

**NATIONAL  
SHORT TERM TRAINING COURSES  
ON  
VARIOUS ASPECTS OF  
SMALL HYDROPOWER DEVELOPMENT  
AND RENEWABLE SOURCES OF ENERGY**

**Scheduled during the years 2009 to 2011**

*Sponsored by*



1 R; eo t; rs

**Ministry of New and Renewable Energy (MNRE)  
Government of India, New Delhi**

*Offered by*



**ALTERNATE HYDRO ENERGY CENTRE  
Indian Institute of Technology Roorkee  
Roorkee – 247667 (Uttarakhand) India**

Capacity Building of different stakeholders working/involved in various renewable energy and small hydropower development is long felt for coping with the requirement of rapidly growing projects in India. This has been also given due emphasize by the Ministry of New and Renewable Energy (MNRE), Govt. of India. To give an impetus to such efforts it is proposed that various training programmes are offered by AHEC IIT Roorkee during the years 2009 to 2011 with the support of MNRE.

### Short Term Training Programmes for the Years 2009 to 2011

Course Serial No.	Training Programme Title	Duration (days in nos)	Target Participants	Tentative schedule
<b>YEAR 2009</b>				
1	DPR Preparation and Evaluation for SHP Projects	4	Owners, Consultants, Financial Institutions, Contractors	April 28 - May 01, 2009
2	O&M of SHP Stations	4	Owners, manufacturers, Contractors	June 09 - 12, 2009
3	SHP Development	5	Govt. Depts., Owners, Consultants, Financial Institutions, Traders, SERCs,	July 14 - 18, 2009
4	SHP Simulator	1	Owners, Manufacturers, Contractors	May 12, 2009
5	Financing of Renewable Energy Systems	2	Financial Institutions, Investors, SERCs,	July 21 - 22, 2009
6	Regulation in Electricity Sector (with specific referenceto Renewable Energy)	4	Owners, Consultants, Financial Institutions, Traders, SERCs, Govt. Depts.	Aug 26 - 29, 2009
<b>YEAR 2010</b>				
7	Performance Testing and Evaluation for SHP stations	5	Owners, Consultants, manufacturers, Govt. Depts., Contractors, Financial Institutions, Academics	Jan 12 - 16, 2010
8	O & M of SHP Stations	4	Owners, Manufacturers, Contractors	March 09-12, 2010
9	SHP Development	5	Govt. Depts., Owners, Consultants, Financial Institutions, Traders, SERCs,	April 20 – 24, 2010
10	SHP Simulator	1	Owners, Manufacturers, Contractors	May 18, 2010
11	Surveys Investigations and Hydrological Studies for SHP Development	5	Govt. Depts., Owners, Consultants, Financial Institutions, Traders, SERCs, Academics	June 08-12, 2010
12	Regulation in Electricity Sector (with specific reference to Renewable Energy)	4	Owners, Consultants, Financial Institutions, Traders, SERCs, Govt. Depts.	Aug 24 – 27, 2010
13	Procurement and Negotiations for Hydro Projects	4	Govt. Depts., Owners, Consultants, Financial Institutions, Traders, SERCs, Academics	Sept 21 – 24, 2010

Course Serial No.	Training Programme Title	Duration (days in nos)	Target Participants	Tentative schedule
<b>YEAR 2011</b>				
14	Performance Testing and Evaluation for SHP stations	5	Owners, Consultants, manufacturers, Govt. Depts., Contractors, Financial Institutions, Academics	Jan 11 – 15, 2011
15	Small Hydropower Development	5	Govt. Depts., Owners, Consultants, Financial Institutions, Traders, SERCs,	Feb 22 – 26, 2011
16	Silt Removal and Resistive Material for SHP Projects	5	Govt. Depts., Owners, Consultants, Financial Institutions, manufacturers, Govt. Depts., Contractors, Academics	April 26 – 30, 2011
17	Regulation in Electricity Sector (with specific reference to Renewable Energy)	4	Owners, Consultants, Financial Institutions, Traders, SERCs, Govt. Depts.	Aug 23 – 26, 2011
18	Bankable DPR for SHP Projects	4	Owners, Consultants, Financial Institutions, Contractors	July 19 – 22, 2011

## SPONSORED SEATS

2 candidates per government organization may avail under the sponsored seats for each course. The total sponsored seats shall be only 20 per course. Organizations intend to depute more persons may also get admission by paying fee mentioned for each course.

## VENUE

The course will be held at Alternate Hydro Energy Center (AHEC), Indian Institute of Technology Roorkee (Uttarakhand), India.

## TRAVEL

Roorkee is about 180 km North of Delhi and has a number of academic and research Institutions. It is connected by road and rail from Delhi. The nearest international airport is in New Delhi. A large number of interstate buses ply from Delhi to Roorkee on way to Haridwar (31 kms from Roorkee) and Dehradun (75 kms from Roorkee). Roorkee is also connected by rail from Delhi and other important towns.

## EXPENSES

The nominating organization(s) or the participant(s) shall have to bear all expenses on travel from their home town to Roorkee and return.

The organizer and sponsor would not hold any responsibility for risk of illness, accidents and loss of property incurred by the participants. Participants are strongly advised to insure themselves for such risks. Participants are to be in good health, proficient in English reading, speaking and listening.

## COURSE FEE

To cover the expenses of the training course a fee as given for each course shall be payable by the sponsoring organisation along with the nominations in favour of Head, Continuing Education Centre, IIT Roorkee through a Bank Draft payable at Roorkee and sent to Head, Alternate Hydro Energy Centre. The fee covers the boarding/lodging, training expenses, literature, institute overhead charges etc. Service tax will be extra as per actuals. The accommodation is arranged in the Trainee Officer Guest House and Khosla International House or nearby hotels/guesthouses as available on twin sharing basis.

This may please be noted that all payment to IIT Roorkee is exempted from any income tax deduction at source as per Ministry of Finance Circular No. 4/2002.

Course Serial No.	Training Programme Title	Fee per Person other than Govt. Organisation
<b>YEAR 2009</b>		
1	DPR Preparation and Evaluation for SHP Projects	Rs. 5,000/-
2	O&M of SHP Stations	Rs. 5,000/-
3	SHP Development	Rs. 6,000/-
4	SHP Simulator	Nil
5	Financing of Renewable Energy Systems	Rs. 3,000/-
6	Regulation in Electricity Sector (with specific reference to Renewable Energy)	Rs. 5,000/-
<b>YEAR 2010</b>		
7	Performance Testing and Evaluation for SHP Stations	Rs. 7,000/-
8	O&M of SHP Stations	Rs. 6,000/-
9	SHP Development	Rs. 7,000/-
10	SHP Simulator	Nil
11	Surveys Investigations and Hydrological Studies for SHP Development	Rs. 7,000/-
12	Regulation in Electricity Sector (with specific reference to Renewable Energy)	Rs. 6,000/-
13	Procurement and Negotiations for Hydro Projects	Rs. 6,000/-
<b>YEAR 2011</b>		
14	Performance Testing and Evaluation for SHP Stations	Rs. 8,000/-
15	Small Hydropower Development	Rs. 8,000/-
16	Silt Removal and Resistive Material for SHP Projects	Rs. 8,000/-
17	Regulation in Electricity Sector (with specific reference to Renewable Energy)	Rs. 7,000/-
18	Bankable DPR for SHP Projects	Rs. 7,000/-

## ABOUT IIT ROORKEE AND AHEC

The Indian Institute of Technology Roorkee (IIT Roorkee), the successor of the University of Roorkee is the oldest technical institution of the country. This oldest seat of learning in technical education, the youngest IIT in the country, offers 11 undergraduate programmes leading to Bachelor's degree in different disciplines of technology and architecture and 62 post-graduate programmes in specialized areas leading to Master's degree and PG Diploma in technology, architecture, science and management.

IIT Roorkee has played a very important role in international cooperation, particularly for developing countries, in the field of engineering, applied sciences and social sciences including management education. It attracted a very large number of students from over 50 countries.

The Institute has about 400, faculty engaged in teaching and research, but also offers its expertise through consultancy services to private and public sector industries as well as to various government agencies. The Institute has about 2400 undergraduate students, 1800 postgraduate students, and nearly 850 Ph.D. students.

Alternate Hydro Energy Centre (AHEC) was set up at Indian Institute of Technology Roorkee by the Ministry of New and Renewable Energy (MNRE) Government of India, in the year 1982 to work for enhancement of power generation in the country through the development of small hydropower. AHEC imparts training to the field engineers and technologists regularly. It also provides expert services on all aspects of SHP development to the users. These services are being utilized by state governments and private developers. AHEC has been identified as 'Apex Technical Institution' for the Small Hydropower Development in India. The centre also runs a 4 semester Master of Technology Programme in "**Alternate Hydro Energy Systems**" and "**Conservation of Rivers and Lakes**", which is open to national and international participants.

## NOMINATIONS

Sponsoring organizations and individuals may send their nomination in the registration form given in the last of this booklet to

Head,  
Alternate Hydro Energy Centre,  
Indian Institute of Technology Roorkee  
Roorkee- 247 667 (Uttarakhand), India  
Phone : +91-1332 274254, 285213  
Fax : +91-1332 273517, 273560  
E-Mail : [ahec@iitr.ernet.in](mailto:ahec@iitr.ernet.in), [aheciitr@gmail.com](mailto:aheciitr@gmail.com)  
Web site : [www.ahec.org.in](http://www.ahec.org.in); [www.iitr.ernet.in/centers/AHEC/Pages/index.html](http://www.iitr.ernet.in/centers/AHEC/Pages/index.html)

The candidate/organization who are to pay the required fee, may remit the fee in favour of Head, Continuing Education Centre, IIT Roorkee through a Bank Draft payable at Roorkee and sent to Head, Alternate Hydro Energy Centre, IIT Roorkee, Roorkee.

**Course Title : DETAILED PROJECT REPORT FOR SMALL HYDROPOWER**  
**Duration : 4 Days**  
**Schedule : April 28 – May 01, 2009**

## OBJECTIVES

Detailed project report and other reports are important tools for investment decision. It has been found that the quality and contents of reports needs improvement and adequate coverage of different details. The course shall aim to improve the quality and contents of the reports which are prepared/used/referred/reviewed by different stake holders of small hydropower.

## COURSE CONTENTS

The course shall cover following:

- Different types of reports for Small hydropower
- Structure for Detailed project report
- Optimal utilization of stream potential
- Hydrology
- Power potential
- Flood estimation and Design values
- Installed capacity
- Cost estimation
- Environmental impacts
- Financial analysis
- Clearances

## TARGET PARTICIPANTS

Middle level e.g. DGMs, Superintending Engineers, Executive Engineers, Assistant Engineers, Account Officers, etc. of utilities, government agencies, financial institutions, consultants, NGOs.

**Course Title : O&M OF SHP STATIONS**  
**Duration : 4 Days**  
**Schedule : ● June 09 - 12, 2009 ● March 09 - 12, 2010**

## OBJECTIVES

Operational and maintenance of hydropower station is a specialized aspect. The course is aimed to provide basics of the electro-mechanical equipments, upkeep, operation and maintenance during running of the plant.

## COURSE CONTENTS

The course shall cover following:

- Basics of Hydro turbines and their auxiliaries
- Operational problems and maintenance in turbines
- Operational problems in generators
- Control and protection equipments
- Operational limitations and application consideration in transformers
- Standards and practices for operation and maintenance of electro-mechanical equipments
- Latest technology for maintaining reliable electrical connection
- Renovation, life extension and upgrading of existing stations

## TARGET PARTICIPANTS

Government Departments, Owners, Consultants, Financial Institutions, Manufacturers, Developers, Academics

**Course Title : SMALL HYDROPOWER DEVELOPMENT**  
**Duration : 5 Days**  
**Schedule : • July 14 - 18, 2009 • April 20 - 24, 2010 • February 22 - 26, 2011**

## OBJECTIVES

Small Hydro Offers a wide range of benefits especially for rural areas. The course is aimed to provide the participants an insight to SHP, site selection potential assessment, planning and design of civil works, selection of E&M equipment and financial aspects.

## COURSE CONTENTS

The course shall cover following:

- Overview of SHP Development
- Country Policy for SHP Development
- Small Hydropower and Rural Electrification
- Use of Modern Techniques such as GPS, RS and GIS for conducting investigations and assessment.
- Regulatory impact on SHP and Tariff issues
- Financial aspects
- Case studies
- Exposure on Real Time Simulator for SHP Plants
- Selection of Electro-mechanical Equipment / Works
- Carbon Trading under CDM
- Visit to SHP Station

## TARGET PARTICIPANTS

Government Departments, Owners, Consultants, Financial Institutions, Manufacturers, Developers, Academics

**Course Title : SHP SIMULATOR BASED TRAINING FOR HYDRO PLANT OWNER**  
**Duration : 1 Day**  
**Schedule : • May 12, 2009 • May 18, 2010**

## OBJECTIVES

This hydropower plant simulator based training course deals with the actual problems faced during plant operation by creating different operating conditions on Simulator. It stresses the benefits of operator training on Simulator for long and trouble free operation of plant which results in better returns on capital invested.

## COURSE CONTENTS

The course shall cover following:

### GENERAL

- Introduction to Real Time Digital Simulator
- Overview of Small Hydropower Plants
- Grid and Hydropower Plant

### OPERATION OF HYDRO PLANT UNDER VARIOUS OPERATING CONDITIONS SUCH AS

- Synchronizing and Loading of Generator on Simulator
- Operation of Hydropower Plant under Various Operating Conditions
- Trouble Shooting in Small Hydropower Plant e.g. High Temperature,
- Benefits of Simulator Training of Operators and Technicians.

## TARGET PARTICIPANTS

Owners, Manufacturers, Contractors

**Course Title** : FINANCING OF RENEWABLE ENERGY BASED SYSTEMS IN THE HILLY AREAS  
**Duration** : 2 Days  
**Schedule** : July 21 – 22, 2009

## OBJECTIVES

Financing of renewable energy projects and applications in the hilly area is still in the infancy stages. Most of financial institutions either are not aware of the technology, incentives and provisions through the legislation for its deployment. The course shall aim to improve the awareness and details of different types of renewable energy projects in hilly areas and financing issues involved so that deployment is accelerated

## COURSE CONTENTS

The course shall cover following:

- Different types of renewable energy projects in hilly areas
- Costing of renewable energy projects
- Structure for proposal for financing in the form of Detailed project report
- Cost estimation
- Environment impacts
- Financial analysis
- Clearances and different acts
- Incentives available from Central and state Government agencies

## TARGET PARTICIPANTS

Personnel from financial institutions.

**Course Title** : REGULATION IN ELECTRICITY SECTOR (WITH SPECIFIC REFERENCE TO RENEWABLE ENERGY)  
**Duration** : 4 Days  
**Schedule** : • August 26 - 29, 2009 • August 24 - 27, 2010 • August 23 - 26, 2011

## OBJECTIVES

The continued growth of the renewable energy industry has been influenced by the competition in energy market. Demands for cheaper power in the short term would likely decrease demand for renewable energy and hence there is a need to make provision in the electricity restructuring legislation in order to breathe new life into this industry. Beside this, we have responsibility to develop energy usage patterns that will minimize damage to the environment. The objective of this course is to make participants aware about regulatory reforms in power sector, policies for promoting renewable energy in regulatory environment, market development and economic incentives

## COURSE CONTENTS

The course shall cover following:

- International experience of regulatory practices
- Review of Indian regulation practices
- Performance appraisal evaluation and monitoring
- Techniques of tariff formulations
- Transmission pricing
- Mock exercise of regulation practicing like public hearing, general procedures

## TARGET PARTICIPANTS

Middle level e.g. DGMs, Superintending Engineers, Executive Engineers, Account Officers, Renewable Energy plant owners, Regulators, Financial Institutions etc.

**Course Title : PERFORMANCE TESTING AND EVALUATION OF SHP STATIONS**  
**Duration : 5 Days**  
**Schedule : • January 12 - 16, 2010 • January 11 – 15, 2011**

### **COURSE CONTENTS**

- Objectives and philosophy of performance testing
- Flow duration and energy generation
- Elements of studies and inspection
- Hydraulic efficiency testing
- Use of CFD in flow analysis
- Flow measurement techniques and instruments
- International and national standards for performance testing
- Special tests with respect to commissioned projects
- Case studies
- Test reports

### **INTERACTION**

- Lectures
- Hands-on sessions
- Group discussions
- Site visit and field testing

### **TARGET PARTICIPANTS**

- Operating and maintenance engineers of small hydropower plants
- Financial institutions
- Equipment manufacturers
- Consultants
- State / Central Govt. nodal agencies
- Academic Institutions with established involvement in small hydropower development

**Course Title : SURVEY INVESTIGATIONS, AND HYDROLOGICAL STUDIES FOR SHP DEVELOPMENT**  
**Duration : 5 Days**  
**Schedule : June 08 - 12, 2010**

### **OBJECTIVES**

Planning of Small Hydropower Project is based on proper survey and investigations. The course is aimed to provide the participants an insight to different type of surveys and investigations required in different stages of SHP developments for proper planning.

### **COURSE CONTENTS**

The course shall cover following:

- Topographical survey
- Hydrological survey
- Geological survey
- Load survey
- Socio-economic survey
- Use of Modern Techniques such as GPS, RS and GIS for conducting investigations and assessment.
- Environmental aspects
- Survey for construction material
- Flow duration and installed capacity estimation

### **TARGET PARTICIPANTS**

Government Departments, Owners, Consultants, Financial Institutions, Manufacturers, Developers, Academics

**Course Title : PROCUREMENT AND NEGOTIATIONS FOR HYDRO PROJECTS**  
**Duration : 4 Days**  
**Schedule : September 21 - 24, 2010**

### **OBJECTIVES**

To provide necessary details, skills and experience required for hydro projects.

### **COURSE CONTENTS**

The course shall cover following:

- Types of Contracts
- Experience of IPP's
- Experience of Bidding for Hydro Projects
- Critical issues related to contracts
- Negotiation skills
- Public private partnership

### **TARGET PARTICIPANTS**

Government Departments, Owners, Consultants, Financial Institutions, Traders, SERCs, Academics

**Course Title : SILT REMOVAL AND RESISTIVE MATERIAL FOR SHP PROJECTS**  
**Duration : 5 Days**  
**Schedule : Apr. 26 – 30, 2011**

### **OBJECTIVES**

The Himalayan Rivers provide a great potential for hydropower Generation but carry high concentration silt content. The objective of this course is to make awareness for latest technological development for silt resistant materials and coatings so that proper care can be taken in designs to encounter this grave problem.

### **COURSE CONTENTS**

The course shall cover following:

- Overview on silt concentration in different rivers
- Methods of sampling and testing for silt concentration
- Effects of silt erosion
- Operational problems due to silt erosion
- Silt removal measures
- Improvement in silt resistance equipment by new materials, alloys and anti erosion coatings
- Design of desilting tank

### **TARGET PARTICIPANTS**

Government Departments, Owners, Consultants, Financial Institutions, Manufacturers, Contractors, Academics

**Course Title : BANKABLE DPR FOR SHP PROJECTS**  
**Duration : 4 Days**  
**Schedule : June 19 -22, 2011**

## **OBJECTIVES**

Detailed project report and other reports are important tools for investment decision. It has been found that the quality and contents of reports needs improvement and adequate coverage of different details. The course shall aim to improve the quality and contents of the reports which are prepared/used/referred/reviewed by different stake holders of small hydropower.

## **COURSE CONTENTS**

The course shall cover following:

- Different types of reports for Small hydropower
- Structure for Detailed project report
- Optimal utilization of stream potential
- Hydrology
- Power potential
- Flood estimation and Design values
- Installed capacity
- Cost estimation
- Environmental impacts
- Financial analysis
- Clearances
- Barriers and Mitigation

## **TARGET PARTICIPANTS**

Middle level e.g. DGMs, Superintending Engineers, Executive Engineers, Assistant Engineers, Account Officers, etc. of utilities, government agencies, financial institutions, consultants, NGOs.

# Registration Form

## TRAINING COURSE ON

Course Title ..... Schedule .....

Name ..... Mr./Dr./Mrs./Ms.)

(Write in block letters)

Position: .....

Company/Organisation.....

Department/Division.....

Mailing Address:.....

Tel (Off.):.....Residence:.....  
(with STD code) (with STD code)

Fax:.....E-mail:.....

Duties and Responsibilities:.....

Please describe briefly your professional experience in the course subject area on separate sheet..

Educational Background:

Degree	Year	Field of Study

Details of Fee: As applicable

DD No. .... Bank ,..... Amount Rs .....

Date:

Signature

*For further information and registration, please contact or write to:*

Head,

Alternate Hydro Energy Centre,

**Indian Institute of Technology Roorkee**

**Roorkee- 247 667 (Uttarakhand), India**

Phone : +91-1332 274254, 285213

Fax : +91-1332 273517, 273560

E-Mail : ahec@iitr.ernet.in, aheciitr@gmail.com

Web site : [www.ahec.org.in](http://www.ahec.org.in); [www.iitr.ernet.in/centers/AHEC/Pages/index.html](http://www.iitr.ernet.in/centers/AHEC/Pages/index.html)