POSTGRADUATE INSTITUTE OF SCIENCE (PGIS)

UNIVERSITY OF PERADENIYA, SRI LANKA

Master of Disaster Management Degree Programme (SLQF Level 9)

Master of Science (M.Sc.) in Disaster Management Degree Programme (SLQF Level 10)

(Conducted jointly by the PGIS and the Faculty of Engineering, University of Peradeniya)

Collaborating Institutions:

1. International Institute for Geo-Information Science and Earth Observation (ITC), The Netherlands
2. Asian Disaster Preparedness Center (ADPC), Thailand
3. Pacific Disaster Center, Hawaii, USA

1. INTRODUCTION

During the last few decades, of the many natural hazards that are prevalent Sri Lanka, floods, landslides, droughts, cyclones and lightning have occurred more frequently causing severe damage to life and property. This situation has created an awareness among policymakers that disaster management should emphasize risk identification and mitigation rather than the commonly practiced relief-oriented approach. The subject of disaster management has now assumed prime importance particularly in view of the devastating December 26, 2004 tsunami that killed tens of thousands of people and destroyed several thousands of dwellings and other buildings.

Over the past five years, with the functioning of the Disaster Management Centre (DMC) under the Ministry of Disaster Management and Human Rights, disaster management infrastructure with an "All Hazards" approach has gradually got established. The capacity building process has been active at provincial, district and divisional administration levels, particularly in landslide- and flood-prone areas. More recently these efforts are being directed also in tsunami affected areas. Short-term training and awareness programs are being periodically conducted by the DMC covering natural, technological and human-induced disasters.

This M.Sc. Programme proposes a value adding philosophy that allows graduates with different backgrounds to gain a focused understanding of disaster management and mitigation. The strategy is to train a broad base of professionals from diverse sectors that can integrate risk reduction appropriately in their practices. It also actively models the interdisciplinary aspect across natural, physical and social sciences as well as between practitioners and researchers. The programme reflects the notion that effective disaster management is an inter-sectoral activity requiring knowledge from a wide range of disciplines. These include an understanding of hazard processes, an appreciation of governance, poverty and household livelihoods as well as cognizance of health and illness on development potentials. The programme has, as its long term objective, the sustainable training of well accomplished professionals who would be available to carry out a range of activities related to hazard, vulnerability, risk analysis and mitigation. This applies irrespective of whether they work in the state sector, private sector, nongovernmental organizations or research institutions. A possible outcome with wide-reaching consequences would be the appreciation that skilled professionals who can contribute to the effectiveness of disaster risk and its management. Their skills achieved in participatory risk assessment techniques, forecasting methods, environmental management and GIS applications should indeed satisfy the aspirations of Sri Lanka's Disaster Management Act approved by the Parliament.

2. OBJECTIVES OF THE PROGRAMME

To provide

- a sound knowledge to graduates with different backgrounds to gain a better understanding of disaster management and mitigation.
- an advanced and enhanced knowledge of recent issues of Disaster Risk Management (DRM). As such at the completion of this course, the candidates will be able to fit into any DRM related enterprise or a research institute.

3. PROGRAMME ELIGIBILITY

Candidates should be proficient in English which will be the medium of instruction for the programme. The minimum requirements for enrolment

(a) Bachelor's degree, preferably in science-based disciplines.

Those applicants possessing a bachelor's degree in Arts / Humanities should have at least 5 years of experience in disaster management activities, particularly in floods, landslides and tsunami affected and drought stricken areas **or** should have completed at the Bachelors degree level, a substantial component of the above activities.

OR

(b) any other equivalent qualifications acceptable to the Postgraduate Institute of Science (PGIS).

4. PROGRAMME FEE

Category	Programme Fee	
	Master of Disaster Management degree programme	**M.Sc. in Disaster Management degree programme**
Local candidates	Rs. 175,000/-	Rs. 225,000/-
Foreign candidates	Rs. 350,000/-	Rs. 450,000/-

Students registered for the Master of Disaster Management 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)* installments. An additional payment of Rs. 50,000/- (or Rs. 100,000/- from foreign students) should be made at the end of the first year to continue for the M.Sc. in Disaster Management 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. (N.B. The Programme fees given above may be revised as per recommendation of the Board of Management of 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 Disaster Management 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 Medical Physics - 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 by Course Work and Research (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 Disaster Management degree - SLQF Level 10 (Students who do not complete the research project within the stipulated time period shall be awarded the Master of Disaster Management 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).

Master of Disaster Management Degree Programme (SLQF Level 9)

Master of Science (M.Sc.) in Disaster Management Degree Programme (SLQF Level 10)

Programme Summary

The programme of study consists of 4 credits of preliminary course (not considered in the computation of the GPA), 13 credits of compulsory courses, 19 credits of optional courses and 12 credits in the specialised courses for the M.Sc. Degree in Disaster Management with course work. Candidates are required to take 13 credits from compulsory General Courses and the balance 17 credits from optional General/Specialized courses.

Course Code	*Course Title*	*Lecture hrs.*	*Practical hrs.*	*No. of Credits*
Preliminary courses				
ESD 401	Preliminary Courses in Earth Sciences	15	-	-
ESD 402	Preliminary Courses in Climate Sciences	15	-	-
ESD 403	Preliminary Courses in Engineering	15	-	-
ESD 405	Statistics Applications	15	-	-
General courses				
Semester I				
ESD 501	Introduction to Disaster Management	15	-	1
ESD 502	Risk Determination and Treatment	15	-	1
ESD 503	Disaster Preparedness and Emergency Management	30	-	2
ESD 504	Social, Cultural, and Administrative Aspects	30	-	2
ESD 505	Application of GIS and RS in Disaster Management	30	-	2

ESD 506	Landslides I: origin, occurrence and mitigation*	30	-	2
ESD 507	Seismic Hazards*	30	-	2
ESD 508	Coastal Hazards*	30	-	2
ESD 509	Hydrological Hazards*	30	-	2
Semester II				
ESD 510	Meteorological (Climatological) Hazards*	30	-	2
ESD 511	Industrial Hazards*	30	-	2
ESD 512	Fire Hazards*	30	-	2
ESD 513	Public Health and Biological Hazards*	45	-	3
ESD 514	Agriculture and Veterinary Hazards*	30	-	2
Specialized courses				
ESD 520	Executive Leadership and administrative skills*	30	-	2
CE 668	Hazard Forecasting and Mitigation*	30	-	2
CE 638	Urban/ Rural Planning and Hazard Mapping*	30	-	2
CE 669	Advanced Course on Landslides and Seismic Hazards*	30	-	2
CE 697	Advanced Course on Coastal and Hydrological Hazards*	30	-	2
CE 639	Design of Structures for Cyclones and High Winds*	15	-	1
CE 698	Mitigation of Industrial Hazards*	15	-	1
ESD 599	Independent Study-**[1]	500 notional hrs.		5
ESD 699/ CE 699	Research Project**[2]	3000 notional hrs. (one year duration)		30

Preliminary courses are compulsory for those without sufficient background knowledge and they are not considered in the computation of the GPA.

CE 6XX courses will be offered by the Faculty of Engineering, University of Peradeniya.

** Optional courses*

**[1] *Compulsory for Master of Disaster Management degree* (*SLQF Level 9*)

**[2] *Compulsory for M.Sc. in Disaster Management degree* (*SLQF Level 10*)

Candidates are required to take 8 credits from compulsory General Courses and the balance 16 credits from optional General/Specialized courses.

6. PROGRAMME CONTENTS

Course code	ESD 599
Course title	Independent Study
Credits	05
Compulsory/optional	Compulsory
Prerequisites	None
Time allocation	500 notional hrs.
Aims	Aims: The broad aim is to familiarize students with concepts and methods involved in scientific research **Specific aims:** 1. To explain the scientific process in the conduct of research. 2. To develop skills to write a review paper and a scientific research proposal. 3. To develop skills to make a presentation. 4. To master the application of statistical methods on quantitative scientific data.
Intended learning outcomes	At the end of the successful completion of the course, students will be able to, 1. Understand the scientific method. 2. Conduct an independent review of literature on a selected topic in the area of disaster management.. 3. Write a formal scientific report conforming to the guidelines provided. 4. Transfer the knowledge gained through (2) and (3) above in the form of a presentation. 5. Complete a research proposal conforming to the guidelines provided. 6. Perform statistical analysis of quantitative data.
Content	*Review paper*: 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. *Proposal writing*: 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. *Project*: Collection and statistical analysis of data on a topic associated with the review paper. *Seminar*: Presentation of literature and data collected on a given topic; Preparation of an abstract, preparation of slides.

Assessment criteria: Continuous Assessment

Components	Review paper	Proposal writing	Project	Seminar
%marks	20%	10%	40%	10%

Recommended Texts:

1. Backwell, J. and 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
3. Creswell, J. W. (2003). Research design: Qualitative, quantitative and mixed methods approaches (2nd ed.), Thousand Oaks, CA: SAGE.

Course code	ESD 699/CE 699
Course title	**Research Project**
Credits	30
Compulsory/optional	compulsory
Prerequisites	*none*
Time allocation	3000 notional hrs. (Twelve months full time)
Aims	To train students in collecting and evaluating scientific literature, generate hypothesis, planning and conducting of scientific research, analysing, handling and presenting scientific data and scientific writing.
Intended learning outcomes	Students will be 1. able to collect scientific literature related to a given topic. 2. able to generate hypothesis, plan and conduct scientific experiments, collect and analyse results and make inferences based on the results. 3. competent enough in oral presentation of scientific findings, report writing and preparation of manuscripts for publications. 4. Show a proficiency in knowledge in the subject area.
Content	The students will conduct sufficient amount of laboratory/field work on a chosen topic under the guidance provided by an assigned supervisor/s and produce a research report/thesis.

Assessment criteria

Report/Thesis	Presentation
80%	20%

Recommended Texts:

1. Backwell, J. and 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
3. Creswell, J. W. (2003). Research design: Qualitative, quantitative and mixed methods approaches (2nd ed.), Thousand Oaks, CA: SAGE.

PROGRAMME CONTENTS OF OTHER COURSES

Preliminary courses

ESD 401: Preliminary Courses in Earth Sciences (1 credit)

Earth's structure and composition, development of continents and oceans, Theory of Plate Tectonics, Introduction to rocks and minerals , rock cycle, different types of rocks and their modes of formation; Methods of identification of rocks and minerals; Geology of Sri Lanka.

ESD 402: Preliminary Courses in Climate Sciences (1 credit)

Introduction to Climatology and Meteorology. Tropical cyclones, tornadoes, storms, hurricanes, droughts, thunderstorms and lightening

ESD 403: **Preliminary courses in Engineering (1 credit)**

Forces and Equilibrium, Stresses and Strains, Strength and Failure, Dynamics, Momentum, Hydrostatics, Water Flow, Materials and their Engineering Behaviour, Engineering Solutions, Engineering Design and use of Codes of Practice

ESD 405: Statistics Applications (1 credit)

(1 Credit: Lectures and Laboratory)
Population and sample; Measures of central tendency and dispersion; Sampling distribution of mean; Introduction to probability; The Z distribution and calculation of probabilities; Principles of hypothesis testing, Type I and II errors, power of test; Two sample paired and non-paired 't' test; Simple linear regression and correlation; Analysis of 2-dimensional categorical tables (chi-square test).

General courses

ESD 501: Introduction to Disaster Management (1 credit)

Mitigation, preparedness, response, relief, recovery and reconstruction. Perception and Identification of risk: Concept of risk and risk terminology. Applications to various situations. Sources of risk data, Risk Management tools. Hazard analysis, Vulnerability Mapping, Statistical techniques, Qualitative Methods.

ESD 502: Risk Determination and Treatment (1 credit)

Fundamental principle relating to loss presentation. Relevant legal structures on-site Emergency Planning and Procedures. Preparing for Emergencies, providing first aid and coping emotionally; Introduction of Risk Analysis techniques, Treatment Criteria including costing methods

ES 503: Disaster Preparedness and Emergency Management (2 credits)

History of Sri Lankan Disaster Management Systems, Disaster Management concepts and principles. Community Awareness and Education. Disaster Planning. Human response to disaster. Current issues and trends in emergency management; Personal effectiveness in relationship management at the workplace; Logistics and evacuation as a key component of emergency management. Legal implications. Logistical support such as medical needs, housing etc. Responsibilities of government/private sector in emergency management and disaster recovery. Community needs. Areas of vulnerability, cultural and social impacts. Tools in the evaluation and assessment of economic recovery. Environmental factors inhibiting recovery .

ESD 504: Social, Cultural and Administrative Aspects (2 credits)

Investigation of basic socio-cultural causes and reasons. Different aspects of human casualties in disasters. Demographic considerations. Inventorying of socio-cultural properties of the impact areas lands, boundaries, trees, animal resources etc. Impact of disaster on anthropological aspects. Sociological studies on the family unit, extended family, single parent family etc.

ESD 505: Applications of GIS & Remote Sensing in Disaster Management (2 credits)

Overview of concepts of Remote Sensing (RS) technology. Visual interpretation of aerial photographs and satellite imagery for landuse, land pattern analysis, geological and structural analysis etc.) Basics of photogrammetry. Overview, history and concepts of GIS; Scope and application areas. Mapping Concept and Map/Projection Data Structure, Input of geospatial data. Concept of Spatial data base. Data acquisition, manipulation and analysis. Introduction to GPS and basic concepts. Integration of RS, GIS techniques and thematic map data and interpretation.

ESD 506: Landslides (2 credits)

Understanding of geological causes, types and processes of slope movement, engineering methods for slope stabilization and mitigation. Landslide risk analysis using Remote Sensing, GIS and other techniques. Preparation of landslide hazard zonation maps. Identification of safe sites for new construction with community participation. Awareness programmes for the community.

ESD 507: Seismic Hazards (2 credits)

Geology of Earthquakes. Seismological studies and surveys. What causes earthquakes and ground-shaking. Economic impact of ground-shaking. How to reduce losses from ground-shaking. Surface faulting and effects. Landslides and liquefaction triggered by earthquakes. Can earthquakes be predicted? Earthquake resistant constructions.

Geology of volcanism. Seismological studies and surveys. Different kinds of volcanic eruptions. Hazards from Volcanic eruptions. Frequency of occurrence. Forecasting of volcanism. Reduction of losses from volcanic activity.

ESD 508: Coastal Hazards (2 credits)

Causes, locations, modes of occurrence of different coastal hazards such as Tsunamis, Storm Surges, Erosion. Their origins, occurrence, and mitigation. Social and economic impacts of tsunamis. Historical records of tsunamis. Construction of tsunami walls, levees etc. Mitigation of their effects. Tsunami Early Warning Systems, Awareness programmes and Drilling exercises: Identification of safe evacuation routes. Modelling studies for Tsunami predictions.

ESD 509: Hydrological Hazards (2 credits)

Hazards from floods, causes of flooding. Dam failures, flash flooding, riverine floods and tidal floods. Their causes, physical characteristics and locations of occurrence. Mitigation procedures.

Droughts: Climatological and human-induced causes. Identification of water supplies in drought-stricken areas. Methods of rain-water harvesting. Awareness programmes.

ESD 510: Meteorological Hazards (2 credits)

Cyclones, genesis, dynamics, products and forecasting;
Atmospheric instability, thunderstorms, products of thunderstorms, cloud electrification, ground and cloud discharge (lightening), types of lightening, energy and hazards, precautions against lightning, Lightning Protection Systems (including lightning conductor).
Tornado, waterspout, downdraughts, updraughts, microburst, gust fronts, hazards,
Meteorites, characteristics, movements. Planetary activities, Solar system, Radiation intensity, global circulation and energy transfer, diurnal and monthly variation of atmospheric pressure leading to weather change. Climate Change/Global Warming: Origin, occurrence, forecasting and mitigation.

ESD 511: Industrial Hazards (2 credits)

Accidents in factories and nuclear power stations. Protection against contamination of the environment from radioactive fallout and leaking of toxic chemicals. Industrial pollution, effluent contamination and acid rain. Monitoring and protective measures. Safe toxic waste disposal technologies.

ESD 512: Fire Hazards (2 credits)

Fires due to natural, technological and human-induced causes. Bush fires: control and safety measures, evacuation, fire fighting procedures and relevant training programmes and drills.

ES 513: Public Health and Biological Hazards (3 credits)

Outbreak of Dengue and Malaria epidemics, contagious diseases e.g. AIDS. Protection and awareness. Ground water contamination; Water-borne diseases affecting bowels/kidney. Human disasters due to air accidents and bomb explosions - development of field disaster victim identification capability and enhancement of forensic and pathology capabilities.

ES 514: Agricultural and Veterinary Hazards (2 credits)

Locust outbreaks and their management. Brown plant hopper attacks in paddy, Foreign animal and plant species invasion, monitoring/forecasting. Coconut mite and beetle attacks. Salt water intrusion into crop fields. Remedial measures. Birds' Flu epidemics and protection and awareness measures. Foot and Mouth/Mad Cow disease. Educating Farmers.

Specialized courses

ESD 520: Executive Leadership and administrative skills (2 credits)

Leadership qualities, capacity and decision making skills, problem solving skills, executive management to meet the needs of police, law enforcement and public safety organisations; Analysis of policing and public safety from a strategic leadership perspective, and the impact of economic, social and technological issues; understanding of the strengths and weaknesses of leadership styles.

CE 668: Hazard Forecasting and Mitigation (2 credits)

Hazard Forecasting and Early Warning Systems: Introduction and historical background, Forecasting techniques, Stochastic modelling of natural and man-made hazards, Reliability analysis involving random loads (exposure) and resistances (vulnerability), Extreme-value probability models, Early warning systems: requirements, reliability, level of penetration, human response, communication.
Engineering Interventions for Hazard Mitigation: Prevention, Vulnerability assessment, Evaluation of failure modes, Vulnerability reduction, Disaster-resistant construction techniques, Structural mitigation measures for tsunamis and storm surges, Flood damage mitigation techniques, Earthquake-resistant structures, Slope stability, Rehabilitation and Re-construction, Technologies for post-disaster repair of lifeline damage.

CE 638: Urban/ Rural Planning and Hazard Mapping (2 credits)

Integration of hazard loss considerations in urban infrastructure planning, Facilities location and planning, Hazard mapping and zoning, Building regulations, Building codes, Performance standards, Shelters, Evacuation route planning.

Practice of Disaster Management: How disaster mitigation is practised in different institutions within the country and outside will be discussed; this will also include presentation of case studies covering all hazards.

CE 669: Advanced Course on Landslides and Seismic Hazards (2 credits)

Pre-requisites: ESD 506 Landslides and ESD 507 Seismic Hazards

Basic characteristics of local soils/rocks, Permeability and seepage, Effective stress and shear strength, Mechanism and classification of landslides, Stability analyses, Preventive, control, and remedial measures.
Seismic zonation, Seismic risk analysis, Soil liquefaction, Performance of infrastructure, Lifeline earthquake engineering.

CE 697: Advanced Course on Coastal and Hydrological Hazards (2 credits)

Pre-requisites: ESD 508 Coastal Hazards and ESD 509 Hydrological Hazards

Wave theories, Coastal environment and Coastal processes, Mechanics of nearshore sediment transport, Hydrodynamics of tsunamis and storm surges, Numerical modelling of tsunamis and storm surges, Marine Pollution, Salinity intrusion, Oil slicks, Impact of sea level rise.
Hydrological data analysis: extreme rainfall and runoff prediction, flood frequency analysis, flood flow regulation, real-time flood forecasting.
General one-dimensional equations for unsteady flows: one-dimensional river flood routing, surge waves in canals, dam-break flood waves.
Flood hazard and inundation modelling, urban flooding, flood control, Two-dimensional kinematic and diffusion wave models, contaminant transport modelling in surface and subsurface flow.

CE 639: Design of Structures for Cyclones and High Winds (1 credit)

Pre-requisite: ESD 510 Meteorological Hazards

Effect of wind forces on buildings and other structures, Assessment of wind pressure, Requirements for structural adequacy, Use of design codes for wind resistant design of masonry, steel and timber structures, Improve resistance to cyclones and high winds; foundations, walls, frames and roofs.

CE 698: Mitigation of Industrial Hazards (1 credit)

Pre-requisite: *ESD 511 Industrial Hazards*

Hazard analysis at the design stage, Planning and Preparation of Response, Contingency plans for hazardous waste generators, Pollution incident prevention plan, Spill prevention, Control and countermeasure plan, Containment of hazardous spills, Sources of information.

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. Preliminary courses, industrial training, research project and seminar will be evaluated on a pass/fail basis.

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^-	3.7
B^+	3.3
B	3.0
B^-	2.7
C^+	2.3
C	2.0
F	0.0

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

$$GPA = \frac{\Sigma c_i g_i}{\Sigma c_i},$$

where c_i = number of credit units for the i^{th} course, and
g_i = grade point for the i^{th} 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. project report) and oral presentation (see Section 6.0 of the PGIS Handbook for the format of the project report).

7. PANEL OF TEACHERS

Prof. K.G.A. Dahanayake, Professor Emeritus, Department of Geology, University of Peradeniya (Sedimentology)
Ph.D. (Ecole Nationale Superieuere de Geologie appliquee et de prospection miniere, France)

Prof. B.S.B. Karunaratne, Professor Emeritus, Department of Physics, University of Peradeniya (Materials Science)
Ph.D. (University of Warwick, UK)

Dr. S.W. Nawaratne, Deveni Rajasinghe Mw, Gatambe, Peradeniya (Economic Geology)
Ph.D. (University of Linz, Germany)

Dr. Rathnayake M. Abeyrathne, Department of Sociology, University of Peradeniya (Health and Medicine)
Ph.D. (University of London, UK)

Dr. A.A.J.K. Gunatilake, Department of Geology University of Peradeniya (Engineering Geology, GIS &RS)
Ph.D. (Saga University, Japan)

Prof. K. D. W. Nandalal, Department of Civil Engineering, University of Peradeniya (Water Resources Engineering)
Ph.D. (University of Wageningen, The Netherlands)

Prof. K.P.P. Pathirana, Department of Civil Engineering, University of Peradeniya (Coastal Engineering)
Ph.D. (Katholieke Universiteit Leuven, Belgium)

Dr. A.G.H.J. Edirisinghe, Department of Civil Engineering, University of Peradeniya (Slope stability analysis)
Ph.D. (Ehime University, Japan)

Dr. P.B.G. Dissanayake, Department of Civil Engineering, University of Peradeniya (Hydrology)
Ph.D. (University of Hong Kong, Hong Kong)

Dr. W.M.V.S.K. Wickramasinghe, Department of Civil Engineering, University of Peradeniya (Transportation Engineering)
Ph.D. (Hokkaido University, Japan)

Dr. D.G.G.P. Karunaratne, Department of Chemical Engineering, University of Peradeniya (Air pollution)
Ph.D. (University of Nova, Portugal)

Dr. Sachith P. Abeysundara, Department of Statistics, University of Peradeniya (Mathematics with concentration on Statistics)
Ph.D. (Texas Tech University, USA)

Dr. H.A.G. Jayathissa, National Building Research Organization, 99/1 Jawatte Road, Colombo 05, (Engineering Geology)
Ph.D. (University of Tuebingen, Germany)

Dr. B.M.K. Perera, Talagolla, Dikkohupitiya, Hettimulla (Biology, Human Resource Management and Leadership)
M.Sc. (Peoples Friendship University, USSR), Ph.D. (Moscow Agricultural Academy)

Mr. K.R. Abhayasinghe, Former Director, Department of Meteorology, 94, Subhavasa, Kotaligoda, Menikdiwela (Atmospheric Physics)
M.Phil. (University of Colombo)

Ms. Anoja Senevirathne, Director, Disaster Management Centre, Colombo (Water Resources and Environment Management)
M.Sc. (ITC, Netherlands)

Mr. Malika Gunawardena, Nanuoya Rd, Kribathkumbura, Peradeniya (GIS)
M.Sc. (University of Peradeniya)

Mr. Dinudu Jayalath, Hatharaliyadde Rd, Mawathagama (GIS)
M.Sc. (University of Peradeniya)

Ms. Sanjeevani Nilmini Bandara Thaldena, Geophysicist, Geological Survey & Mines Bureau, No.569, Epitamulla Road, Pitakotte (Disaster Management, Seismology and Earthquake Engineering)
M.Sc. (Building Research Institute, Tokyo, Japan), Postgraduate Diploma (International Institute of Japan)

Outside Experts

Mr. P.N.R. Fernando, Chief Fire Officer, Fire Department, T B Jayah Mawatha, Colombo 10
Graduate & Corporate Member of the Institution of Fire Engineers U.K.
Diploma in Occupational Safety & Health - National Institute of Occupational Safety & Health

9. PROGRAMME COORDINATOR

Prof. B. S. B. Karunaratne
Postgraduate Institute of Science
University of Peradeniya
Peradeniya

E-mail: bsbk@pdn.ac.lk