

Biogas Energy Technician Course-PCP (Theory & Practical) Training Schedule

Total course duration (320 hr)			
PCP (140 hrs)		Self learning (260 hrs)	
Practical (90 hrs)	Theory (50 hrs)		

Week	Schedule		PCP- Topic				Learning outcomes- After attending the PCP learner would be able to -:
	Topic	Day	Duration (Hr)	Theory	Duration (Hr)	Practical	
Week 1	Bio Gas Technology	DAY 1	2 hrs	<ul style="list-style-type: none"> •Introduction to Biogas fuels •Difference between Biogas & LPG/CNG •Advantages & disadvantages of Biogas 	3 hrs	<ul style="list-style-type: none"> • Demonstration of Biogas generation process by using chats or audio/video aid 	<ul style="list-style-type: none"> • differentiate between biogas & petroleum gas fuels • identify the devices & biogas plants. • observes the limitations and advantages of biogas fuel. • identify various application of biogas.
		DAY 2	2 hrs	<ul style="list-style-type: none"> •Principles of conversion of slurry into Biogas •Composition of Biogas & slurry. •Raw materials for Biogas generation 	3 hrs	<ul style="list-style-type: none"> • Demonstration of slurry & raw materials by using chats or audio/video aid • Demonstration of Biogas & slurry composition by using chats 	<ul style="list-style-type: none"> • state the principles of slurry/raw material conversion to biogas • identify the composition of biogas & slurry • identify the raw materials required for biogas generation. • prepare slurry for biogas generation.

Week 2	Optimum Biogas Generation	DAY 1	2 hrs	<ul style="list-style-type: none"> • Chemistry of fermentation • Acid Phase including Hydrolysis • Methane Phase 	4 hrs	<ul style="list-style-type: none"> • Demonstration of fermentation process Acid phase & Hydrolysis, Methane phase & conditions for optimum Biogas production by using chats or audio/video aid. 	<ul style="list-style-type: none"> • identify the factors affecting fermentation. • identify the stages of bio-gas preparation. • carry out fermentation process for the generation of biogas from slurry.
		DAY 2	2 hrs	<ul style="list-style-type: none"> • Conditions for optimum biogas production a. Anaerobic conditions b. pH value of slurry/raw material c. Temperature d. Carbon/Nitrogen ratio e. Digestibility of raw material f. Retention time g. Slurry h. Feed Rate Mixing & agitation 	4 hrs	<ul style="list-style-type: none"> • Demonstration of conditions for optimum Biogas production by visit of a running Biogas plant 	<ul style="list-style-type: none"> • identify the important parameters affecting the production of biogas. • identify the conditions for optimum biogas production. • adjust the parameters for optimum biogas production.
Week 3	Biogas Plants	DAY 1	2 hrs	<ul style="list-style-type: none"> • Introduction to Biogas plants • Types of Biogas plants • Selection of size of Biogas plants • Advantages & limitations of different types plants 	4 hrs	<ul style="list-style-type: none"> • Demonstration of various types Biogas plants & selection of size criteria by using chats or audio/video aid 	<ul style="list-style-type: none"> • identify the different types of biogas plants & its uses • identify the various components of biogas plant • select the size of biogas plants according to location. • state the advantages & limitation of biogas plants

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Week 4	Biogas Plant Construction	DAY 1	2 hrs	<ul style="list-style-type: none"> • Selection of site • Draw-Plan, section & elevation of different type of Biogas plants • Material requirement for different type Biogas plants 	4 hrs	<ul style="list-style-type: none"> • Demonstration of selection of site, drawing, materials requirement for different type Biogas plants by using charts, audio/video aid or visit of a running Biogas plant. 	<ul style="list-style-type: none"> • select the appropriate site according to drawing of type of biogas plant • identify the material of construction for different type of biogas plant.
		DAY 2	2 hrs	<ul style="list-style-type: none"> • Construction Techniques <ul style="list-style-type: none"> a. Layout b. Excavation c. Floor d. Wall e. Feed Mixing tank f. Inlets & Outlets g. Construction of dome h. Plastering of plant 	4 hrs	<ul style="list-style-type: none"> • Demonstration of construction techniques by using charts, audio/video aid or by visit actual construction site of a Biogas plant. 	<ul style="list-style-type: none"> • adopt appropriate procedure for construction of a bio-gas plant. • sketch the layout of the biogas plant. • perform costing and estimation of the biogas plant.
Week 5	Construction Techniques	Day 1	2hrs	<p>Important features of construction of –</p> <ul style="list-style-type: none"> a. Excavation b. Floor c. Wall d. Feed Mixing tank 	4 hrs	<p>Practice for handling tools & equipments required for construction work in –</p> <ul style="list-style-type: none"> • Excavation • Floor • Wall • Feed Mixing tank <p>And demonstrate this construction works.</p>	<ul style="list-style-type: none"> • handling tools & equipments required for construction work. • identify materials used for construction. • identify the time for construction.

		Day 2	2hrs	<p>Important features of construction of –</p> <ul style="list-style-type: none"> a. Inlets & Outlets b. Construction of done c. Plastering of plant 	4 hrs	<p>Practice for handling tools & equipments required for construction work in –</p> <ul style="list-style-type: none"> • Inlets & Outlets • Construction of done • Plastering of plant <p>And demonstrate this construction works.</p>	<ul style="list-style-type: none"> • carry out construction work for the biogas plant. • undertake the construction for different type of biogas plant
Week 6	Biogas Plant Testing	Day 1	2 hrs	<ul style="list-style-type: none"> • Introduction about testing • Checking and testing of Biogas plants <ul style="list-style-type: none"> a. Visual Observation b. Water leakage testing 	4 hrs	<ul style="list-style-type: none"> • Demonstration of checking & tested method by using chats or audio/video aids 	<ul style="list-style-type: none"> • carry out the schedule maintenance of a bio-gas plant. • carry out checking by adopting proper testing methods for different types of biogas plants. • locate faults by visual observation. • carry out water leakage test.
		Day 2	2 hrs	<ul style="list-style-type: none"> • Gas Leakage testing <ul style="list-style-type: none"> a. Measure water level & using soap solution b. Using manometer soap solution c. Using smoking method <p>Leakage test for Gas outlet & pipe line fitting</p>	4 hrs	<ul style="list-style-type: none"> • Demonstration of testing techniques by visit of running Biogas plant. • Practice on testing techniques. 	<ul style="list-style-type: none"> • checking for newly constructed and already existing biogas plants by selecting proper testing methods. • carry out gas leakage test.
Week 7	Biogas Plant Commissioning	Day 1	2 hrs	<ul style="list-style-type: none"> • Introduction about commissioning • Equipment required for actual commission 	4 hrs	<ul style="list-style-type: none"> • Demonstration of biogas plant commissioning by using charts or audio video aids. 	<ul style="list-style-type: none"> • adopt proper techniques for commissioning of bio-gas plants. • identify the equipments required for commissioning of plants. • state how to use the biogas fuel for domestic work.
		Day 2	2 hrs	<ul style="list-style-type: none"> • Checkup and testing required before commissioning of 	6 hrs	<ul style="list-style-type: none"> • Visit of running Biogas plant • Demonstration of 	<ul style="list-style-type: none"> • Complies with proper standards of checking the biogas plants before

				Biogas plant .		various domestic works by using Biogas fuel (i.e. preparing tea, cooking food, heating water etc.)	commissioning. <ul style="list-style-type: none"> • identify the various domestic uses of biogas fuel. • observes the limitation and advantage of bio-gas fuel
Week 8	Biogas Plants fault finding & Repair	Day 1	2 hrs	<ul style="list-style-type: none"> • Introduction about fault finding & repair • Identification of causes of faults • Locate problems in Biogas plant. 	4 hrs	<ul style="list-style-type: none"> • Demonstration of various types of faults by using chats, or audio/video aid. 	<ul style="list-style-type: none"> • identify various faults of biogas plant. • locate the problem in biogas plant operation.
		Day 2	2 hrs	General faults & Repairs <ul style="list-style-type: none"> • Crack in digester wall • Leakage of gas. 	4 hrs	<ul style="list-style-type: none"> • Demonstration of various repair method by using chats, audio/video aid or by visit of a sunning Biogas plant. • Practice to diagnose and repair of fault of Crack in digester wall, Leakage of gas 	<ul style="list-style-type: none"> • identify various repairs of biogas plants. • use the appropriate repair methods for repairing diagnosed fault in biogas plant.
Week 9	Biogas Plants fault finding & Repair	Day 1	2 hrs	General faults & Repairs <ul style="list-style-type: none"> • Accumulation of water in pipe. • Reduced gas production. 	4 hrs	<ul style="list-style-type: none"> • Practice to diagnose and repair of fault of water accumulation, reduced gas production. 	use the appropriate repair methods for repairing diagnosed fault in biogas plant.
		Day 2	2 hrs	General faults & Repairs <ul style="list-style-type: none"> • No gas at stove • Small flames in burner • Pulsating flame 	4 hrs	<ul style="list-style-type: none"> • Practice to diagnose and repair of fault of no gas at stove, small flames in burner, pulsating flame. 	use the appropriate repair methods for repairing diagnosed fault in biogas plant.

Week 10	Maintenance of Biogas Plant	Day 1	2 hrs	<ul style="list-style-type: none"> • Introduction to preventive maintenance method for Biogas plant • Daily maintenance • Weekly maintenance • Monthly maintenance 	4 hrs	<ul style="list-style-type: none"> • Demonstration of various preventive maintenance methods by using charts or audio/video aid. 	<ul style="list-style-type: none"> • identify various preventive maintenance methods. • carry out daily, weekly and monthly maintenance of a biogas plant.
		Day 2	2 hrs	<ul style="list-style-type: none"> • Annual maintenance • Five yearly maintenance 	4 hrs	<ul style="list-style-type: none"> • Site visit of a running Biogas plant. 	<ul style="list-style-type: none"> • use various preventive maintenance techniques. • prepare trouble shooting chart and carry out maintenance according to it.
Week 11	Different uses of Biogas & slurry	Day 1	2 hrs	<ul style="list-style-type: none"> • Introduction about the uses of Biogas a. Biogas burners b. Biogas Lamps c. Maintenance of Biogas appliances. 	3 hrs	<ul style="list-style-type: none"> • Demonstration of Biogas utilization by using charts or audio/video aids. 	<ul style="list-style-type: none"> • identify various different set up which use biogas fuel. • carry out dismantling and assembling of this appliances for repair and maintenance.
		Day 2	2 hrs	<ul style="list-style-type: none"> • Utilization of slurry a. Utilization of slurry as manure b. Composition of slurry c. Wet slurry d. Dried slurry e. Other Uses of slurry 	3 hrs	<ul style="list-style-type: none"> • Demonstration of slurry utilization by using charts or audio/video aids. 	<ul style="list-style-type: none"> • identify different composition and state of slurry. • use slurry for different applications.
Week 12	Advanced/Industrial Packaged Biogas plants	Day 1	4 hrs	<ul style="list-style-type: none"> • Introduction of Advanced/Industrial Biogas plants 	4 hrs	<ul style="list-style-type: none"> • Demonstration of Advanced/Industrial Biogas plants by using charts or audio/video aids. 	<ul style="list-style-type: none"> • identify various types of advanced industrial biogas packaged plants. • observes the advantages of these plants.

