Course Outline

Energy, Environment, and Utilities **REVISED: July/2022**

Job Title
Solar Photovoltaic Installers

Career Pathway:
Environmental Resources

Industry Sector:
Energy, Environment, and Utilities

O*NET-SOC CODE:
47-2231.00

CBEDS Title:
Energy and Environmental Technology

CBEDS No.:
5691

72-65-60

Photovoltaics/2

Credits: 5 **Hours:** 90

Course Description:
This competency-based course is the second in a sequence of three designed for alternative and renewable energy technology. It provides students with project-based experiences in photovoltaics (PV). Instruction includes orientation review, safety, trade mathematics review, PV system hardware and components, site assessment, PV system size, cost, and selection, mechanical design adaptation, and employability skills and resume prepartion review. The competencies in this course are aligned with the California High School Academic Content Standards and the California Career Technical Education Model Curriculum Standards.

Prerequisites:
Enrollment requires the successful completion of the Photovoltaics/1 (72-65-50) course.

NOTE: For Perkins purposes this course has been designated as a **concentrator** course.

Tasks designated by an asterisk (*) meet the North American Board of Certified Energy Practitioners (NABCEP) 10 Learning Objectives for the PV Entry Level exam. The competencies of this course are aligned with the knowledge requirements set by the NABCEP's Entry Level 10 Learning Objectives.

This course **cannot** be repeated once a student receives a Certificate of Completion.

Los Angeles Unified School District
Division of Adult and Career Education
Instructional and Couseling Services Unit
Adult Curriculum Office
www.wearedace.org

COURSE OUTLINE COMPETENCY-BASED COMPONENTS

A course outline reflects the essential intent and content of the course described. Acceptable course outlines have six components. (Education Code Section 52506). Course outlines for all apportionment classes, including those in jails, state hospitals, and convalescent hospitals, contain the six required elements:

(EC 52504; 5CCR 10508 [b]; Adult Education Handbook for California [1977], Section 100)

COURSE OUTLINE COMPONENTS	**LOCATION**
GOALS AND PURPOSES	Cover

The educational goals or purposes of every course are clearly stated, and the class periods are devoted to instruction. The course should be broad enough in scope and should have sufficient educational worth to justify the expenditure of public funds.

The goals and purpose of a course are stated in the COURSE DESCRIPTION. Course descriptions state the major emphasis and content of a course and are written to be understandable by a prospective student.

PERFORMANCE OBJECTIVES OR COMPETENCIES	pp. 7-13

Objectives should be delineated and described in terms of measurable results for the student and include the possible ways in which the objectives contribute to the student's acquisition of skills and competencies.

Performance Objectives are sequentially listed in the COMPETENCY-BASED COMPONENTS section of the course outline. Competency Areas are units of instruction based on related competencies. Competency Statements are competency area goals that together define the framework and purpose of a course. Competencies fall on a continuum between goals and performance objectives and denote the outcome of instruction.

Competency-based instruction tells a student before instruction what skills or knowledge they will demonstrate after instruction. Competency-based education provides instruction which enables each student to attain individual goals as measured against pre-stated standards.

Competency-based instruction provides immediate and continual repetition. In competency-based education the curriculum, instruction, and assessment share common characteristics based on clearly stated competencies. Curriculum, instruction, and assessment in competency-based education are explicit, known, agreed upon, integrated, performance oriented, and adaptive.

COURSE OUTLINE COMPETENCY-BASED COMPONENTS (continued)

COURSE OUTLINE COMPONENTS	LOCATION
INSTRUCTIONAL STRATEGIES	p. 15
Instructional techniques or methods could include laboratory techniques, lecture method, small-group discussion, grouping plans, and other strategies used in the classroom. Instructional strategies for this course are listed in the TEACHING STRATEGIES AND EVALUATION section of the course outline. Instructional strategies and activities for a course should be selected so that the overall teaching approach takes into account the instructional standards of a particular program, i.e., English as a Second Language, Programs for Adults with Disabilities.	
UNITS OF STUDY, WITH APPROXIMATE HOURS ALLOTTED FOR EACH UNIT	Cover
The approximate time devoted to each instructional unit within the course, as well as the total hours for the course, is indicated. The time in class is consistent with the needs of the student, and the length of the class should be that it ensures the student will learn at an optimum level. Units of study, with approximate hours allotted for each unit are listed in the COMPETENCY AREA STATEMENT(S) of the course outline. The total hours of the course, including work-based learning hours (community classroom and cooperative vocational education) is listed on the cover of every CBE course outline. Each Competency Area listed within a CBE outline is assigned hours of instruction per unit.	pp. 7-13
EVALUATION PROCEDURES	p. 15
The evaluation describes measurable evaluation criteria clearly within the reach of the student. The evaluation indicates anticipated improvement in performances as well as anticipated skills and competencies to be achieved. Evaluation procedures are detailed in the TEACHING STRATEGIES AND EVALUATION section of the course outline. Instructors monitor students' progress on a continuing basis, assessing students on attainment of objectives identified in the course outline through a variety of formal and informal tests (applied performance procedures, observations, and simulations), paper and pencil exams, and standardized tests.	
REPETITION POLICY THAT PREVENTS PERPETUATION OF STUDENT ENROLLMENT	Cover
After a student has completed all the objectives of the course, he or she should not be allowed to reenroll in the course. There is, therefore, a need for a statement about the conditions for possible repetition of a course to prevent perpetuation of students in a particular program for an indefinite period of time.	

ACKNOWLEDGMENTS

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CALIFORNIA CAREER TECHNICAL EDUCATION MODEL CURRICULUM STANDARDS
Energy, Environment and Utilities Industry Sector
Knowledge and Performance Anchor Standards

1.0 Academics
Analyze and apply appropriate academic standards required for successful industry sector pathway completion leading to postsecondary education and employment. Refer to the Energy, Environment, and Utilities academic alignment matrix for identification of standards.

2.0 Communications
Acquire, and accurately use Energy, Environment, and Utilities sector terminology and protocols at the career and college readiness level for communicating effectively in oral, written, and multimedia formats.

3.0 Career Planning and Management
Integrate multiple sources of career information from diverse formats to make informed career decisions, solve problems, and manage personal career plans.

4.0 Technology
Use existing and emerging technology to investigate, research, and produce products and services, including new information, as required in the Energy, Environment, and Utilities sector workplace environment.

5.0 Problem Solving and Critical Thinking
Conduct short, as well as more sustained, research to create alternative solutions to answer a question or solve a problem unique to the Energy, Environment, and Utilities sector using critical and creative thinking, logical reasoning, analysis, inquiry, and problem-solving techniques.

6.0 Health and Safety
Demonstrate health and safety procedures, regulations, and personal health practices and determine the meaning of symbols, key terms, and domain-specific words and phrases as related to the Energy, Environment, and Utilities sector workplace environment.

7.0 Responsibility and Flexibility
Initiate, and participate in, a range of collaborations demonstrating behaviors that reflect personal and professional responsibility, flexibility, and respect in the Energy, Environment, and Utilities sector workplace environment and community settings.

8.0 Ethics and Legal Responsibilities
Practice professional, ethical, and legal behavior, responding thoughtfully to diverse perspectives and resolving contradictions when possible, consistent with applicable laws, regulations, and organizational norms.

9.0 Leadership and Teamwork
Work with peers to promote divergent and creative perspectives, effective leadership, group dynamics, team and individual decision making, benefits of workforce diversity, and conflict resolution as practiced in the SkillsUSA career technical student organization.

10.0 Technical Knowledge and Skills
Apply essential technical knowledge and skills common to all pathways in the Energy, Environment, and Utilities sector.

11.0 Demonstration and Application
Demonstrate and apply the knowledge and skills contained in the Energy, Environment, and Utilities anchor standards, pathway standards, and performance indicators in classroom, laboratory, and workplace settings, and through the SkillsUSA career technical student organization.

B. Energy and Power Technology Pathway

The Energy and Power Technology pathway provides learning opportunities for students interested in preparing for careers in the energy and power industries.

Sample occupations associated with this pathway:

- Energy Efficiency Evaluation Specialist
- Energy Engineer
- Energy Generation/Power Distribution, Maintenance, Inspection, and Repair Technicians
- Energy/Building Retrofit Specialist
- Plant/Field Weatherization Installer

B1.0 Explore the basic conventional and emerging principles and concepts of the energy industry, including energy production, energy transmission, and alternative energy technologies.

B2.0 Identify various conventional electric power generation fuel sources and the cost and efficiency issues associated with each.

B3.0 Investigate emerging and alternative electric power generation technologies and fuel sources.

B4.0 Understand nonnuclear power generation plant operations (coal, oil, natural gas, solar, wind, geothermal power, hydroelectric, or biofuel).

B5.0 Understand and apply basic knowledge and skills necessary for nuclear power generation and nuclear power plant personnel.

B6.0 Research methods of energy procurement, transmission, distribution, and storage.

B7.0 Understand the interrelationships among components of systems.

COMPETENCY-BASED COMPONENTS for the Photovoltaics/2 Course

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
A. ORIENTATION REVIEW Review and evaluate classroom and workplace policies and procedures used in accordance with federal, state, and local regulations. (3 hours)	1. Review the scope and purpose of the course. 2. Review the overall course content as a part of the Linked Learning Initiative. 3. Review classroom policies and procedures. 4. Review the different occupations in the Energy, Environment, and Utilities Industry Sector which have an impact on the role of photovoltaic installers. 5. Review the opportunities available for promoting gender equity and the representation of non-traditional populations in computer technology. 6. Review the City of Los Angeles Building and Safety Codes and their applications to the photovoltaic field. 7. Review OSHA-10 policies, procedures, and regulations for the workplace environment.	**Career Ready Practice:** 1, 2, 3, 5, 6, 7, 9 **CTE Anchor:** Communications: 2.5 Career Planning and Management: 3.4 Health and Safety: 6.2, 6.3, 6.4, 6.6, 6.7, 6.9, 6.11, 6.12, 6.15 Ethics and Legal Responsibility: 8.2 Leadership and Teamwork: 9.6 Technical Knowledge and Skills: 10.2 **CTE Pathway:** B1.7
B. SAFETY Review and evaluate classroom and workplace policies and procedures used in accordance with federal, state, and local safety and environmental regulations.	1. Review the procedures for contacting proper authorities for the removal of hazardous materials based on the EPA standards. 2. Review the National Electrical Code (NEC) and its role in safeguarding the work conditions of photovoltaic installers/craftsmen. 3. Review the use of the Safety Data Sheet (SDS) as it applies to the photovoltaic field. 4. Review classroom and workplace first aid and emergency procedures based on the American Red Cross (ARC) standards. 5. Review the California Occupational Safety and Health Administration (Cal/OSHA) and its electrical safety standards governing photovoltaic installers/craftsmen.	**Career Ready Practice:** 1, 2, 3, 5, 6, 7, 9, 11, 12 **CTE Anchor:** Communications: 2.5 Career Planning and Management: 3.4

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
(1 hour)	6. Review how each of the following insures a safe workplace: a. employees' rights as they apply to job safety b. employees' obligations as they apply to safety c. employees' training on how to accurately test high voltages d. employees' training on how to identify potential electrical/non-electrical hazards e. employees' training on how to use safety equipment 7. Pass the safety exam with 100% accuracy.	Health and Safety: 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.11, 6.12, 6.15 Responsibility and Flexibility: 7.7 Ethics and Legal Responsibility: 8.2 Leadership and Teamwork: 9.6 Technical Knowledge and Skills: 10.2 Demonstration and Application: 11.1 **CTE Pathway:** B1.7
C. TRADE MATHEMATICS REVIEW Review and apply the mathematical requirements in the photovoltaic field.	1. Review the practical applications of math in the photovoltaic field. 2. Review and demonstrate problem-solving techniques involving whole number problems using arithmetic operations (addition, subtraction, multiplication, and division). 3. Review and demonstrate problem-solving techniques involving various fraction problems using arithmetic operations. 4. Review and demonstrate problem-solving techniques involving various decimal problems using addition, subtraction, multiplication, and division. 5. Review and demonstrate techniques for changing fractions to decimals. 6. Review and demonstrate techniques for changing decimals to fractions. 7. Review converting the Standard American Engineering (SAE) to metric and metric to SAE systems of measuring dimensions, length, weight, volume, and capacity. 8. Review and demonstrate SAE and metric problem-solving techniques for various measuring problems using arithmetic operations. 9. Review and demonstrate SAE and metric measuring techniques of objects by using tools common to the trade. 10. Review metric units in ascending and descending powers of ten. 11. Review the conversion of the SAE numbering system to metric system. 12. Review the conversion of the metric system to SAE numbering system.	**Career Ready Practice:** 1, 3. 5 **CTE Anchor:** Academics: 1.0 Problem Solving and Critical Thinking: 5.1, 5.2 Technical Knowledge and Skills: 10.1 Demonstration and Application: 11.1 **CTE Pathway:** B2.4, B3.1

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
(3 hours)	13. Review the calculation of square roots of SAE numbers. 14. Review and demonstrate problem-solving techniques for: a. geometric and algebraic problems b. percentages 15. Review and demonstrate techniques for: a. reading and interpreting graphs b. using a calculator	
D. PV SYSTEM HARDWARE AND COMPONENTS Understand, apply, and evaluate the fundamentals of solar energy.	1. Define and describe the features and functions of the following categories of PV systems: a. flat-plate systems b. concentrator systems 2. Describe the importance of the following when mounting PV system structures: a. stability b. durability c. latitude of the site d. load requirements e. availability of the sun 3. Compare the features of the different mounting techniques and related hardware for each type of PV. 4. Describe the relationship between solar module cell temperature and environmental conditions. 5. Define and describe the importance of the following: a. power conditioners b. electricity storage c. charge controllers d. tracking structures 6. Describe the advantages and disadvantages of the following mounting positions for flat-plate PV panels: a. fixed position b. tracking position 7. Define the following: a. stand-alone service b. grid-tied service c. load demand d. net metering e. rebates f. tax incentives 8. Identify and describe the features and functions of the following: a. hardware for a typical stand-alone roof assembly b. key components and location in a stand-alone system c. key components and location in a grid-tied system 9. Design examples of the following with hardware and key component specifications: a. PV in simple, stand-alone systems b. PV systems with Energy Storage System (ESS) c. PV with backup generator power d. PV in hybrid power systems	**Career Ready Practice:** 1, 3, 4, 5, 10 **CTE Anchor:** Academics: 1.0 Communications: 2.5 Technology: 4.3 Problem Solving and Critical Thinking: 5.1, 5.2, 5.3 Health and Safety: 6.6, 6.9 Responsibility and Flexibility: 7.4, 7.5, 7.6, 7.7 Technical Knowledge and Skills: 10.1 Demonstration and Application: 11.1 **CTE Pathway:** B1.4, B1.7, B1.8, B2.2, B2.3, B2.4, B6.1, B6.2, B6.3, B6.4, B7.1, B7.3, B7.4, B7.5, B7.6

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
(15 hours)	e. PV connected to the utility grid f. PV in micro grid systems 10. Identify and describe the features and functions of the following PV system electrical designs: a. PV in simple, stand-alone systems b. PV systems with ESS c. PV with backup generator power d. PV in hybrid power systems e. PV connected to the utility grid f. PV in micro grid systems 11. Research and document the features and functions of the following PV system electrical designs from five manufacturers: a. PV in simple, stand-alone systems b. PV systems with ESS c. PV with backup generator power d. PV in hybrid power systems e. PV connected to the utility grid f. PV in micro grid systems	
E. SITE ASSESSMENT Understand and apply the proper techniques for conducting a site assessment for PV systems. (20 hours)	1. Identify and demonstrate the proper use, maintenance and storage of tools and equipment required to conduct site surveys for PV installations. 2. Describe and demonstrate the establishment of the following: a. a suitable location for installing PV arrays i. proper orientation ii. sufficient area iii. adequate solar access iv. structural integrity b. a suitable location for inverters c. a suitable location for controls d. a suitable location ESS e. a suitable location for other Balance of System (BOS) components 3. Review use of the Solar Pathfinder and/or Google Sunroof.	**Career Ready Practice:** 1, 2, 3, 5, 10 **CTE Anchor:** Academics: 1.0 Communication: 2.5 Problem Solving and Critical Thinking: 5.1, 5.2, 5.3, 5.4 Health and Safety: 6.6 Responsibility and Flexibility: 7.7 Technical Knowledge and Skills: 10.1 Demonstration and Application: 11.1 **CTE Pathway:** B4.5, B4.6

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
F. PV SYSTEM SIZE, COST AND SELECTION Understand, apply, and evaluate the variables of calculating PV system size, cost, and selection based on site assessment. (25 hours)	1. Describe the importance of the following: a. stand-alone service b. grid-tied service c. load demand d. net metering e. rebates f. tax incentives 2. Describe the following selection techniques for a system design based on results from a site assessment: a. determining the appropriate system design/configuration based on: i. customer needs and budget ii. customer expectations iii. site conditions b. estimating size requirements for major components based on: 1. customer load 2. desired energy or peak power production 3. autonomy requirement 4. applicable size and cost c. determining and selecting major components and balance of system equipment required for installation d. estimating time, materials, and equipment required for installation e. determining installation sequence to optimize use of time and materials 3. Describe the following PV Ownership Application Models and document the impact of net metering, rebates, and tax incentives on system sizing, costing, and selection: a. residential application: i. retrofitting a 90-year old 980 sq. ft. residence ii. new construction of a 2,750 sq. ft. residence b. commercial application: i. retrofitting a 50-year old 10-unit apartment building ii. new construction of a 60-unit condominium building c. grid-sited 4. Describe and demonstrate the following: a. analysis of load demand for: i. stand-alone service for a retrofitted 90-year old 980 sq. ii. ft. residence and a newly constructed 2,750 sq. ft. residence iii. grid-tied service for a 50-year old 10-unit apartment building and a newly constructed 60-unit condominium building b. estimate power output needs for a typical residential installation c. calculate array and inverter size for grid-tied system d. estimate monthly energy output of a grid-tied system	**Career Ready Practice:** 1, 3, 5, 9, 10 **CTE Anchor:** Academics: 1.0 Communications: 2.5 Technology: 4.1 Problem Solving and Critical Thinking: 5.1, 5.2, 5.3 Health and Safety: 6.9 Responsibility and Flexibility: 7.4, 7.5, 7.6, 7.7 Technical Knowledge and Skills: 10.1 Demonstration and Application: 11.1 **CTE Pathway:** B1.3, B1.7, B1.8, B2.2, B2.3, B2.4, B6.1, B6.2, B6.3, B6.4, B7.1, B7.3, B7.4, B7.5, B7.6

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
G. MECHANICAL DESIGN ADAPTATION Understand, apply, and evaluate various PV mechanical design criteria and adaptations. (20 hours)	1. Define the following: a. absorption coefficient b. bandgap c. single crystalline thin films d. polycrystalline thin films 2. Explain the importance of determining the following in PV installation: a. absorption coefficient of the solar cell materials b. bandgap of the semiconductor material in solar cells c. complexity of manufacturing 3. Describe the relationship between row spacing of tilted modules and sun angle. 4. Describe the potential mechanical loads on a PV array (wind, snow, seismic, etc.). 5. Determine the system weight and support requirements of a typical PV array. 6. Differentiate between the mechanical designs criteria of amorphous and crystalline modules. 7. Describe the design considerations of thin film and other Building Integrated PV (BIPV). 8. Determine the proper mounting hardware and techniques required for various roof and wall surfaces. 9. Research and document the following for a project or potential client: a. mechanical design, equipment, and installation plan consistent with the: i. environmental condition ii. architectural condition iii. structural condition iv. code requirements v. other conditions of the site b. appropriate module/array layout, orientation, and mounting method for: i. ease of installation ii. electrical configuration maintenance at the site iii. maintenance at the site	**Career Ready Practice:** 1, 3, 4, 5, 6, 10 **CTE Anchor:** Academics: 1.0 Communication: 2.5 Technology: 4.1, 4.3 Problem Solving and Critical Thinking: 5.1, 5.2, 5.3, 5.4 Health and Safety: 6.2, 6.3, 6.4, 6.6, 6.8, 6.9 Responsibility and Flexibility: 7.7 Ethics and Legal Responsibility: 8.1 Technical Knowledge and Skills: 10.2 **CTE Pathway:** B1.3, B4.5, B4.6, B6.3
H. EMPLOYABILITY SKILLS & RESUME PREPARATION REVIEW Review, apply, and evaluate the employability skills required in the photovoltaic field.	1. Review employer requirements for soft skills such as: a. punctuality and attendance b. time management c. flexibility and adaptability d. interpersonal skills e. work ethic f. communication and collaboration g. teamwork h. critical thinking and problem solving i. leadership and responsibility j. ethical behavior	**Career Ready Practice**: 1, 2, 3, 4, 5, 7, 8, 9 **CTE Anchor:** Academics: 1.0 Communication: 2.2, 2.3, 2.4, 2.5 Career Planning & Management: 3.2, 3.3, 3.4, 3.6, 3.8

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
(3 hours)	k. cultural and diversity differences 2. Review a resume, cover letter, and/or portfolio. 3. Review the role of online job searching platforms and career websites. 4. Review an on-line job application. 5. Review interview skills to get the job: a. do's and don'ts for job interviews b. how to dress for the job 6. Review sample follow-up letters. 7. Review the importance of the continuous upgrading of job skills as it relates to: a. certification, licensure, and/or renewal b. professional organizations/events c. industry associations and/or organized labor	Technology: 4.1, 4.3 Problem Solving & Critical Thinking: 5.1 Responsibility and Flexibility: 7.2, 7.3, 7.4, 7.7 Ethics and Legal Responsibilities: 8.4 Leadership and Teamwork: 9.2, 9.3, 9.4, 9.6 Demonstration & Application: 11.5 **CTE Pathway:** B1.6, B1.7

SUGGESTED INSTRUCTIONAL MATERIALS and OTHER RESOURCES

TEXTBOOKS

Dunlop, James P. Photovoltaic Systems, Latest Edition. American Technical Publisher, 2012

White, Sean. Solar Photovoltaic Basics Latest Edition, Earthscan, 2019

Solar Energy International, Solar Electric Handbook Latest Edition, Pearson Learning Solution, 2013

RESOURCES

Employer Advisory Board members

CTE Model Curriculum Standards
http://www.cde.ca.gov/ci/ct/sf/documents/energyutilities.pdf

Barnett, Dave and Kirk Bjornsgaard. Electrical Power Generation: A Nontechnical Guide. Pennwell Books, 2000.

International Association of Plumbing and Mechanical Officials. Uniform Solar Energy Code. International Association of Plumbing and Mechanical Officials, 2009.

Michael Casey, Douglas Hansen, and Redwood Kardon. Code Check: Electrical: An Illustrated Guide to Wiring a Safe House. 4th edition, Taunton Press, 2006.

National Fire Protection Association. National Electrical Code 2011. National Fire Protection Association, 2011.

www.americangreenjobs.net

www.ases.org

www.careers.pennenergyjobs.com

www.cleantechrecruits.com

www.irecusa.org

www.renewableenergyjobs.com

www.solarenergy.org

www.solarelectricpower.org

www.seia.org

www1.eere.energy.gov

COMPETENCY CHECKLIST

METHODS AND PROCEDURES

A. Lecture and discussion

B. Multimedia presentations

C. Demonstrations and participations

D. Individualized instruction

E. Peer teaching

F. Role-playing

G. Guest speakers

H. Field trips and field study experiences

I. Projects

EVALUATION

SECTION A – Orientation Review - Pass all assignments and exams on orientation with a minimum score of 80% or higher

SECTION B – Safety – Pass the safety test with 100% accuracy.

SECTION C – Trade Mathematics Review – Pass all assignments and exams with a minimum score of 80% or higher.

SECTION D – PV System Hardware and Components – Pass all assignments and exams with a minimum score of 80% or higher.

SECTION E – Site Assessment – Pass all assignments and exams with a minimum score of 80% or higher.

SECTION F – PV System Size, Cost, and Selection – Pass all assignments and exams with a minimum score of 80% or higher.

SECTION G – Mechanical Design Adaptation – Pass all assignments and exams with a minimum score of 80% or higher.

SECTION H –Employability Skills & Resume Preparation Review – Pass all assignments and exams with a minimum score of 80% or higher.

Standards for Career Ready Practice

1. **Apply appropriate technical skills and academic knowledge.**
   Career-ready individuals readily access and use the knowledge and skills acquired through experience and education. They make connections between abstract concepts with real-world applications and recognize the value of academic preparation for solving problems, communicating with others, calculating measures, and performing other work-related practices.

2. **Communicate clearly, effectively, and with reason.**
   Career-ready individuals communicate thoughts, ideas, and action plans with clarity, using written, verbal, electronic, and/or visual methods. They are skilled at interacting with others: they are active listeners who speak clearly and with purpose, and they are comfortable with terminology that is common to workplace environments. Career-ready individuals consider the audience for their communication and prepare accordingly to ensure the desired outcome.

3. **Develop an education and career plan aligned with personal goals.**
   Career-ready individuals take personal ownership of their educational and career goals and manage their individual plan to attain these goals. They recognize the value of each step in the educational and experiential process, and they understand that nearly all career paths require ongoing education and experience to adapt to practices, procedures, and expectations of an ever-changing work environment. They seek counselors, mentors, and other experts to assist in the planning and execution of education and career plans.

4. **Apply technology to enhance productivity.**
   Career-ready individuals find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring and using new technology. They understand the inherent risks—personal and organizational—of technology applications, and they take actions to prevent or mitigate these risks.

5. **Utilize critical thinking to make sense of problems and persevere in solving them**
   Career-ready individuals recognize problems in the workplace, understand the nature of the problems, and devise effective plans to solve the problems. They thoughtfully investigate the root cause of a problem prior to introducing solutions. They carefully consider options to solve a problem and, once agreed upon, follow through to ensure the problem is resolved.

6. **Practice personal health and understand financial literacy.**
   Career-ready individuals understand the relationship between personal health and workplace performance. They contribute to their personal well-being through a healthy diet, regular exercise, and mental health activities. Career-ready individuals also understand that financial literacy leads to a secure future that enables career success.

7. **Act as a responsible citizen in the workplace and the community.**
   Career-ready individuals understand the obligations and responsibilities of being a member of a community and demonstrate this understanding every day through their interactions with others. They are aware of the impacts of their decisions on others and the environment around them, and they think about the short-term and long-term consequences of their actions. They are reliable and consistent in going beyond minimum expectations and in participating in activities that serve the greater good.

8. **Model integrity, ethical leadership, and effective management.**
Career-ready individuals consistently act in ways that align with personal and community-held ideals and principles. They employ ethical behaviors and actions that positively influence others. They have a clear understanding of integrity and act on this understanding in every decision. They use a variety of means to positively impact the direction and actions of a team or organization, and they recognize the short-term and long-term effects that management's actions and attitudes can have on productivity, morale, and organizational culture.

9. **Work productively in teams while integrating cultural and global competence.**
Career-ready individuals contribute positively to every team, as both team leaders and team members. To avoid barriers to productive and positive interaction, they apply an awareness of cultural differences. They interact effectively and sensitively with all members of the team and find ways to increase the engagement and contribution of other members.

10. **Demonstrate creativity and innovation.**
Career-ready individuals recommend ideas that solve problems in new and different ways and contribute to the improvement of the organization. They consider unconventional ideas and suggestions by others as solutions to issues, tasks, or problems. They discern which ideas and suggestions may have the greatest value. They seek new methods, practices, and ideas from a variety of sources and apply those ideas to their own workplace practices.

11. **Employ valid and reliable research strategies.**
Career-ready individuals employ research practices to plan and carry out investigations, create solutions, and keep abreast of the most current findings related to workplace environments and practices. They use a reliable research process to search for new information and confirm the validity of sources when considering the use and adoption of external information or practices.

12. **Understand the environmental, societal, and economic impacts of decisions.**
Career-ready individuals understand the interrelated nature of their actions and regularly make decisions that positively impact other people, organizations, the workplace, and the environment. They are aware of and utilize new technologies, understandings, procedures, and materials and adhere to regulations affecting the nature of their work. They are cognizant of impacts on the social condition, environment, workplace, and profitability of the organization.

Statement for Civil Rights

All educational and vocational opportunities are offered without regard to race, color, national origin, gender, or physical disability.