GEPEA (Global Educational & Professional Excellence Academy)

Name of the Program(s): - BSc (Bachelor of Science) in Solar Energy/Alternative Energy/Renewable Energy Engineering (BSCSE/BSCAE/BSCEEE), Graduate Diploma in Solar Energy (GDSE), Graduate Diploma in Renewable Energy (GDRE), Graduate Diploma in Alternative Energy (GDAE).

Are you interested in earning your BSC or Graduate Diploma in Solar Energy and Alternative Energy or Renewable Energy Engineering Professional degree? (BSc or GDSE or GDRE or GDAE) ™ certification, but you're unsure how to start the process? While this is a great step for your individual career, it doesn't have to be a complex one really if you study from GEPEA. This is the ultimate guide on BSCSE™ or BSCAE™ or BSCEEE™ certification and it can be your easy roadmap for navigating this process. You may explore some common questions you might have about international Solar Energy, Renewable Energy and Alternative Energy Engineering certification holder.

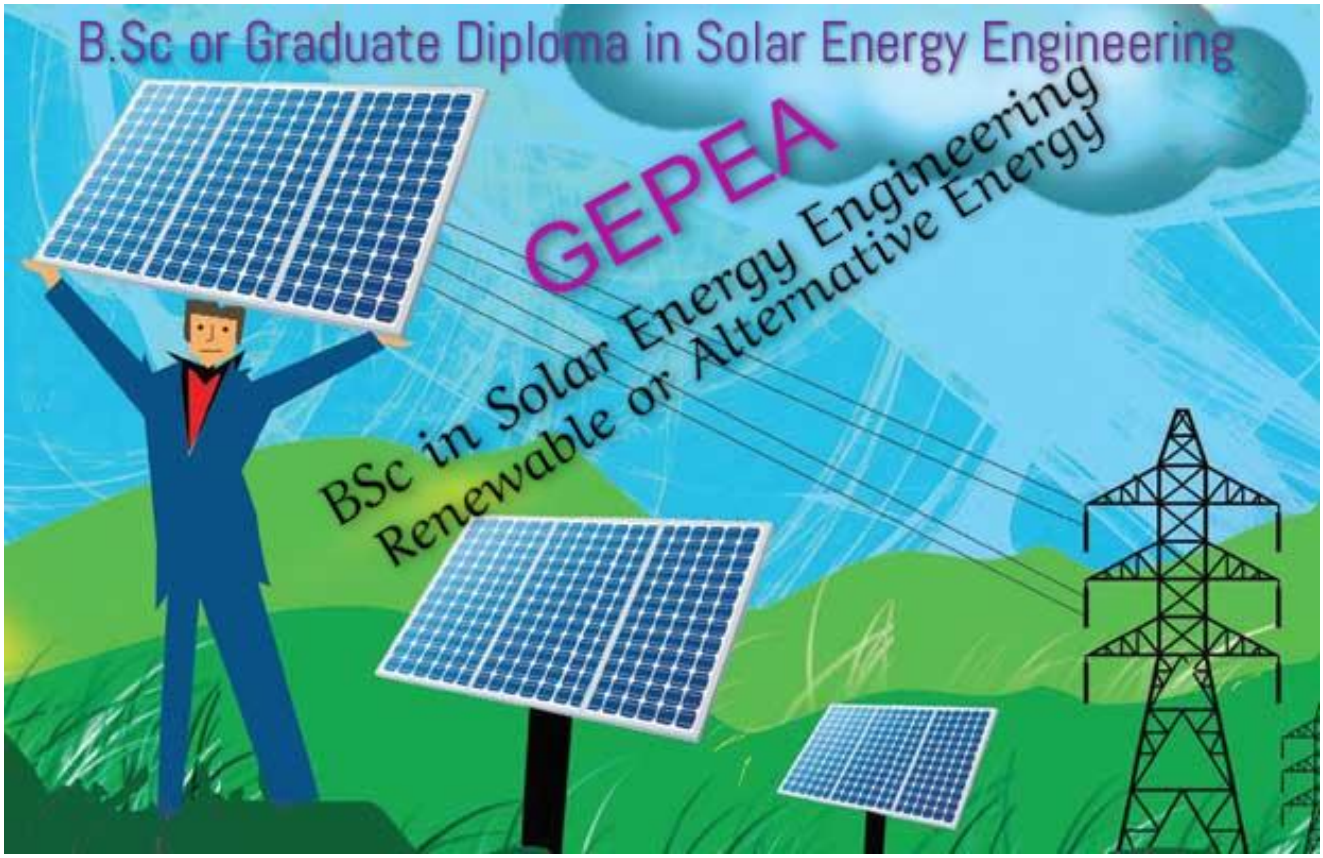
Why Study Solar Energy Engineering?

As part of the clean energy economy, Solar Energy Engineers can design large-scale photovoltaic or solar thermal systems; after the design phase, they evaluate effectiveness, cost, reliability, and safety etc. Many of our GEPEA students and alumni actively work as engineers and managers in the global solar energy industry. Also, there are some other reasons, these are as follows:

1. Some countries set their aims to be a pioneer for renewable energy engineering
2. Specialize in relevant renewable energy engineering issues
3. The renewable energy market is expected to generate almost 18,000 new graduate jobs by 2030.
4. Pursue a career that has a positive impact and so on.

What does a Renewable Energy Engineer do?

A renewable energy engineer works on environmental projects to research and develop approaches to providing clean energy sources and green solutions for the world's energy needs. Some work as consultants, some of them works as technician while others have duties that involve designing machines and systems to capture and distribute renewable energy from wind, solar, and geothermal resources. As a renewable energy engineer, can specialize in chemical, industrial, mechanical, or electrical engineering, but regardless of your specialty, may focus on sustainability and reducing the use of non-renewable products like oil as an energy source. A renewable Energy Engineer goal is to limit the effects of fossil fuels on climate change and reduce the risk these energy sources pose to human health.



SOLAR ENGINEERING OR RENEWABLE ENGINEERING OR ALTERNATIVE ENGINEERING PROFESSIONAL TRANINGS

Training Hours: *120 hours.*

Program Duration: 1 Year (Fast Track for Diploma holders through Course Exemption) or 2 Years (full time studies Certifications).

Solar Energy Graduate Diploma program is a 1 to 2 years course taught in distance learning /Online learning mode.

Diploma should be completed within 1 year (2 Semesters) and Graduate Diploma for three semesters through one or two additional subjects *respectively.*

Admission Requirements: A diploma or an associate degree in general science or science (or global equivalent), Secondary degree (high school diploma, associate degree, or the global equivalent).

Other Requirements: Any Science related degree are needed to take this course, but have some extra skills using laptop/computer and internet, E-mail for communications will help.

Training Delivery: The course duration will comprise 120 hours of self-study home based delivery through Email/online distance learning. The 120 hours will be delivered in 15-17 sessions online distance learning based on given course materials. This 1 to 2-year course aims to provide an introduction to the principles of Solar Energy, Alternative and Renewable Energy Engineering.

Syllabus Outline

Serial No.	Syllabus component	Assignment **TMA** (Tutor Mark Assignment) or **Case Study**	Board Questions (**OBS** = Open Book System) Exam.	**MCQ** (Multiple Choice Questions) 10 Questions (each @ 2 marks)
	17 parts will count 6 hours each (17 parts/courses x 6 hours study each = 102 hours total + Optional Subject @ 6 Per subject =108) + Project Exercises Minimum 12 hours **= Grand Total 120 Hours.**	**45**	**35**	**20**
1	**BSc (Bachelor of Science) in Solar Energy/Alternative Energy/Renewable Energy Engineering (BSCSE/BSCAE/BSCEEE), Graduate Diploma in Solar Energy (GDSE), Graduate Diploma in Renewable Energy (GDRE), Graduate Diploma in Alternative Energy (GDAE).**	*120 Hours (Time)*		
	SEMESTER -1 **1. Principles of Solar Engineering:** 1. Introduction to Solar Energy Conversion 2. Fundamentals of Solar Radiation 3. Solar Thermal Collectors 4. Thermal Energy Storage and Transport 5. Solar Heating Systems 6. Solar Cooling and Dehumidification 7. Passive Solar Heating, Cooling, and Daylighting 8. Solar Thermal Power 9. Photovoltaics 10. Solar Photochemical Applications **2. Solar Dryer:** Solar Photochemical Applications Sun drying vs. Solar drying Classification of Solar Dryers Non-Technical Aspects Applications and Experiences Components etc. **3. Solar Cookers/Solar Cooking Basics:** A. Introduction B. Solar Cooking Basics C. The History of Solar Cooking D. Types of Solar Cooking E. Where Is Solar Cooking Possible? F. Why Solar Cooking Is Important G.	**45** *6 Credit Hours Per Subject*	**35**	**20**

	Health and Safety H. How Solar Cookers Work I. Follow the Sun J. Components of Solar Cookers 1. Glazing 2. Insulation 3. Reflective Material 4. Containers for Solar Cooking K. Build a Solar Oven L. Buy a Solar Oven M. Solar Pots N. Cooking Instructions O. Solar Cooking Tips and Tricks P. Recipes Q. Solar Cookbooks R. Solar Cooking Frequently Asked Questions S. Data Collection T. CO_2 Balance U. Heat Storage V. Testing W. Most Important Solar Cooking Projects X. Solar Cooker Group Meetup Y. The Sustainable Development Objectives of the United Nations Z. Solar Cooking and Emergency Preparedness **4. Domestic and Industrial Water Heaters:** Solar Water Heating Commercial Systems Water Heaters 1 General technical specification of solar water heaters 2 Selection of right technology 3 Sizing of solar water heater system 4 Cost evaluation of solar water heater system 5 Installation of solar water heater system 6 Maintenance and trouble shooting **5. Solar Distillation:** What is Distillation? Different Types of S.W.D Properties of water Solar Still Different type of solar still Parameters affecting the output of a solar still Classification of solar distillation system Construction and working Construction of Solar water (Project) Details of the different parts of the system How a solar still works? **6. Design of Solar Cell:** Introduction Solar Spectrum Solar Cell working principle Solar Cell I-IV Characteristics Solar Cell Materials and Efficiency What is a Solar Cell? Construction of Solar Cell Materials Used in Solar Cell Criteria for Materials to be Used in Solar Cell **7. Solar Electric System Design, Installation and Maintenance:** Evaluation a site for solar PV Potential System Components Putting the system together System design considerations Cost considerations Solar Maintenance	*6 Credit Hours Per Subject*		

SEMESTER -2

6 Credit Hours Per Subject

6. Solar Photovoltaic Lighting System:

Evaluating the potential for PV Lighting Application
PV Lighting Application
Sources for PV Lighting System and Equipment
Design and Construction of Solar PV LEDs Lighting System

7. Solar Water Pumping/ Solar Water Pumping Systems - Design, Selection and Installation:

System types and configuration
Designing and Selecting a Solar Water Pumping System
Site Visit
Solar Irradiation
Selecting the water pipe
Total Dynamic Head
Selecting the solar water pumping system
Installation of the solar water pumping system
Maintenance etc.

8. Solar Thermal:

Solar Thermal (Renewable Energy)

1- Introduction 3
2- Solar Radiation 6
3- Geometry Globe-Sun 8
4- Solar Thermal Energy Applications 10
5- Collection Systems 15
6- Active Solar Heating 17
7- Passive Solar Heating 30
8- Conclusions. 39

9. Solar Radiation:

Sun Earth Relationship
Solar Radiation
Electromagnetic Spectrum
Solar Irradiance (Solar Power)
Solar Irradiation (Solar Energy)
Solar Power & Solar Energy
Peak Sun Hours
Atmospheric Effects, Air Mass, Solar Radiation Data etc.

10. Solar wind power & its application: Wind and Solar Electricity

Wind and Solar Electricity Generating Technologies
Barriers to Increasing Wind and Solar Electricity Generation
Overcoming Barriers to Wind and Solar Electricity
A High Wind and Solar Future: Scenarios and Implications

Introduction: Modern Wind Energy and its Origins
Wind Characteristics and Resources
Wind Turbine Materials and Components
Wind Turbine Design and Testing
Wind Turbine Siting, System Design, and Integration
Wind Energy Applications etc.

	11. Renewable Energy Supply and Storage: Introduction to Renewable Energy System The project development process Technology, Energy System, Excel Screening tool, etc. **SEMESTER -3** **12. Alternative Energy Equipment:** Alternative Energy Equipment and Systems Photovoltaic Systems Energy Storage Systems Fuel Cells and Hydrogen Generators Engine Generators and Microturbines -Wind Turbine Generating Systems Etc. **13. Renewable Energy for Commercial/Industrial Sector:** Options for doubling the share of renewable energy General methodology and data sources Potential of renewable technologies for global industry Discussion etc. **14. Managing Alternative Energy Project:** 1. Renewable Energy Sector Project – Cook Islands Project description Project implementation plan Cost & financing Procurement etc. 2. Renewable Energy Projects **15. Renewable Energy Management:** Introduction: The Energy Management Profession Effective Energy Management Boilers and Fired Systems Steam and Condensate Systems Cogeneration Waste-Heat Recovery HVAC Systems Electric Energy Management Energy Management Control Systems Energy Systems Maintenance Industrial Insulation Use of Alternative Energy **16. Energy Policy:** Introductory Chapter: Trends and General Information on Energy Policies in the world General evaluation of energy policies Overview of world energy and aspect of energy policy https://www.intechopen.com/chapters/72587 https://www.intechopen.com/books/7633 American Energy Policy And from the book “Alternative and Renewable Energy by WPI “ can be studied “3. Energy Policy” USA, Europe, Japan, Australia, Russia, and China, India, Brazil.	*6 Credit Hours Per Subject*		

	17. Introduction to Alternative and Renewable Energy: Traditional Energy Renewable Energy Energy Policy Solutions to Energy Problem: Topics on Hydropower. **OPTIONAL SUBJECTS (For BSc or Graduate Diploma Any one/Two subjects can be chosen):** ### Renewable Energy and Green Technology, ### Alternative Energy Sources, ### Renewable Energy Resources/Sources, ### Green Energy, ### Energy Efficiency, ### Advanced Concepts for Renewable Energy Supply of Data Centers, ### Energy and Environment, ### Optical Engineering & Solar Collectors, ### Solar Heating, Cooling & Air-conditioning Systems. ### Construction Safety, ### Codes and Standards, ### Energy Storage and the Hydrogen Economy. **FOLLOWING ADDITIONAL TASKS SHOULD HAVE TO DONE BY PARTICIPANTS OR STUDENTS:** a) Solar Energy, Renewable Energy, Alternative Energy, Solar Energy Engineering Certification Test MCQ Questions answer practicing b) Solar Energy, Renewable Energy, Alternative Energy, Solar Energy Engineering Certification Test Board Questions/TMA (Tutor Mark Assignment) c) Solar Energy, Renewable Energy, Alternative Energy, Solar Energy Engineering Certification Case Studies **Exercises and projects**	*6 Credit Hours Per Subject*		
	Project/Thesis/Case Studies			
	Student have to take a Project/Thesis/Case studies as per their major subject in order to complete his/her Graduate Diploma/BSC. • In case Project/Thesis, respective students should submit 25 to 45 (A4 Size) pages long report. *Course Tutor or Concern Authority will assign/fix Project/Thesis Topic or Title with consultation with respective student.* • In Case Studies, respective students should submit case studies answer script in written form to the GEPEA within stipulated time frame. *Concern Authority will assign case studies question paper in time.*			

	TOTAL HOURS REQURIED TO BE COMPLETED FOR THE SOLAR ENERGY, ALTERNATIVE ENERGY, RENEWABLE ENERGU & ENGINEERING GRADUATE DIPLOMA OR BSC PROFESSIONAL CERTIFICATIONS = 17 parts will count 6 hours each (17 parts/courses x 6 hours study each = 102 hours total + Optional Subject @ 6 Per subject =108) + Project Exercises Minimum 12 hours **= Grand Total 120 Hours.**			

How Does Solar Energy Work?

In active solar power systems, solar energy from the sun is captured by photovoltaic cells located in solar panels, generally installed on rooftops in residential installations or, for business or utility-scale installations, in a solar array that is a large set of panels either on the ground, floating on water or in some instances as a solar roof in a parking lot. Depending on whether your home system is on-grid or off-grid, the solar energy is then added to the electricity in circulation generated by your local provider, which will be reflected in a lower electricity bill for you, or used to power your home, with excess stored on-site in a battery.

What Do Solar Technicians Do?

Solar technicians install, maintain, troubleshoot and test photovoltaic systems, which include solar panels, fans pump and other equipment. They can work on residential installations, private business or utility scale installations. Solar technicians should be comfortable working outdoors. Not all solar installations are on rooftops, but anyone interested in becoming a solar technician should be comfortable with heights. The installation of solar energy systems may require the help of roofers and electricians, and so the solar energy technician needs to be comfortable working alongside other professionals.

Solar Photovoltaic (PV) installers piece together, set up, and maintain rooftop or other systems that convert sunlight into energy. They will typically be responsible for planning the configuration of the PV system to meet the needs of the customer. This configuration will depend on the amount of energy required (for heating, cooling or charging battery systems), the size of the building and the normal hours of sunlight for the location. The configuration may be constrained by the architecture of the building. They will measure, cut and assemble the structure required to support the solar PV panels, then install the solar panels and support structures in compliance with local building codes and standards.

Solar panel installers may be responsible for connecting solar energy system to the electrical grid, depending on the job and state regulations, although this is sometimes a job for electricians. Once installed, the system will require testing for proper wiring, polarity, and grounding. Solar energy technicians are also responsible for the maintenance of solar PV systems.

COURSE MATERIAL

Besides using the traditional books GEPEA has also modernized the learning process by providing students with online portal consisting of –

- **Study Materials (Soft copies)** – PDF of books are provided to students making studies nomadic & convenient. GEPEA Department of Students Affairs will assign Study Materials via Email or other methods after registration and admission.
- The focal point of **GEPEA** study materials is enhancing Practical Education. **GEPEA** Kit provided to applicants is a world full of practical scenarios, explanation in terms of facts rather than theoretical phrases. Customized to be self-explanatory & easy to understand.
- **Faculty Guidance** – GEPEA panel of intellectuals guide students personally with regards to any query through email about any concept in the notesprovided, being the author of the same.

EXAMINATION

GEPEA Professionals are given the privilege to answer exams from any examination center in the world along with the freedom to pick the exam schedule for the same, as time permits in the particular examination months of GEPEA. Students are allotted 2 modes of examinations – Home Based/Center Based.

- Question papers would be drafted by **GEPEA** panel of veteran professors which would be TMA (Tutor Mark Assignment), OBS (Open Book System) and MCQ study pattern. A single course will consist 100 marks based on these three pattern of exam types. In each program will consist a major (Thesis Research) course or theory in order to complete the respective Diploma Program.
- This unique & novel methodology teaches a student how to assess business situations and make decisions based upon those assessments, allowing students to display their potential.
- In case of home based/distance learning exams question paper would be emailed to the students, which they would have to answer & courier back to GEPEA office or GEPEA directed authority in therespectable exam slab.
- Candidate also has the option of appearing for Center Based Examination wherein they would have to visit one of the many GEPEA exam centers &complete answering the exam in the duration of 3 hours which wouldn't be an open book examination.

CASE STUDY METHOD & STUDY MATERIAL:

Today communication systems have advanced so much that it is much easier, convenient and quicker to gain expertise via online distance learning. GEPEA offer potential students the opportunity to study through an autonomous online distance learning program. This means that people who can't get traditional further education can still achieve what they want and get their qualifications through Online Distance Learning. That gives the opportunity for a much wider range of people to get the qualifications that they want. Today, thanks to technological advances, higher education is more readily available to those who want it.

GEPEA is an institute of excellence offering widest range of autonomous programmes in the field of Business Management and different Professional Training education. In response to the rapidly changing economic environment and the process of globalization, the Academy has made sustained efforts to bring an international perspective to all its wide range of areas and activities.

BENEFITS AND FETURES:

(i) **Flexible Programs & Curriculum:** You can earn and study at the same time! From GEPEA International Curriculum, Flexibility is the biggest advantage of distance learning courses. This stands true especially if you are a working professional. Not everyone has the luxury of taking their own time to finish their studies. For those who had to take a break from studies to start working, such courses are a boon and provide the opportunity to pursue higher education.

(ii) **Saves Time & Energy:** You save up a lot of time and energy on commuting. You can stay at any place and pursue a course that is available at GEPEA. Or you might be based out of a remote village or town which does not have enough options for higher studies. Distance learning courseseliminate these obstacles.

(iii) **MCQ, Case Based Learning:** MCQ, A Case-based approach engages students in discussion of specific situations, typically real-world examples of African, Asian and International companies. Allowing the students to put their theoretical knowledge to practice.

(iv) **Study at your own Pace**: Not everyone has the same pace of learning. Some students pick up things fast, others need time to grasp a concept. Oneof the biggest advantages of distance learning is that you can study at a pace that is comfortable for you.

(v) **Saves Money:** These courses are almost always cheaper as compared to their on-campus counter-parts. You also cut down on the costs incurred while commuting etc.

(vi) **Personal Fulfillment:** An MBA is the key to unlocking both a professionally and personally rewarding future. Education is the foundation upon which you can build lifelong business and personal achievements. The GEPEA MBA program is designed to enrich your personal life, as well as tokeep you informed about a constantly changing industry.

(vii) **Convenient:** You can submit your assignment with the click of a button or simply drop it off at a post-office! It's sometimes as simple as that!

(viii) **24X7 Access to Study Material & fellow Students:** This is the best way to study if you are comfortable with internet and technology. You can access your study material online whenever you want and also clear doubts, exchange views and discuss with your virtual class-mates!

(ix) **Study any Topic You Want:** Since you'd already have all your books/online study material with you, you can pick up any topic/chapter that interests you and tackle that first! This way your interest in the subject is sustained.

(x) **Higher Level of Self-Confidence:** The knowledge gained through our Correspondence MBA program will enhance your effectiveness in your current position and help define your future career path. It will sharpen your skills in critical business areas, giving you the self-confidence youneed to become a leader in your profession.

(xi) **Specialization:** We provide more than 80 specializations which allow students to gain additional knowledge and background on specific businesstop.

ACCREDITATIONS AND RECOGNITIONS:

ITQSM Accredited & International Partnered Professional Academies.

GEPEA has proudly claimed the Excellence in Online Distance Learning Award presented by its Governing Body Really Matters as a token of appreciation for providing top notch education to professionals globally. This solely proclaims that GEPEA is one of the best Professional Academy in the field of online distance learning.

PROFESSIONAL FACULTIES:

GEPEA Faculty members are highly professional, qualified & experienced. Professors provide substantial assistance through 24*7 web support. Each & every query regarding studies, assignments, cases, projects, research are resolved on time & responded with clear, relevant answers on par with syllabus. They update themselves from time totime about the changing market scenario & syllabus. Thus working professionals have chance to get resourceful information by interacting with professorsthrough web-support from time to time. Timely communication & assistance is key to our successful association with our students & our professors believe in same.

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In case any query, please feel free to contact us via E-Mail: gepea.official@gmail.com , office@gepea.eu or visit Website: www.gepea.eu or www.gepea.education