



Lumbini Buddhist University

School of Development Studies & Applied Sciences

MSc in Disaster Risk Engineering and Management

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LUMBINI BUDDHIST UNIVERSITY

Faculty of Engineering and Management

General Information

Duration of the program is 2 years (four semesters).

Minimum Duration to Finish the M.Sc. Program: Five Years

Entry Requirements for Admission

An eligible candidate in the M.Sc. program is a 4 year Bachelor of Science Degree or Equivalent (B.Sc.) with recognized University. Minimum 2 years of Bachelor Degree and 2 years of Master Degree in Natural Resources Applied Sciences also qualify eligible for admission.

Course of Study

M.Sc. IN DISASTER RISK ENGINEERING AND MANAGEMENT

Prepared By

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Syllabus and Curriculum

The Master of Science in Disaster Risk Engineering and Management (DRM) degree program includes 12 regular courses (each of 100 marks) and a thesis of 500 marks. Six courses will be electives (two electives in each semester will be offered. Student will select 1 subject in each semester).

Course Code	Title of Course	Total Credits		Total Credits	Full Marks
		Theoretical	Tutorial		
Year I	Semester I				
DRM 510	Principles of Disaster Risk Engineering and Management	3	1	4	100
DRM 512	Earthquake Risk Management	3	1	4	100
STA 503	Statistical Analysis	3	1	4	100
DRM 513	Community Based Disaster Risk Management	3	1	4	100
	Elective I				
DRM 514	Emergency Management Planning	3	1	4	100
GRS 511	GIS and Remote Sensing	3	1	4	100
Year I	Semester II				
DRM 515	Landslide Risk Management	3	1	4	100
DRM 516	Flood Control Techniques and Management	3	1	4	100
DRM 517	Disaster Law, Policies, Frameworks, and Strategies	3	1	4	100
REM 535	Research Methodology	3	1	4	100
	Elective II				
DRM 518	Disaster Prevention and Mitigation	3	1	4	100
DRM 519	Disaster Risk Management of Cultural Heritages	3	1	4	100
Year II	Semester III				
DRM 621	Urban Disaster Risk Management	3	1	4	100
DRM 622	Disaster Preparedness and Public Awareness	3	1	4	100
BBS 603	Basics of Buddhist Studies and Buddhism in Nepal	3	1	4	100
DRM 623	Climate Change Adaptation and Mitigation	3	1	4	100
	Elective III				
DRM 624	Environmental Management	3	1	4	100
DRM 625	Disaster Response and Recovery	3	1	4	100
Year II	Semester IV				
DRM 650	Thesis on relevant topic as prescribed by the Department (in close co-ordination with the student)			15	500

EVALUATION CRITERIA

1. Academic performance of students shall be evaluated on the basis of individual course for all the courses registered for the program. The final grade will be determined by aggregating the course-wise grades.
2. Performance of a student shall be judged by
 - a. Continuous internal semester assessment carried out by the concerned course tutor, and
 - b. External semester examination carried out by the University.
3. In any semester a student shall register for all the courses offered by the University in that semester as per the approved curriculum of the concerned program.
4. The course-wise weights for the continuous internal semester assessment and external semester examination shall be as given below.

Evaluation Criteria	General Courses (Each carries 100 marks)	Pass Marks (50%)
Internal assessment	50 percent (50 marks)	25 marks
External examination	50 percent (50 marks)	25 marks

5. The external semester examination shall be of three hours duration for all the courses except for those designated as internal evaluation.
6. For the courses designated as 'practical', the viva or other practical examinations component of the external semester examination shall be conducted by the concerned course tutor.
7. The continuous internal semester assessment shall be taken by the concerned course tutor in any of the following ways:
 - a. Written test
 - b. Workshop practice
 - c. Practical works
 - d. Project work
 - e. Viva-voce
 - f. Home assignment
8. A student must secure minimum 50 percent marks in the internal assessment for him/ her to be eligible for sitting in the end-semester examination.

9. A student must obtain minimum 50 percent marks in the external examination to pass a course.
10. A student who has secured 50 percent or more marks in the continuous internal semester assessment (and 50 percent or more in the practical courses) but fails to obtain a passing grade in the external semester examination can re-sit in the compartmental examination and in the external semester examination of the same course.
11. In each course a student shall be evaluated on a four point scale by giving letter grades representing grade values as follows:

Grade	A	A-	B+	B	B-	C+	C	F
Grade Point	4	3.7	3.3	3	2.7	2.3	2	0

12. A student may register for a maximum of two non-credit courses during the entire program with the approval of the concerned department but the student will not be graded for these courses.
13. The combined total marks obtained by the students in both the internal semester assessment and the external semester examination shall be converted into letter grades as follows:

Percent of marks	Letter grade	Meaning
80 and above	A	Outstanding
75 and below 80	A-	Excellent
70 and below 75	B+	Very Good
65 and below 70	B	Good
60 and below 65	B-	Fair
55 and below 60	C+	Fair
50 and below 55	C	Fair
Below 50	F	Fail

14. A student who has abstained from or not completed the final examination or has been expelled from the examination hall by the university authority will be considered to have failed the examination.

15. The maximum duration for completion of the master level program for a student is five years from the date of admission in that program. The student must clear all the course requirements, including all the provisions of this evaluation scheme within this period.
16. First compartment examination will be held after one month of the publication of result. If he/she fails in the exam, they will appear again in regular exam with regular student.

The main objective of this course is to make students familiar with the concepts, principles and various risk reduction engineering.

Course Objectives

1. Understand the various Terminologies and Concepts

2. Understand the various types of hazards, their sources, prevention, mitigation, control, assessment, risk analysis, risk reduction, hazard identification, hazard characterization, acceptable risk, hazard mapping, risk reduction, emergency planning, natural disasters, coastal risk, resilience, response, recovery, disaster recovery, reconstruction, risk assessment, risk management, risk transfer, disaster risk reduction, disaster management, disaster risk management, Prospective disaster risk management, disaster risk management, early warning system, public awareness, emergency management, disaster management plan, disaster management cycle etc.

3. Understand the various types of disasters like Flood, Droughts, Volcano, Tsunami, Epidemic, Earthquake, etc. and their mitigation, Technological Hazard, Disaster in Nepal etc.

4. Understand the various types of disasters and their mitigation

5. Understand the various types of disasters and their mitigation

6. Understand the various types of disasters and their mitigation

7. Understand the various types of disasters and their mitigation

8. Understand the various types of disasters and their mitigation

9. Understand the various types of disasters and their mitigation

10. Understand the various types of disasters and their mitigation

11. Understand the various types of disasters and their mitigation

12. Understand the various types of disasters and their mitigation

13. Understand the various types of disasters and their mitigation

14. Understand the various types of disasters and their mitigation

15. Understand the various types of disasters and their mitigation

16. Understand the various types of disasters and their mitigation

17. Understand the various types of disasters and their mitigation

18. Understand the various types of disasters and their mitigation

SEMESTER: I YEAR: I

Course Title: Principles of Disaster Risk Engineering and Management Full marks: 100

Course No: DRM510

Pass marks: 50

Internal Examination (50%), External Examination (50%)

Nature of Course: 3 Theory +1 Practical

Credit: 4 (60 hours)

Course Objective: The objective of this course is to make students familiar with the concepts, principles and management of disaster risk engineering.

Course Content

I. Disaster Risk Reduction Terminologies and Concept

15 Hrs.

Disaster, risk, hazard, vulnerability, exposure, extensive risk, forecast, prevention, mitigation, preparedness, residual risk, geological hazard, hydro-meteorological hazard, resilience, acceptable risk, adaptation, coping capacity, contingency planning, critical facilities, residual risk, resilience, response, rescue, relief, early recovery, recovery, reconstruction, risk assessment, risk management, risk transfer, disaster risk reduction, disaster management, disaster risk management, Prospective disaster risk management, corrective disaster risk management, early warning system, public awareness, emergency management, disaster risk reduction plan, disaster management cycle etc.

II. Introduction to Disaster

15 Hrs.

Earthquake, Landslide, Flood, Glacial Lake Outburst Flood, Droughts, Volcano, Tsunami, Cyclone, Lightning, Thunderstorm, Fire, Epidemic, Technological Hazard, Disaster in Nepal etc.

III. Disaster Risk Assessment Tools and Techniques

15Hrs.

- Defining Risk and Vulnerability
- Impacts of Disaster on Social, Economic and Physical fabric at Local, National and Global level
- Tools for Vulnerability Assessment (Social, Economic and Physical)
- Tools for Risk Assessment (Social, Economic and Physical)
- Indigenous Technical Knowledge on Disaster Risk Reduction with focus to Buddhist approach
- Disaster Risk Reduction System Analysis
- Stakeholders Analysis and DRR Framework

IV Tutorial / Practical

15Hrs.

Field visit to introduce hazards and to conduct road slope risk assessment is mandatory. Students need to submit field visit report in a Group (4 members in a group).

References

1. Disaster Risk Reduction Terminology, UNISDR, 2009
(http://www.unisdr.org/files/7817_UNISDRTerminologyEnglish.pdf)
2. Morrow, B. H. (1999). Identifying and mapping community vulnerability. *Disasters*, 23(1), 1-18.
3. Godschalk, D.R. E.J. Kaiser and P.R. Berke. Chapter 5 —Hazard Assessment: The Factual Basis for Planning and Mitigation in Burby, Raymond (Ed.). 1998. *Cooperating with Nature*. Washington, DC: Joseph Henry Press.

Course Title: Earthquake Risk Management

Full marks: 100

Course No: DRM 512

Pass marks: 50

Nature of Course: 3Theory +1 Practical

Credit: 4 (60 hours)

Course Objective: The aim of this course is to provide basic knowledge of earthquake risk management technology with reference to Nepal.

Course Content

- 1: Seismology and Earthquake** **7 Hrs.**
Meaning of an earthquake, Internal structure of Earth, Plate tectonics, Causes of Earthquake, Propagation of Elastic waves, Primary wave and Secondary waves, Magnitude and Intensity, effect of earthquake. Great Earthquakes of the world, Earthquakes of Nepal, etc
- 2: Geotechnical Engineering** **6 Hrs.**
Soil structure interaction, pore pressure, Bearing capacity of soil, Liquefaction, Ground improvement techniques, etc
- 3: Seismic Risk Analysis** **8 Hrs.**
Hazard, vulnerability, Risk, Seismic Risk management, Seismic Risk mitigation Seismic Risk vulnerable evaluation, Seismic Risk Assessment tool etc.
- 4: Nepal National Building Codes (NBC)** **8 Hrs.**
Historical approach, Types and division of NBC, Need of implementation of NBC, Provisions in Building Act-2055 (BhawanAin 2055), etc
- 5: Earthquake Resistance concept of building** **8 Hrs.**
Introduction, Beam Column Joint detail, Ductile detailing in frame structure, short column effect, The Cause of masonry building failure due to earthquake, Performance of masonry structure in lateral load, Failure of Walls due to Shear, bending and torsion, Earthquake Protection of Building (DPC band, Sill Band, Lintel Band, Corner Stitches, Vertical bars in junctions, Roof Bands), Detail at Junction of wall and beam, Earthquake preparedness and mitigation etc.
- 6: Retrofitting Technique** **8 Hrs.**
Introduction, Global and Local Retrofitting Technique, Importance of retrofitting, Techniques of Retrofitting for Masonry and RCC Building, Retrofitting Materials
- 7. Tutorial / Practical** **15Hrs.**

Students are required to prepare an earthquake Scenario Report, its impact, mitigation and early recovery management with presentation (either group or individual). Topics will be selected as per instruction given by the respective teacher.

References:

1. Arya, A. S et., al 1986. *Guidelines for Earthquake Resistant Non-Engineered Construction*, International Association for Earthquake Engineering
2. FEMA310, 1998. Handbook for the Seismic Evaluation of Existing Buildings. Federal Emergency Management Agency (FEMA), Washington D.C
3. GON/ *Building Act., 1998*, Government of Nepal
4. <http://earthquake.usgs.gov>
5. Geo Risk, 2005. Earthquake terminology. Insurance, risk management <http://www.georisk.com/terminol/termeq.shtml>
6. GON/MPPW.,UNDP/ERRRP, 2009 *Report of the Training Program on Earthquake Resistant Design of Buildings / Nepal National Building Code and its Implementation Strategy for Municipal Engineers final Report*. Ministry of Physical Planning and Works, Government of Nepal
7. GON/MPPW/DUDBC, UNDP/ERRRP., 2011 *Engineers training on Earthquake Resistant Design of Buildings, Volume I – Seismicity and design aspects*. Ministry of Physical Planning and Works, Government of Nepal
8. IAEE-Japan and IIT-Kanpur, 2004. *Guidelines for Earthquake Resistant Non-Engineered Construction*. National Information Centre of Earthquake Engineering, IIT Kanpur
9. JICA, 2002. *The Study on Earthquake Disaster Mitigation in the Kathmandu valley Nepal*, Japan International Cooperation agency (JICA) and Ministry of Home affairs
10. Ministry of Home Affairs, Nepal. 2015 *Nepal Earthquake 2015: Situation Update as of 11th May*, Government of Nepal
11. Nepal National Building Code (NBC)-1994 Revision 2003, Government of Nepal
12. MOH. (2002). *A Structural Vulnerability Assessment of Hospitals in Kathmandu Valley*. Kathmandu: Ministry of Health , Department of Health Services, Epidemiology & Disease Control Division.
13. NSET-Nepal. (2002). *Protection of Educational building Against Earthquakes: A Manual for Designers and Builders*. Kathmandu: National Society for Earthquake Technology-Nepal.
14. NSET-Nepal. (2004). *Proceeding of the Symposium on Seismology, Earthquake Hazard and Assessment and Risk Management, held in Conjunction with the Fourth General Assembly of the Asian Seismological Commission, 21-26 November 2002*. Kathmandu, by Amod Mani Dixit (edit), National Society for Earthquake Technology-Nepal.
15. NSET-Nepal. (BS 2056).*Earthquake Preparedness Hand Book (Nepali)*. Kathmandu: National Society for Earthquake Technology-Nepal.
16. NSET-Nepal. (nd). *30 Frequently Asked Questions and Answers by NSET-Nepal*. Kathmandu: National Society for Earthquake Technology-Nepal.

17. NSET-Nepal (n.d). What to do an Earthquake. Kathmandu: National Society for Earthquake Technology-Nepal.

18. USGS, 2005. U.S. Geological Survey, National Earthquake Information Centre, USA, Information Centre, USA. <http://earthquake.usgs.gov>

19. UN/ISDR, 2004. Living with Risk: A Global Review of Disaster Reduction Initiatives. Inter-Agency Secretariat of the International Strategy for Disaster Reduction, Geneva

20. UNDP, Earthquake Risk Reduction and Recovery Preparedness Programme for South Asian Region. International Recovery Platform, 2007.

Course Title: Statistical Analysis

Full marks: 100

Course No: STA 503

Pass marks: 50

Nature of Course: 3 Theory +1 Practical

Credit: 4 (60 hours)

Course Objective: The objective of this course is to equip the students with tools and techniques of statistical analysis that are applicable in conducting research work and /or fact finding process and decision making process.

Course Content

- 1. Review of Introduction and Descriptive statistics: 2 Hrs.**
Measures of central tendency and location; Measures of variability
- 2. Theory of Probability: 7 Hrs.**
Introduction; Basic terms used in probability; Theorems of probability, Baye's theorem; Mean or Expectation of random variable; Variance and standard deviation of a random variable.
- 3. Theoretical Probability Distribution: 6 Hrs.**
Binomial distribution; Poisson distribution; Hyper geometric distribution; Concept of continuous distribution; the normal distribution; fitting of normal distribution.
- 4. Sampling and Sampling Distribution: 4 Hrs.**
Introduction to sampling, Random sampling; Introduction to sampling distribution of sample mean proportion; Central limit theorem; Relationship between sample size and standard error.
- 5. Estimation: 3 Hrs.**
Basic concept, point estimate and interval estimate and confidence intervals; calculating interval estimate of mean and proportion; Determining sample size in estimation
- 6. Hypothesis Testing: 11 Hrs.**
Basic concepts to the hypothesis testing; Hypotheses testing of mean; Hypothesis testing of proportions; Test for equality of population means; Test of difference between proportion; The t-test; Testing equality of variances of two normal populations; Confidence interval; Chi-square as a test of goodness of fit; Test of independence of attributes and test of population variance; Analysis of Variance: One way classification and two way classification.
- 7. Nonparametric test: 4 Hrs.**
Introduction to nonparametric Statistics; The sign test for paired data; Mann-Whitney U-Test; Kruskal – Wallis Test; Kolmogorov – Smimov Test.
- 8. Correlation and Regression: 8 Hrs**
Scatter Diagram; Simple correlation analysis; simple regression analysis; Multiple Correlations; Multiple regressions; Curvilinear Regression; Power function regression.
- 9. Tutorial / Practical 15Hrs.**

References:

1. Levin, R.I. & Rubin, D.S. Statistics for Management. New Delhi: Pearson.
2. Sthapit, A.B. Gautam, H., Joshi, P.R., & Dongol, P. M. Statistical methods. Kathmandu: Buddha Academic Publisher.
3. Sthapit, A.B., Yadav, R.P., & Khanal, S.P. Business Statistics. Asmita Books Publisher.
4. Gupta, S.P., Fundamental of Statistics Methods. New Delhi: Himalaya Publishing House.
5. Srivastava, U.K., Shenoy, G.V., & Sharma, S.C. Quantitative Techniques for Management Decision. New Delhi: Wiley Eastern Pvt. Ltd.
6. Miller, I., & Miller, M. John E. freund's Mathematical Statistics with Applications. New Delhi: Pearson.
7. Johnson, R. Miller & Freund's Probability and Statistics for Engineers. New Delhi: PHI Learning.

Course Title: Community Based Disaster Risk Management	Full marks: 100
Course No: DRM 513	Pass marks: 50
Nature of Course: 3 Theory +1 Practical	
Credit: 4 (60 hours)	

Course Objective: The objective of this course is to make students familiar with the community-based disaster risk management with reference to Nepal.

Course Content

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| I. CBDRR Background and Framework | 5 Hrs. |
| <ul style="list-style-type: none"> • Historical Perspective on Disaster Risk Reduction • Risks and Trends: Disasters in Nepal and South Asia • Understanding Terminology and Evolving Approaches in Disaster Management • Linking DRR with Development • DRM Models and approaches Relevant to CBDRR • CBDRR Features, Elements, Processes and Outcomes • Familiarization of Sendai Framework | |
| II. Participatory Approaches to Disaster Risk Assessment and DRR Planning | 15 Hrs. |
| <ol style="list-style-type: none"> 1. Disaster Risk Assessment at the Community Level <ul style="list-style-type: none"> • Introduction to Participatory Community Disaster Risk Assessment, Hazard Assessment, Capacity and Vulnerability Assessment, Analysis of Stakeholders and Resources 2. DRR Planning and Preparedness at Community Level <ul style="list-style-type: none"> • Community Training on Participatory Community Risk Reduction Plan, Building and Sustaining a Community DRR Organization, Partnership for Community Risk Reduction, Mobilizing Resources for CBDRR Planning and Implementation and Participatory Monitoring and Evaluation for CBDRR, etc | |
| III. Community Risk Reduction Strategies | 10 Hrs. |
| <ul style="list-style-type: none"> • Disaster Risk Reduction Measures and Overview • Implementing CBDRR Action Plans at the community level • Community Early Warning System • Mitigating Geological and Hydro-meteorological Hazards through community action • Strengthening Livelihoods through Disaster Resilience • CBDRR in Recovery – Opportunity to Build Back Better and More Sustainable DRR Organizations • Child Focused DRR and School- Based DRR • Public Awareness, Disaster Risk Communication and Advocacy for CBDRR • Risk Transfer and Insurance for the Poor and Vulnerable | |
| IV. CBDRR Programme Implementation: Challenges and Solutions | 15 Hrs. |
| <ul style="list-style-type: none"> • Sustaining CBDRR in At-Risk Communities Nationwide | |

- **Implementing CBDRR in Challenging Circumstances**
 - CBDRR in Conflict Areas and During Complex Emergencies
 - CBDRR in Religious Societies with special focus to Buddhist Philosophy
 - CBDRR in Urban Areas
- **Linking CBDRR in National and Local Government Programs for Disaster Management and Development**
- **Mainstreaming CBDRR into Community Development Work of Community Development Organizations**
- **Linking CBDRR to Community-based Approaches for Sustainable Livelihoods, Natural Resource Management, Environmental Protection and Wetland and Dry-land Management**

V. Tutorial / Practical:

15Hrs.

CBDRM plan of disaster impacted community in a Group

Reference Books:

1. *CBDRM: Field Practitioners Handbook (ADPC)*
2. *Community-Based Disaster Risk Management and the Media (ADPC)*
3. *Critical Guidelines: CBDRM (ADPC)*
4. *Guidebook on advocacy: Integrating CBDRM into government policy and programming (ADPC)*
5. *Proceedings: Third Disaster Management Practitioners' Workshop for Southeast Asia - Institutionalizing Community Based Disaster Risk Management in Government Policy Making, Planning and Program Activities*
6. *At Risk: Natural Hazards, People's Vulnerability and Disasters*, by Ben Wisner, Piers Blaikie, Terry Cannon and Ian Davis
7. *Doryog Nivaran Publications*
8. *ISDR case studies including: Building Disaster Resilient Communities (2007); Gender Perspective: Working Together for Disaster Risk Reduction (2007).*

Course Title: Emergency Management Planning

Full marks: 100

Course No: DRM 514

Pass marks: 50

Nature of Course: 3 Theory +1 Practical

Credit: 4 (60 hours)

Course Objective: The course aims to make students familiar with the theory and practices of emergency management planning with reference to Nepal.

Course Content

I. Conceptual and Methodological Issues

6 Hrs.

1. Types of disasters and post-disaster stages
2. Classification of damages and effects
3. Social, infrastructure, economic, environmental and overall effects of damages

II. Databases and Disaster Information

6 Hrs.

1. Types and sources of disaster related data and information
2. Developing appropriate databases at the community level to the national level
3. Database coordination, sharing and communication over time and space

III. Social and Economic Impact assessment of disasters

8 Hrs.

1. Impact assessment framework/process
2. Tools and techniques
3. Case studies and applications

IV. Risks and needs assessment of the communities and areas affected, and prone to disasters

1. Risks and Needs of the communities prone to natural disasters
2. Risks and Needs of the disaster affected communities

V. Handling and managing emergencies

10 Hrs.

1. Needs assessment and immediate response, supplies and logistics
2. Site selection, planning and shelter
3. Health, food and nutrition, water, sanitation and environmental services, Social services and education
4. Field level management

VI. Contingency planning and its process

5 Hrs.

1. Hazard and risk analysis, contingency prioritization
2. Scenario building
3. Preparing a contingency plan for each selected scenario
4. Monitoring and updating the contingencies plan

VII. Planning for recovery and resettlement

10 Hrs.

1. Disaster planning and recovery issues
2. Response and recovery programs (settlement, infrastructure, services and livelihood, etc.)

3. Institutional framework and networking
4. Preparing for emergencies

VIII. Tutorial / Practical:

15Hrs.

References:

1. Asian Disaster Reduction Center, Kobe, Japan, Total Disaster Risk Management (Good Practices), 2005.
2. Economic Commission for Latin America and the Caribbean (ECLAC), 2003. Handbook for Estimating the Socio-economic and Environmental Effects of Disasters, Vol. 1 to 4, 2003.
3. Joseph Gustin, Disaster & Recovery Planning: A guide for facility managers, 4th Edition, Fairmont Press, 2002.
4. Donna R. Childs and Stefan Dietrich, Contingency planning and disaster recovery, John Wiley and Sons, Inc., 2002.
5. WFP, Contingency Planning (Guidelines).
6. UNCHR, Handbook for emergencies, 1982

Course Title: GIS and Remote Sensing

Full marks: 100

Course No: GRS 511

Pass mark: 50

Nature of Course: 3 Theories + 1 Practical

Credit: 4 (60 hours)

Course Objective: The course aims to introduce the principles, concepts and applications of Remote Sensing (RS) and Geographic Information Systems (GIS) and the major applications for disaster monitoring and management.

Course Content

- I. Introduction to GIS** **5Hrs.**
1. Overview, Concepts of GIS
 2. Purpose and Benefits of GIS
 3. Functions of GIS
 4. Functional Elements of GIS
 5. Scope & Application Areas of GIS
 6. Importance of Remote Sensing Data in GIS
- II. Digital Mapping Concept** **5 Hrs.**
1. Map concept – Map Features, Map elements, Map Layers
 2. Map scales and representation
 3. Map Projection – coordinate system and projection systems
 4. Map Design
- III. Data Structure in GIS** **5Hrs.**
1. Introduction
 2. Data Models – Raster Data Models, Vector Data Models
 3. Database Management System (DBMS)
 4. Raster Data Structure
 5. Vector Data Structure
 6. Data Compression Techniques
- IV. Data Acquisition** **5 Hrs.**
1. Analogue to digital conversion
 2. Data from Remote Sensing Imagery
 3. Global Positioning System (GPS) based data acquisition
- V. Data Manipulation and Analysis** **5 Hrs.**
1. Data Manipulation Techniques
 2. Spatial Analysis Techniques – statistical and geometrical
 3. Geo-processing Techniques
 4. Model Development

VI. Introduction to RS Digital Image Processing **5 Hrs.**

1. Introduction
2. Data Acquisition
3. Visualization of RS Data
4. Image Conversion – NDVI, LSWI

VII. Correction and Calibration of RS Imagery **5 Hrs.**

1. Geometric Correction
2. Radiometric Calibration
3. Atmospheric Calibration

VIII. Image Classification **5 Hrs.**

1. Objective of Classification
2. Supervised and Unsupervised Classification
3. Land Cover and Land Use

IX. Application of GIS and RS to Disaster Mitigation **5 Hrs.**

1. Introduction
2. Damage Assessment Methodologies
3. Risk Management Approach

X. Tutorial / Practical: **15Hrs.**

Reference Books:

1. Jeffrey Star & John Estes Geographic Information Systems, An Introduction, University of California, Santa Barbara
2. P.A. Burrough and R. A. McDonnell (1998): Principles of Geographical Information Systems, Oxford University Press.
3. S. Morain and S. L. Baaros (1996), Raster Imagery in Geographical Information Systems, ONWORD Press, 1996.

Course Title: Landslide Risk Management**Full marks: 100****Course No: DRM 515****Pass marks: 50****Nature of Course: 3 Theory +1 Practical****Credit: 4 (60 hours)**

Course Objective: The course aims to make students familiar with the theory and practices of landslide risk management with reference to Nepal.

Course Content

I. Introduction to Landslide Hazard

5Hrs.

Landslide definitions, classification, types of landslide, landslide mechanism, morphology of landslide, parts of landslides – description of features, factors responsible for landslides, potential landslide risk indicators, Impact of landslide disasters, effects and consequences of landslides, inter-relationship of landslides with other natural hazards, multiple hazard effect, communicating landslide hazard, landslide warning signs, minimizing the effects of landslides, landslide scenario in Nepal.

II.Landslide Inventory Mapping and Hazard Zonation

10Hrs.

Basic definition, procedure of landslide inventory mapping, scope of landslide inventory mapping, landslide database, landslide hazard zonation mapping, selection of scales, hazard zonation of rainfall and earthquake induced landslides, measures to reduce landslides hazards and/or risks, limitations and qualifications of landslides assessment.

III.Landslide Risk Assessment and Vulnerability Analysis

10Hrs.

Introduction, Principles of Landslide Risk Assessment, Risk Assessment Framework and Process, Component of Vulnerability Mapping, Landslide Vulnerability Mapping and Analysis, Community Based landslide risk assessment and Vulnerability Analysis, Hazard Identification and Mapping, Exposure Analysis, etc.

IV.Landslide Investigation and Mitigation

10 Hrs.

Investigation of Landslides, Preparing a Detailed Investigation Plan, Geological Investigations, Geotechnical Investigations, Landslide Remediation Practices, Mass Improvement Techniques, Mitigations Methods for Various Types of Landslide Hazards, Slope Stabilization using Vegetation, Mulching, Biotechnical Slope Protection, Landslide Dam Mitigation, Construction of an Erosion-Resistant Spillway, Drainage Tunnel through an Abutment.

V.Landslide Instrumentation, Monitoring, and Early Warning

10Hrs.

Slope Instrumentation, Monitoring and Landslide Prediction, Early Warning of Landslides, Monitoring of Landslides, Surface Measurements of Landslide Activity, Subsurface Measurements of Landslide Activity, Total Regime Measurements, Real time Automated Monitoring of Landslide, Investigation of Surface Deformation, Investigation of Geologic Structure, Evaluation of Slide Plane / Monitoring of Sub-

surface Movements, Groundwater Investigation, Geotechnical Investigations (Soil and Rock Mechanic Tests), Early Warning Systems for Landslides, Dissemination and Communication.

Landslide Field Visit/Tutorial / Practical:

15Hrs.

Reference Books:

1. Thomas Glade, Malcolm Anderson, Michael J. Crozier, Landslide Hazard and Risk, 2005
2. OldrichHungr, Robin Fell, Réjean Couture, Erik Eberhardt, Landslide Risk Management 2005

failure of embankment, Preventive measures, Closure of breach, Protection of embankment, Stability analysis for high embankments, Selection of design parameters, Analysis procedure, Stability computation, Final selection of embankment section, Defensive design measures, Merits and demerits of embankments: Merits, Demerits

Design of Bank Revetment: Causes of bank failures, Methods of bank protection: Vetivers, Submerged vanes, RCC Kelleher Jetty, Geo-cell, Planning of bank revetment, Degree of protection, Design of bank revetment: Weight of stones/ boulders, Size of stone/ boulder, Thickness of pitching, Filter Paneling, Top key/Berm, Design of bank revetment: An illustration, Pitching in mortar: Size of stones, Paneling, Drain holes, Pitching by geo-textile bags: Size of geo-bag, Thickness of geo-bags pitching, Filter, Toe protection: Toe key, Toe wall, Sheet piles and launching apron, Size of launching apron, Anchoring: Merits and demerits of bank protection.

Design of Spurs/Groynes: General design features, Alignment, Functions of spurs, Classification of spurs, Orientation of spurs, Design of boulder spurs, Length and spacing, Top level/top width and side slope, Weight of stones for pitching, Thickness of pitching, Filter, Pitching in mortar, Size of stones, Drain holes, Pitching by geo-bags, Size of geo-bag, Thickness of geo-bags pitching, Filter, Launching apron for spur, Size of launching apron, Design of boulder spur: an illustration, Permeable spurs, Introduction, Classification of permeable spurs, Submergence of spurs, Length and spacing of permeable spurs, Limitation of spurs, etc.

Design of RCC Porcupines- Screens/ Spurs/ Dampeners: Concept, Functions of permeable structures, Structural elements, Layout in plan, Limitation of RCC porcupines etc.

Design of Drainage Improvement Works: Planning of drainage improvement works, Requirement of data, Degree of protection, Classification of drains, Alignment of drains, Capacity /design discharge of drains, Design frequency of rainfall, Period of disposal, Run-off , Run-off for composite crops, Capacity/ design discharge for cross drainage works, etc.

Design discharge for cross drainage works: Velocity, discharge capacity of the drain, side slopes, cross sections of the drain, Fixation of full supply level (FSL) at outfall, Hydraulic slope, Falls, Longitudinal section, Collection of data, Preparation of longitudinal section, Channel improvement by dredging Methodology for determining the dominant flood level, Design of regime drainage channel using the Lacey's theory.

VII. Implementation and Construction

5Hrs.

Construction planning, Invitation of Tenders, Procurement of construction material, Storage of construction material at site, testing of the material, Construction methodology: Construction methodology for gabion/ crate structures, Construction methodology for anti-erosion measures with geo-bags, etc.

Cost Estimate of Flood Management Works, Basic rates, Abstract of cost estimate of flood management works, Assumptions for cost estimate: Earthen-embankment/km length, Geo-tube-embankment/km length, Bank pitching in boulders, Bank pitching in geo bags, Boulder spur with earthen shank, Spur with geo-bags with earthen shank, Bank protection using RCC porcupines, etc.

Unit Rate Analysis for Flood Management Works:

Earth in excavation, Earthwork in embankment filling, Turfing, Spreading of earth over crest, Earthwork in bank trimming, Collection of boulders, Local carriage of boulders, Preparation of stack-yard, Local carriage of wire-netting sheets, Labor charge for dumping boulders in crates with boat, Labor charge for dumping boulders for pitching, Carriage of Geo-bags, Carriage of Poly-propylene gabions, Filling of Geo-bags, Dumping of geo-bags in gabions by barge, Dumping of boulders in wire crates without boat, Dumping of geo-bags in gabions by crane without boat, Construction of RCC porcupines, Transportation/carriage of RCC porcupines, Laying of RCC porcupines without boats, Laying of RCC porcupines with boats, etc.

VIII. Tutorial / Practical:

15Hrs.

References

1. RIVER TRAINING TECHNIQUES Fundamentals, Design and Application by B.Prezedwojski, R. Blazjewski and K.W. Pilarczyk, A.A. Balkema/Rotterdam/Brookfield/1995
2. Water Resources System Planning and Management by Chaturvedi, McGRAW HILL

Course Title: Disaster Law, Policies, Frameworks, and Strategies **Full marks: 100**

Course No: DRM 517

Nature of Course: 3 Theory + 1 Practical

Pass marks: 50

Credit: 4 (60 hours)

Course Objective: The course aims to make students familiar with the disaster laws, policies, frameworks and strategies with reference to Nepal and South Asia.

Course Content

I. Disaster Policies, Laws, and Legislation in Nepal **15 Hrs.**

1. Introduction and History of Disaster Policy, Laws and Legislation in Nepal
2. National Disaster Management Legislation in Nepal
3. Contingency Planning
4. Standard Operating Procedure
5. Local Disaster Risk Management Plan
6. National Disaster Response Framework

II. Global and Regional Policies, Frameworks, and Strategies **15 Hrs.**

1. Introduction to Global DRR Policy
2. DRM Policies and Strategies of SAARC, ASEAN, EU, etc.
3. DRM Policies and Strategies of United Nations, World Bank, Asian Development Bank, and other Major Donors.
4. Framework and Strategies, Sendai Framework for Disaster Risk Reduction

III. Mainstreaming DRM into Government Policy, Plan, and Program **15 Hrs.**

1. Definition, Scope and Needs of Mainstreaming
2. Global and Regional Scenario on DRM Mainstreaming
3. National and Local Level Mainstreaming
4. Sectoral Mainstreaming Plans, Policies, Programs and Guidelines
5. Addressing the transboundary issues in reference to Nepal-India floods

IV. Tutorial / Practical: **15Hrs.**

Reference Books:

1. Nepal Governments Disaster related Documents
2. UN, World Bank, ADB, EU and other related organizations publications

Course Title: Research Methodology

Full marks: 100

Course No: REM 535

Pass marks: 50

Nature of Course: 3 Theories + 1 Practical

Credit: 4 (60 hours)

Course Objective: The objective of the course is to make students able to comprehend the fundamentals of research; facilitates student to carry out their research activities independently; and to familiarize the students with the participatory approaches and methodology.

Course Content

1: Introduction to research

5 Hrs.

Meaning and importance of research; Classification of research; The Research Process; Qualities of good research; Ethical Issues Governing Research Function; Inductive and deductive reasoning; Qualitative vs. Quantitative Research.

2: Literature Review

5Hrs.

Need; Procedure- Search for existing literature, Review the literature selected, develop a theoretical and conceptual framework, write- up the review of relevant literature, etc.

3: Research Design

5 Hrs.

Meaning, purpose, principles and Importance of Research Design; Types of research design; Features of a good research design; Exploratory research design; Descriptive research design; Experimental research design; Qualitative research design; Quantitative research design; Variables; Hypothesis; Errors Affecting Research Design; Issues Governing Research Design; Formulating research problems and objectives; Formulating research questions; Hypothesis setting-null hypothesis and alternative hypothesis; Hypothesis testing-logic and importance; Research Modeling: Types of Models, Model building and stages, Heuristic and Simulation modeling.

4: Development of Research Proposal

5 Hrs.

Meaning and Importance of research proposal ; the Development of Research Issues Governing Proposal; Writing a research report- Developing an outline; Key elements of research proposal- Objective, Introduction, Design or Rationale of work, Experimental Methods, Procedures, Measurements, Results, Discussion, Conclusion, Referencing and various formats for reference writing of books and research papers; Publications of articles in peer review journals

5: Sampling Designs

5 Hrs.

Concepts of statistical population; Sampling Vs. Census; Sampling Frame; Advantage of sampling; Sampling error; Characteristics of a good sample; Sampling Techniques; Issues Governing Sampling Decisions; Determination of sample size; Sampling method (probability sampling and non-probability sampling); Characteristics of good sample; Probability Sample – Simple Random Sample, Systematic Sample, Stratified Random Sample & Multi-stage sampling. Non-Probability Sample – Judgment, Convenience, Quota & Snowballing methods.

6: Attitude Scaling Techniques

5Hrs.

Concept of Scale – Rating Scales viz. Likert Scales, Semantic Differential Scales, Constant Sum Scales, Graphic Rating Scales; Ranking Scales – Paired Comparison & Forced Ranking, etc.

7: Data management **5 Hrs.**
Meaning, Importance, and Types of Data; Secondary and primary data- definition, sources, characteristics, advantages and disadvantage; Advantages and disadvantages of primary data over secondary data; Methods of Data Collection-Questionnaire Construction, Pre-testing of questionnaire, Personal Interviews, Telephonic Interview, Mail Survey, Email/Internet survey; Steps of Data processing and Presentation.

8: Data Reduction and Analysis **5 Hrs.**
Meaning and Importance of Data Reduction; Data Reduction Process; Selected Techniques of Data Analysis; Tabulation, analysis and interpretation of data; Editing, decoding and classification of data; Preparation of tables; Scaling techniques; Graphic and diagrammatic representation of data; Univariate analysis – Cross tabulations and Chi-square test including testing hypothesis of association.

9: Participatory Approaches and Methodology **5 Hrs.**
Participatory Rural Appraisal/Participatory Learning and Action : genesis, different between participatory and conventional approaches, methods, applications, Focus Group Discussion, Key Informant Interview, participants ' observation, case study, appreciative inquiry and its uses in project planning, monitoring and evaluation, gender equality and social inclusion, etc.

10: Formatting the report **5 Hrs.**
Formatting a Report; Developing the Final Draft; Preparing for Citation and Referencing; Making an Oral Presentation of a Report

11: Research Ethics **5 Hrs.**
Issues governing Research Function; Incorporating Socio-Ethical Issues in Research; Impact of Social Issues in Research, etc.

12. Tutorial / Practical: **15Hrs.**

Reference Books

1. Cooper & Schindler (2004). Business Research Methods. New Delhi: Tata McGraw-Hill Publishing Co.
2. Kothari, C.R. (2008). Research Methodology-Methods and Techniques, New Age International Publishers, New Delhi.
3. Donald Cooper & Pamela Schindler (2006). Business Research Methods (9th edition), TMGH.
4. Alan Bryman & Emma Bell (2007). Business Research Methods, Oxford University Press.

Course Title: Disaster Prevention and Mitigation

Course No: DRM 518

Nature of Course: 3 Theory + 1 Practical

Credit: 4 (60 hours)

Full marks: 100

Pass marks: 50

Course Objective: The course aims to make students familiar with the disaster prevention and mitigation aspects with reference to Nepal.

Course Content

I. Disaster Prevention

1. Introduction:

Basic Concept and Component on Disaster Prevention, Guiding Principles of Prevention, Key Objectives and Scope, Need to Consider Disaster Prevention, National development planning, national disaster management policy, counter-disaster planning, etc. **10 Hrs.**

2. Problem Areas in Prevention:

Traditional outlooks, cost, other national priorities, political aspects, development problems, balance in disaster management, public apathy, etc. **5 Hrs.**

3. Positive Approaches towards Prevention:

National policy, legislation, assessment and monitoring, planning and organization, public awareness and education, international assistance, resources relevant to prevention, etc. **5 Hrs.**

II. Disaster Mitigation

1. Introduction and Guiding Principles of Mitigation:

Disaster Mitigation in Nepal, Initiation, Management, Prioritization, Monitoring and Evaluation, Examples of Mitigation Measures, Problem Areas in Mitigation, Requirements for Effective Mitigation, etc. **5 Hrs.**

2. Major Mitigation Components:

Non-Structural Mitigation: Legal Framework, Incentives, Training and Education, Public Awareness, Institutional Building, Warning Systems, Agricultural Mitigation Measures, etc. **10 Hrs.**

3. Structural Mitigation: Engineered Structures, Site Planning, Assessment of Forces Created by the Natural Phenomena, Planning and Analysis of Structural Measures, Design and Detailing of Structural Components, Non-Engineered Structures at Local Scale, etc.

4. Resources for Mitigation Programs:

Government agencies concerned with hazards, academic Institutions, research establishments, technical authorities, scientific programs, private sector, national planning authorities, disaster management authorities, construction/disaster specialists, non-government organizations, international disaster assistance agencies, private sector companies and contractors, co-opted specialist institutions, communities, media, general public, etc. **10 Hrs.**

III Tutorial / Practical:

15Hrs.

Reference Books:

1. Carter W. Nick, "Disaster Management: a Disaster Manager's Handbook", Manila: Asian Development Bank, 1991
2. Sharma V.K., "Disaster Management", National Center for Disaster Management, Indian Institute of Public Administration, 1994

Course Objective: To familiarize the student with the broad aspects of disaster risk management and develop perspectives in the area of risk management of cultural heritage with reference to Nepal.

Course Content

1. Introduction to heritage	1 Hr.
+ Different types of heritage	
+ Methods for measuring universal value	
+ Criteria for National heritage	
2. Introduction of disaster risk reduction of cultural heritage	2Hrs.
+ Scenario of disaster in Asia	
+ Disaster in context of Nepal	
3. Terminology and Interrelation	1Hrs.
+ Conservation, Preservation, Renovation, Reconstruction	
+ Archaeology, Museology, Preparation, Resilience	
4. Principles of Safeguarding of heritage	4Hrs.
+ Conservation, Preservation, Renovation, Reconstruction	
5. Different type of Risk	4Hrs.
+ Natural	
+ Human induced	
+ Case study examples	
6. Vulnerability Assessment of Cultural Heritage	6Hrs.
+ Vulnerability framework	
+ Different method to assess vulnerability	
+ Case study	
7. Risk assessment of Cultural heritage	2Hrs.
+ Qualitative value of risk	
+ Quantitative value of risk	
+ Methodologies of risk assessment	
+ Risk Map approach	
+ Case study	
8. Global warming and climate change and heritage	4Hrs.
+ Macro/micro level climate, climate perception, and climate change	
+ Mitigation, adaptation and level of risk	
9. International regulation and institutional framework for disaster management and protection of cultural heritage	2Hrs.
+ International framework	

Course Title: Disaster Risk Management of Cultural Heritages

Full marks: 100

Course No: DRM 519

Pass marks: 50

Nature of Course: 3 Theory +1 Practical

Credit: 4 (60 hours)

Course Objective: To familiarize the student with the fundamentals of disaster risk management and develop perspective in the area of risk management of cultural heritage with reference to Nepal.

Course Content

1. **Introduction to heritage** 2 Hrs.
 - Different types of heritage
 - Criteria for outstanding universal value
 - Criteria for National heritage
2. **Introduction of disaster risk reduction of cultural heritage** 2Hrs.
 - Scenario of disaster in Asia
 - Disaster in context of Nepal
3. **Terminology and interrelation** 2Hrs.
 - Conservation, Preservation, Renovation, Reconstruction
 - Archeology, Monument, Preparedness, Resilience
4. **Principles of Safeguarding of heritage** 4Hrs.
 - Conservation, Preservation, Renovation, Reconstruction
5. **Different type of Risk** 4Hrs.
 - Natural
 - Human induced
 - Case study example
6. **Vulnerability Assessment of Cultural heritage** 6Hrs.
 - Vulnerability framework
 - Different method to assess vulnerability
 - Case study
7. **Risk assessment of Cultural heritage** 8Hrs.
 - Qualitative value of risk
 - Quantitative value of risk
 - Methodologies of risk assessment
 - Risk Map approach
 - Case study
8. **Global warming and climate change and heritage** 4Hrs.
 - Macro/micro level climates, climatic parameters, and climatic variations
 - Mitigation, adaptation and livelihoods
9. **Government regulation and Institutional Framework for disaster management and protection of cultural heritage** 3Hrs.
 - International framework

- Preparedness (ICOMOS - ICORP); Marsh - United Kingdom; United Nations Educational, Scientific and Cultural Organization (UNESCO); United Nations Office for Disaster Risk Reduction (UNISDR) | 2013
12. Disaster risk management of cultural heritage in urban areas: a training guide International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM); Ritsumeikan University; United Nations Educational, Scientific and Cultural Organization (UNESCO); Jigyasu, Rohit; Arora, Vanicka | 2013
 13. Disaster preparedness and mitigation: UNESCO's role United Nations Educational, Scientific and Cultural Organization (UNESCO) | 2007
 14. Cultural heritage and natural disasters: risk preparedness and the limits of prevention
 15. International Council on Monuments and Sites, Nepal (ICOMOS Nepal); Meier, Hans-Rudolf; Petzet, Michael; Will, Thomas (Eds.) | 2007
 16. Between two earthquakes: cultural property in seismic zones Getty Conservation Institute, the (GCI); International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM); Feilden, B. | 1987
 17. Risk preparedness: a management manual for world cultural heritage International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM); International Council on Monuments and Sites, International Committee on Risk Preparedness (ICOMOS - ICORP); United Nations Educational, Scientific and Cultural Organization (UNESCO); Stovel, H. | 1998
 18. Managing disaster risks for world heritage International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM); International Council on Monuments and Sites, International Committee on Risk Preparedness (ICOMOS - ICORP); International Union for the Conservation of Nature (IUCN); United Nations Educational, Scientific and Cultural Organization (UNESCO) | 2010

SEMESTER: III YEAR: II

Course Title: Urban Disaster Risk Management

Full marks: 100

Course No: DRM621

Pass marks: 50

Nature of Course: 3 Theory +1 Practical

Credit: 4 (60 hours)

Course Objective: The course aims to make students familiar with the urban disaster risk management with reference to Nepal.

Course Content

I. Introduction of Urban Risk Assessment

5 Hrs.

Key Concepts, Elements of Urban Risk Management, Disaster Impacts on Urban Infrastructure Development, Disasters and cities, etc.

II. Risk Sensitive Urban Infrastructure Planning

20 Hrs.

Urban risk mapping: Need for an urban risk assessment, pillars of urban risk assessment, integrated urban risk assessment, initiating, undertaking and mainstreaming urban risk assessment, vulnerability assessment and risk mapping, etc.

III. Risk Sensitive Landuse Planning: Concepts and terminology, Establishing Basic Parameters: Risk Assessment, Methods and Tools of Contemporary Landuse Planning, Policies and Practice, disaster master plan for major disasters, opportunities, incentives and challenges to risk sensitive land use planning, etc.

IV. Risk Sensitive Urban Social and Economic Development Planning

10 Hrs.

- Risk sensitive community mobilization planning
- Risk sensitive local economic development planning
- Gender mainstreaming in resilient towns/cities development

V. Risk Sensitive Urban Environmental Planning

10 Hrs.

- Water, Sanitation and hygiene (WASH) Planning
- Solid Waste Management Plan Preparation, Data and Information Gathering and Information Analysis, Plan Formulation, Plan Adoption and Gazetting.

VI. Tutorial /Practical

15 Hrs.

Reference Books:

1. Erick Dickson, Judy L. Baker, Daniel Hoomweg and Asmita Tiwari, *Urban Risk Assessment: Understanding Disaster and Climate Risk in Cities*, World Bank, 2013
2. *Mainstreaming Disaster Risk Management in Urban Development Planning and Local Governance: Proceedings of the Asia Megacities Forum (2009)* EMI, Quezon city, Philippines

Course Title: Disaster Preparedness and Public Awareness

Full marks: 100

Course No: DRM622

Pass marks: 50

Nature of Course: 3 Theories + 1 Practical

Credit: 4 (60 hours)

Course Objective: The course aims to make students familiar with the disaster preparedness and community empowerment with reference to Nepal.

Course Content

I. Disaster Preparedness

1. Nature of Preparedness:

Key Components of Preparedness, Scope of Preparedness **5 Hrs.**

2. Some Problem Areas in Preparedness:

Organization and Planning, Resources, Co-ordination, Readiness, Training, Capacity Building and Public Awareness **5 Hrs.**

3. Preparedness Needs and Maintenance Levels:

Introduction, National Disaster Policy, Disaster Legislation, Organizational Structure, Assessment of Preparedness Action, Planning Framework, Utilization of Resources, Coordination of effort, Operational Facilities and Systems, Equipment and Supplies, Training, Public Awareness and Education, effects of Crisis Pressure, Maintenance of Preparedness Levels, Funding/Resource, etc. **10 Hrs.**

4. Warning and Precautionary Measures:

National and International Warning System, Format of warning Information, Official Government Action, Power Supplies, Transport, Crops, Households, Preparation of Precautionary Information, etc. **5 Hrs.**

5. Resources Relevant to Preparedness Arrangements:

Resources for identifying, analyzing and advising on disaster threat, resource organization which need to undergo training and other forms of preparedness in readiness for response operations, Resources capable of implementing training and other preparedness measures, etc. **5 Hrs.**

II. Public Awareness/Community Empowerment

1. Importance of Public Awareness:

Aim of Public Awareness Program, Community Needs, Community Understanding and Cooperation, Early Warning System, etc. **5 Hrs.**

2. Responsibility of Public Awareness/ People's Empowerment Programs:

Main Aspects of Programs, Program Themes, Information to be communicated to the Public, Information Format, Information Channels, Organization of Programs, Effectiveness of Information, Maintenance of Awareness Levels, etc. **10 Hrs.**

III. Tutorial / Practical:

15Hrs.

References:

1. Carter W. Nick, "Disaster Management: a Disaster Manager's Handbook", Manila: Asian Development Bank, 1991

Course Title: Basics of Buddhist Studies and Buddhism in Nepal

Full marks: 100

Course No: BBS 603

Pass marks: 50

Nature of Course: 3 Theory + 1 Practical

Credit: 4 (75 hours)

Course Objective: The main objectives of these courses are to impart students with basic knowledge on fundamental of Buddhism, Buddhist Philosophy, Literature and Buddhist Tradition of Nepal.

Course Content:

Section A: Basics of Buddhism

20 Hrs.

1. History of Buddhism

- 1.1 Life of Buddha from birth to *Mahāparinirvān*
- 1.2 Buddhist Councils
- 1.3 Introduction to Eighteen *Nikāyas*
- 1.4 Rise of *Mahāyāna* and *Vajrayāna* Buddhism

2. Buddhist Teachings

- 1.1 Triratna (Triple Gems): Meaning, Concept, Purpose and Importance
- 1.2 *Ti-lakshan* (Three Universal Characteristics)
- 1.3 *Cattāri-ariyasaccani* (Four Noble Truths)
- 1.4 *Paticca-samuppāda* (Law of Dependent Origination)
- 1.5 Concept of *Arhatand Nibbāna*
- 1.6 *Bodhisattva* and Buddhahood in *Srāvakyāna*

Section B: Buddhist Philosophy

20 Hrs.

3. Four Philosophical Schools

3.1 Vaibhāsika

- 3.1.1 Meaning, sub-schools and etymology
- 3.1.2 Theory of Dharmas in *Sarvāstivāda*
- 3.1.3 Concept of *Pratisankhyanirodha* and *Apratisankhyānirodha*, *Prāpti*, *Aprāpti*, *Avijnapti*

3.2 Sautrāntic

- 3.2.1 Meaning, sub schools and etymology
- 3.2.2 *Kshanikavāda* (Theory of Momentariness)
- 3.2.3 Concept of Perception and Apperception

3.3 Mādhyāmika

- 3.3.1 Meaning, sub-schools and etymology
- 3.3.2 Two Truths: *SamvrittiSatya* and *ParmārthaSatya*
- 3.3.3 Concept of *Sunyatā*, *Anutpāda* (Non production theory), *Catuskoti* (Fourfold analysis)

- 3.4 **Yogācāra**
 - 3.4.1 Meaning, sub-schools and etymology
 - 3.4.2 Theory of "Mind Only" (*Cittamātratā- Vijnaptimātrasiddhi*)
 - 3.4.3 Concept of *Ālayavijnāna*, *Klistamanovijnāna* and *Pravrttivijnāna*
 - 3.4.4 Three nature of objects: *Parikalpita*, *Paratantra* and *Parinispannanature*

4. Later Buddhist Philosophy

- 4.1 **Mahayana**
 - 4.1.1 *Bodhisattva* Ideals, *Bodhisattvasaṃvar*(precepts), *Bodhicitta* generation,
 - 4.1.2 Concept of *Tri-Kāya*: *Dharmakāya*, *Sambhogakāya*, *Nirmāṇakāya*
 - 4.1.3 Concept of *Tathāgata* and *Tathāgatagarbha*
- 4.2 **Vajrayāna**
 - 4.2.1 *Vajrayāna* Philosophy and Practice
 - 4.2.2 *Vajrayāna* Philosophy
 - 4.2.3 *Vajrayāna* Practice

Section C: Buddhism in Nepal

20 Hrs.

5. Historical Background

- 5.1 SvayambhuPurān as source of Buddhism of Nepal
- 5.2 Visit of Buddha, Ānanda and Ashoka to the Nepal Valley
- 5.3 Buddhism through Ages - (Historical account of Buddhism during *Licchavi*, Early Medieval and Medieval period)

6. Buddhism of Nepal Mandala

- 6.1 Concept of *Tri-Ratna* (Triple Gem)
- 6.2 Classification of *Vihāras* of Nepal Mandala and their tradition.
- 6.3 Religious practices
- 6.4 Feast and festivals
- 6.5 Principle Buddhist sites of Nepal Mandala

7. Buddhism of Northern Nepal

- 7.1 Introduction
- 7.2 Buddhist Ethnic groups
- 7.3 Prominent sects of Buddhism
- 7.4 Prominent *Gonpās*
- 7.5 Feast, festivals and Important Buddhist Sites

8. Theravada Buddhism in Nepal

- 8.1 Revival of *Theravāda* Buddhism in 19th century
- 8.2 Theravada Monasticism
- 8.3 *Theravāda* Buddhist Practices

9. Introductory Background

- 9.1 Evolution of "Buddha Vacana" to Buddhist Literature
- 9.2 Meaning of Dharma as "Buddha Vacana" in the context of *Tri-Ratnaie. Buddha, Dharma and Sangha* with special reference to eighty four thousand "Dharma Skanda"
- 9.3 Introduction to *Navānga* (Nine Angas) and *Dwādasāng* (Twelve Angas)

10. Formation of Pali Literature

- 10.1 Origin and development of Pāli Tripitaka
- 10.2 Sutta
- 10.3 Vinaya
- 10.4 Abhidhamma

11. Formation of Sanskrit Tripitaka

- 11.1 Origin and development of Buddhist Sanskrit literature
- 11.2 Āgama
- 11.3 Sūtra
- 11.4 Vinaya
- 11.5 Abhidharma
- 11.6 Tantra
- 11.7 Śāstra

References:

1. Bodhi, Bhikkhu, *The Connected Discourses of the Buddha: A Translation of the Samyutta Nikāya*, Boston: Wisdom Publications, 2000,
2. Brown, Brian Edward, *The Buddha Nature. A study of Tathagatagarbha and Alayavijnana.* Buddhist tradition series, New Delhi: MLBD, 1994
3. Chatterjee, Ashoka Kumar, *Yogachara Idealism*, New Delhi, MLBD, 1975. reprint
4. Conze, Edward, *A Short History of Buddhism*, London: George Allen and Unwin, 1980.
5. Dayal, Har, *The Bodhisattva Doctrine in Buddhist Sanskrit Literature* (reprint), Delhi: Motilal Banārasidass Publishers, 2004.
6. Dharmananda, K. Sri, *Buddhism as a Religion*, Kuala Lumpur: Sasana Abhiwurd Wardhana Society, 1994.
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8. Dutt, Sukumar, *Buddhist Monks and Monasteries of India: Their History & Their Contributions To Indian Culture*, London: George Allen and Unwin, 1962.
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14. Harris, I., *The Continuity of Madhyamaka and Yogacara in Indian Mahāyāna Buddhism*, Leiden: EJ Brill, 1991.
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16. Hazara, Kanai Lal, *The Rise and Decline of Buddhism in India*, New Delhi: Munshi Ram Manohar Lal, 1998.
17. HH Dalai Lama - *The Awakening Mind Bodhicittopada*, Taipei: The Corporate Body of Buddha Educational Foundation, 1999.
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19. Hopkins, Jeffrey and GesheSopa, *The Tantra in Tibet (reprint)*, New York: Snowland Publications, 1987.
20. Kochumuttom, Thomas A., *A Buddhist Doctrine of Experience*, Delhi: Motilal Benarasidass, 1982
21. Lamotte, Étienne, *History of Indian Buddhism*, tr. Sara Webb-Boin, Louvain: Peeters Press, 1988.
22. Law, Bimala Curna, *A History of Pali Literature*, London: Kegan Paul, Trench, Trubner and Co., 1933.
23. Murti, T.R.V, *The Central Philosophy of Buddhism*, London: Unwin Paperbacks, 1980 (reprint)
24. Narada, Thera, *Buddha and His Teachings*, Taipei: The Corporate Body of the Buddha Educational foundation, 1988.
25. Nariman, G. K., *Literary history of Sanskrit Buddhism*, Delhi: MLBD, 1992.
26. Pande, G.C, *Studies in the Origins of Buddhism*, New Delhi: MLBD, 1995 (reprint)
27. Pandey, Govinda C. *Studies in the Origins of Buddhism*, Delhi: Motilal Banarsidass. 1999.
28. Prebish, Charles S., *Buddhism: A Modern Perspective*, University Park: The Pennsylvania State University Press, 1994.
29. Ruegg, David S., *The Literature of the Madhyamaka School of Philosophy in India*. Wiesbaden: Otto Harrassowitz, 1981.
30. Sangharakshita, MahaSthavira. *The Eternal Legacy: An Introduction to the Canonical Literature of Buddhism*. London: Tharpa, 1985.

31. Santina, Peter De La, *The Tree of Enlightenment* by (reprint), Taiwan: Chico Dharma Study Foundation, 1997.
32. Sarao, K T S, *The Decline of Indian Buddhism: A Fresh Perspective*, New Delhi: MunshiramManoharlal, 2012. Schumann, H. W., *The Historical Buddha: the Times, Life and Teachings of the Founder of Buddhism*, New Delhi: MLBD, 2004.
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4. Key Response Measures to deal with climate change (e.g. mitigation and adaptation, etc.

B. Vulnerability to Climate Change, Linkage between Climate Change and Disaster 15 Pgs.

1. Key concepts, vulnerability in natural, physical and social system, vulnerability index within systems, etc.
2. Identification of area specific extreme climatic events or disasters (e.g. flood, GLEW, typhoon, systems, etc.
3. Role of intensity and frequency of these events depending on regional distribution
4. Vulnerability of the community to these events and disasters.

III. Adaptation to Climate Change 15 Pgs.

1. Adaptation across types of adaptation, context specificity of adaptation, etc.
2. Link between adaptation and development, water, agriculture and fisheries sector

IV. Tutorial / Practical 15 Pgs.

References

2. Dewacharya, B., Suresha, A.R., & Mahabender, L. 2007. Ghazal Lake Outburst Floods in the Sagarbani Region: Hazard Assessment Using GIS and Hydrodynamic Modeling. Mountain Research and Development.
3. Bradley, M., Diaz, H.F. & Bradley, S. 1999. Climate Change at High Elevation Sites: An Overview. Climate Change.
4. CMO 2006. Environmental Studies of Nepal. Kathmandu, Nepal.
5. Chaudhary and Aryal. 2009. Global Warming in Nepal: Challenges and Policy Implications. Journal of Forest and Livelihood, Vol 8, February 2009, Kathmandu, Nepal.

Course Title: Climate Change Adaptation and Mitigation

Full marks: 100

Course No: DRM623

Pass marks: 50

Nature of Course: 3 Theory +1 Practical

Credit: 4 (60 hours)

Course Objective: The course aims to make students familiar with the climate change adaptation and mitigation aspects with reference to Nepal and global level.

Course Content

I. Key Terminologies and Climate Change Science and Impacts

15 Hrs.

1. **Key Terminologies:** Impacts, vulnerability, adaptation, mal-adaptation, coping, resilience, mitigation, risk, hazards, shock, variability, trend, exposure, sensitivity, adaptive capacity etc.
2. **Climate Change Scenarios:** Changes in temperature (changes in land surface temperature, changes in sea surface temperature), Variation in rainfall, Ice melting and sea level rise
3. **Impact of Climate Change:** Climate change impacts on different sectors such as Agriculture, Forest, Infrastructure, Water Resources, etc.
4. **Key Response Measures** to deal with climate change i.e. mitigation and adaptation, etc.

II. Vulnerability to Climate Change, Linkage between Climate Change and Disaster

15 Hrs.

1. Key concepts, vulnerability to natural, physical and social system, vulnerability varies within societies, etc.
2. Identification of area specific extreme climatic events or disasters; i.e. flood, GLOF, typhoon, cyclone, etc.
3. Analysis of intensity and frequency of those events depending on temporal dimension
4. Vulnerability of the community to those events and assessment

III. Adaptation to Climate Change

15 Hrs.

1. Adaptation science, types of adaptation, context specificity of adaptation, etc.
2. Link between adaptation and development, where commonalities and differences exist

IV. Tutorial / Practical:

15Hrs.

References

2. Bajracharya, B., Shrestha, A.B. & Rajbhandari, L. 2007. Glacial Lake Outburst Floods in the Sagarmatha Region. Hazard Assessment Using GIS and Hydrodynamic Modeling. Mountain Research and Development.
3. Beniston, M., Diaz, H.F. & Bradley, S. 1997. Climatic change at High Elevation Sites: An overview. Climatic change.
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9. Ebi, K.L., Woodruff, R., Von Hildebrand, A. & Corvalan, C. 2007. Climate change-related Health impacts in the Hindu Kush-Himalayas. EcoHealth.
10. Eriksson, M. 2006. Climate change and its implications for Human Health in the Himalaya. Sustainable Mountain Development in the Greater Himalayan Region.
11. Fujita, K., Kadota, T., Rana, B., Shrestha, R.B. & Ageta, Y. 2001. Shrinkage of Glacier AX010 in Shorong Region, Nepal Himalayas in the 1990s. Glaciological Research, 18:51-54.
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15. Thapa, Narbikram and Mahendra N Mahato. 2009. Water and Sanitation Need Assessment in Dadeldhura and Baitadi District, Far Western Region, Nepal
16. Thapa, Narbikram (2009). Getting Prosperity through Farmer-led Agriculture. Kathmandu: Sudeepa Publications.
17. Regmi et al. 2009. Agro-biodiversity Management: An Opportunity for Mainstreaming Community-based Adaptation to Climate Change, Journal of Forest and Livelihood, vol. 8, Feb 2009.
18. Shrestha et al. 2000. Precipitation Fluctuations in the Himalaya and its Vicinity: An Analysis Based on Temperature Records from Nepal, International journal of Climate, 20: 317-327.
19. UNEP. 2002. Environment Outlook 3. Nairobi, Kenya: United Nations Environment Program.
20. World Bank. 2008. World Development Report, Agriculture for Development, Washington, DC.

Course Title: Environmental Management

Full marks: 100

Course No: DRM624

Pass marks: 50

Nature of Course: 3 Theory +1 Practical

Credit: 4 (60 hours)

Course Objective: The course aims to make students familiar with the environment management with reference to Nepal.

Course Content

- I. Introduction** **15 Hrs.**
Key Terminologies, Basic Concepts, Environmental Pollutants and Fate, Exposure and Human Health Risks, Environmental Standards, Monitoring, and Modeling, Pollution Management, Waste Management, Emerging Environmental Issues , etc.
- II. Environmental Impact Assessment** **5 Hrs.**
Introduction
1. Disasters in the light of sustainable development
2. History of EIA (before 1970 and after) versus the history of our management of disasters (case studies)
3. Definition of EIA as an underlying platform for Disaster Management
- III. Impacts and structure of EIA** **10 Hrs.**
1. Principles guiding EIA for disasters
2. Impact classification and disaster variation
3. Direct, Indirect and Cumulative impacts (Cumulative Impact Assessment as a new tool for Disaster Management)
4. Main features and stages of EIA process
- IV. Logistics of EIA** **5 Hrs.**
1. Integration of EIA into the development project cycle
2. Financial aspects, Institutionalization of EIA and its integration into laws and policies
- V. Express Approaches** **5 Hrs.**
1. Screening and Scoping (Initial Environmental Evaluation, full scale EIA, Terms of Reference)
2. Rapid Environmental Assessment (REA)
- VI. EIA Methodologies** **5 Hrs.**
1. Assessing hazards and impact risks: case studies (checklists, matrices, networks, overlays, etc.)
2. Concept of Environmental Risk Assessment for disaster situations, etc.
- VII. Tutorial / Practical:** **15Hrs.**

References

1. Barrow, C. J., Environmental Management: Principles and Practice, Taylor & Francis, 2002.
2. Asante-Duah, K., Risk assessment in environmental management: a guide for managing chemical contamination problems. John Wiley and Sons, 1998.
3. Ricci, P.F., Environmental and Health Risk Assessment and Management: Principles and Practices, Springer, 2006.
4. Theobald, R.H., Environmental management, Nova Science Publishers, 2008.
5. Madu, C.N., Environmental planning and management, Imperial College Press, 2007.

Course Title: Disaster Response and Recovery

Full marks: 100

Course No: DRM 625

Pass marks: 50

Nature of Course: 3 Theory +1 Practical

Credit: 4 (60 hours)

Course Objective: The course aims to make students familiar with the disaster response and recovery aspects with reference to Nepal.

Course Content

I. Disaster Response

1. Characteristics of Response:

3 Hrs.

Type of disaster, Effective response, severity and extent of disaster, pre-impact action, capacity of sustained operations, response requirements, etc.

2. Problem Areas in Response:

7Hrs.

Key factors, inadequate preparedness, warning factors, slow activation of response system, effects of impact and crisis pressure, difficulties in survey of damage and assessment needs, inaccurate and /or incomplete information from survey, convergence, poor information management, inadequate relief commodities, logistic problems, poor coordination of response operations, inadequate public awareness, problems with media, international assistance, etc.

3. Effective Response Requirements:

10 Hrs.

General background of preparedness, readiness of resource organizations, warning, evacuation, activation of response system, coordination of response operations, communications, survey and assessment, information management, major emergency response aspects, allocation of tasks, availability of relief supplies and commodities, international assistance resources, public cooperation, media cooperation, pattern of response management, period of response operations, follow-up from response operations, Response Operation, Human Factors in Response, Resources Relevant to Various Aspects of Response, etc.

II. Disaster Recovery

1. Introduction:

5 Hrs.

Key Points, fundamentals and definitions, basic concept, early recovery, recovery, disaster analysis, transfer of responsibilities from response to recovery, continuation of response activity, basis for recovery action, problem areas in recovery, etc.

2. Major Requirements for Effective Recovery:

10Hrs.

Understanding Recovery Process, Recovery and National Development, Recovery Information Base: Information from Response Operations, Post-disaster review, information from development programs, information from special teams, information for program parameters, information from previous disasters, etc.

3. Recovery Strategy, Policy Direction and Needs:

10Hrs.

Major areas of recovery need, envisaged time frame for recovery action, interlinking of recovery with national development, assessment resources available, system for monitoring from national government level, policy direction of recovery program, Recovery Program Needs and Areas: Government aspects, private sector, community, etc.

III. Tutorial / Practical:

15Hrs.

References

1. Carter W. Nick, "Disaster Management: a Disaster Manager's Handbook", Manila: Asian Development Bank, 1991
2. Rubin, C.B. (2009). Long-term recovery from disasters-the neglected component of emergency management. *Journal of Homeland Security and Emergency Management*, 6(1): 1-19.
3. Garnett, J.D. and Moore, M. (2009). Enhancing disaster recovery: Lessons from exemplary international disaster management practices. *Journal of Homeland Security and Emergency Management*, 7(1): 1-22.
4. Phillips B.D. 2009. Disaster Recovery, Chapter 3: Disaster Recovery Planning. Chapter 8 - Business Recovery; Chapter 9 – Infrastructure and Lifelines.

Year II	Semester IV	Thesis			
		Credits		Total Credits	Total Hours
		Theoretical	Tutorial		
DRM 650	Thesis on relevant topic as prescribed by the Department (in close co-ordination with the student)	15		15	500



**Subject Committee of
Buddhist Architecture and Engineering (BAE)
Meeting Notes and Decisions**

First Meeting (SC/BAE/01)

Date: November 22, 2020, Sunday

Time: 3:00 pm – 4:30 pm

Zoom Link:

<https://us02web.zoom.us/j/89888016872?pwd=SUdvaStWa3hlQWc0VWtJSG9jZmQ1Zz09>

Meeting ID: 898 8801 6872, Passcode: 121282

Chair: Prof Dr Sushil Bahadur Bajracharya,
sushil_bajracharya@ioe.edu.np, sushil_bajracharya@hotmail.com

Members:

Dr Naresh Shakya, nare72@gmail.com
Prof Deepak Pant, dpantji@yahoo.com
Associate Prof Nagendra Raj Sitoula, nrsitoula@gmail.com, nrsitoula@ioe.edu.np
Prof Dr Rajendra Adhikari, adhikari_rajendra@outlook.com
Prof Dr Sangeeta Singh, sangeeta@ioe.edu.np
Mr Siddhishwor Man Shrestha, Siddhishwor@lbu.edu.np

Special Invitees

Prof Dr Jiba Raj Pokhrel, Immediate Past Vice Chancellor, Nepal Academy of Science and Technology
Prof Dr Hridaya Ratna Bajracharya, Vice Chancellor, Lumbini Buddhist University
Dr Tilak Ram Acharya, Registrar, Lumbini Buddhist University
Prof Dr Shashidhar Ram Joshi, Dean-Institute of Engineering, Tribhuvan University
Mr Ukesh Raj Bhujju, Dean, School of Development Studies & Applied Sciences, Lumbini Buddhist University

Agenda:

1. Individual Introduction: Name, Address, Expertise and Current Involvement
2. General Introduction to MoU between IoE (TU) and SDSAS (LBU)
3. Brief Remarks by Invitees
4. Recommendations on continuation of the existing programs:
 - a. MSc in Constructions Engineering and Management, and
 - b. MSc in Disaster Risk Engineering and Management

These programs are being implemented under the aegis of the Lumbini International Academy of Sciences and Technology (LIASST) since December 13, 2015 when affiliation as granted.

Course structures are given in the **Annex 1**.

5. Formation of a sub-committee on MSc/ME/MA in Buddhist Architecture and Planning
6. AOB

Subject Committee of Buddhist Architecture and Engineering (BAE) Meeting Notes and Decisions

A. Meeting Notes

1. Individual Introduction: Name, Address, Expertise and Current Involvement

Upon arrival of all the participants and invitees, the meeting started at the scheduled time under the chairmanship of the Subject Committee, Prof Dr Sushil Bahadur Bajracharya, and emceed by Mr Ukesh Raj Bhuju.

As per the schedule, the participants gave their self-introductions along with their personal remarks on their areas of interests.

Mr Ukesh Raj Bhuju has received his forestry diploma from the Indian Forest College, Dehradun in 1977, and MS in agricultural and extension education from Michigan State University in 1984. Served for the Ministry of Forests & Soil Conservation, International Union for Conservation of Nature, and World Wildlife Fund as a forester and field researcher, and served at the National College of Kathmandu University as an Academic Director and faculty before joining LBU in January 2020.

Mr Nagendra Raj Sitoula received his Bachelor in Civil Engineering in 1991 and MSc in Environmental Engineering in 2005 both from Tribhuvan University, Nepal. Currently, he is Director of the Centre for Disaster Studies, Institute of Engineering (TU), and Program Coordinator of the Master program in Disaster Risk Management at the Department of Civil Engineering of the IoE Pulchowk Campus.

Prof Deepak Pant received his academic degrees from Nepal, Pakistan and Norway, and recently retired from IoE. Retired in 2019, he has been professionally engaged in heritage studies, and urban planning.

Prof Dr Rajendra Prasad Adhikari has served for the subject committee at the Pokhara University. The current efforts of LBU towards creating new academic programs in the field of Buddhist architecture and planning would be a milestone in quality education.

Prof Dr Sushil B Bajracharya has been serving as an Assistant Dean of Institute of Engineering, a Coordinator of MESSD PhD Program, and Member of the NAST Science Award Selection Committee. There have been informal connections and cooperation going on with the LBU in the last few years particularly in respect to the two master level programs of LBU, and signing of MoU has formalized these relations.

Prof Dr Sangeeta Singh has received her professional degree in civil engineering, and specialized in Infrastructure Planning from the University of Stuttgart in Germany. She is a Deputy Director at the Centre for Disaster Studies and a Program Coordinator for M.Sc. in Energy for Sustainable Social Development. She is associated with the 'Tomorrow's Cities' project of the UKRI GCRF Urban Disaster Risk Hub.

Mr Siddhishwor Man Shrestha is the Controller of Examinations and LBU, and earlier he has served for over 30 years at the IoE.

2. General Introduction to MoU between IoE (TU) and SDSAS (LBU)

Prof Dr Sushil B Bajracharya briefed on the salient features of the MoU between IoE (TU) and SDSAS (LBU) that was signed on November 13, 2020. The key features are

- i. Recommendations for continuation of the two on-going programs such as a) MSc in Constructions Engineering and Management, and b) MSc in Disaster Risk Engineering and Management;
- ii. Preparation for Master level program of Buddhist Architecture & Planning; and
- iii. Feasibility study for Bachelor of Arts in Information Technology, and Bachelor of Buddhist Architecture and Engineering.

The MoU also opens an avenue for joint research and project development and implementation.

3. Brief Remarks by Invitees

Prof Dr Jiba Raj Pokhrel, Immediate Past Vice Chancellor, Nepal Academy of Science and Technology

It gives me a pleasant feeling to be in this platform of intellectuals for promoting Nepal's unique cultural heritage of Buddhist architecture and engineering. The authorities of LBU and IOE have demonstrated their pro-activeness by signing an MoU that was one of the requirements for promoting the concepts. I am much delighted and satisfied with the steps being taken including this meeting of a subject committee. I am confident that this MoU will not remain as memory only; rather it will be translated into real actions.

An MoU can be reviewed in two ways, such as terminal evaluation at the end of its period, or on a continued basis. I would rather prefer the second choice given the fast changing scenario and urgency of the matter.

In the previous feasibility study, we have also developed certain tools such as questionnaires for survey among the key stakeholders. As committed earlier, such survey should also be completed for the academic programs that have been conceived.

Prof Dr Hridaya Ratna Bajracharya, Vice Chancellor, Lumbini Buddhist University

On behalf of LBU, I would like to extend my sincere gratitude to Prof Dr Jiba Raj Pokhrel and his teams in the past. He has successfully completed two vital studies for LBU, such as first one on the on-going Master programs in 2019 and the second one on the proposed programs on Buddhist Architecture and Engineering in 2020. The studies have given us a full confidence to sign an MoU with IoE, and move forward towards continuing the existing programs and developing new programs.

The three major conclusions made by Prof Dr Jiba Raj Pokhrel and his teams in reference to the on-going MSc programs of engineering are i) curriculum is competent, ii) LBU's support is satisfactory, and iii) the examinations are to the mark.

Now, we have entered into the second phase of our efforts. For me it is a breakthrough to have an MoU signed with IoE. This arrangement has created a mechanism of enhancing

LBU's capacity with the 'mentorship' of IoE in developing and implementing academic programs of architecture and engineering. Personally, IoE Dean Prof Dr Shashidhar Ram Joshi played a vital role in materializing the idea of MoU.

It would also be relevant to review the past efforts made by LBU in respect to engineering programs. These days, we have noticed that youths are attracted to the contemporary professions like development, engineering, environment, management, and tourism etc. In fact, their interests do match the need of the country. Thus, we have created the Faculty of Humanities & Social Sciences and the School of Development Studies & Applied Sciences in 2019.

When LBU initiated its engineering programs, we did not have our own capacity, and our mandate was to focus on the Buddhist studies. At present, the LBU Act has also been amended in 2020 by incorporating its scope in the 'other subjects' along with the Buddhist philosophical domains. This gave us a legal back-up.

This subject committee is a culmination of the recommendations made by the feasibility study team that completed its study in October 2020. I would like to see the feasibility team be continued as an advisory body.

Dr Tilak Ram Acharya, Registrar, Lumbini Buddhist University

In his separate remarks over the phone, he appreciated for the support and cooperation of IoE to LBU. He added that the formation of a subject committee was a great leap forward. He wished all the success. He remarked that the deliberations were very fruitful for making future plans.

Prof Dr Shashidhar Ram Joshi, Dean-Institute of Engineering, Tribhuvan University

For this MoU to be signed there has been a lot of home works and exercises done by our colleagues. I feel much privileged to be the one to sign on this significant document. On behalf of IoE, there will be our full support to LBU's endeavour of advancing higher education on Buddhist Architecture and engineering.

4. Agenda-wise discussion

As per the schedule, the two main agenda tabled for making decisions are

- i. Recommendations on continuation of the existing MSc programs
- ii. Formation of a sub-committee on MSc/ME/MA in Buddhist Architecture and Planning

SBB explained the agenda and opened the floor for views and inputs. On the first agenda, following views and inputs were shared.

- i. Recommendations on continuation of the existing MSc programs

Prof Dr Sangeeta Singh

- Credits: According to the syllabus, there are four core courses of 4 credits plus two electives of 4 credits each. Since there are already 16 credits of core courses, there will not be sufficient time for the electives.

- Project works: It would be more appropriate to offer project works in the third semester, so that students will gain experience and confidence to complete their thesis works in the fourth semester.
- Content: The current syllabus does not reflect on the contemporary topics like Sustainable Development Goals, and disaster resilience. It is essential to address such topics.
- Isolation: The courses seem to be developed in isolated manner, rather than by integrating.
- Modelling is equally important since the programs are on engineering management.

Mr Nagendra Raj Sitoula

- The courses prescribed for both the MSc programs have been reviewed by comparing with the similar courses offered by the other universities in Nepal. They were also reviewed from the international perspectives as well. They have been well designed.
- Revision of the courses is a good idea, since they have been designed almost five years back. Similarly, some additional topics could be accommodated such as project works and quantitative tools. However, at present there is no objection for continuing the program as such.

Prof Dr Jiba Raj Pokhrel

- It is a good idea that Prof Dr Sangeeta Singh brought some contemporary issues pertinent to the MSc programs. When we reviewed the courses in 2019, we found them compatible with the similar courses within the country and also abroad. Syllabus is not a rigid topic. There are conventions of revisions, such as once in five years, or on a continuous basis. The contemporary topics such as SDG can be well addressed also during thesis works of the students. We suggest linking the elective courses with the thesis works.

Prof Dr Rajendra Prasad Adhikari

- There is no problem in continuing the MSc programs at present. Suggestions proposed by Prof Dr Sangeeta Singh are fine. We may also discuss in depth on the quality of the syllabus in the separate forum.

Prof Dr Sushil B Bajracharya

- We have a uniform structure for all Master programs. There are some inconsistencies in CEM and DRM courses.
- Similarly, the total credits for Master program should be 60. We at IoE offer only 12 courses for master programs totalling 36 credits, and the remaining 24 credits set aside for practical and research works. However, an in-depth review of courses and credits can be separately discussed.

Dr Naresh Shakya

- In both the MSc programs, the course entitled 'Basics of Buddhist Studies and Buddhism in Nepal' has been oddly inserted in the third semester. There seems to be no link with the other courses. It would be more appropriate to include the topics relevant to the program, such as Buddhist arts, architecture, history etc.

Prof Dr Jiba Raj Pokhrel

- The courses offered in the MSc programs need to integrate Buddhist philosophy rather than offering a separate course on Buddhist studies. The Buddhist studies are not be separately studies in isolation, rather they should be built in the all the courses.
- There is also a plan to develop bachelor programs, thus, it is necessary to have thorough discussion in incorporating Buddhist philosophy.
- LBU has to define its unique feature, as done by other institutions. For example, KU and ICIMOD have coined the term like 'Himalayan architecture'.
- The idea of SDG is much more relevant to Buddhist philosophy.

ii) *Formation of a sub-committee on MSc/ME/MA in Buddhist Architecture and Planning*

Prof Dr Sushil B Bajracharya

- The concept of MSc/ME/MA in Buddhist Architecture and Planning has been developed during the feasibility study that was conducted in June through October 2020. It was also spelled out specifically in the MoU. The proposal is to form a separate committee within the LBU's policy framework to develop the program.

B. Decisions

On the basis of the remarks made by the invitees, and the ideas and inputs shared by the subject committee members, the meeting made the following four decisions:

- a) Considering that the two on-going programs (i. MSc in Constructions Engineering & Management, and ii. MSc in Disaster Risk Engineering and Management) comply with the academic requirements; the currently studying students should be duly registered.
- b) Considering that the syllabuses of both the MSc programs were developed in 2015, it would be appropriate to review them from the following perspectives:
 - accommodate in the course contents the contemporary topics like Sustainable Development Goals, and disaster resilience etc.;
 - reorganize course structure and credits to be compatible with the guidelines of University Grants Commission; and
 - incorporate Buddhist philosophy in all the courses as appropriate rather than inserting a separate course in isolation.
- c) Considering the priority as endorsed by the feasibility study team in October 2020 and specified in the MoU, the meeting decided to recommend LBU the following experts to be nominated in a committee for developing an academic program of MSc/ME/MA in Buddhist Architecture & Planning:

Chair: Prof Dr Sushil B Bajracharya (Architect)

Members:

Prof Dr Sangeeta Singh (Urban Planning)

Prof Dr Rajendra Prasad Adhikari (Construction)

Prof Deepak Pant (Architect, Specialized in Buddhist monuments)

Dr Naresh Shakya (Buddhist Arts and Philosophy)

- d) Considering the valuable contributions of the feasibility study team, the meeting decided to recommend LBU to continue the team composed of the following experts as an advisory body for developing an academic program of MSc/ME/MA in Buddhist Architecture & Planning and the other programs.

Chair: Prof Dr Jiba Raj Pokhrel, Immediate Past Vice Chancellor, Nepal Academy of Science and Technology

Members: Prof. Dr. Sushil Bahadur Bajracharya, Assistant Dean, IoE
Er. Sushil Gyewali, CEO, National Reconstruction Authority
Er Prof Dr Tri Ratna Bajracharya, President, Nepal Engineering Association
Dr Manik Ratna Shakya, Dean, LBU Faculty of Buddhist Studies
Mr Ukesh Raj Bhujju, Dean, LBU-SDSAS

C. AOB

There was no additional topic for discussion and decision.

Prof Dr Sushil B Bajracharya thanked all, and declared the meeting to be ended.



Prof Dr Sushil B Bajracharya
Chair Subject Committee
Buddhist Architecture and Engineering (BAE)
Lumbini Buddhist University

Annex 1

Syllabus and Curriculum

The Master of Construction Engineering and Management (CEM) degree program includes 12 regular courses (each of 100 marks) and a thesis of 500 marks. Six courses will be electives (two electives in each semester will be offered. Student will select 1 subject in each semester).

Course Code	Title of Course	Total Credits		Total Credits	Total Hours
		Theoretical	Tutorial		
Year I Semester I					
CEM 511	Principles of Construction Management	3	1	4	100
CEM 512	Legal and Ethical issues in Engineering Management	3	1	4	100
STA 503	Statistical Analysis	3	1	4	100
CEM 513	Safety Engineering	3	1	4	100
	Elective-I				
CEM 514	Earthquake Engineering	3	1	4	100
DRM 510	Principles of Disaster Risk Engineering and Management	3	1	4	100
Year I Semester II					
CEM 516	Quality Management	3	1	4	100
CEM 517	Project Management	3	1	4	100
CEM 518	Engineering Economic Analysis	3	1	4	100
REM 535	Research Methodology	3	1	4	100
	Elective-II				
GRS 511	GIS and Remote Sensing	3	1	4	100
CEM 519	Construction Environment in Developing Countries	3	1	4	100
Year II Semester III			3		
CEM 621	Construction Equipments, Plants and Management	3	1	4	100
CEM 622	Construction Project Engineering and Administration	3	1	4	100
BBS 603	Basics of Buddhist Studies and Buddhism in Nepal	3	1	4	100
FCM 623	Financial Management	3	1	4	100
	Elective III				
HRM 624	Human Resource Management	3	1	4	100
CEM 625	Hydropower Engineering	3	1	4	100
Year II Semester IV					
CEM 650	Thesis on relevant topic as prescribed by the Department	15		15	500
	Total			75	2000

Syllabus and Curriculum

The Master of Science in Disaster Risk Engineering and Management (DRM) degree program includes 12 regular courses (each of 100 marks) and a thesis of 500 marks. Six courses will be electives (two electives in each semester will be offered. Student will select 1 subject in each semester).

Course Code	Title of Course	Total Credits		Total Credits	Full Marks
		Theoretical	Tutorial		
Year I	Semester I				
DRM 510	Principles of Disaster Risk Engineering and Management	3	1	4	100
DRM 512	Earthquake Risk Management	3	1	4	100
STA 503	Statistical Analysis	3	1	4	100
DRM 513	Community Based Disaster Risk Management	3	1	4	100
	Elective I				
DRM 514	Emergency Management Planning	3	1	4	100
GRS 511	GIS and Remote Sensing	3	1	4	100
Year I	Semester II				
DRM 515	Landslide Risk Management	3	1	4	100
DRM 516	Flood Control Techniques and Management	3	1	4	100
DRM 517	Disaster Law, Policies, Frameworks, and Strategies	3	1	4	100
REM 535	Research Methodology	3	1	4	100
	Elective II				
DRM 518	Disaster Prevention and Mitigation	3	1	4	100
DRM 519	Disaster Risk Management of Cultural Heritages	3	1	4	100
Year II	Semester III				
DRM 621	Urban Disaster Risk Management	3	1	4	100
DRM 622	Disaster Preparedness and Public Awareness	3	1	4	100
BBS 603	Basics of Buddhist Studies and Buddhism in Nepal	3	1	4	100
DRM 623	Climate Change Adaptation and Mitigation	3	1	4	100
	Elective III				
DRM 624	Environmental Management	3	1	4	100
DRM 625	Disaster Response and Recovery	3	1	4	100
Year II	Semester IV				
DRM 650	Thesis on relevant topic as prescribed by the Department (in close co-ordination with the student)			15	500



लुम्बिनी बौद्ध विश्वविद्यालय

लुम्बिनी, नेपाल

Lumbini Buddhist University

Lumbini, Nepal



बौद्ध अध्ययन संकाय

Faculty of Buddhist Studies

डीनको कार्यालय

Dean's Office

Ref. No.: २४/०६२/०६३

Date: २०६२/८/२६

श्री क्याम्पस प्रमुख

Lumbini International Academy of Science and Technology

सातदोबाटो, ललितपुर

विषय: सम्बन्धन बारे ।

त्यस क्याम्पसमा (i) M.Sc. in Disaster Risk Engineering and Management, (ii) M.Sc. in Rural Infrastructure Engineering र (iii) M.Sc. in Construction Engineering and Management को स्नात्कोत्तर तहको कक्षा संचालन गर्न माँग गर्दै निवेदन दिइएकोमा मिति २०७२/०८/२५ को कार्यकारी परिषद्को निर्णय अनुसार क्याम्पस/शिक्षण संस्थाको सम्बन्धन सम्बन्धी विनियममा २०६८ को दफा ६ अनुसार शैक्षिक सत्र २०७२ माघ देखि कक्षा संचालन गर्न त्यस क्याम्पसलाई सम्बन्धन दिने निर्णय भएको जानकारी गराउन चाहन्छु । विश्वविद्यालयको ऐन नियम एवं विनियममा रही कार्यक्रम संचालन गर्न हुन अनुरोध छ ।

कक्षा संचालन पूर्व सम्बन्धन प्राप्त क्याम्पसले पुरा गर्नु पर्ने आवश्यक प्रक्रिया पुरा गर्न अनुरोध गर्दै त्यस बारे थप जानकारी चाहिएमा विश्वविद्यालयमा सम्पर्क राख्न पनि सूचित गरिन्छ । क्याम्पस संचालन गर्न स्वीकृति पाउनु भएकोमा बधाई छ ।

भवदीय

डा. भद्ररत्न बज्राचार्य
डीन

o/c

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बौद्ध अध्ययन संकाय
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ई-मेल कार्यालय
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Ref. No.: ४२१०६३/१०६४

Date: २०६३/४/२६

श्रीमान क्याम्पस प्रमुखज्यू
लुम्बिनी इन्टरनेशनल कलेज अफ साइन्स एण्ड टेक्नोलोजी
सातदोबाटो, ललितपुर।

विषय: Syllabus पठाइएको बारे।

उपरोक्त सम्बन्धमा यस लुम्बिनी बौद्ध विश्वविद्यालयबाट M.Sc. तर्फ Engineering विषयको कक्षा संचालनको लागि पाठ्यक्रम निर्माणको सम्बन्धि गोष्ठी श्रावण १७ र १८ मा सम्पन्न भई प्राप्त सुझावहरु समेटि तयार पारिएको Master's of Disaster Risk Engineering and Management र Master's of Construction Engineering and Management विषयको Syllabus पठाइएको व्यहोरा अबगत गराउँदै सो अनुसार शैक्षिक कार्यक्रम संचालन गर्नुहोला।

डा. भद्रन्त वज्राचार्य
डीन

सुप्रति गुनसि लाल
१२/१०/२३