

Programme Project Report (PPR)
for
Distance Learning Programme under School of Distance Education

Certificate in Water Harvesting and Management (CWHM)

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Academic support by

School of Environmental Sciences

Mahatma Gandhi University

Kottayam, Kerala

**CERTIFICATE IN WATER HARVESTING AND MANAGEMENT (CWHM)
(Distance Learning Programme - Certificate Programme)**

Programme Project Report

Mahatma Gandhi University started the School of Distance Education in 1989 with the vision of providing the opportunity for quality education to all realms of society. Since the beginning, thousands of students have availed themselves of this opportunity for higher education to a great extent throughout Kerala. Many students outside the State have also benefited from this. But after the new directions of the UGC in 2014, the University had stopped all the Off-Campus Centres of the School of Distance Education both inside and outside the State.

Now it is the new endeavour of the School to revamp its functioning by offering different types of Diploma and Certificate programmes very relevant to contemporary society, in addition to the conventional Graduate and Post Graduate programmes. This is being done with the academic and infrastructural support of the eminent Schools and Interdisciplinary Interuniversity Centres of the University. All these Schools/ Centres have already conducted similar Programmes or Post Graduate Programmes in the same area. This Certificate Programme has been designed by the School of Environmental Sciences and is to be conducted by the School of Distance Education with the academic support of the School.

School of Environmental Sciences was brought into existence in 1995 as a Center of Learning in the frontier areas of Environmental Sciences. It is an effort by the University to give a new direction and dimension to fulfill the long-standing needs of the different sections of the society. The major mandate of the School is to develop appropriate technologies and skilled human resources for conservation of nature, sustainable utilization and management of natural resources for development.

a) Programme’s mission & Objectives :

The Certificate programme in Water Harvesting and Management (CPWHM) is envisaged to provide integrated knowledge and training in water harvesting and management with available technologies. Management of water resources is a ‘hot issue’ in the world particularly the tropical countries. Due to the increasing population, per capita demand and supply of water is increasing and hence wise use and management is very essential. At the same time, most of the water resources are facing serious threats due to anthropogenic pollution and other climate related events. Hence, both awareness and technological intervention is inevitable for the management of water resources. The curriculum formed aims to impart full justice to the subject matter with a strong knowledge base and skill development in water harvesting and management.

b) Relevance of the programme with HEI’s Mission Goals :

Water harvesting and management is a key issue in a highly populated country like India. Sound knowledge and skill is very essential for proper water harvesting and management, both are prerequisite for meeting the problem effectively. The message involved in the proposed course can be spread to the public at large by through the learners.

c) Nature of prospective target group of learners:

Students from various streams can join for the programme. Thus the prospective target group of learners include undergraduates, postgraduates, researchers and the general public who are desirous of studying such a programme.

d) Appropriateness of programme to be conducted in Open and Distance Learning mode to acquire specific skills and competence:

Water harvesting and management is of paramount importance in the general public particularly in the era of changing climate. So the required information on the problem and the adequate measures can be extended to large section of learners through the Open and Distance Learning mode.

e) Instructional design:

The programme is of six month duration comprising four courses with a total of 16 credits. There are adequate contact classes and the assessment involves both internal as well as external components. Each student has to submit a report based case studies or individual project.

Duration-6 months						
Course Code	Course Name	Contact Sessions (hours)	Credits	*Internal Marks	External Marks	Total Marks
DE-SES-01	Water – Science & Hydrology	12	4	20	80	100
DE-SES-02	Integrated Water	12	4	20	80	100

	Resource Management					
DE-SES-03	Water Harvesting Techniques & Management	12	4	20	80	100
DE-SES-04	Case study/ Project work and Report	12	4		100	100
Total		48	16		400	

*Through assignments

f) Procedure for admission, curriculum transaction and evaluation:

Admission to the programme will be done by the University through a common procedure for all the programmes under the School of Distance Education. A pass in the Plus Two level is the minimum eligibility for the admission. Fee structure will be decided by the University. The School will prepare an academic calendar/activity planner and will be circulated among all the learners at the time of admission itself. The academic calendar will include all the significant activities, important dates, schedule of submission of assignments, schedule of contact classes, schedule of examinations, etc.

Evaluation of the courses shall be done by the faculty themselves on the basis of internal assessment and end semester examinations. 20% of the marks will be decided by the internal evaluations and the remaining 80% by the end semester examinations which will be done by the University. The performance of a student in each course is evaluated in terms of percentage of marks with a provision for conversion to grade points.

Each student shall be required to do one Assignment/Book Review/Debate/Seminar/ Presentation of case study for each course. Assignments/Book Review after valuation shall be returned to the students. The teacher shall define the expected quality of the above in terms of structure, content, presentation and the like, and inform the same to the students.

Grading System will be followed for the evaluation on a ten point scale. The details of the grading system are given in the following Table.

Percentage Equivalence of Grade:

Range of % of Marks	Grade Letter	Performance	Grade Point
95 - ≤ 100	O	Outstanding	10
85 - < 95	A plus	Excellent	9
75 - < 85	A only	Very Good	8
65 - < 75	B plus	Good	7
55 - < 65	B only	Above Average	6
45 - < 55	C	Average	5
40 - < 45	P	Pass	4
< 40	F	Fail	0

Absent	Ab	Absent	0
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'P' grade is required for a minimum pass in a course. The minimum GPA required for a pass in the Certificate programme is 4.

Calculation of Grade Point Average (GPA) :

Credit Points for the Course = (No. of Credits assigned for the course x Grade Point secured for that course).

GPA indicates the performance of a student in the programme. GPA is based on the total **credit points** earned by a student in all the courses divided by the total number of credits assigned to the courses required in the programme.

Note: GPA is computed only if the candidate passes in all the required courses (gets a minimum required grade for a pass in all the required courses as per the curriculum).

$$\text{GPA} = \frac{\text{Total credit points earned by the student from all the required courses of the programme}}{\text{Total credits of all courses required in the programme}}$$

This formula shall be printed on the Grade Card issued to the student with a note that it could be used to convert the grades into mark-percentages. (The details of the grading system as indicated above shall also be printed on the Grade Card).

Conversion of GPA to Grade

GPA	Grade
10	O
9.0 - < 10	A plus
8.0 - < 9	A only
7.0 - < 8	B plus
6.0 - < 7	B only
5.0 - < 6	C
4.0 - < 5	P
< 4	F
Absent	Ab

Conversion of GPA to percentage

$$\text{Equivalent Percentage} = (\text{GPA obtained}) \times 10$$

g) Requirement of the laboratory support and library resources:

The library and infrastructure support of the School and the University will be extended to the learners as per the requirement. To handle the practical components in syllabus, technicians and consumables are required. Certain level of the practical would be conducted and performed by applying virtual reality methods.

Mahatma Gandhi University Library and Information System consists of University Library, libraries of the Schools and 4 study centre Libraries. The University Library was established in 1989. The University Library which is situated in the main campus occupies purpose-built accommodation, and provides a variety

of facilities and has a user-friendly environment. These include individual work spaces, room for group study and teaching, audio-visual access and online information retrieval system. The building of the University Library is 2000 sq.m in area consisting of the cellar, the ground floor and the first floor.

Academic as well as public users are given the facility to use the library. Special category membership is provided to journalists. The library is providing service from 8 am to 8 pm in three shift timings for its staff. The library functions on an average of 345 days in a year. The libraries of teaching departments are open during working hours of the Schools. Reading space is provided in all the three floors housing the various sections of the library. The library provides reading facility to the visually impaired users too. For this, an electronic lab custom made for visually and physically challenged users has been set up during 2016.

The University Library has a Library Advisory Committee. It is an 18 member committee with Vice-Chancellor as Chairman and University Librarian as Convener. The library has a collection of 59,000 books, 232 journals, 2,135 Ph.D. theses and has access to 15000+ e-journals under E-Shodh Sindhu. The activities of the Library are comprehensively automated using open source library management software KOHA. OPAC, Journal Article Index, By monthly Bibliography compilation and Literature Search Service are also available

The library is a member of the INFLIBNET Centre, Ahmedabad as well as DELNET (Developing Library Network). As a member of these networks, the library provides access to the resources of other major libraries in the country. In addition to the access to UGC INFONET consortium, it has access to major online databases, such as EBSCO, ProQuest dissertations and theses, Oxford Scholarship Online, IEEE All Society Periodicals Package etc. Mahatma Gandhi University had won the State IT Award during the year 2009 in the e-learning category for its university online theses digital library. The various department libraries have a good collection of subject specific books and journals.

A. MAHATMA GANDHI UNIVERSITY LIBRARY	
Category	No.
Books	59000
Journals	232
Bound Journals	7500
Ph.D Theses	2135
E-Journals (in UGC-Infonet, renamed as E-ShodhSindhu)	15000
Online databases (in UGC Infonet)	11
Online Archives subscribed	185 Titles
Online databases subscribed	4
E-books	7338
DVDs: Educational Videos	293

B	Name of School/Centre	Total No. of books	Books added during the last three

			years
	School of Environmental Sciences	5607	66

h) Cost estimate of the programme and the provisions:

Budget estimate (for 100 students)

Sl.No.	Item	Amount (Rs. in Lakhs)
1.	Manpower	3.00
2.	Study material	2.00
3.	Laboratory & Equipments	2.00
4.	Internal assessment	0.50
5.	Field visits (2Nos.)	0.50
5.	End semester examination	1.00
	Total	9.00

(Rupees Nine Lakh Only)

Total Programme fee: Rs.9000/-

i) Quality assurance mechanism and expected programme outcomes:

The quality of the programme will be ensured through strict monitoring by an executive committee including the Co-ordinator of the programme, the subject experts, Director, School of Distance Education and Head of the School of Environmental Sciences. The Co-ordinator of the programme shall ensure the regular student feedback of courses, teachers and programme in the prescribed format towards the end of the semester and the same shall be analysed to draw conclusions for effecting improvement. Periodical review meetings on the programme efficacy will be held in which the remarks of teachers on curriculum, syllabi and methods of teaching and evaluation will be given due importance. Moreover, the progress and the quality of the programme will be monitored by the Internal Quality Assurance Cell of the University from the outcome and feedback of the learners as well as the proper documentation maintained in the Centre.

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Syllabus

Certificate in Water Harvesting and Management

DE- SES 01. Water – Introduction

Unit I : Introduction – Water resources and its significance – Water : distribution on earth, Water quality and standards; Water pollution : Types, sources and impacts – Surface water, ground water pollution, Wastewater : Domestic – black and grey water; industrial and agricultural wastewater. Waste water treatment – Methods.

Unit II: Ground water and Hydrology: Hydrological cycle, Precipitation Evaporation and condensation, Groundwater - Classification, Aquifers – types and management. Soil conservation and water recharge. Ground water management and key factors.

Unit III : Water and Disaster: Floods – Droughts- Soil erosion- sedimentation - Salinity intrusion, Soil salinity- Water logging, Sand mining-Impact of population and anthropogenic activities on water resources- Pollution due to domestic and urban sewage, industrial effluents, agro-chemicals-Water borne and related diseases-Impact of water resources projects on human health. Changing climate and water related disasters.

Unit IV – Water Policies and Laws : Water policies: goal and strategies-Water policy of India-Water rights: international and Indian scenario-Power, function and regulatory role of state and central pollution control board.. Environmental guidelines and regulations for water management-Water auditing-Water monitoring and sustainability issues-Understanding UN law on non-navigable uses of international water courses. Water governance.

DE- SES- 02. Integrated Water Resource Management

Unit 1: Sustainable Water Resource Management: Introduction, Concept, Conventional and Tradition water management. Advances in water management.

Unit II: Irrigation Water Management – Introduction, Development of irrigation, Soil – Water –Plant relationships; Role of Climate; Canal and canal network irrigation, Furrow irrigation: design parameters, types of furrows, ideal wetting pattern and planting techniques – Basin irrigation: types of basins, suitable crops, soils and slopes, ideal wetting pattern, shapes and size – Efficiency of surface irrigation methods, Drainage systems, Drip irrigation: components, suitable crops and land types – Sprinkler irrigation: types, components, and suitable crops, slope, soils and climate.

Unit III: Participatory Water Management : Public- Private partnership, Gender and water management, Water pricing – Key issues and policies. Tools and techniques in PRA approach. Community water management. Institutional linkages and approaches in water management. Water and Sanitation.

- Case studies**
1. Traditional water conservation methods of the state/country
 2. Water and sanitation – Issues and solutions

DE – SES -03. Techniques for Water Resource Management

Unit I: Methods for conservation of water resources: Introduction, Mapping – methods, community participation, Application of Remote sensing and GIS in water resource management

Unit II: Rainwater Harvesting - Conservation and Harvesting of rain. Types and design of water harvesting structures; catchments – type and methods. Rainwater harvesting-Catchment and roof top harvesting; yield calculation, Check dams, Artificial recharge, Farm ponds, Percolation tanks, traditional rain water harvesting structures

Unit III: Watershed and Basin Management: Definition, watershed delineation; watershed development: concepts, objectives and need- Integrated and multidisciplinary approach for watershed management- Characteristics of watershed: size, shape, physiography, slope, climate, drainage, land use, vegetation, geology and soils, hydrology and hydrogeology- Socio-economic characteristics.

Basin management – Definition, Factors affecting basin management- Preparation of land drainage schemes-Types and design of surface drainage -Controlling of soil erosion and soil characteristics; Estimation of soil loss due to erosion. Water availability assessment – Surface water and groundwater-Water demand assessment: municipal, industrial, agricultural and environmental-Water allocation - Principles and policies, State and National water conflicts and management.

Unit IV – Wetland Management – Definition, Types, Classification, Significance and threats to wetlands, Conservation of wetlands National and International efforts. Wetlands for water and Climate regulation. Interlinking of rivers – Issues. Sustainable water management.

Case studies-

1. Community based rain water harvesting in the State/country
2. Impacts of anthropogenic activities and climate change on water resources of the state/country.
3. Water and river basin management in India – selected studies

DE- SES- 04. Case study / Project and Report - Individual

References (selected)

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