।। 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

Phone: (02462) 229542
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E-mail: bos.srtmun@gmail.com

प्रस्तुत विद्यापीठीय संकुलातील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदव्युत्तर स्तरावरील M. Phil. अभ्यासक्रमाचे CBCS Pattern नुसारचे 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 विषय क्र.११/४७–२०२० च्या ठरावानुसार प्रस्तुत विद्यापीठीय संकुलातील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदव्युत्तर स्तरावरील M. Phil. अभ्यासक्रमाचे** खालील विषयांचे **C.B.C.S. (Choice Based Credit System) Pattern** नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०२०–२१ पासून लागू करण्यात येत आहेत.

01. M.Phil. - Geology
02. M.Phil. - Geography
03. M.Phil. – Environmental Science
04. M.Phil. – Computer Sceicne (Common To Camus & Sub Campus)
05. M.Phil. – Chemistry
06. M.Phil. – Physics

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/पदव्युत्तर(संकुल)–सीबीसीएस अभ्यासक्रम/२०२०–२१/५९१

दिनांक : २४.०८.२०२०.

स्वाक्षरित/–
उपकुलसचिव
शैक्षणिक (१–अभ्यासमंडळ) विभाग

प्रत माहिती व पुढील कार्यवाहीस्तव :

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

Swami Ramanand Teerth Marathwada University, Nanded

“Dnyanteerth”, Vishnupuri, Nanded-431606

RULES AND SYLLABUS

M.Phil. in Geology

(with effect from June 2020)

Swami Ramanand Teerth Marathwada University, Nanded

M. Phil. Syllabus

Paper Code	Paper Title	Lecturer Per week	Total No. of Lectures	Internal Exam.	University Exam.	Total Marks	Credits
MPG-101	Research Methodology	04	90	25	75	100	04
MPG-102	Information Technology	04	90	25	75	100	04
MPG-103	Hydrogeology OR Morphotectonics	04	90	25	75	100	04
MPG-104	Advanced Hydrogeology OR Advanced Morphotectonics	04	90	25	75	100	04
	Dissertation	--	--	25 (Viva-Voce)	75	100	04
	Total	**16**	**360**	**125**	**375**	**500**	**20**

Swami Ramanand Teerth Marathwada University, Nanded

Rules for the

Degree of Master of Philosophy (M. Phil.) Geology

(With effect from June 2020)

1. **Content**

   a) The M. Phil. Course in Geology comprises four theory papers of hundred (100) marks each. (This includes 75 marks of University examination (UE) and 25 marks of Internal examination (IE) for each paper. One seminar of 15 marks and one tutorial of 10 marks will be the mode of internal examination.) The content component of four papers will be prepared by the concerned Board of Studies.

   b) The college/department shall communicate internal marks obtained by the candidate to the University a month before end of the term.

   c) Dissertation will carry 100 marks (Dissertation 75 marks & viva-voce 25 marks). The dissertation will be assessed in grades. Each student will be required to submit three copies of the dissertation. The evaluation report, marks and grade will be sent by the external referee (Other University) well in advance before the date fixed for viva. The viva on the dissertation will be conducted at the place of registration by a committee consisting of two teachers one of whom will be the guide and other will be the external referee.

   d) The M. Phil. course is of 500 marks.

      i) Four theory papers of 100 marks each and

      ii) One dissertation of 100 marks.

   e) Dissertation topic will be finalized by the Chairman of BOS and the concerned guide.

2. a) The M. Phil. examination shall be held in the month of April/May every year.

   b) Those candidates who failed in the examination held in April/May in any theory on internal paper will be allowed to appear for the examination which will be held in next April/May.

   c) The candidate shall be allowed to submit the dissertation before or after theory examination.

d) If the candidate fails to clear the M. Phil. theory or internal papers within the stipulated period, he/she should appear for the theory or internal examination only as a repeater. However the result of dissertation will be carried forward.

e) The candidate should appear for examination in April/May and he has to submit dissertation within two years after the theory examination. If he/she fails to submit that period, his/her performance in theory examination will be cancelled. The candidate must complete the whole course within three years from the date of registration for M. Phil.

3. Medium of instructions and examinations: The medium of instructions and examinations will be English.
4. The teacher recognized as a P.G. teacher in the subject will be qualified to teach the papers. The teachers with Ph.D. in the particular subject will be eligible for guiding dissertation.
5. **Fees:**

i)	Registration Fee :	Rs.100/-
ii)	Tuition Fee :	Rs.5000/-
iii)	Laboratory Fee :	Rs.300/-
iv)	Examination Fee :	Rs.500/-
v)	Dissertation Fee :	Rs.500/-
vi)	Concerning College Fee :	Rs. as par with P.G. Admission Fee

6. **Remunerations:**

i) Theory paper setting remuneration per set Rs.250/-

ii) Theory examination remuneration Rs.10/- per answer paper.

iii) Dissertation assessment remuneration Rs.200/-

7. **Standard of Passing:**

a) The assessment of the candidates shall be in grades on the seven point scale. The candidate should get at least 'B' grade in every paper and in his/her dissertation and viva-voce in the aggregate. He/She should get minimum 'B' grade for being eligible for the award of M.Phil. Degree.

Marks Obtained %	Grade	Grade Points
100-90	A++	10
89-80	A+	9
79-70	A	8
69-60	B++	7
59-55	B+	6
54-50	B	5
49 and less	C	0

A student with 'C' grade in a paper would be disqualified for getting a credit for that paper. The student will however be permitted to reappear for the said paper.

b) i) The average grade point for each paper or dissertation will be calculated up to two places of decimals.

ii) The assessment of dissertation will be given in marks (out of 75 marks) and this should be added to the viva-voice test marks (out of 25 marks) for calculating the grade. iii) At the time of consolidation the grade points of each paper worked out according to (i) will be added together up to two places of decimals and shown on the result sheet. For giving the final grade the grade point average should be rounded off to the next digit if the fraction is 1/2 or more than half.

The final result will be declared by working out the overall grades of (a) Written examination (b) Internal (c) Dissertation and (d) Viva.

8. Nature of Question Papers

a) There shall be four questions in each theory papers. The candidate has to attempt all of them.

b) There should be internal choice to the first three questions and the question no. 4 will be on short notes (Any two to be attempted out of four)

c) Meeting will be held for paper seating at the University.

d) There shall be three paper setters for theory papers-two from the university and one from out of the university.

e) There shall be three examiners for the evaluations of theory papers-two from the University and one from out of the University.

9. Procedure for Evaluation of Dissertation:

The 48(3) Committee of the concerned subject in consultation with the guide shall submit a panel of referees consisting of at least 05 qualified teachers from outside universities and research institutes, from which the Vice-Chancellor will appoint any teacher of his choice as the referee.

10. Admission Preferences:

The candidates who have completed their P.G. degree from Swami Ramanand Teerth Marathwada University, Nanded will be preferred first for the admission of M. Phil. course. Then the preference will be given to Dr. B.A.M. University, Aurangabad, and other universities as per the following ratio.

a) S.R.T.M.U. 60%

b) Dr. B.A.M.U. 20%

c) Other universities 20%

In case of candidate not available from the home University, the quota will be transferred to other universities.

Swami Ramanand Teerth Marathwada University, Nanded

M. Phil. Syllabus

Paper code: MPG-101: Research Methodology

Marks: 100 **Credit: 04** **Periods: 90**

Objectives

- To enable the student to understand and work with methods and concepts related to research.
- To enable the student to develop research proposal and to work on research problem.
- To develop broad comprehension of research area.

Unit-I : Introduction **15**

Meaning, concept, nature steps, and their characteristics. Approaches and theories of paradigm and theirs implications in research. Philosophical and sociological foundations of research. Interdisciplinary approach and its implications in various research area.

Unit-II : Methods of Research **15**

Qualitative and quantitative methods of research like. Historical, caste study, ethnography, ex post facto, documentary and content analysis, survey (Normative, descriptive, evaluative etc.) field and laboratory experimental studies. Characteristics of methods and their implications in research area.

Unit-III : Development of Research Proposal **15**

Research proposal and its elements. Formulation of research problem-criteria of sources and definition. Development of objectives and characteristics of objectives. Derivation and operational of variables. Developing assumptions and applications

Unit-IV : Methods of Data Collection **15**

Concept of sampling and other related to sampling. Probability and non-probability samples, their characteristics, and implications. Tools of data collections, their types, attributes, and uses. Redesigning, research tools like-questionnaire, opinnaire, observation, interviews, scales, and tests etc.

Unit-V : Methods of Data Analysis **15**

Analysis of qualitative data based on various tools. Analysis of quantitative data and it presentation with tables, graphs etc. Statistical tools of data analysis – measures of central tendency, dispersion, relative position etc. Decision making with hypothesis testing through parametric and non-parametric tests. Validity and delimitations of research findings.

Unit-VI : Report Writing and Evaluations **15**

Principles of report writing and guidelines according to style manuals. Writing and presentation of preliminary, main body and reference section of report. Evaluation of research report. Home Assignment: How to submit research proposals? How to file patents?

Reference

- Kothari, C.F. (2005) Quantitative Techniques, New Delhi, Vikas Publishing House.
- Gautam, N.C. (2004) Development of Research Tools, New Delhi, Shree Publishers.
- Gupta, Santosh (2005) Research Methodology and Statistical Techniques, Deep and Deep Publications.
- Chandra, A. and Saxena T.P. (2000) Style Manual, New Delhi, Metropolitan Book Comp. Ltd.
- Shukla, J.J. (1999) Theories of Knowledge, Ahemadabad, Karnavati Publication.
- Bhattacharya, D.K. (2004) Research Methodology, New Delhi, Excel Books.
- Brymann, Alan and Cramer, D. (1995) Qualitative Data Analysis for Social Scientist, New York, Routledge Publications.
- Best, J.W. and Khan J.V. (2005) Research Introduction, New Delhi, PHI
- Creswell J.W. (1994) Qualitative Approach, New Delhi, Sage Publication.

Books:

1. Research Methodology - C. R. Kothari
2. Research Methodology : An Introduction - Stuart Melville and Wayne
3. Practical Research Methods - Catherine Dawson

Swami Ramanand Teerth Marathwada University, Nanded

M.Phil. Syllabus

Paper code: MPG-102 : Information Technology

Marks : 100 **Credit : 04** **Period : 90**

Unit-I Knowing basics of computers for research applications **10**

Unit-II Introduction of Operating Systems **10**

i) MS Windows ii) Linux

Unit-IIII Introduction to Software **10**

i) Application Software ii) Software related to research

Unit-IV Using Internet for Research **15**

i) Internet ethics and information reliability ii) Finding authenticated information on www iii) Finding research related sources on www iv) Knowing research journals on www

Unit-V Introduction to research related software **10**

i) Statistical data analysis software : SPSS, MS-Excel

ii) Core calculations software : Mata-lab iii) GIS

Unit-VI Developing utility programs for research **10**

Programming languages C, Fortran

Unit-VII Research related tools and utilities **15**

i) Research publishing tools : MS-Word, Adobe Acrobat, LaTex etc.

ii) Graphic Tools : MS-Excel (Graphs), Hayward Graphics

iii) Presentation tools MS-PowerPoint

iv) Subject/field specific research tools on WWW (Freeware)

Unit-VIII Introduction to advance research IT related technologies **10**

i) Simulation ii) Modeling iii) Cluster Computing Home Assignment : Study of at least two softwares associated with concern subject.

Reference

1) Search internet for appropriate information and references.
2) Computer Fundamentals – Pradip K. Singh & Priti Singha
3) The Internet : A users guide – K.L. James (PHI)
4) Internet Research Skill-Niall O' Dochartanish (Sage Publication)
5) MS-Office (2003) Edition (PHI)
6) Programme in 'C' – E. Balagurusamy
7) Principles of Remote Sensing & Image Interpretation-Lilly Sand & Keifer (Tata McGraw Hill)
8) GIS – Harbert R. Mann.

Swami Ramanand Teerth Marathwada University, Nanded

M. Phil. Syllabus

Paper code: MPG-103 : Morphotectonics

Marks: 100 **Credit : 04** **Period : 90**

Unit I: Drainage basin and morphometry: 25

Basin demarcation, ordering of streams – Strahler's and Horton methods. Relief and slope analysis – profiles and maps. Identification of landforms on toposheet maps (aerial photographs and satellite imageries). Soils: textural characteristics, study of representative soil profiles. Morphometric analysis: bifurcation ratio, Drainage density, stream frequency, constant of channel maintenance.

Unit II: Geomorphic Features and Tectonics 25

Scale of geomorphic features, landforms of fluvial, Aeolian and glacial origin. Tectonics and geomorphic theory. Landform development in relation to plate tectonics. Structural and tectonic land forms, Volcanic activity and land forms, Landslides, mud flows and gravity tectonics, land scape erosion and crustal movements, Mountain and Plateau formation.

Unit III: Coastal geomorphology 20

Classification of coasts, erosional and depositional features, Lineament analysis, Neotectonic evidences, Climate and landforms. Geomorphology and tectonics of the oceans, sea level changes.

Unit IV: Major tectonic features of the Earth's crust 20

Development of the concept of plate tectonics. Critical assessment of the concept. Plate tectonics and sedimentation. Plate tectonics and mountain building activity. Plate tectonics and metamorphic belts. Plate tectonics and metallogeny. Intraplate tectonics.

Reference

1. Bloom, A.L. 1998. Geomorphology: A systematic Analysis of Late Cenozoic Landforms (3rd Edition), Pearson Education, Inc.
2. Singh, S. 1998. Geomorphology. Prayag Pustak Bhavan, Allahabad.
3. Kale, VS. and Gupta, A. 2001. Introduction to Geomorphology. Orient Longman Ltd.
4. Easterbrook, D.J. 1992. Surface processes and landforms. McMillan Publ.
5. Bryirely, G and Fryirs, K. 2005. Geomorphology and river management. Blackwell Pub.
6. Vanoni, V.A., 2006. Sedimentation Engineering, ASCE, Manual.
7. Richards. K., 2004. Rivers: Forms and processes in alluvial channels. Blackburn Press.

Swami Ramanand Teerth Marathwada University, Nanded

M. Phil. Syllabus

Paper code: MPG-103 : Hydrogeology

Marks: 100 **Credit : 04** **Period : 90**

Unit I: Introduction and Scope of Hydrogeology **25**

Hydrologic cycle, Types of Precipitation, Evapotranspiration, Runoff, infiltration, etc. Classification of groundwater, porosity and permeability, Darcy's law, Hydraulic conductivity methods of determination of hydraulic conductivity, Hydrostratigraphic units and types aquifers. Hydraulic conductivity for an anisotropic aquifer,

Unit II: Occurrence of groundwater **25**

Types of openings in the rocks, Occurrence of groundwater in igneous, sedimentary, and metamorphic rocks. Application and limitation of law of groundwater flow. Well hydraulics, steady and radial flow to wells, boundary effects. Concept of leaky aquifers and hydraulics of open wells. Types of wells and methods of water well drilling.

Unit III: Quality of Groundwater **20**

Methods of Groundwater quality analysis including, physical, Chemical and Biological constituents of Groundwater. Water quality criteria for drinking, industrial and irrigation purposes. Flow net analysis, saturated and unsaturated flow net, seepage flow. Hydrologic budgets and stream flow generation. Sea water intrusion, Sources of groundwater contamination, Groundwater and Economic mineralization.

Unit IV: Prospecting and Utilization of Groundwater Resources **20**

Groundwater investigations, hydrogeological and geochemical surveys. Geological and Geophysical methods of groundwater prospecting. Well hydraulics and determination of different aquifer parameters. Assessment of groundwater resources. Utilization of groundwater resources, conjunctive use of surface and subsurface water resources.

1. **Reference**

2. Walther John, V., 2009. Essentials of geochemistry, student edition. Jones and Bartlett Publishers. Mason, B (1986). Principles of Geochemistry. 3rd Edition, Wiley New York.
3. Hugh Rollinson (2007) Using geochemical data – evaluation, presentation and interpretation. 2nd Edition. Publisher Longman Scientific & Technical.
4. Todd, D.K. 2006. Groundwater hydrology, 2nd Ed., John Wiley & Sons, N.Y.
5. Davis, S.N. and De Weist, R.J.M. 1966. Hydrogeology, John Wiley & Sons Inc., N.Y.
6. Karanth K.R., 1987, Groundwater: Assessment, Development and management, Tata McGrawHill Pub. Co. Ltd.
7. Fetter, C.W. 2001. Applied Hydrogeology, Prentice Hall Inc., N.J.

Swami Ramanand Teerth Marathwada University, Nanded

M. Phil. Syllabus

Paper code: MPG-104 : Advanced Morphotectonics

Marks: 100 **Credit : 04** **Period : 90**

Unit I: Advanced Morphotectonic Analysis **25**

Application of Drainage Basin Morphotectonic Analysis for Assessment of Tectonic Activities. Slope formation, classification, controls, and analysis. Morphotectonic analysis and some case histories. Geomorphic Indices of Active Tectonics. Quantitative morphotectonic analysis as a tool for detecting deformation patterns. Recent advances in understanding the morphotectonic and neotectonic evolution.

Unit II: Mechanisms in Morphotectonics **25**

Morphotectonic mechanisms behind the creation of tectonic landforms by processes such as crust uplift, subsidence, faulting, or folding etc. Morphotectonics involved in cross-disciplinary research, drawing from fields such as geology, seismology, physical geography, climatology, geochronology, and geodesy.

Unit III: Geomorphology and Morphotectonic studies in India **20**

Aim and context, Davisian dogma, erosion surfaces, denudational chronology and tectonics. Geomorphological evidences of neotectonics in India. Morphotectonic evolution of Himalaya and Tibetan Plateau. Evolutionary history of Thar Desert of India. Morphotectonic evolution of Kutchch and Western Ghats of India.

Unit IV: Recent advances in morphotectonic studies **20**

Recent advances in morphotectonic through analytic approach with the advancement of technologies including the advancement of dating methods, development of new geodetic tools, and the availability digital topographic data along with high-speed computing, advances remote sensing and GIS.

Reference

1. Passhier, C. and Trouw, RAJ, 2005. Microtectonics. Springer, Berlin.
2. Sharma, D.D.. Geostatistics with Applications in Earth Sciences. Springer, 2005
3. Knighton, D., 1998. Fluvial forms and processes: A new perspective. Arnold Pubs.
4. Richards. K., 2004. Rivers: Forms and processes in alluvial channels. Balckburn Press.
5. Bryirely and Fryirs, 2005. Geomorphology and river management. Blackwell Pub.
6. Burbank, W.B., and Anderson, R.S., 2001. Tectonic Geomorphology, Blackwell Science.
7. Bull, W.B., 2007. Tectonic Geomorphology of Mountains, Blackwell Publishing.
8. Keller, E.A. and Pinter N., 2001. Active Tectonics: Earthquakes, Uplift, and Landscape, Prentice Hall.
9. McCalpin, J., 1998. Paleoseismology, Academic Press.
10. Schumm, S.A. and Holbrook, 2000. Active Tectonic and Alluvial Rivers, Cambridge University Press.
11. Merriam D.F., (Ed.) 2000. Computer methods in the Geosciences, Elsevier.

Swami Ramanand Teerth Marathwada University, Nanded

M. Phil. Syllabus

Paper code: MPG-104 : Advanced Hydrogeology

Marks: 100 **Credit : 04** **Period : 90**

Unit - I : Methods and Problems Associated with Groundwater Development 25

Type of well and methods of water well drilling. Design and construction of water well and tube well. Water resource evolution studies. Groundwater development and management, water balance studies. Fluctuations in groundwater, briefs, and causative factors. Groundwater recharging methods. Consumptive and conjunctive use of surface and groundwater. Artificial recharge methods and structures, Water logging problems, Problems of over exploitation of Groundwater,

Unit – II: Techniques in hydrological studies 25

Study of aerial photographs and imaginaries and their signification in groundwater investigations. Application of geomorphology in groundwater investigation. Hydrogeological studies of alluvial and basaltic terrains. Hydro-geochemical analysis and interpretation of chemical quality of groundwater. Hydrogeomorphological studies of areas. Radioisotopes in hydrological studies.

Unit – III: Groundwater in Various Geologic Provinces of India 20

Occurrences and potentials of groundwater in various geologic provinces of India including soft and hard rock terrain. Groundwater Occurrences and potentials in Alluvial plains, Thar desert, Kutchch Saline and Marshy lands, Deccan Basaltic Province, hard rock of Granites, Charnockites, Khondalites, Peninsular Gneissic complex, Cuddapah, Vindhyan and Gondwana province. Environmental pollution studies in related groundwater province.

Unit IV: Groundwater Modelling 20

Groundwater movement and tracer technique, Groundwater equations for steady and unsteady flow. Equations governing groundwater flows, Continuum concepts, principles of analytical and numerical modeling for simulation of groundwater flows, study of available models verification of models. Computer application and statistical analysis methods applied in Hydrogeological studies.

Reference

1. Fetter, C.W., 2001, Applied Hydrogeology, Prentice Hall Inc., N.J.
2. Fitts, C.R., 2006. Groundwater Science, Academic Press.
3. Freeze, R.A. and Cherry, J.A., 1979. Groundwater, Englewood Cliffs, New Jersey: Prentice-Hall.
4. Raghunath, H.M., 2007, Third Edition, Ground Water, New Age International Publishers, New Delhi.
5. Mansell, M.G., 2003. Rural and Urban Hydrogeology, Thomas and Telford
6. Davie, T., 2008. Fundamentals of hydrology. Routledge Publications.
7. Knighton, D., 1998. Fluvial forms and processes: A new perspective. Arnold Pubs.
8. Julien, P.Y., 2002. River Mechanics. Cambridge University Press.