।। सा विद्या या विमुक्तये ।।

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

"ज्ञानतीर्थ" परिसर, विष्णुपूरी, नांदेड - ४३१६०६ (महाराष्ट्र)

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED

"Dnyanteerth", Vishnupuri, Nanded - 431606 Maharashtra State (INDIA)

Established on 17th September 1994 – Recognized by the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'A' Grade

ACADEMIC (1-BOARD OF STUDIES) SECTION

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प्रस्तुत विद्यापीठाच्या भुशास्त्र संकुलातील विज्ञान व तंत्रज्ञान विद्याशाखेतील Certificate Course in Water Literacy या अभ्यासक्रमचा CBCS Pattern नुसारचा अभ्यासक्रम शैक्षणिक वर्ष २०२०–२१ पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, **दिनांक २० जून २०२० रोजी संपन्न झालेल्या ४७व्या मा. विद्या परिषद बैठकीतील ऐनवेळेचा विषय क्र.११/४७–२०२०** च्या ठरावानुसार **प्रस्तुत विद्यापीठाच्या भुशास्त्र संकुलातील विज्ञान व तंत्रज्ञान विद्याशाखेतील Certificate Course in Water Literacy या अभ्यासक्रमचा CBCS Pattern नुसारचा अभ्यासक्रम** शैक्षणिक वर्ष २०२०–२१ पासून लागू करण्यात येत आहेत.

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या **www.srtmun.ac.in** या संकेतस्थळावर उपलब्ध आहेत. तरी सदरील बाब ही सर्व संबंधितांच्या निदर्शनास आणून द्यावी.

'ज्ञानतीर्थ' परिसर,
विष्णुपुरी, नांदेड – ४३१ ६०६.

जा.क्र.:शैक्षणिक–१/परिपत्रक/ Certificate (संकुल)–सीबीसीएस अभ्यासक्रम/२०२०–२१/**५९३**

दिनांक : २४.०८.२०२०.

स्वाक्षरित/–
उपकुलसचिव
शैक्षणिक (१–अभ्यासमंडळ) विभाग

प्रत माहिती व पुढील कार्यवाहीस्तव :

१) मा. अधिष्ठाता, विज्ञान व तंत्रज्ञान विद्याशाखा, प्रस्तुत विद्यापीठ.
२) मा. संचालक, परीक्षा व मूल्यमापन मंडळ यांचे कार्यालय, प्रस्तुत विद्यापीठ.
३) मा. संचालक, भुशास्त्र संकुल, प्रस्तुत विद्यापीठ.
४) साहाय्यक कुलसचिव, पदव्युत्तर विभाग, प्रस्तुत विद्यापीठ.
५) उपकुलसचिव, पात्रता विभाग, प्रस्तुत विद्यापीठ.
६) सिस्टम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ.

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Swami Ramanand Teerth Marathwada University

Nanded 431606 (Maharashtra)

www.srtmun.ac.in

Certificate Course in Water Literacy

One Semester, Part Time

Syllabus

(From 2020-2021)

:: Course Offered by ::

School of Earth Sciences,

Swami Ramanand Teerth Marathwada University, Nanded, MH

Certificate Course in Water Literacy

One Semester, Part Time

- **Duration:**

One Semester (Four Months, Part-Time)

The minimum duration of the program is one semester (Four Months). However, the students are allowed a maximum period of the two years (initial semester + its next 3 semesters) to complete the program from the date of his / her first registration. After this, the students have to apply for readmission, completely as a fresh candidate.

- **Total Credits, Marks and Weightage:**

Papers	Total	Credit		Marks			Weightage
		Each	Total	Internal	External	Total	
Theory	2	2	4	50 (25 each)	50 (25 each)	100	40%
Practical	2	2	4	50 (25 each)	50 (25 each)	100	40%
Project	1	2	2	25 (25 each)	25 (25 each)	50	20%
Total	5	2	10	125	125	250	100%

(Note: Each 2 Credits includes 25 marks Internal and 25 marks External Examinations)

- **Course Description:**

Admissions for the Certificate Course (Four Months, Part-Time), will be made twice a year. First cycle will be commencing in the first week of August and the second cycle will begin from the first week of December every year. The admission process will be completed in July and November respectively.

This course (10 credits) includes two theory papers of 50 marks each (2 credits each). This training course aims to aware of the common society through strengthening the well-trained team. For this, the course will focus more on practical training in addition to the theoretical base. It is therefore 60 percent credits are devoted to practical papers and project work (total 6 credits). For this, the course includes two practical papers (50 marks each) and one project work (50 marks).

For each paper, there will be internal and external evaluation, for equal marks. Each theory paper consists of 30 hours of teaching (total 60 hours for theory). Every 2 credits of Practical and Project papers will be assigned 30 hours of training (total 90 hours for practical and project work - demonstration, field visits, experiments, laboratory practices and skill development of project writing). It means the course will be taught with 150 hours of teaching, equally divided into two modes, i.e. offline and online.

The trainee should attend at least 70 percent teaching hours from offline and online mode. For passing, the candidate should secure a minimum of 40 percent marks from internal examinations and the same from external examinations.

- **Pre-requisite:**

  The candidate should have passed 12th Standard.

- **Course Objectives:**

  This Certificate Course in Water Literacy aims to do the following:

  It seeks to

  - aware and sensitize the trainee candidates on 'Water Issues' and
  - raise consciousness among them to preserve, conserve and strengthen the Water Resources.

  It intends to engage participants in

  - awareness programs for the prevention of water at home and workplace (Agriculture, Industry, Office, etc),
  - motivate people for conservation of water with different types of methods and
  - work as a social volunteer in any body of social movement for water.

- **Course Outcomes:**

  After urbanization and industrialization, we have tremendously changed our lifestyle. In the last 5 decades, computerized technological innovations have created unlimited scope for all sectors, from urban to rural. In addition, our population is ever growing. It affects mainly natural resources like soil, air, and water. It has led to a phenomenal increase in demand for water. It results in overexploitation and consistent and continuous depletion of the groundwater table.

  Therefore, there is an urgent need for not only conservation of water resources but also spread proper awareness within the society in a sustainable manner. For this, everyone should save and conserve water at their place and try to motivate others for the same for protecting water as a national resource, through applying rainwater and rooftop harvesting, minimizing water demand, proper management of water supply, strengthening artificial recharges, controlling water pollution, among others. In short, governmental policies and their steps for water conservation are not a single way for the issue but also it needs to spread the positive message within the society through devotees, volunteers, and well trained-educated young force.

  This Certificate Course in Water Literacy is trying to build a trained young force for the task. It will improve the capacity of the trainee to design, implement and assess water management plans and procedures. It definitely has strong academic and research relevance. Moreover, it will provide career opportunities to the candidate as the extracurricular skills.

- **Mode of Study:**

Paper	Offline (Classroom and Field)	Online (any suitable mode)
Theory	**50%**	**50%**
Practical and Project	**50%**	**50%**

◆ **Course Contents:**

Certificate Course in Water Literacy

Papers	Code	Title	Credit	Weightage
Theory 1	WL1	Water Resources and Policies	2	20%
Theory 2	WL2	Water Harvesting and Conservation	2	20%
Practical 1	WL3	Morphometric Analysis	2	20%
Practical 2	WL4	Measurement Tools and Techniques	2	20%
Project	WL5	Dissertation / Research Project	2	20%
Total			10	100%

❖ **Contents: Theory 1: WL1 – Water Resources and Policies (2 Credits)**

The following are the units and sub-units of this theory paper.

Unit	Sub-Units
A) Water on Earth	▪ Global Distribution: Fresh and Saline Water ▪ Concepts: Precipitation, Runoff, Evaporation, Infiltration, Water Balance and Budget, Groundwater Level ▪ Hydrological Cycle and Hydrological Losses ▪ Water as a Resource
B) Water Uses	▪ Different Types of Uses ▪ Under, Over and Optimum use ▪ Extraction of Water Resources
C) Policies	▪ International Water Policy and Regulations ▪ National Water Policy ▪ Maharashtra State Water Policy (2019)

❖ **Contents: Theory 2: WL2 – Water Harvesting and Conservation (2 Credits)**

The following are the units and sub-units of this theory paper.

Unit	Sub-Units
A) Prevention	▪ Need to preserve water resources ▪ Uses: Refuse, Reduce, Reuse and Recycle ▪ Ways of Prevention of water resources
B) Harvesting	▪ Methods and Techniques of Water Harvesting ‣ Rain water ‣ Rooftop and ‣ Wastewater treatment ▪ Need, Scope and Methods of Watershed Development
C) Conservation	▪ Need of Water Conservation ▪ Water Conservation Techniques ▪ Types of Conservation ▪ Artificial Groundwater Recharge: Site Suitability and Methods

❖ **Contents: Practical 1: WL3 – Morphometric Analysis (2 Credits)**

List of Practical (Learning Points and Experiments) is as below:

A) Drainage Patterns

1. To understand the basics of Drainage and types patterns.
2. To understand and draw:
   - ▶ Dendritic drainage pattern
   - ▶ Parallel drainage pattern
   - ▶ Trellis drainage pattern
   - ▶ Rectangular drainage pattern
   - ▶ Radial drainage pattern
   - ▶ Centripetal drainage pattern
   - ▶ Annular drainage pattern
   - ▶ Barbed drainage pattern

B) Stream Ordering

1. To understand Basics of Stream Ordering.
2. To apply Strahler's Method of Stream Ordering.

C) Morphometric Analysis (Laboratory work with map and digital tools)

1. To measure basin length and width.
2. To measure Stream Length and Stream Length Ratio.
3. To calculate Drainage Density.
4. To calculate Bifurcation Ratio.
5. To measure basin area.
6. To calculate stream frequency.
7. To calculate total slope of the basin.
8. To calculate total slope of the given stream.

❖ **Contents: Practical 2: WL4 – Measurement Tools and Techniques (2 Credits)**

List of Practical (Learning Points and Experiments) is as below:

A) Map Reading

1. To understand the scale, direction and elements of map.
2. To understand the units and types of map scale.
3. To convert the units of map scale (British and Metric Units).

B) Measurements (Field Experiments and Survey)

1. To measure the length, width and height of the land.
2. To measure the area of the catchment / land.
3. To measure the slope of the land / stream with simple techniques.
4. To observe and measure the rate of Infiltration.
5. To calculate the water storage capacity of various types of Pond / Tank.
6. To calculate the harvested water of Roof Top / Rain Water.
7. To measure and estimate the Runoff.

C) Climatological Experiments

1. To understand and measure the rainfall.
2. To understand and measure the wind speed.
3. To understand and measure the temperature.
4. To understand the concept of:
   - ▶ 1 inch rainfall
   - ▶ 10 mm rainfall
   - ▶ Evaporation
   - ▶ Rate of evaporation
   - ▶ Evapotranspiration
   - ▶ Rain shadow Zone / Region
   - ▶ Litre/ Gallon/ TMC/ Cusec

❖ **Contents: Project: WL5 – Dissertation / Research Project (2 Credits)**

Topic:

Trainee candidates can select any suitable topic for his / her research project work, which will be devoted to any one or more sub-topics given below:

1. Watershed Planning and Management
2. Artificial Water Recharge Methods
3. Ways of water prevention: at home, at the office, at an industrial unit, etc
4. Estimation of Wastewater
5. Estimation of Runoff
6. Modelling and or Estimation of Rooftop / Rainwater Harvesting
7. The Site and or Method suitability analysis of a Basin

Dissertation / Project Design:

Students are required to select an exploratory topic, as given above, with applied importance based on empirical evidence of literature search and mainly on experimental work. They are expected to carry out fieldwork, generate primary data, analyze it and prepare a Dissertation / project to submit it 15 days before the date of examination.

◆ **Recommended Readings / Reference Books:**

In English

1. Savindra Singh (2002): Geomorphology, Prayag Pustak Bhawan, Allahabad
2. Strahler A. H and Strahler, A. N. (1992): Modern Physical Geography, John Wiley, New York
3. Amy Vickers, 1992, Handbook for Water Use and Conservation: Homes, Landscapes, Businesses, Industries, Farms, Amy Vickers & Associates, Inc., in Amherst, Mass., USA.
4. Francis J. Pierce, 1998, Advances in Soil and Water Conservation 1st Edition, Publisher: CRC Press; 1 edition (February 1, 1998), ISBN-10: 1575040832, ISBN-13: 978-1575040837
5. Frederick R. Troeh, J. Arthur Hobbs and Roy L. Donahue, 2003, Soil and Water Conservation for Productivity and Environmental Protection (4th Edition) 4th Edition, Publisher: Prentice Hall; 4 edition (May 17, 2003), ISBN-10: 0130968072, ISBN-13: 978-0130968074.
6. Bimal Chandra Mal, 2011, Introduction to Soil and Water Conservation, Publisher: Kalyani Publishers (2011), ISBN-10: 8127267449, ISBN-13: 978-8127267445
7. Paul W. Unger, 2006, Soil and Water Conservation Handbook 1st Edition, Publisher: Routledge; 1 edition (October 19, 2006), ISBN-10: 1560223308, ISBN-13: 978-1560223306.
8. Water Conservation, Reuse, and Recycling, Proceedings of an Iranian-American Workshop (2005), Washington, DC: The National Academies Press, ISBNs: Paperback: 978-0-309-09293-7, e-book: 978-0-309-18119-8, DOI: https://doi.org/10.17226/11241
9. Sonia Ferdous Hoque, 2014, Water Conservation in Urban Households, Roles of Prices, Policies and Technologies, IWA Publications, ISBN 13:9781780405476
10. S K Gupta, 2020, Fundamentals of Soil and Water Conservation, ISBN-10: 9388982983, ISBN-13: 978-9388982986.
11. Frederick R. Troeh, 1991, Soil and Water Conservation 2nd Edition, Publisher: Prentice Hall College Div; 2nd edition (March 1991), ISBN-10: 013830324X, ISBN-13: 978-0138303242.

In Marathi

1. Dhoble Shital and others (2017): Geomorphology, Nirali Prakashan, Pune
2. Chaudhari Dr SR and Gavit (2015): Geomorphology, Prashant Publications, Jalgaon
3. Karlekar Shrikant (2015): Physical Geography and Geomorphology, Diamond, Pune.
4. Pathare and Gajhans (2015): Physical Geography, Vidya Books, Aurangabad.

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