

# POSTGRADUATE INSTITUTE OF SCIENCE UNIVERSITY OF PERADENIYA



## **Master of Engineering Geology & Hydrogeology Degree Programme (SLQF Level 9)**

## **Master of Science (M.Sc.) in Engineering Geology & Hydrogeology Degree Programme (SLQF Level 10)**

### **1. INTRODUCTION**

The Masters programme in Engineering Geology and Hydrogeology seeks to provide a sound theoretical knowledge and comprehensive training in engineering geological and hydrogeological principles and their applications. It will also involve imparting of considerable practical experience in the areas of interests to geologists, engineers and other scientists. In Sri Lanka, at present there is a growing need to improve her infrastructure facilities with particular reference to construction of buildings, roads, railways, bridges, sub-way tunnels, overpasses etc., and to develop energy and water resources to meet the requirements of an increasing population. It is important to emphasize that these goals could be achieved only by those having a sound knowledge of geological principles and their applications to civil engineering practices. In this programme it is intended to give an opportunity for the students to get a better insight into the complex inter-relationships of soils, rocks and water.

At present, postgraduate educational opportunities particularly for geologists and civil engineers working in public and private sector organizations in Sri Lanka are limited. A large number of them stand to benefit personally and the country at large if postgraduate training is made available in Sri Lanka for the above fields. This programme is offered by the PGIS and will be conducted by the Department of Geology and the Department of Civil Engineering in collaboration.

The Board of Study in Earth Sciences has regularly updated the M.Sc. programme in Engineering Geology & Hydrogeology, introducing new courses to suit national needs. This proposal introduces a five-credit independent study module to improve writing/oral communication skills as applied to Engineering Geology & Hydrogeology.

The proposed programme includes an optional research component and at the end of the course work, the students will have the option whether to obtain one year Masters degree (SLQF 9) or continue with another 1-year research project (equivalent to 30 credits) selecting a suitable research topic in any of the fields mentioned above and submit a thesis. In this connection, the students are free to select an institution of their choice to conduct the research study. The Postgraduate Institute of Science would also help the students to find suitable institutions and topics for their research.

This Masters degree programme will thus prepare the candidate to take the challenge of meeting not only national needs in diverse areas as stated above, but also to continue toward a higher degree anywhere in the world.

## 2. OBJECTIVES OF THE PROGRAMME

The programme is designed to provide the students a sound theoretical and practical knowledge of engineering geological and hydrogeological principles, soil mechanics, rock mechanics, applications of engineering geology, groundwater resources, ground water investigation and development, groundwater pollution and transport of groundwater contaminants, groundwater engineering, investigation and development of groundwater, environmental impact studies, land use planning, landfill and waste isolation, and infrastructure planning and development.

## 3. PROGRAMME ELIGIBILITY

The candidates possessing the following educational and professional qualifications are eligible to apply for the programme.

- i. B.Sc. Special Degree in Geology from a recognized University
- ii. B.Sc. General Degree from a recognized University with Geology as a subject
- iii. B.Sc. Degree in Mining Engineering from a recognized University
- iv. Any other qualifications acceptable to the PGIS.

Candidates who meet eligibility requirements will be called for an aptitude test/interview and the selected candidates will be admitted to the programme. Employed candidates who are eligible for admission should produce evidence of leave granted to follow the programme and a letter of release from the Head of the Department/Institution.

## 4. PROGRAMME FEE

*(N.B. The programme fees given below may be revised.)*

Category	Programme Fee	
	Master of Engineering Geology & Hydrogeology degree programme	M.Sc. in Engineering Geology & Hydrogeology degree programme
Local candidates	Rs 150,000/-	Rs 180,000/-
Foreign Candidates	Rs 300,000/-	Rs 360,000/-

Students registered for the Master of Engineering Geology & Hydrogeology degree programme shall pay the Programme fee in full or in two (1/2 at the registration and the balance at the end of the first semester) or three (1/3<sup>rd</sup> at the registration, another 1/3<sup>rd</sup> after 4 months from the date of registration and the balance after 8 months from the date of registration) installments. An additional payment of Rs. 30,000/- (or Rs. 60,000/- from foreign students) should be made at the end of the first year to continue for the M.Sc. in Engineering Geology & Hydrogeology degree programme. Other payments including registration fee, medical fee, library subscription, examination fee and deposits (science and library) should be paid according to the procedure stipulated by the PGIS.

## **5. THE PROGRAMME STRUCTURE AND DURATION**

This programme consists of three options for completion.

### **5.1 Masters Degree by Course Work (SLQF Level 9)**

The Master of Engineering Geology & Hydrogeology degree can be obtained by completing course work only (without conducting any research project).

Course work, comprising of theory courses, and laboratory and/or fieldwork, shall be conducted over a period of two semesters of 15 weeks each. The total duration of the degree, including examinations, shall be about 12 months. Satisfactory completion of a minimum of 30 credits of course work with a GPA of not less than 3.00 is required for the successful completion of the degree - SLQF Level 9 (Students who do not satisfy the above criteria but obtain a GPA in the range 2.75 to 2.99 for course work of 25 credits are eligible for the Postgraduate Diploma in Engineering Geology & Hydrogeology - SLQF Level 8, and those who obtain a GPA in the range 2.75 to 2.99 for course work of 20 credits are eligible for Postgraduate Certificate - SLQF Level 7).

### **5.2 Masters Degree (SLQF Level 10)**

In addition to Masters Degree with course work (5.1), the Masters Degree (Research) requires a research project. The duration of the entire programme shall be 24 months inclusive of 5.1. Completion of all the requirements of 5.1 with a GPA of not less than 3.00 is a prerequisite for the Masters Degree (Research). The research project for this degree should be conducted on full-time basis, and completed during the second year. The research component is allocated 30 credits, totalling 60 credits for the entire programme. After successful completion of the research project, the student shall be eligible for the award of the M.Sc. in Engineering Geology & Hydrogeology degree - SLQF Level 10 (Students who do not complete the research project within the stipulated time period shall be awarded the Master of Engineering Geology & Hydrogeology degree - SLQF Level 9).

### **5.3 Extension of the programme for M.Phil. (SLQF Level 11) or Ph.D. (SLQF Level 12)**

After conducting research for a period of six months in the M.Sc. degree (research) programme, students who have demonstrated exceptional progress may apply for upgrading the degree status to M.Phil. The student should continue the research project and any additional research work/assignments recommended by the PGIS for a total of two years (60 credits of research) to qualify for the award of the M.Phil. degree (SLQF Level 11).

During the second year of research, students who have demonstrated exceptional and continuous progress may apply for upgrading the degree status from M.Phil. to Ph.D. The student should continue the research project and any additional research work/assignments recommended by the PGIS for another year on full-time basis (additional 30 credits) to qualify for the award of the Ph.D. degree (SLQF Level 12).

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**(SLQF Level 10)**

**Programme Summary**

Course Code	Course	Status	Lecture hrs.	Practical hrs.	No. of Credits
<b>Semester I</b>					
ES 531	Basic Geology <sup>1</sup>	Compulsory	30	30	3
ES 532	Basic Mechanics * <sup>2</sup>	Compulsory	30	-	2
ES 533	Fundamentals of Hydrogeology	Compulsory	20	20	2
ES 534	Fundamentals of Engineering Geology	Compulsory	25	P/F(10)	2
ES 535	Geo technical Site Investigation	Compulsory	20	P/F(20)	2
ES 536	Rock Mechanics*		30	30	3
ES 537	Soil Mechanics*		30	30	3
ES 538	GIS and Remote Sensing *		20	50	3
<b>Semester II</b>					
ES 546	Applications of Engineering Geology	Compulsory	30	P/F(30)	3
ES 547	Applied Hydrogeology	Compulsory	30	P/F(30)	3
ES 548	Hydrogeochemistry and Water Quality	Compulsory	30	30	3
ES 549	Computer Software Applications *		15	30	2
ES 550	Applied Geophysics	Compulsory	30	30	3
ES 551	Drilling and Underground Excavations *		30	P/F(30)	3
ES 552	Landslides and Stability of Slopes *		30	P/F(30)	3
ES 553	Environmental Engineering Geology *		30	P/F	2
ES 554	Bore Hole logging *		30	P/F	2
ES 555	Project Procedures *		30	-	2
ES 556	Water Resources Management *		30	-	2
ES 557	Field Monitoring and Instrumentation*		30	P/F(30)	3
ES 558	Statistics *		30	-	2
ES 559	Groundwater modeling*		30	30	3
ESR 599	Independent Study	Compulsory	500 notional hrs.		5
ESR 699	Research Project on RS and/or GIS Applications**	Compulsory for M.Sc. (Research)	3000 notional hrs. (one year duration)		30

\* *Optional courses*

<sup>1</sup> *Foundation course for non Geology graduates*

<sup>2</sup> *Foundation course for Geology graduates*

*F - Field work, demonstrations and excursions*

\*\* *Compulsory for M.Sc. in Engineering Geology & Hydrogeology (SLQF Level 10).*

## 6. PROGRAMME CONTENTS OF ES 599 AND ES 699

<b>Course code</b>	ES 599
<b>Course title</b>	Independent Study
<b>Credits</b>	05
<b>Compulsory/optional</b>	Compulsory
<b>Prerequisites</b>	None
<b>Time allocation</b>	500 notional hrs.
<b>Aims</b>	<p>Aims: The overall aim is to familiarize the student with concepts and methods involved in scientific research</p> <p><b>Specific aims:</b></p> <ol style="list-style-type: none"> <li>1. To explain the scientific process in the conduct of research.</li> <li>2. To develop skills to write a review paper and a scientific research proposal.</li> <li>3. To develop skills to make a presentation.</li> <li>4. To master the application of statistical methods on quantitative scientific data.</li> </ol>
<b>Intended learning outcomes</b>	<p>At the end of the successful completion of the course, students will be able to,</p> <ol style="list-style-type: none"> <li>1. Describe the scientific method.</li> <li>2. Conduct an independent review of literature on a selected topic in the area of Engineering Geology &amp; Hydrogeology</li> <li>3. Write a formal scientific report conforming to the guidelines provided.</li> <li>4. Transfer the knowledge gained through (2) and (3) above in the form of a presentation.</li> <li>5. Complete a research proposal conforming to the guidelines provided.</li> <li>6. Perform statistical analysis of quantitative data.</li> </ol>
<b>Content</b>	<p><i>Review paper:</i> Review of literature; Development of the review paper in concise and professional manner and logical presentation of results that have been reported, writing the abstract, compilation of the list of references.</p> <p><i>Proposal writing:</i> Interpretation and critical evaluation of results of published research; Formulation of a research problem: Concise literature review, justification, time frame, identification of resources, budgeting, etc.</p> <p><i>Project:</i> Collection and statistical analysis of data on a topic associated with the review paper.</p> <p><i>Seminar:</i> Presentation of literature and data collected on a given topic; Preparation of an abstract, preparation of slides.</p>

### Assessment criteria

Continuous assessment	End-semester examination	
30%	Review paper	25%
	Proposal writing	10%
	Project	25%
	Seminar	10%

### Recommended Texts:

1. Backwell, J., Martin, J. (2011) A Scientific Approach to Scientific Writing, Springer.
2. Postgraduate Institute of Science (2016) Guidelines for Writing M.Sc. Project Report/M.Phil. Thesis/Ph.D. Thesis

<b>Course code</b>	ES 699
<b>Course title</b>	Research Project
<b>Credits</b>	30
<b>Compulsory/optional</b>	Compulsory
<b>Prerequisites</b>	None
<b>Time allocation</b>	3000 notional hrs. (one year duration)
<b>Aims</b>	<p>Aims: The overall aim is to prepare the student to conduct a research independently.</p> <p><b>Specific aims:</b></p> <ol style="list-style-type: none"> <li>1. To train students to apply scientific method in scientific research.</li> <li>2. To train students to generate researchable hypotheses.</li> <li>3. To train students to plan, design and conduct scientific research.</li> <li>4. To gather reliable scientific data, analyse, and interpret.</li> <li>5. To develop skills in scientific writing.</li> </ol>
<b>Intended learning outcomes</b>	<p>At the end of the successful completion of the course, students will be able to,</p> <ol style="list-style-type: none"> <li>1. Apply the scientific method.</li> <li>2. Design a research project.</li> <li>3. Complete a research project.</li> <li>4. Explain ethical issues in scientific research.</li> <li>5. Describe the patenting process in research (There are no formal lectures related to this aspect in the Independent Study module. However, patenting process is taught and discussed in workshops conducted by the PGIS for which participation is required).</li> <li>6. Make presentations at national/international conferences.</li> <li>7. Produce a thesis conforming to the requirements of the PGIS.</li> <li>8. Write manuscripts for publication in refereed journals.</li> </ol>
<b>Content</b>	The students will conduct sufficient amount of laboratory/field work on a chosen research topic under the guidance provided by an assigned supervisor/s, make a presentation of research findings at a national/international conference, and produce a thesis.

#### Assessment criteria

Continuous assessment	End-semester examination
30%	Oral examination (20%) Thesis (40%) Conference presentation (10%)

#### Recommended Texts:

1. Backwell, J., Martin, J. (2011) A Scientific Approach to Scientific Writing, Springer.
2. Postgraduate Institute of Science (2016) Guidelines for Writing M.Sc. Project Report/M.Phil. Thesis/Ph.D. Thesis

#### Course Contents of Other Courses

**ES 531: Basic Geology (3 credits)**

Descriptions of rock and soil, igneous, metamorphic and sedimentary rocks, basic geological structures. Map work and section drawing associated with interpretation of site investigation reports.

**ES 532: Basic Mechanics (2 credits)**

Force, momentum, force diagrams, friction, resolution of forces, moments, centre of gravity, stress. Mohr system for presenting stress, elasticity, strain, and Mohr system for presenting strain, 3D stresses and strains, principle stresses, stress distribution, strain transformations. Strength of materials.

**ES 533: Fundamentals of Hydrogeology (2 credits)**

The role of groundwater in the hydrological cycle. Measurements of precipitation and evaporation, runoff, return periods. Methods of estimating recharge and base flow. Understanding the groundwater-surface water interface. Soil water balances and flow in the unsaturated zone. Subsurface distribution of water. Hydraulic properties. Aquifer types and groundwater environments. Groundwater flow theory.

**ES 534: Fundamentals of Engineering Geology (2 credits)**

Formation, accumulation and geotechnical characteristics of residual and sedimentary soils, Weathering grade classification, Formation and geotechnical characteristics of igneous, metamorphic and sedimentary rocks. Geological structures, stereographic analysis, Rock mass and intact rock classification systems.

**ES 535: Geotechnical Site Investigations (2 credits)**

Design and execution of ground investigation, the recording of data, its assessment. Computer management of geotechnical data, quantitative methods in ground investigation.

**ES 536: Rock Mechanics (3 credits)**

Classification of intact rocks, Defects in rock mass, Physical and Mechanical properties of rocks, Rock Testing, Creep behavior and rheological models, strength and failure of rocks, Stress and Strain, Rock deformation.

**ES 537: Soil Mechanics (3 credits)**

Soil classification, mineralogy of soils, soil water, soil stresses, consolidation and settlement, shear strength, lateral earth pressures, slope stability, site investigation in soils.

**ES 538: GIS and Remote Sensing (3 credits)**

Aerial photogrammetry, topographic measurements, orographic measurements, geological measurements; Remote sensing with satellite images and other remotely collected terrain data, Terrain analysis, GIS methods; Computer usage and applications.

**ES 546: Applications of Engineering Geology (3 credits)**

Engineering geological aspects of aggregates, roads, foundations, dams, reservoirs, and underground excavations, and geotechnical processes for groundwater control, grouting, mechanical support, consolidation and soil improvement.

**ES 547: Applied Hydrogeology (3 credits)**

Hydrogeological characterization, exploration techniques, hydrogeological maps and data. Percussion drilling, Conventional rotary and pneumatic hammer percussion drilling, Reverse circulation and drilling fluid systems. Well design and construction, materials selection, screen selection and gravel pack design. Well efficiency testing and analysis. Pumping test analysis techniques for confined, leaky and unconfined conditions.

**ES 548: Hydrogeochemistry/water quality (3 credits)**

Basic introduction to quantitative aqueous chemistry including: Structure of water, activities,

equilibrium constants, thermodynamic calculations, acid-base reactions, redox reactions, ion exchange, the effects of mixing, and silicate system reactions. Interpretation of major and minor ion concentrations with respect to groundwater flow and evolution, and related hydraulic controls. Assessment of incrustation and corrosion potential of groundwater. Natural groundwater quality with respect to potable, industrial and agricultural use, water quality standards. Concepts of basic contaminant movement in groundwater systems. Inorganic contaminant chemistry, organic contaminant chemistry. The methods used for sampling and monitoring.

**ES 549: Computer software applications (2 credits)**

Use of currently available software packages for selected hydrogeological and engineering geological themes (minimum two packages).

**ES 550: Applied Geophysics (3 credits)**

Principles of electrical resistivity, seismic refraction, gravity, magnetic and electromagnetic techniques. Analysis and interpretation of field data with particular reference to resistivity sounding and seismic refraction. The application of surface geophysical surveying to ground water and engineering geological problems including identification of aquifer geometry, aquifer properties and water quality. Field determination of geophysical survey techniques.

**ES 551: Drilling and Underground Excavations (3 credits)**

Classification of Rock Masses, Stereographic Projections, Stresses around underground excavations, Strength of rock and rock masses, Underground excavation failure mechanisms, Underground excavation support design, Rock bolts, Shotcrete, and Mesh, Blasting in underground excavations, Drilling techniques for exploration and water supply, Instrumentation

**ES 552: Landslides and Stability of Slopes (3 credits)**

Causes of landslides, classification, investigation of land slides, Basic mechanics of slope failure, Graphical presentation of slope geological data, shear strength of rocks, Groundwater flow, Permeability, monitoring and instrumentation, slope stability analysis, prevention and control.

**ES 553: Environmental Geology (2 credits)**

Land use patterns and environmental problems, urban geology, urban canals, aquatic chemistry, solid waste disposal and environmental impact assessment applications.

**ES 554: Bore Hole Logging (2 credits)**

Principles of geophysical well logging techniques including electrical (SP, resistivity, induction), radiometric (gamma, density, neutron), sonic, fluid temperature and conductivity, flowmeter and caliper logs. Applications in hydrogeology. Interpretation of field records.

**ES 555: Project Procedures (2 credits)**

Hydrogeological and Engineering geological employment, project tender invitation, proposals, work schedules, costing, group project proposal exercise.

**ES 556: Water Resources Management (2 credits)**

Dynamic equilibrium in Natural Aquifers, case studies, groundwater budgets, management potential of aquifers, paradox of safe yield. groundwater legislation, laws regulating quantity of groundwater, laws regulating quality of groundwater, groundwater mining and cyclic storage.

**ES 557: Field Monitoring and Instrumentation (3 credits)**

Principles of instrumentation and field monitoring field instrumentation and monitoring in slopes, land fills, building foundations, tunnels and excavations, ground water systems etc. Types of instruments and their details.

**ES 558: Statistics (2 credits)**

Population and sample, scale of measurement, introduction to probability, discrete and continuous



variables and cumulative distribution functions, the family of normal distributions, testing of hypotheses - parametric case, point and interval estimation, introduction to analysis of variance (one way and 2 way ANOVA), linear regression and correlation, contingency tables and test of association.

**ES 559: Groundwater modeling (3 credits)**

Finite difference, Finite element and Crank Nicholson methods; explicit and implicit methods; stability criteria, programming techniques; application to problem solving in hydrogeology and engineering geology.

**ES 597: Seminar (1 credit)**

**FIELD WORK/EXCURSIONS:**

As indicated in the programme structure, field work/demonstrations/excursions are compulsory part of some courses. The programme will include pumping tests, geophysics, and visits to landfill sites, water resource schemes, and drilling sites. Students are encouraged to gain further field experience either during their own projects and/or when helping their colleagues with their projects. Excursions to national hydrogeological conferences, seminars, workshops and meetings are also organized.

**7. PROGRAMME EVALUATION**

**Evaluation of Course work**

Based on the scheme given below, the overall performance of a student in a given course shall be evaluated by the respective instructor(s) and a grade shall be assigned.

*Evaluation Scheme*

- For all courses a minimum of 80% attendance is expected.
- The evaluation of each course (except independent study and research project) shall be based on within course and end of course examinations, and assignments. The weightage of marks given below can generally be used as a guideline in the computation of the final grade, except for Independent Study and Research Project.

End of course examination	50 - 60%
Continuous assessments (mid-semester examination, assignments, etc.)	40 - 50%
- Courses with laboratory and/or fieldwork shall be evaluated, where applicable, on a continuous assessment basis.
- The minimum grade a student should achieve to pass a course is C.
- Students will be informed of the evaluation scheme by the instructor at the beginning of a given course.

*Grade Points and Grade Point Average (GPA)*

The Grade Point Average (GPA) will be computed using the grades earned for core courses and optional courses, taken for credit.

On completion of the end of course examination, the instructor(s) is/are required to hand over the grades of a given course to the programme coordinator who will assign the Grade Points using the following table:

Grade	Grade Point
A+	4.0
A	4.0
A <sup>-</sup>	3.7

B <sup>+</sup>	3.3
B	3.0
B <sup>-</sup>	2.7
C <sup>+</sup>	2.3
C	2.0
D	1.0
E	0.0

The Grade Point Average (GPA) will be computed using the formula:

$$\text{GPA} = \frac{\sum c_i g_i}{\sum c_i}, \quad \text{where } c_i = \text{number of credit units for the } i^{\text{th}} \text{ course, and } g_i = \text{grade point for the } i^{\text{th}} \text{ course}$$

#### *Make-up Examinations*

'Make-up' examinations may be given only to students who fail to sit a particular examination due to medical or other valid reasons acceptable to the PGIS.

#### *Repeat Courses*

If a student fails a course or wishes to improve his/her previous grade in a course, he/she shall repeat the course and course examinations at the next available opportunity. However, he/she may be exempted from repeating the course, and repeat only the course examinations if recommended by the teacher-in-charge or M.Sc. Programme Coordinator. The student may repeat the same course or a substituted (new) optional course in place of the original course. A student is allowed to repeat five credits of coursework free-of-charge. The maximum number of credits a candidate is allowed to repeat is fifteen. The maximum grade, a candidate could obtain at a repeat attempt is a B and he/she is allowed to repeat a given course only on two subsequent occasions.

#### *Evaluation of Research Project*

Research project will be evaluated on the basis of a written report (M.Sc. Theses) and oral presentation (see above Table for Course Code ES 699).

## **8. TEACHING PANEL**

Mr. KN Bandara, NBRO, 99/1, Jawatta Road, Colombo 5

*BSc (Perad), MSc (AIT)*

*(Field of Specialization: Engineering Geology, Rock Mechanics, Slope Stability)*

Mr. SDPJ Dampegama Survey Dept. of Sri Lanka, Narahenpita, Colombo

*B.Sc. (Kelaniya), MSc (USA)*

*(Field of Specialization: GPS)*

Prof. C.B. Dissanayake, Department of Geology, University of Peradeniya

*B.Sc. (Perad.), Ph.D. (Oxford)*

*(Field of Specialization: Geochemistry)*

Prof. H A Dharmagunawardana, Department of Geology, University of Peradeniya

*B.Sc. (Perad.), M.Phil. (Perad.) PhD(Denmark)*

*(Field of Specialization: Geophysics, Hydrogeology)*

Dr. Jayalath Edirisinghe, Dept. of Civil Engineering, Faculty of Engineering, University of Peradeniya

*B.Sc. Eng (Perad.), Ph.D.(Sheffield)*

*(Field of Specialization: Structural Engineering)*

Dr. Jagath Gunatilake, Department of Geology, University of Peradeniya

- B.Sc. (Perad), M.Sc. (AIT – Bangkok), .PhD ( Japan)*  
*(Field of Specialization: Soil Mechanics, Mass Movement, Engineering Geology, GIS)*
- Mr. Malika Gunawardena, Department of Geology, University of Peradeniya  
*BSc (Perad), MSc (Perad)*  
*(Field of Specialization: GIS & RS)*
- Dr. Gemunu Herath, Department of Civil Engineering, Faculty of Engineering  
*BSc. (Perad) PhD (Japan).*  
*(Field of Specialization: Hydrology)*
- Prof. Tilak Hewawasam Department of Geography, University of Peradeniya  
*B.Sc. (Perad.), M.Phil. (Perad.) PhD (Berne)*  
*(Field of Specialization: Geochemistry)*
- Dr. H A G. Jayathissa, NBRO, 99/1, Jawatta Road, Colombo 5  
*B.Sc. (Perad.), M.Sc., PhD (Tubingen)*  
*(Field of Specialization: Landslides)*
- Mr. K.A.W. Kodituwakku, Kurunegala Road, Mawathagama,  
*B.Sc. (Perad), M.Sc. (Nederlands)*  
*(Field of Specialization: Geophysics, Hydrogeology)*
- Mr. Nalin Mannapperuma, Waste Management Authorityn-WP – Srawasthi Mandiraya, No. 32,  
 Marcus Fernando Mw, Colombo 7  
*BSc (Perad), MSc (Japan)*  
*(Field of Specialization: Environmental Geology)*
- Prof. K.D.W. Nandalal, Department of Civil Engineering, Faculty of Engineering.  
*BSc. (Perad) PhD.*  
*(Field of Specialization: Hydrology)*
- Prof. H.A. Pitawala, Department of Geology, University of Peradeniya  
*B.Sc. (Perad), M.Sc. (Perad), Ph.D.(Germany)*  
*(Field of Specialization: Oceanography, Urban Geology)*
- Dr. Jayantha Ranasooriya, 324/2, Kurunduwatta Road, Katukurunda, Kalutara  
*BSc (Perad), MSc (AIT), PhD (Australia)*  
*(Field of Specialization: Engineering Geology, Rock Mechanics)*
- Prof. A Senaratne, Department of Geology, University of Peradeniya  
*B.Sc. (Perad.), M.Sc. (Lond.), Ph.D. (Mainz)*  
*(Field of Specialization: Petroleum Geology, Geochemistry)*
- Prof. K G H C N Seneviratne, Faculty of Engineering, University of Peradeniya  
*B.Sc. Eng (Cey.), Ph.D. (Cambridge)*  
*(Field of Specialization: Geotechnical Engineering, Soil Mechanics)*
- Prof. Emeritus D Thanthrigoda, Dept. of Physics, University of Sri Jayawardenapura, Nugegoda  
*B.Sc. (Perad.), PhD (Australia)*  
*(Field of Specialization: Applied Geophysics)*
- Eng. Shavindranath Fernando, National Engineering Research & Development Centre, 2P/17B, IDB,  
 Industrial Estate, Ekala, Jaela  
*B.Sc. (Perad), M.Sc. (AIT – Bangkok)*  
*(Field of Specialization: Project Management)*
- Mr. Upul Goonasekera, Uma Oya Multipurpose Development Project, MAT Office, Karandagolla,  
 Wellawaya.  
*M.Sc. (Moscow)*  
*(Field of Specialization: Engineering Geology, Project Management)*
- Dr. J.J. Wijethunge, Department of Civil Engineering, University of Peradeniya  
*B.Sc.Eng. Moratuwa),, Ph.D. ( Cambridge )*  
*(Field of Specialization: Disaster Management)*

## LIST OF COLLABORATIVE INSTITUTIONS

1. National Water Supply & Drainage Board (NWS&DB)
2. Geological Survey and Mines Bureau (GSMB)
3. National Building Research Organization (NBRO)
4. Central Engineering Consultancy Bureau (CECB)
5. Water Resources Board (WRB)

## PROGRAMME COORDINATORS

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