701</p> <p><b>Contact:</b> Nancy Jumper, Business &amp; Employee Development <b>E-mail:</b> njumper@cocc.edu <b>Tele.</b> (541) 383-7273</p> <p><a href="http://noncredit.cocc.edu">http://noncredit.cocc.edu</a></p>	<p><b>PV for Electricians:</b> A two-day (approx. 16 hour) course for electricians with existing knowledge to prepare for the NABCEP PV Entry Level exam. Not intended for those without prior electrical background.</p> <p>A future, 45 hour class is planned for those with no prior PV solar experience.</p>
<p><b>OREGON – Central Point</b></p> <p><b>Crater Lake Electrical JATC</b> 4864 Airway Drive Central Point, OR, 97502</p> <p><b>Contact:</b> Claire Lizana, Training Director <b>E-mail:</b> clejatc2@clearwire.net <b>Tele.</b> (541) 773-5888</p> <p><a href="http://clejatc.clearwire.net/">http://clejatc.clearwire.net/</a></p>	<p>This course covers all of the basic requirements for system installations:</p> <ul style="list-style-type: none"> <li>• OSHA Safety/Fall Protection</li> <li>• System Design</li> <li>• Mechanical &amp; Electrical Design</li> <li>• Site Assessment</li> <li>• Equipment</li> <li>• Maintenance and Troubleshooting</li> </ul> <p>This 24 hour course is presented in three 8 hour sessions. In addition to classroom training, it also includes field training in solar site assessment and hands on training assembling a 1kW Grid Tie Photovoltaic system. At the completion of this course, students have the opportunity to sit for the NABCEP Entry Level Certificate of Knowledge exam. This course is also registered with the Building Codes Division of the State of Oregon for 24 hours of continuing education credits.</p>
<p><b>OREGON - Eugene</b></p> <p><b>Lane Community College</b> Science/Energy Programs 4000 East 30<sup>th</sup> Avenue Eugene, OR 97405 <b>Contact/Instructor(s):</b> Roger Ebbage, Ryan Mayfield <b>e-mail:</b> <a href="mailto:ryan_mayfield@earthlink.net">ryan_mayfield@earthlink.net</a> <b>Tele.</b> (541) 463-3977</p>	<p><b>Photovoltaic Design &amp; Installation, I, II and III</b> are offered. Students may take the NABCEP Entry Level exam after taking <i>any one</i> of the three classes.</p> <p>This is a progressive series of courses over three terms. The first class starts with PV basics and electrical basics. The courses cover grid-tie and battery based systems (design and installation), NEC, job site safety, component specification, and system finances. Course structure is traditional classroom with labs, field trips and on-site installation.</p> <p><b>Prep for the NABCEP Solar PV Entry Level Exam:</b> This course is designed for individuals who have a working knowledge of general electrical concepts and photovoltaics. This intensive two-day class is structured to prepare participants to take the North American Board of Certified Energy Practitioners (NABCEP) Entry Level Certificate of Knowledge exam. This certificate of knowledge allows individuals to meet of the technical requirements of the Oregon Department of Energy's Tax Credit Certified Technician (TCCT)</p>

	<p>program. Those seeking TCCT status will need to attend an additional state-sponsored training on specific program requirements. The NABCEP Entry Level Certificate of Knowledge will be granted to those who successfully participate in the course and pass the two-hour, 60-question exam that will be administered at the end of the course.</p> <p>Due to the fast paced nature of the course, the registration is limited to 30 students.</p>
<p><b>OREGON – Portland</b></p> <p><b>NECA-IBEW Electrical Training Center (NIETC)</b>  16021 NE Airport Way  Portland, Oregon 97230  <b>Contact/Instructor:</b> Brian L. Crise  <b>e-mail:</b> <a href="mailto:bcrise@nietc.org">bcrise@nietc.org</a>  <b>Tele.</b> (503) 501-5054</p>	<p><b>Photovoltaic Basics:</b> An entry-level course designed to provide the electrician basic information about PV systems, general operating principles, installation methods of system components and applicable codes. This includes information for taking the NABCEP Entry Level Certificate of Knowledge exam. The NABCEP Entry Level Certificate or their Installer Certification are not required for installers of photovoltaic equipment in Oregon and Washington. (16 hours)</p>
<p><b>OREGON – Tangent</b></p> <p><b>Central Electrical Joint Apprenticeship Training Committee (JATC)</b>  33309 Hwy 99E  Tangent, Oregon 97389  <b>Contact/Instructor:</b> Greg Creal  <b>e-mail:</b> <a href="mailto:greg@ibew280.org">greg@ibew280.org</a>  <b>Tele.</b> (541) 917-6199</p> <p><a href="http://www.cjatc.org">www.cjatc.org</a></p>	<p><b>Photovoltaic Systems:</b> The course is a combination of classroom instruction and hands-on lab work. The course will be presented as part of a 5 year apprenticeship program, and to licensed journeyman electricians. The text “Photovoltaic Systems” by Jim Dunlop will be used.</p>
<p><b>PUERTO RICO - Aguadilla</b></p> <p><b>University of Puerto Rico - Aguadilla</b>  Building 251, Belt Road  Aguadilla, P.R. 00604-6150  <b>Contact/Instructor(s):</b> Prof. Ana E. Cuebas  Director, Educational Continuing Division  <b>e-mail:</b> <a href="mailto:ana.cuebas@gmail.com">ana.cuebas@gmail.com</a>  <b>Tele.</b> (787) 890-7118, 890-2681, Ext. 264/275/269</p>	<p><b>Introduction to Photovoltaic Solar Energy Systems:</b>  This 45 hour course will provide the students knowledge and tools for the application of the basic concepts involved in the operation and installation of photovoltaic solar energy systems, with or without connection to the electric wire system of Puerto Rico. The participant will be able to install a complete PV system with or without batteries in the solar classroom laboratory. Regulations from the Puerto Rico Electrical Power Authority and state laws regulating the renewable energy area will be covered in the course.</p>
<p><b>TENNESSEE, Cleveland</b></p> <p><b>Cleveland State Community College</b>  3535 Adkisson Drive NW  PO Box 3570 T101A  Cleveland, TN. 37320  <b>Contact/Instructor(s):</b> Allan Gentry  <b>e-mail:</b> <a href="mailto:AGentry@clevelandstatecc.edu">AGentry@clevelandstatecc.edu</a>  <b>Tele.</b> (423) 473-2447</p>	<p><b>PV Panel Installation (CST 2050):</b> Basic details of sizing a PV installation to meet site and energy needs. Techniques of rooftop, pole, etc. mounting to meet weather, grounding and disconnecting needs. Electronics for battery bank and/or utility grid tie. NEC Code 690 for utility tie. Open circuit voltage and closed circuit current measurements.</p> <p>Traditional community college classroom with lab.</p>

**TEXAS, Austin**

**Austin Community College**  
5930 Middle Fiskville Road

Austin, TX 78752

**Contact/Instructor(s):** Michael Kuhn, John Hoffner

**emails:** [Michael.kuhn@imagesolar.com](mailto:Michael.kuhn@imagesolar.com)

[John.Hoffner@imagesolar.com](mailto:John.Hoffner@imagesolar.com)

**Tele.** (512) 223-7662 (Robert McGoldrick at ACC)

**HART 1071** Solar Electric Systems, Entry-Level. This is in alignment with the NABCEP Entry-Level Certificate of Knowledge task analysis and prepares people to go to work for solar installers. It is 42 contact hours and is offered through the ACC Continuing Education department. This is our original course and we have offered it every semester since Spring of 2006.

**HART 1072** Advanced Solar Photovoltaic Installer. This is an advanced course (48 contact hours) in alignment with the NABCEP Professional-Level task analysis and prepares installers to take the NABCEP professional-level solar installer exam once they have the experience requirements as stated by NABCEP. This course is offered through the ACC Continuing Education department. We offered this course for the first time in Spring of 2008.

**ELMT 2474** Solar Photovoltaic Systems. This is an intermediate level (96 contact hours) and is in alignment with the NABCEP Entry-Level Certificate of Knowledge task analysis and prepares people to go to work for solar installers. This is a for-credit course offered through the Electronics and Advanced Technologies department. It is a requirement for our new 2-year associates degree in renewable energy. We offered this course for the first time in Spring of 2008.

*Each of the above three courses are approved by NABCEP as satisfying the training pre-requisite for sitting for the Entry-Level Certificate of Knowledge exam.*

*Each course also qualifies as a NABCEP-approved training program for reducing the experience requirement for the professional-level solar installer exam. All three courses are college-level full-semester courses.*

**TEXAS, Austin**

**Austin Joint Apprenticeship and Training Committee**

4000 Caven Road,  
Austin, Texas

**Contact:** Nora Ureste

[nora.ureste@imagesolar.com](mailto:nora.ureste@imagesolar.com)

**Tele.** 512.443.5725

**Instructors:**

Michael Kuhn: [michael.kuhn@imagesolar.com](mailto:michael.kuhn@imagesolar.com)

**Photovoltaic System Design & Installation Workshop**

This workshop is offered by ImagineSolar in partnership with the Austin JATC Electrical Training Center. It is an intensive 40-hour hands-on workshop on photovoltaic system design & installation complete with classroom lectures, hands-on labs, and a utility-interactive PV system installation.

Our workshop assumes no previous experience. However, it covers advanced material from the NABCEP professional-level PV Installer task analysis in addition to the entry-level NABCEP task analysis. Therefore, it is appropriate for the serious non-technical beginner as well as electrical contractors and engineers.

Training modules include the following: The Photovoltaic Industry and the Qualified Solar Pro;

<p>John Hoffner: <a href="mailto:John.hoffner@imagesolar.com">John.hoffner@imagesolar.com</a>  Also, Brad Newcomb,  Richard Stovall,  James E. McElhanon, and  T.J. Ramsey</p> <p><a href="http://www.imagesolar.com">www.imagesolar.com</a></p>	<p>Basics of Electricity; The Solar Resource; Site Assessments; Tools for the Solar Professional; System Components and Configurations; Cells, Modules, and Arrays: Specifications, Technologies, Vendor Comparisons; Batteries and Charge Controllers; Inverters: Types and Specifications; System Sizing and Design; Mechanical Integration; Electrical Integration: National Electric Code, Voltage Drop; Utility Interconnection; System Installation and Commissioning; Performance and Troubleshooting. Workshop attendees will be provided the textbook titled "Photovoltaic Systems" from American Technical Publishers, Copyright 2007 by National Joint Apprenticeship &amp; Training Committee for the Electrical Industry (NJATC).</p>
<p><b>TEXAS, Texas State Technical Colleges;  Contact Provider for Locations</b></p> <p><b>ADVEN, LLC</b>  7707 Gault St  Austin, TX 78757</p> <p><b>Contact:</b> Stephen Shelton  <a href="mailto:sshelton@advenaes.com">sshelton@advenaes.com</a></p> <p><b>Instructor:</b> Janet Hughes  <a href="mailto:jhughes@advenaes.com">jhughes@advenaes.com</a></p> <p><b>Tele.</b> 504-343-4638</p> <p><a href="http://www.advenaes.com">www.advenaes.com</a></p>	<p><b>Solar Installer Training – Solar Electric Systems</b></p> <p>The courses follow the ISPQ standards and NABCEP task analysis including recommended safety procedures, system design, electrical code and industry standard practices. The focus is to provide trainees with real life solar site specific knowledge. Hands-on training covers implementing the task analysis in the field with site analysis, mechanical and electrical design based on specific site conditions, site specific safety issues and construction issues using tools and testing equipment, best practice construction skills and specific site code and inspection issues. The 48 hours of instruction includes 40 hrs of classroom lecture, hand-on labs and hands-on installations and 8 hrs of homestudy.</p>
<p><b>UTAH, Salt Lake City</b></p> <p><b>Salt Lake Community College</b>  4600 South Redwood Road  Salt Lake City, Utah 84123  <b>Contact Course Coordinator:</b> Jule Marine  <b>Email:</b> <a href="mailto:Jule.Marine@slcc.edu">Jule.Marine@slcc.edu</a>  <b>Tele.</b> (801) 957-3455</p>	<p><b>Basic PV Installation and Advanced PV Installation:</b> 5 week programs each.  Tues - Thurs 6-9pm.</p> <p>Classes will cover BASIC topics associated with the design and installation of photovoltaic systems. Final project includes installation of a grid tied PV solar system.</p>
<p><b>VIRGINIA- Chesapeake</b></p> <p><b>Tidewater Electrical JATC</b>  828 Providence Road, Suite A  Chesapeake, VA, 23325</p> <p><b>Contact:</b> Michael Iacobellis, Training Director  <b>Email:</b> <a href="mailto:mikei@tidewaterjatc80.com">mikei@tidewaterjatc80.com</a>  <b>Tele.</b> (757) 480-2812</p> <p><a href="http://www.jatc80.com">www.jatc80.com</a></p>	<p><b>Solar PV Systems &amp; Installations</b> - The solar photovoltaic course offered by the Tidewater JATC is a 32 hour course taught over four weeks. This is an interactive course combining Hands on Training using Textbook &amp; Computer based lessons in a classroom setting. The Tidewater JATC uses the following study guides, American Technical Publishers "Photovoltaic Systems" and the NJATC "Photovoltaic Systems Workbook". The on-site PV system is used throughout the training sessions.</p> <p>Topics covered:</p> <ul style="list-style-type: none"> <li>• Solar Energy relativity to Earth</li> <li>• Measuring &amp; recording solar data</li> </ul>



	<ul style="list-style-type: none"> <li>• Understanding and the use of solar tracking devices to determine site placement of a PV system.</li> <li>• How to properly plan and lay-out a photovoltaic system, with an in depth look at each of the major components in a PV system</li> <li>• Installations of a photovoltaic systems</li> </ul> <p>Upon completion of the course, students will sit for their NABCEP entry level Certificate of Knowledge exam.</p> <p>No experience in PV systems work is necessary; however an understanding of basic electrical principles is required to complete the class. Access to a computer is required for some of the lessons.</p>
<p><b>VIRGINIA</b></p> <p><b>IEC Chesapeake Apprenticeship &amp; Training, Inc</b>  <b>Contact:</b> Grant Shmelzer  <b>Phone:</b> (800) 470-3013  <b>Website:</b> <a href="http://www.iec-chesapeake.com">www.iec-chesapeake.com</a></p>	<p><b>Please refer to IEC Chesapeake’s course description under MARYLAND, Odenton</b></p>
<p><b>WASHINGTON, Mt. Vernon</b></p> <p><b>NWJATC</b>  306 Anderson Road  Mt. Vernon, WA 98273  <b>Contact/Instructor(s):</b> Ryan Bradt  <b>Email:</b> <a href="mailto:broughty@earthlink.net">broughty@earthlink.net</a>  <b>Tele.</b> (425) 210-9105</p>	<p><b>Installing Photovoltaic Systems:</b> Course is split between traditional classroom setting and lab work on a photovoltaic demonstrator.</p>
<p><b>WASHINGTON, Tacoma</b></p> <p><b>SW Washington JATC</b>  3001 S. 36<sup>th</sup> Street, Suite A  Tacoma, WA, 98409</p> <p><b>Contact:</b> Anthony Lewis, Training Director  <b>Email:</b> <a href="mailto:tony@swwaejatc.org">tony@swwaejatc.org</a>  <b>Tele.</b> (253) 475-2922</p> <p><b>Instructor(s):</b> Steve Harper, Barry Blackburn</p> <p><a href="http://www.swwaejatc.org">www.swwaejatc.org</a></p>	<p>Photovoltaic systems installation class is a twenty four hour class that is covered in three days. The course is presented using a power point presentation with lecture using the Photovoltaic Systems book by the NJATC, and then concludes with hands-on activity using a solar pathfinder for a site assessment followed by an installation of a 1.2 kw photovoltaic system installation. Prior to the first and second class, reading assignments are given in order to cover all necessary materials. During the three days, you will be exposed to all aspects of Photovoltaic, from the basic introduction, site surveys, cells &amp; modules, inverters, permitting, and safety to name a few.</p>
<p><b>WISCONSIN, Custer</b></p> <p><b>The Midwest Renewable Energy Association (MREA)</b>  7558 Deer Road  Custer, WI 54423  <b>Contact:</b> Clay Sterling, Education Director</p>	<p><b>PV101 – Basic PV</b>  <b>PV205 – Intermediate PV</b>  <b>PV301 or PV305 – Advanced PV Design and Installation Lab or Advanced PV1:</b> Students will attend three separate workshops. Students must complete basic and intermediate PV and then attend a 4 or 5 day advanced PV course. Students will learn all aspects of design, installation, safety, codes and</p>

<p><b>Email:</b> <a href="mailto:Clay@The-MREA.org">Clay@The-MREA.org</a>  <b>Tele.</b> (715) 592-6595</p> <p><a href="http://www.the-mrea.org/">www.the-mrea.org/</a></p>	<p>troubleshooting. Total course length is 40 to 56 hours depending upon specific advance class taken. All courses are in-person and include a mixture of lecture and hands-on activities.</p>
<p><b>WISCONSIN, Green Bay</b></p> <p><b>Northeast Wisconsin Technical College</b>  2740 W. Mason Street  Green Bay, WI 54307  <b>Contact:</b> Amy L. Kox  <b>Email:</b> <a href="mailto:amy.kox@nwtc.edu">amy.kox@nwtc.edu</a>  <b>Tele.</b> (920) 498-6908</p> <p><a href="http://www.nwtc.edu">www.nwtc.edu</a>  Northeast Wisconsin Technical College offers a <i>Renewable Energy Solar Certificate program.</i></p>	<p><b>Energy-Intro to Solar Electricity</b> is an overview of the use of sunlight to produce electricity and the practical and economic use of PV power systems. Learn the importance of energy efficiency and the economics of PV-generator hybrid designs. (3 credits.)</p> <p><b>PV-Design &amp; Site Assessment</b> will teach the steps to performing a site audit prior to installation of a PV system. Focus on defining the solar window, system site placement and sizing, lead analysis and energy efficiency. (2 credits)</p>
<p><b>WISCONSIN, Milwaukee</b></p> <p><b>Milwaukee Community Service Corps</b>  1441 N. 7<sup>th</sup> Street  Milwaukee, WI 53205  <b>Contact:</b> Chris Litzau  <b>Email:</b> <a href="mailto:investinyouth@wi.rr.com">investinyouth@wi.rr.com</a>  <b>Tele.</b> (414) 372-9040</p> <p><a href="http://www.milwaukeecommunityservicecorps.org">www.milwaukeecommunityservicecorps.org</a></p>	<p><b>PV Entry Level Installer 40-hour Classroom Training.</b> Curriculum based on <i>Photovoltaics Design and Installation Manual</i> by SEI, <i>Photovoltaic Systems</i> by Jim Dunlop. Course structure includes traditional classroom, field-based and experience-based lab learning opportunities.</p> <p>The Milwaukee Community Service Corps is a registered apprenticeship program. It is also a U.S. DOL-awarded Youthbuild job training program.</p>
<p><b>WISCONSIN, Wisconsin Rapids</b></p> <p><b>Mid-State Technical College</b>  500 32<sup>nd</sup> St. N.  Wisconsin Rapids, WI 54494  <b>Contact:</b> Mike Marcoe  <b>Email:</b> <a href="mailto:Mike.Marcoe@mstc.edu">Mike.Marcoe@mstc.edu</a>  <b>Tele.</b> (715) 422-5428</p> <p><a href="http://www.mstc.edu">www.mstc.edu</a> (Technical and Industrial Division)</p>	<p><b>Introduction to Renewable Electricity:</b> Students in this course will learn the basics of renewable electricity generation with particular emphasis on wind and solar energy. Topics will include wind and solar resources, basic system components (including design considerations), system types and applications. Offered fall semester.</p> <p><b>Photovoltaic System Design &amp; Installation:</b> Students will learn the details involved in sizing and siting a PV system and gain a basic understanding of PV system installation. Topics include: System components, product specifications, product integration, system design capabilities and limits, system diagramming, wiring configurations, battery connections, safety, NEC, common design mistakes and solutions, wiring and installation techniques. This course will involve students in the installation of a PV system. Offered spring semester. <b>Prerequisite: Intro to Renewable Electricity.</b></p> <p><b>Both courses contain 51 hours of instruction (17 hours lecture and 34 hours lab).</b></p>