

ENVIRONMENTAL DESIGN

APPROPRIATE TECHNOLOGY (1582)

Supplementary Material

ALLAMA IQBAL OPEN UNIVERSITY
Autumn, 2013

ALLAMA IQBAL OPEN UNIVERSITY

Department of Home and Health Sciences

Course: Appropriate Technology (1582)

Semester Autumn, 2013

CONTENT LIST

The study pack for “**Appropriate Technology**” includes the following items:

1. Course Books

- **The worth of Water:** Technical briefs on health water and sanitation by John Pickford. Intermediate Technology Publications, 1998.
- **The Running Water:** More Technical briefs on health water and sanitation by John Pickford. Intermediate Technology Publications, 1999.
- **Appropriate Technology, AIOU**

2. CD (3, 6, 8, and 9)

3. Supplementary Material

- Course outline
- Student guide
- Tutor guide
- Assignments 1 & 2

4. Assignments Forms

5. Schedule for submitting the assignments and tutorial meetings

Note: If any of the above mentioned material is missing in your pack, please contact at the following address:

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Allama Iqbal Open University
H-8 Islamabad

OR

Dr. Nomana Anjum

Program Coordinator/ Chairperson
Block No. 6, Allama Iqbal Open University
H-8 Islamabad

Course Outline

Appropriate Technology

Reference Books:

- Appropriate Technology: Tools choices and implications by Barrett Hazeltine and Christopher Bull
- Technology and Developing Countries: Practical Applications Theoretical Issues
Lead Editor: Richard Heeks 1995
- The worth of Water. Technical briefs on health water and sanitation by John Pickford. Intermediate Technology Publications, 1998.

Unit 1 Appropriate Technology

- 1.1 Background
- 1.2 Tools, Choices and Implications
- 1.3 Appropriate Technology Movement (an overview)

Unit 2 Technology and Developing countries

- 2.1 Practical Implications
- 2.2 Theoretical Issues

Unit 3 Appropriate Technology with reference to Building Design

- 3.1 Appropriate Energy Saving Techniques:
- 3.2 Appropriate Building Materials
- 3.3 Water Conservation (Indoor)

Unit 4 Water Management

- 4.1 Rain Water Harvesting
- 4.2 Storage: Designing Dams and Pipelines

Unit 5 Health, Water and Sanitation

- 5.1 Appropriate Selection for Sanitation Technique

- 5.2 Sewerage
- 5.3 Communal Health
- 5.4 Water Recycling

Unit 6 Solid Waste Management

- 6.1 Types of Solid Waste and its Generation Sources
- 6.2 Collection and On-site Processing
- 6.3 Transferring Stations
- 6.4 Disposal Systems

Unit 7 Energy Efficient Techniques

- 8.1 Biofuels
- 8.2 Biogas
- 8.3 Electricity
- 8.4 Solar
- 8.5 Steam
- 8.6 Wind

Unit 8 Recycling of Waste Materials

- 8.1 Glass
- 8.2 Paper
- 8.3 Tin
- 8.4 Wood Wastes
- 8.5 Recycling Units

Unit 9 Appropriate technology: Pakistan's Profile

- 9.1 Pakistan Council of Renewable Energy Technologies (PCRET)
- 9.2 Areas of Interest (Photovoltaic, Solar Thermal Applications, Micro Power Hydel Plant, Biogas, Wind Energy).
- 9.3 Research and Development
- 9.4 Products and Services
- 9.5 Constraints and Potentials

Student Guide

**Dear student,
Assalam-o- Alaikum!**

We hope you have enjoyed and successfully completed the first semester of your PGD Leading to M.S. Environmental Design Program. This course is a part of the second semester of the programme. In order to understand the course content it is vital to know its aims and objectives properly. Let's go through its aims and objectives first.

Course objectives

The specific objectives of this course are:

1. Introduce the basic concepts behind appropriate technology movement.
2. Raise awareness on the importance of low cost substitutes and their possible applications.
3. Impart knowledge and skills to adapt appropriate technology methods and techniques related to built environment.

Details of the course

Appropriate technology is technology that fits. In other words, appropriate technology is the kind of technology that fits small-scale, grassroots, people-centered economics.

The bulk of the population in developing countries is poor and survives on non-commercial energy sources. There is a need of a substantial reduction in cost of services through increased efficiency and through the application of appropriate technology.

Selection of the most appropriate technologies is important, so it is essential that engineers, planners and policy makers have plenty of information about the alternatives. Particularly those who are active in field (architects, engineers, planners) need to be able to advise and guide and direct those who are actually involved in implementation. Since the major role in implementing the technology is played by the local community, the field workers require details of technology that can be passed on. This course is specially designed keeping in view the need of the day so that the fuel substitutes, water supply and sanitation technology, reusing and recycling of waste and low-cost building techniques can be passed over to the masses by educating the engineers and planners.

Unit no. 1 and 2 are the introductory units that will make you familiar with the definitions, concepts, and applications of appropriate technology

Unit no. 3 emphasizes the appropriate technology with special reference to building material and design.

Unit no. 4 and 5 will cover in detail the water management; treatment and sanitation with reference to the low cost and intermediate techniques that are applicable to conserve water and overcome water deficiency.

Unit no.6 deals with the solid waste management and the technology applied in it.

Unit no. 7 consists of the details regarding energy efficient techniques that include biogas, solar, wind, steam etc.

Unit no. 8 deals with the recycling of materials, whereas unit no. 9 will make you familiar with the institutions working in Pakistan and the techniques locally popular and successful.

This course is divided into three components:

- a. This AIOU compiled book, which contains Units 1, 2 and 7
- b. Units 3, 6, 8, and 9 are available on the CD enclosed
- c. Unit 4 and 5 are covered in a set of two books “The Worth of Water” provided as the course material

Part time tutors

Students are allocated a part time tutor. The name and address of your tutor will be provided to you at the earliest. The tutor is to help and guide you in studying the books and conducting activities related to study units. You are expected to take full advantage of the tutor knowledge and experience. These tutors are also responsible for marking your assignments.

Make all efforts to complete your written assignment according to the prescribed schedule and try your best to attend all the study sessions according to the timetable provided to you.

As in the previous semester the schedule for tutorial meetings are arranged on fortnightly bases. The specific dates in the form of tutorial schedule are being provided separately. Try to attend these meetings regularly to get proper guidance from your tutor.

Assignments

The course is a half credit course therefore includes two assignments, which are compulsory for successful completion of the whole course. Each assignment is of 100 marks and out of these students obtaining 40 marks will be declared pass.

Assignment no. 1 is theory based as you have experienced earlier and must reach your assigned tutor before the due date. The schedule of submitting the assignment is provided separately. The tutor will send the marked assignment back to the students within 15 days, if you do not receive the marked assignment after 15 days please contact your tutor or regional office of the Allama Iqbal Open University.

The **assignment no. 2** is research based and do not need submission to the tutor before the workshop is held. For detailed instructions related to your research based assignment please go through the detailed instructions enclosed with the assignment

Note: Do not forget to dispatch the prescribed forms along with the complete assignments.

Methods of Study

Study period of 16 weeks has been allocated for studying this course through distance learning where as 17th and 18th weeks are kept for general assessment and for final examination.

Units	Assignments	Study period
1-2		4 weeks
3-6		4 weeks
7	Assignment 1	2 weeks
8-9		2 weeks
Revision	Assignment 2	4 weeks
Preparation for examination		2 weeks

Practical workshop

Practical workshop will be arranged for three days. Schedule of the workshop and venue will be sent to the students during the study period. Workshop will cover some of the lectures of the specialist on important topics Attendance in workshop is **compulsory** for the students.

Final examination

At the end of the course there will be a final examination, all the students will be expected to take this examination in the examination halls especially established for this purpose.

For any queries you can write to the course / programme coordinator Suggestions for improvement will also be welcomed. We wish you all the best.

Dr. Nomana Anjum
(Course coordinator)

Tutor Guide

Dear tutor;

Students enrolled in PGD Leading to M.S. Environmental Design offered through the distance learning system belong to a number of professions and have a variety of educational backgrounds and experience.

These students have very limited contact with their course mates and the part time tutors. It is therefore important to keep in mind that some of the distance-learning students have had no links with education during the past few years after completing their formal education, therefore they might lack confidence. Secondly distance-learning students are involved in studying during their spare time, probably after office hours. You are therefore requested to guide and help the students while keeping these issues in mind. Some students may need help in developing professional attitudes as well as understanding the facts about design and environmental sustainability.

Study Center

The main purpose of establishing the study center for distance learning students is to provide help and guidance for the difficulties faced by the students while studying at home. The study centers have been established in local institutions (Main Campus Islamabad, Regional Office Karachi and Regional Office Lahore). During the lecture sessions it is required to provide guidance to the students to sort out their problems.

Assignments

In the distance learning system, studying the course units has its own importance but assignments and workshops are the major source of link between tutor and the student. Therefore it is important to offer your comments through these assignments. Express your views in such a way that the student is not discourage, hurt or feels depress after going through your comments.

You are also expected to guide on issues like methods of solving assignments, effective methods of studying and methods to improve study habits and working hard.

It is anticipated that the student will submit their assignment in time according to the prescribed schedule.

You are therefore requested to mark the assignments wit in 15 days and return these with detailed comments within the scheduled dates.

Marking guides are provided to you. You are expected to follow the instructions and make full use of these guides while marking the assignments. The students are expected to avoid giving unnecessary details and try to be brief and comprehensive. While marking the assignments the tutor has to assess whether the students have followed the instructions provided to them or not.

Practical Assignment

The students are given another assignment which is research based and would involve the student in some research activity after which they will be representing their work report in the workshop held by the end of the semester. The students are not required to submit this assignment to you before it is presented however, after the workshop the assignments will be submitted and will be marked by you.

Workshop

A three-day workshop will be arranged for the students for each course in their respective study center. You will be intimated before time, as your presence in the workshop is necessary.

- During the workshop the experts will be delivering lectures to the students in the main areas of the subject.
- Secondly they would be taken to the field visit the details of which will be mailed to you later.
- Thirdly the students would be presenting their research-based assignment and you are required to mark the assignments after their presentation.

ALLAMA IQBAL OPEN UNIVERSITY
(Department of Home and Health Sciences)

WARNING

1. PLAGIARISM OR HIRING OF GHOST WRITER(S) FOR SOLVING THE ASSIGNMENT(S) WILL DEBAR THE STUDENT FROM AWARD OF DEGREE/ CERTIFICATE, IF FOUND AT ANY STAGE.
2. SUBMITTING ASSIGNMENT(S) BORROWED OR STOLEN FROM OTHER(S) AS ONE'S OWN WILL BE PENALIZED AS DEFINED IN "AIOU PLAGIARISM POLICY"

Course: Appropriate Technology (1582)
Level: Post- graduate
Credit: 3(3+0)

Semester: Autumn, 2013
Total Marks: 100
Pass Marks: 40

Assignment No. 1
(Units: 1-7)

Note: 10 Marks for class attendance and participation

- Q.1 (a) What practical steps have Pakistan taken regarding appropriate technology? (6)
- (b) To what extent Pakistan has succeeded in harnessing and developing Small, micro and mini hydropower potential in Punjab/Sindh and in Gilgit-Baltistan? (10)
- Q.2 What appropriate technology measures could be adoptable for addressing the energy crises in the country? (16)
- Q.3 Provide basic material selection and environmental considerations required in planning and designing a one kanal eco-friendly cottage in Murree hills. (20)
- Q.4 (a) Explain Green Idea and describe how it can be attuned to an office premises comprising of more than 200 staff, generating lot of solid waste. Suggest remedial measures. (10)
- (b) Label the main stages elaborated about management and monitoring of landfill Gas. (6)
- Q.5 Why should we recycle and what can be recycled? Describe saving of energy through Recycling? Briefly describe the steps involved in recycling of Aluminum cans (Tins) and wood. (16)
- Q.6 (a) Define desalination and the Reverse Osmosis process? (8)

- (b) Solicit water conservation approaches at your own provincial level. (8)

Instructions for Assignment No. 2

1. This assignment is of practical nature, you have to prepare a research report and present it in the workshop prior to the final examination (you do not need to send this to your tutor before the workshop).
2. The workshop component is mandatory for all the students. You cannot sit in the final examination without compiling this report and presenting it in the workshop.
3. This assignment requires thorough review of literature to develop the conceptual framework before conducting the field research, which also needs to be incorporated in the report systematically.
4. You can select any of the given topics for field research; the field visits should preferably be based closed to your home address.
5. Your research report should be at least 20-25 typed pages covering both theoretical and practical components.
6. Include the following sections in your report:
 - a) Introduction and objectives of the study
 - b) Methodology for field research
 - c) Review of literature
 - d) Data Analysis with statistics and graphical representations
 - e) Conclusions / suggestions
 - f) Appendices and bibliography
7. Prepare three copies of this assignment, one for yourself, one for the tutor and the third one for the Department of Home and Health Sciences (AIOU) for record. Attach three assignment forms with this assignment as for assignment one.
8. The student is supposed to do a power point presentation in the workshop to the resource person and course mates.
9. You are advised to consult source material frequently. If you need any guidance you may contact your tutor or write to the Department of Home and Health Sciences (AIOU)

Assignment No. 2

TOPICS FOR REPORT WRITING

1. VISIT SOME PETROL PUMPS IN YOUR CITY (Preferably LAHORE / ISLAMABAD / KARACHI / PESHAWAR / MULTAN)
 - i) Gather data about the approximate number of vehicles/day coming to that pump.
 - ii) How much of petrol/gasoline is consumed every day in comparison with the total amount/volume of petroleum stored.
 - iii) What is the routine for wastewater and petrol handling and disposal? Do you think that they are adopting proper methods for maintenance of hygiene? Take pictures of wastewater generation, accumulation, petrol and mobil oil spills etc.
 - iv) If you find that the petrol pump owners are not handling the wastewater generated daily and petrol spills properly, then what do you think could be the consequences in the form of environmental disasters 20 years or more from today (surf/browse on the internet to see the dangers and consequences of petroleum spills)
 - v) What do you suggest/recommend after concluding from personal visits, photography and Internet surfing that the local gasoline industry should do to help sustain a better environment?

2. Gasoline spills underground are causing soil deterioration (brown field generation) and groundwater contamination;
 - i) Write down the description of brown-field generation.
 - ii) Describe the process of the movement of the petroleum contamination towards the groundwater reserves.
 - iii) What are the different techniques used for treating the contaminated groundwater throughout the world? Describe briefly about them.
 - iv) Which are of them is most suitable for Pakistan while treating the water on-site.

- v) Explore the possibility of utilization of “Air Stripping” technology for groundwater treatment in Pakistan.
 - vi) Run a concise financial check/budget analysis for implementing “Air Stripping” plant in Pakistan.
 - vii) Conclude your report by commenting on the possibility or impossibility of using “Air Stripping Technology” in Pakistan.
- viii)
3. Preservation of World Heritage Sites is of prime importance these days; what sort of environmental improvements can you suggest to sustain the cultural heritage associated with them, Take one case study like Jahangir’s Tomb, Baltit/ Altit Fort Hunza, Ranni Fort Sindh, Shah Rukan e Aalam / Bahuddin Zakaria Tombs, Shah Abdul Latif Bhitai Tomb etc. Write description of the following components;
- ❖ Present situation of the components (like water supply, sewerage, storm drainage systems, air pollution etc.)
 - ❖ Future Predictions.
 - ❖ Conclusions & Recommendations.

NOTE:

- ✓ Your report must be thoroughly complimented by on-site pictures.
- ✓ Provide data values and numbers, as much as possible.
- ✓ In the first two topics, especially concentrate on the utilization of prescribed technology in Pakistan
- ✓ Provide full reference, for example if you visit a petrol pump, provide details such as;
 - Name of the Petrol Pump
 - Location.
 - Time and date of visit (this is absolutely inevitable for comprehensive report writing)
 - Persons interviewed (provide the interviewee comments as annexure along with the name of the interviewee, and his/her where-about).
 - Supervisor’s/manager’s name of the Pump etc.
 - Provide as much on-site detail as possible

Develop a project proposal which aims to: Provide community leaders all the information which assist the policy makers in implementing and sustaining a **sustainable village project** which should covers the following aspects:

- Provision of renewable energy
- Water, sanitation and hygiene of the village
- Role of woman in water supply and hygiene programme.
- Pavement and drainage system
- Solid waste management collection and disposal system
- Domestic and community's provision of health services

MARKING GUIDE

It is anticipated that the tutors mark the assignments carefully and follow the similar marking standard for all the students.

For the theory based assignment you are requested to follow the marks division as indicated on the assignment that is six questions, making a total of hundred. For the research based assignment the allocaton of marks is indicated as uner:

Research activity.....	50 marks
Report writing.....	25 marks
Presentation in the workshop.....	25 marks

You are expected to stick to the guidelines provided to maintain the standardization and uniformity.