

**CURRICULUM
OF
DISASTER MANAGEMENT**

BS/MS

(2018)



**HIGHER EDUCATION COMMISSION
ISLAMABAD**

CURRICULUM DIVISION, HEC

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PREFACE

The curriculum, with varying definitions, is said to be a plan of the teaching-learning process that students of an academic programme are required to undergo to achieve some specific objectives. It includes scheme of studies, objectives & learning outcomes, course contents, teaching methodologies and assessment/evaluation. Since knowledge in all disciplines and fields is expanding at a fast pace and new disciplines are also emerging; it is imperative that curricula be developed and revised accordingly.

University Grants Commission (UGC) was designated as the competent authority to develop, review and revise curricula beyond Class-XII vide Section 3, Sub-Section 2 (ii), Act of Parliament No. X of 1976 titled "Supervision of Curricula and Textbooks and Maintenance of Standard of Education". With the repeal of UGC Act, the same function was assigned to the Higher Education Commission (HEC) under its Ordinance of 2002, Section 10, Sub-Section 1 (v).

In compliance with the above provisions, the Curriculum Division of HEC undertakes the revision of curricula regularly through respective National Curriculum Revision Committees (NCRCs) which consist of eminent professors and researchers of relevant fields from public and private sector universities, R&D organizations, councils, industry and civil society by seeking nominations from their organizations.

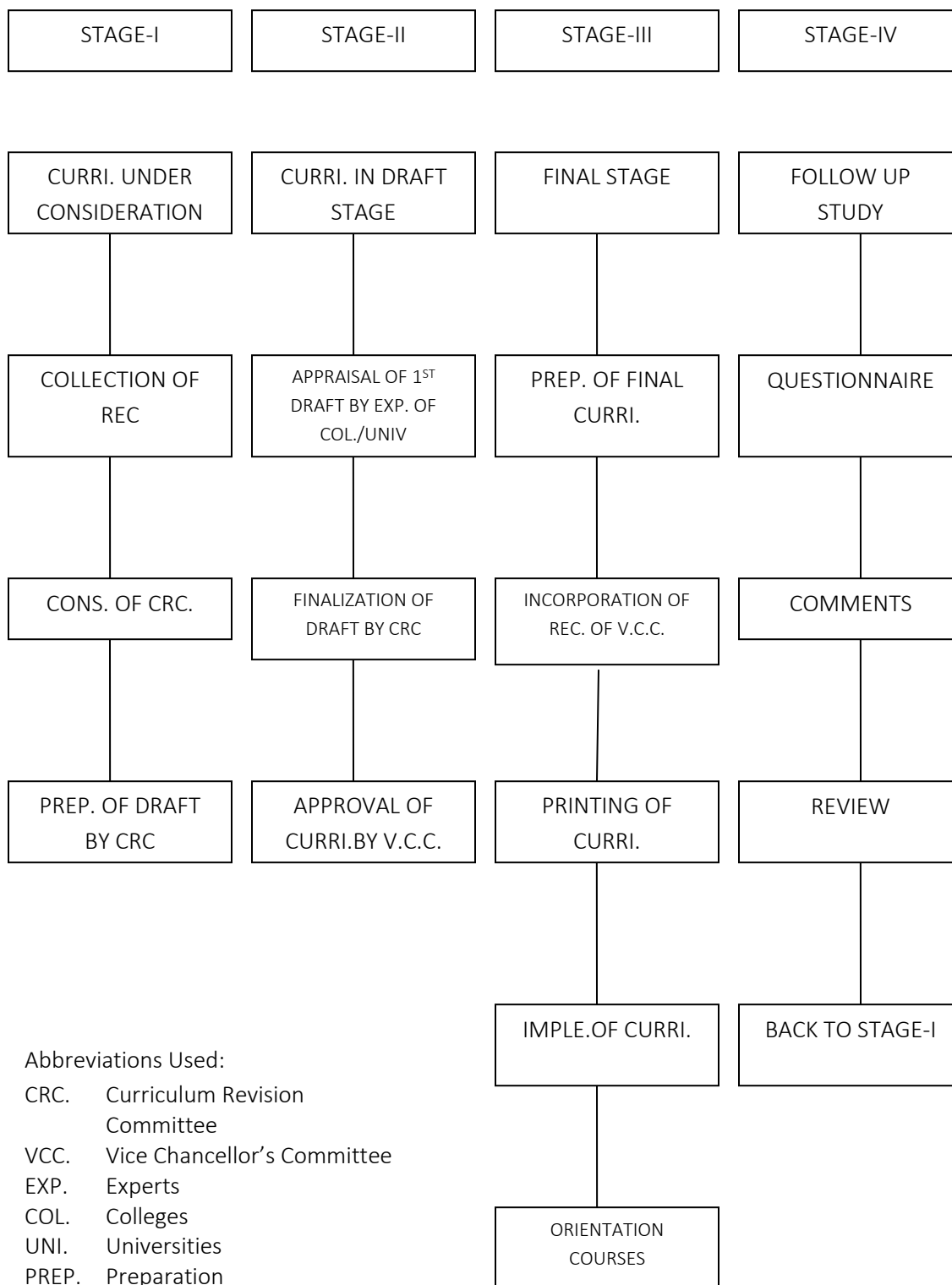
In order to impart quality education which is at par with indigenous needs and international standards, HEC NCRCs have developed unified framework/templates as guidelines for the development and revision of curricula in the disciplines of Basic Sciences, Applied Sciences, Social Sciences, Agriculture and Engineering.

It is hoped that this curriculum document, prepared by the respective NCRC's, would serve the purpose of meeting our national, social and economic needs, and it would also provide the level of competency specified in Pakistan Qualification Framework to make it compatible with international educational standards. The curriculum is also placed on the website of HEC

<http://hec.gov.pk/english/services/universities/RevisedCurricula/Pages/default.aspx>

(Muhammad Raza Chohan)
Director General (Academics)

CURRICULUM DEVELOPMENT PROCESS



Abbreviations Used:

- CRC. Curriculum Revision Committee
- VCC. Vice Chancellor's Committee
- EXP. Experts
- COL. Colleges
- UNI. Universities
- PREP. Preparation
- REC. Recommendations

Minutes of Final Meeting - National Curriculum Revision Committee (NCRC) in the discipline of Disaster Management held from April 11-13, 2018 at HEC Regional Centre, Karachi

The final meeting of National Curriculum Revision Committee in the subject of Disaster Management was held on April 11-13, 2018 at HEC Regional Centre Karachi to finalize the draft curriculum reviewed / prepared in its preliminary meeting held on January 08-10, 2018 at HEC, Regional Center, Peshawar. Experts from Academia, Industry, R & D organizations, National and International organizations and Civil Society participated in the meeting. Mr. Hidayatullah Kasi (Deputy Director, Academics Division, HEC, Pakistan) coordinated the NCRC meeting. Following members attended the meeting:

Sr. No	Name & Address	Status
1.	Dr. Noor Jehan Director / Professor, Centre for Disaster Preparedness & Management, University of Peshawar, Peshawar	Convener
2.	Dr. Syed Ainuddin Chairman / Associate Professor, Department of Disaster and Development Studies Faculty of Social Sciences, and Chairman, Undergraduate Studies Office, University of Baluchistan, Quetta.	Co- Convener
3.	Dr. Atta-ur-Rahman Associate Professor, Department of Geography, Faculty of Life and Environmental Sciences, University of Peshawar, Peshawar	Secretary
4.	Prof. Dr. Amir Nawaz Khan Meritorious Professor, Faculty of Life & Environmental Sciences Centre for Disaster Preparedness & Management, University of Peshawar, Peshawar.	Member
5.	Prof. Dr. Saadullah Afridi Dean & Director SIHS Sarhad University, Ring road Peshawar	Member
6.	Prof. Dr. Qaiser uz Zaman Khan Professor, Department of Civil Engineering, University of Engineering & Technology, Taxila	Member
7.	Dr. Shaker Mahmood Mayo Professor, Faculty of Architecture & Planning, Department of City & Regional Planning, University of Engineering & Tech, Lahore.	Member

8.	Dr. Naeem Shahzad Chairman/Associate Professor Military College of Engineering, Civil Engineering Wing, National University of Science & Technology, Risalpur.	Member
9.	Dr. Salah Uddin Associate Professor, Department of Civil Engineering, Baluchistan University of Engineering & Technology, (BUET), Khuzdar	Member
10.	Mr. Tariq Moen Secretary Fire Protection Association of Pakistan A-163 Sahba Akhtar Rd, Karachi	Member
11.	Dr. Javed Akhter Qureshi Assistant Professor, Department of Earth Sciences, Karakoram International University, Main Campus, University Rd, Gilgit-Baltistan	Member
12.	Dr. Muhammad Ashraf Assistant Professor, Department of Disaster Management & Development Studies, University of Baluchistan, Quetta.	Member
13.	Mr. Mushtaq Ahmad Jan Assistant Professor, Centre for Disaster Preparedness & Management, University of Peshawar, Peshawar.	Member
14.	Mr. Shakeel Mahmood Lecturer, Department of Geography, Government College University, Lahore.	Member
15.	Brig. Fiaz Hussain Shah (Retired) Senior Capacity Building Specialist, Ministry of Climate Change, National Disaster Management Authority, Islamabad.	Member
16.	Mr. Abdul Rashid Director Pakistan Metrological Deptt, University Road Karachi	Member
17.	Mr. Hidayatullah Kasi Deputy Director (Curriculum), Higher Education Commission, Islamabad.	Coordinator

List of members who attended preliminary meeting but could not attend final meeting due to their personal engagements during these dates:-

Sr. No	Name & Address	Status
1.	Prof. Dr. Sajid Rashid Ahmad Principal / Professor, College of Earth & Environmental Sciences, University of the Punjab, Quaid-i-Azam Campus, Lahore.	Member
2.	Dr. Safdar Ali Shirazi Director / Associate Professor, Center for Integrated Mountain Research, University of the Punjab, Quaid-i-Azam Campus, Lahore.	Member
3.	Dr. Naveed Ahmad Assistant Professor, Earthquake Engineering Centre, University of Engineering & Technology, Peshawar.	Member
4.	Dr. Amjad Ali Assistant Professor, Centre for Disaster Preparedness & Management, University of Peshawar, Peshawar.	Member
5.	Dr. Saleem Ullah Assistant Professor, Department of Space Science, Institute of Space Technology, Islamabad.	Member
6.	Mr. Muhammad Ahmed Lecturer, Department of Urban & Infrastructure Engineering, NED University of Engineering & Technology, Karachi.	Member
7.	Dr. Muhammad Hanif Director, National Weather Forecasting Center, Pakistan Meteorological Department, Sector H-8/2, Islamabad.	Member
8.	Dr. Bashir Ahmad Principal Scientific Officer, PARC Institute of Advance Studies in Agriculture, NARC, Park Road, Chak Shahzad, Islamabad.	Member
9.	Dr. Abdur Rehman Cheema Team Leader Research, Rural Support Programs Networks 3rd Floor, IRM Complex, Plot # 7, Sunrise Avenue, Park Road, Near COMSATS University, Islamabad.	Member
10.	Mr. Muhammad Shakeel Deputy Director Provincial Disaster Management Authority, Peshawar	Member

11.	Dr. Amna Khan Program Manager (Health & Training) Pakistan Red Crescent, Ashfaq Ahmad Road, H-8/2, Islamabad.	Member
12.	Maj (Retd.) Harris Khatak Program Manager (security) Pakistan Red Crescent, Ashfaq Ahmad Road, H-8/2, Islamabad.	Member

NCRC Agenda:

The agenda of the final meeting for NCRC in the subject of Disaster Management was as follows:

1. To finalize objectives / learning outcomes, list of contents and assessment criteria (formative & summative) aligned with Bachelor and Master programs.
2. To finalize the contents of draft curriculum in the discipline of **Disaster Management** and to bring it at par with international standards.
3. To finalize the intake criteria for this programme.
4. To finalize contents keeping in view the uniformity across other disciplines and avoiding overlapping.
5. To incorporate/suggest latest reading materials/references (local & international) against each course.
6. To make final recommendations for finalization of the discipline, keeping in view the futuristic needs of the society.

The meeting started with recitation from the Holy Quran by Mr Shakeel Mahmood , GC University Lahore. Mr Hidayatullah Kasi Deputy Director, Academics Division, HEC, Islamabad welcomed the participants on behalf of Higher Education Commission, Pakistan. All the participants introduced themselves highlighting their qualification, experience and area of expertise. The convener of the committee, Prof. Dr. Noor Jehan, Director/ Professor, Centre for Disaster Preparedness and Management, University of Peshawar welcomed the participants and thanked HEC, Pakistan for providing opportunity of hosting NCRC meeting at Higher Education Regional Office, Karachi. She further highlighted the importance of OBE based curriculum and encouraged the committee to participate in this academic and professional activity. Mr Hidayatullah Kasi presented the agenda and objectives of the NCRC. He highlighted the importance of this meeting and emphasized for adaptation of general rules of curriculum development and revision like scope of the subject/program, horizontal & vertical alignment, rule of flexibility and adaptability keeping in view the futuristic approach, market value/job market and societal needs. He also shared a template for revising/updating the curricula. The template was unanimously accepted to be followed. It was also agreed to add vision, mission, program learning outcomes (PLOs) and course

learning outcomes (CLOs), teaching methodology and assessment segments in the curricula. In next session the house openly discussed the nomenclature of the discipline, preface, vision, mission, objectives of the programs, Program Learning Outcomes (PLOs), methods of instruction and learning environment, assessment and operational framework keeping in mind new trends of Outcome Based Education (OBE) being adopted by various institutions. Sample Course Learning Outcomes (CLOs) were also proposed for few subjects. After long deliberation, the committee finalized the above said segments of the curriculum. Similarly, framework/scheme of studies of undergraduate 4-years program for Disaster Management was discussed keeping in view the duration of the program, number of semesters, number of weeks per semester, total number of credit hours, number of credit hours per semester, weightage of theory and practical. Furthermore, list of courses (core & elective) and semester wise breakup of courses were also discussed thoroughly and the same was unanimously finalized. In the afternoon session, admission criteria/intake criteria was discussed and finalized. After that the list of courses was distributed among the committee members keeping in view the experience and expertise in the field for reviewing course objectives, adding learning outcomes, updating list of contents, adding teaching-learning methods and assessment, and updating bibliography/ references/ suggested books. On second day, task assigned to the groups was displayed and discussed the addition/deletion and revising the courses. After thorough deliberations, draft curriculum of the BS (4-years) for Disaster Management was finalized. On third day, the courses of MS program of Disaster Management were reviewed and after thorough discussion, courses were finalized. It was decided that the draft curriculum of Disaster Management would be circulated among the experts of the field (local & foreign) and the feedback of the experts will be incorporated in final meeting.

VISION

Transformation and contribution towards national integration and consolidation to overcome the sense of forlornness and alienation in vulnerable communities.

MISSION

To impart knowledge and skills to effectively manage disasters.

RATIONALE

Disasters, natural or man-made result in untold misery on the human beings and adverse impacts on the community. The frequency and intensity of Disasters are mounting with every passing day as experienced in the past decade. The ability to manage and mitigate disaster assumes paramount importance. Disaster management is understood as the managerial function charged with creating the framework, within which communities reduce vulnerability to hazards and cope with disasters. The function of disaster managers is to evaluate risk and exposure, create response plans and ensure response capacity after an event. The response capacity to disaster becomes complete when the community is involved in the entire disaster management cycle.

The recent International Conference held in Sendai, Japan has formulated a new framework for Disaster Risk Reduction (SFDRR) which has superseded the Hyogo Framework for Action (HFA). The close inter-linkages between sound Disaster Risk Reduction, environmental management and climate change impacts require a more systematic and comprehensive approach to disaster management. Considering the importance of Disaster Management for all professions (doctors, engineers, military officers, social scientists, logisticians, risk managers, decision makers, etc.) proper education and training is required. There is a severe shortage of qualified and trained professionals in this field. Therefore, a broad array of people either working or looking for jobs in the national authorities, international organizations (UN, NGOs, etc.), public services (health, energy, water) and relief/aid organizations can benefit from this program.

SCOPE

Disaster Management is an inter-disciplinary and multi-disciplinary academic field devoted to various aspects of disaster management across societies and cultures. This program aspires to provide disaster management professionals and specialists for public and private sector Organizations, Institutions and Authorities who can plan, manage, and evaluate interventions in the field of disaster management

PROGRAM LEARNING OUTCOMES

PLO 1. Disaster Management Knowledge:

An ability to apply knowledge of science to the solution of complex disaster problems.

PLO 2. Design/Development of Solutions:

An ability to design solutions for prevention, preparedness, mitigation and response to disaster situations.

PLO 3. Investigation:

An ability to carry out vulnerability and risk assessments in a methodical way.

PLO 4. Modern Tool Usage:

An ability to create, select and apply appropriate techniques, resources, and modern tools to complex disaster activities.

PLO 5. Individual and Team Work:

An ability to work effectively, as an individual or in a team, on multifaceted and /or multidisciplinary settings.

PLO 6. Communication:

An ability to communicate effectively, orally as well as in writing on complex disaster management projects with the community and society at large.

PLO 7. Project Management:

An ability to demonstrate management skills and apply disaster management knowledge to one's own work, as a member and/or leader in a team, to manage projects in a multidisciplinary environment.

PLO 8. Ethics:

An ability to apply ethical principles and commit to professional ethics and responsibilities and norms of disaster management practices

AIMS AND OBJECTIVES

The following objectives were considered to prepare curricula for BS in Disaster Management:

- i. To develop international standard Disaster Management curriculum for 4 years BS and 2 years MS curriculum so that the uniformity could be adopted by the public and private sector institutions throughout the country.
- ii. To impart current knowledge and practical skills to Disaster Management graduates through theory, practical and field exercises.

Keeping in view the mandate of the NCRC on Disaster Management, following decisions were made, accordingly.

TITLE OF THE DEGREE

The title of the degree for BS and MS was discussed by the committee. The committee unanimously approved “**Disaster Management**” as the title of all the degree programmes to be offered by the HEIs in Pakistan.

PART-I: Scheme of Study for BS (04 YEARS) PROGRAMME

ELIGIBILITY

FSc. OR FA with Mathematics, Biology, Statistics, Computer Science, Geography, Economics and Commerce

DURATION

4-year programme spread over 8 semesters

DEGREE REQUIREMENT

Minimum of 124 credits are required to complete 4 years BS in Disaster Management.

EVALUATION

For the uniformity in the evaluation system, NCRC recommends that the minimum CGPA required to pass a semester is 2.0 out of 4.0 at undergraduate level OR decided by the respective bodies of the university as per rules in vogue.

Standardized Format / Scheme of Studies for Four-Year Integrated Curricula for Bachelor Degree in Basic, Social, Natural and Applied Sciences

STRUCTURE

Sr.	Categories	No. of courses Min – Max	Credit Hours Min – Max
1.	Compulsory Requirement (No Choice)	9 – 9	25 – 25
2.	General Courses to be chosen from other departments	7 – 8	21 – 24
3.	Discipline Specific Foundation Courses	9 – 10	30 – 33
4.	Major Courses including research project / Internship	11 – 13	36 – 42
5.	Electives within the major	4 – 4	12 – 12
	Total	40 – 44	124 – 136

- Total numbers of Credit hours 124-136
- Duration 4 years
- Semester duration 16-18 weeks
- Semesters 08
- Course Load per Semester 15-18 Cr hr
- Number of courses per semester 4-6 (not more than 3 lab / practical courses)

LAY OUT FOR BS 4-YEAR IN DISASTER MANAGEMENT

Compulsory Requirements (the student has no choice)		General Courses to be chosen from other departments	
9 courses		7-8 courses	
25 Credit hours		21-24 Cr. Hours	
Subject	Cr. hr	Subject	Cr. hr
1. English I	3	1. Fundamentals of Geography	3
2. English II	3	2. General Geology	3
3. English III	3	3. Introduction to Environmental Science	3
4. English IV/ Statistics I / Univ. Optional *	3	4. Introduction to Sociology	3
5. Pakistan Studies	2	5. Introduction to Economics	3
6. Islamic Studies / Ethics	2	6. Introduction to Psychology	3
7. Mathematics I	3	7. Fundamentals of GIS and RS	2+1

8. Mathematics II / Statistics II/ Univ. Optional **	3	8. Principles of Management	3
9. Introduction to Computer	3		
	25		24

Discipline Specific Foundation Courses		Major courses including research project/internship		Elective Courses within the major	
9-10 courses		11-13 courses		4 courses	
30-33 Credit hours		36-42 Credit hours		12 Credit Hours	
Subject	Cr. hr	Subject	Cr. hr	Subject	Cr. hr
1. Basic Science of Natural Hazards	3	1. Research Approaches in Disaster Management	3	Elective-I (7)	3
2. Fundamentals of Disaster Management	3	2. Applied Geomorphology and Natural Hazards	2+1	Elective-II (7)	3
3. Basic Principles of Disaster Planning and Management	3	3. Gender Mainstreaming in Disaster Management	3	Elective-III (8)	3
4. Disaster and Sustainable Development	3	4. Economics of Disasters	3	Elective-IV (8)	3
5. Community Based Disaster Risk Management	3	5. Disaster Project Management	3		
6. Hydro- meteorological Hazards	2+1	6. Multi-Hazards Vulnerabilities	3		
7. Geo-Hazards	2+1	7. Research Project /Internship	1+2		
8. Complex & Biological Hazards	3	8. Natural Hazards of Pakistan	3		
9. Emergency Management	2+1	9. Disasters Risk and Urbanization	3		
10. Disaster Risk Management	3	10. GIS and Remote Sensing in Disaster Management	2+1		

		11. Climate Change and Natural Hazards	2+1		
		12. Techniques of Hazard Mapping	2+1		
		13. Practical in Disaster Management	1+2		
	30		39		12

* University has the option to recommend any other course in lieu of English IV

** University may recommend any other course in lieu of Mathematics II

Scheme of Studies for BS in Disaster Management

Course No.	Course Titles	Credit Hrs.
	English-I	3
	Pakistan Studies	2
	Math/Stat-1	3
	G-I Fundamentals of Geography	3
	G-II General Geology	3
DM 311	FOUNDATION-I Basic Science of Natural Hazards	3
		17
	English-II	3
	Islamic Studies / Ethics	2
	Math/stat-II / Univ. Optional	3
	G-III Introduction to Environmental Science	3
	G-IV Introduction to Sociology	3
DM 321	FOUNDATION-II Fundamentals of Disaster Management	3
		17
	English-III	3
	Introduction to Computer	3
	G-V Introduction to Economics	3
	G-VI Introduction to Psychology	3
DM 431	FOUNDATION-III Basic Principles of Disaster Planning and Management	3
		15
	English-IV / Univ. Optional	3
	G-VII Fundamentals of GIS and RS	2+1
	G-VIII Principles of Management	3
DM 441	FOUNDATION-IV Disasters and Sustainable Development	3
DM 442	FOUNDATION-V Community Based Disaster Management	3
		15
DM 551	FOUNDATION-VI Hydro-meteorological Hazards	2+1
DM 552	FOUNDATION-VII Geo-Hazards	2+1
DM 553	FOUNDATION-VIII Complex and Biological Hazards	3
DM 554	MAJOR-I Research Approaches in Disaster Management	3
DM 555	MAJOR-II Applied Geomorphology and Natural Hazards	2+1
DM 556	MAJOR-III Gender Mainstreaming in Disaster Management	3
		18
DM 561	FOUNDATION-IX Emergency Management	2+1
DM 562	FOUNDATION-X Disaster Risk Management	3
DM 563	MAJOR-IV Economics of Disasters	3
DM 564	MAJOR-V Project Management in Context of Disasters	3

DM 565	MAJOR-VI 6. Multi-Hazard Vulnerabilities	3
Proj 569	MAJOR-VII Research Project /Internship	1+2
		18
DM 671	MAJOR-VIII Natural Hazards of Pakistan	3
DM 672	MAJOR-IX Disasters Risk and Urbanization	3
DM 673	MAJOR-X GIS and Remote Sensing in Disaster Management	2+1
	ELECTIVE-I	3
	ELECTIVE-II	3
		15
DM 681	MAJOR-XI Climate Change and Natural Hazards	2+1
DM 682	MAJOR-XII Techniques of Hazard Mapping	2+1
DM 683	MAJOR-XIII Practical in Disaster Management	1+2
	ELECTIVE-III	3
	ELECTIVE-IV	3
		15
Total Credit Hours (124-136)		130

Note: Students are allowed to select any four electives from the given groups.

LIST OF ELECTIVE COURSES

Course No.	Course Titles	Credit Hrs.
DM 674a	Climate Change Adaptation and Disasters	3
DM 674b	Structural and Non-Structural Measure in DM	3
DM 674c	Ageing and Disasters	3
DM 674d	Public Private Partnerships for DRR	3
DM 674e	Environment and Hazards Management	3
DM 674f	Humanitarian Crisis Management	3
DM 675a	Child Friendly Disaster Management	3
DM 675b	Earthquake Hazard Risk Reduction	3
DM 675c	Quantitative Techniques for Disaster Management	2+1
DM 675d	Natural Resources and Disaster	3
DM 675e	Global Regime in Disaster Management	3
DM 684a	Disaster Management Policies	3
DM 684b	Good Governance in Disaster Management	3
DM 684c	Disability and Disasters	3
DM 684d	Health, Hygiene and Sanitation in Disaster Management	3
DM 685a	Psychological Impacts of Disasters	3
DM 685b	Flood Hazard Risk Reduction	3
DM 685c	Basic Engineering Practices in Disaster Management	3
DM 685d	Role of Media in Disaster Management	3
DM 685e	Contingency Planning in Disaster Management	3

Detail of Foundation Courses

Foundation-I

DM 311

BASIC SCIENCE OF NATURAL HAZARDS

Cr. H. 3

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

- **Understand** the science of Natural hazards and Geomorphic processes

COURSE CONTENTS:

1. Introduction

- Scientific Methods, Principles and logic.
- Universe, Solar System, Earth
- Concept of Time, Space, Scale, Matter, Energy, Form and
- Geomorphic Processes

2. Dynamic Earth

- Earth's Structure and Composition
- Plate Tectonics
- Atmospheric Structure
- Earth Heat System

3. Hydro-meteorological Systems

- Elements of Weather and Climate
- Hydrological Cycle
- Metrological System
- Hydro-Meteorological Phenomena

4. Natural Hazards

- Geo-Hazards
- Hydro-Meteorological Hazards

Teaching Methodology

- Lecturing
- Written Assignments
- Seminar Lectures
- Documentaries

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. HYNDMAN, Donald and Hyndman, David (2010) Natural Hazards and Disasters. Brooks Cole, 3rd Revised Edition, Stamford, Connecticut, USA.
2. KREBS, Robert E. (2003) The Basics of Earth Science. Greenwood, Westport, Connecticut, USA.
3. Khan A.N. (2016) Introduction to Hazards and Disasters. Al-Azhar Environmental planning and management, Peshawar
4. STRAHLER, Alan H. and Strahler, Arthur (2004) Physical Geography: Science and Systems of the Human Environment. John Wiley & Sons, 3rd Edition, Hoboken, New Jersey, USA.
5. Rahman A., Khan AN., Shaw R. (2015) Disaster Risk Reduction Approaches in Pakistan. Springer Tokyo.

Foundation-II

DM 321

Fundamentals of Disaster Management

Cr. H. 3

Course Learning Outcomes:

Upon Successful completion of this course, the student will be able to:

- **Understand** the basic concepts of disaster management, disaster risk, vulnerability, capacity, disaster risk situation, impacts and evolution of disaster management.

COURSE CONTENT:

1 Introduction to Disaster Management

- Basics Concepts evolving terminologies in Disaster Management
- Nature and Scope of Disaster Management
- Historical Evolution

2 Classification of Disasters

- Socio-Natural Disasters
- Anthropogenic Disasters
- Technological Disasters

3 Concept of Risk, Vulnerability and Capacity

- Disaster Risk
- Vulnerability (Types and Causes, Models)
- Capacity and Types of Capacity

- Level of Capacities
- 4 Disaster Risks Trends**
 - Global Disaster Risk Trends
 - Costs and Frequency
 - Historical Review of Disasters Trends
- 5 Case Studies on Impacts of Disasters**
 - Economic
 - Social
 - Environmental
 - Physical Infrastructure

Teaching Methodology

- Lecturing
- Written Assignments
- Documentaries
- Interactive Sessions

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. Comprehensive Risk Assessment for Natural Hazards. World Meteorological Organization 2006.
2. DAMON, P. C. (2006) International Disaster Management. Butterworth-Heinemann.
3. Khan A.N. (2016) Introduction to Hazards and Disasters. Al-Azhar Environmental planning and management, Peshawar
4. Rahman A. 2010. Disaster Risk Management: Flood Perspective. VDM Verlag Publishing Co. Ltd Germany, ISBN 978-3-639-29891-8, 192 Pages.
5. Rahman A., Khan AN., Shaw R. (2015) Disaster Risk Reduction Approaches in Pakistan. Springer Tokyo.
6. Shaw R, Rahman A, Surjan A, Parvin GA. 2016. Urban Disasters and Resilience in Asia. Elsevier, New York.

7. UNISDR. (2009). Global Assessment Report on Disaster Risk Reduction, United Nations International Strategy for Disaster Reduction.
8. W. N. Carter (1999) Disaster Management: Disaster Manager's Handbook, Manila: Asian Development Bank.
9. Wisner, B., P. Blaikie, T. Cannon, and I. Davis. (2004). "At Risk: Natural Hazards, People's Vulnerability and Disasters (2nd Ed.)." Rutledge, London, UK.

Foundation-III

DM 431

Basic Principles of Disaster Planning and Management

Cr. H. 3

Course Learning Outcomes:

Upon Successful completion of this course, the student will be able to:

- **Understand** the basic concepts of disaster management, disaster risk, vulnerability, capacity, disaster risk situation, impacts and evolution of disaster management.

COURSE CONTENTS:

1. **Significance of Disaster Planning and Management**
 - Concept of Planning
 - Concept of Disaster Planning and Management
2. **Disaster Management Cycle**
 - Prevention
 - Mitigation
 - Preparedness
 - Impact
 - Response
 - Recovery
 - Development
3. **Planning Process**
 - Types of Plan
 - Level of Plan
 - National and Provincial Disaster Management Plans
 - Elements at Risk
4. **Legal and Administrative Structure for Disaster Management in Pakistan**
 - National Disaster Management Acts
 - National Disaster management Policies
 - Administrative Structures
5. **Emerging Challenges in Disaster Management**
 - Socio-Culture Challenges
 - Financial Constraints

- Environmental Challenges

Teaching Methodology

- Lecturing
- Written Assignments
- Documentaries
- Interactive Sessions

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. BIRKMANN, J. (2006) Measuring Vulnerability to Natural Hazards: Towards Disaster Resilient Societies. Tokyo, United Nations University Press.
2. BURTON, I.; Kates, R.W. and White, G.F. (1993) The Environment as Hazard, The Guildford Press, London, UK.
3. COLLINS, A.E. (2009) Disaster and Development, Routledge, London, UK.
4. CROUHY, Michel; Galai, Dan and Mark, Robert (2005) The Essentials of Risk Management. The McGraw Hill Co., New York, US.
5. DAMON, P. C. (2006) International Disaster Management. Butterworth-Heinemann.
6. DAMON, P. C. (2006) Introduction to International Disaster Management. Butterworth-Heinemann, UK.
7. DILLEY, Max (2005) Natural Disaster Hotspots: A Global Risk Analysis. World Bank and University of Columbia, US.
8. ELLIOT, J.E. (2006) An Introduction to Sustainable Development. Third Edition. Routledge, London UK.
9. HEWITT, K. (1997) Regions of Risk: A Geographical Introduction to Disaster. Harlow, Longman, New York, US.
10. Khan A.N. (2016) Introduction to Hazards and Disasters. Al-Azhar Environmental planning and management, Peshawar
11. LEWIS, J. (1999) Development in Disaster-Prone Places, IT Press, London, UK.
12. Rahman A. 2010. Disaster Risk Management: Flood Perspective. VDM Verlag Publishing Co. Ltd Germany, ISBN 978-3-639-29891-8, 192 Pages.

13. Rahman A., Khan AN., Shaw R. (2015) Disaster Risk Reduction Approaches in Pakistan. Springer Tokyo.
14. Shaw R, Rahman A, Surjan A, Parvin GA. 2016. Urban Disasters and Resilience in Asia. Elsevier, New York.
15. SMITH, Keith and Petley, David N. (2009) Environmental Hazards: Assessing Risk and Reducing Disaster ,Rourledge .London, UK.

Foundation-IV

DM 441

Disasters and Sustainable Development

Cr. H. 3

Course Learning Outcomes:

Upon Successful completion of this course, the student will be able to:

- **UNDERSTAND** the concept of development and sustainable development;
- **ACQUIRE** knowledge about the synergies between disaster risk reduction and development.

COURSE CONTENTS:

1 Introduction

- Concepts of Development and Sustainable Development
- Conceptual Relationship between Disaster and Development
- Disasters-Challenge for Developing Countries
- The Dilemma of Sustainability

2 Global Developmental Frameworks

- Millennium Development Goals and Hyogo Framework
- Sendai Framework and Sustainable Development Goals
- DRR as a cross cutting theme in SDGs

3 Mainstreaming DRR in Development

- Inclusion of DRR in development policies
- Inclusion of DRR in all sectors
- Assessing the trade-offs in Investing in Vulnerability Reduction

4 Disaster Risk and National Development

- National Development Plans and DRR
- Development Project Design and Disasters
- Risk appraisal in Development projects design, implementation and Monitoring and Evaluation

Teaching Methodology

- Lecturing
- Written Assignments
- Documentaries
- Interactive Sessions

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. ADAMS, W.M. (2009) Green Development: Environment and Sustainability in a Developing World. Routledge: Oxon.
2. COLLINS, A. E. (2009) Disaster and development. Routledge: London.
3. CUNNY, F. C. (1983) Disasters and Development. Oxford University Press: London.
4. Khan A.N. (2016) Introduction to Hazards and Disasters. Al-Azhar Environmental planning and management, Peshawar
5. MIDDLETON, N. (1998) Disaster and development: The politics of humanitarian aid. Pluto Press: London.
6. PELLING, M. (2003) Natural Disaster and Development in a Globalizing World. Routledge: London.
7. Rahman A. 2010. Disaster Risk Management: Flood Perspective. VDM Verlag Publishing Co. Ltd Germany, ISBN 978-3-639-29891-8, 192 Pages.
8. Rahman A., Khan AN., Shaw R. (2015) Disaster Risk Reduction Approaches in Pakistan. Springer Tokyo.
9. Shaw R, Rahman A, Surjan A, Parvin GA. 2016. Urban Disasters and Resilience in Asia. Elsevier, New York.
10. UN. Department of Humanitarian Affairs. (1996) Disaster and development. UN Dept. of Humanitarian Affairs: Geneva.
11. UNDP. (2004) Reducing Disaster Risk: A Challenge for Development: A Global Report. New York: UNDP.

Foundation-V

DM 442

Community Based Disaster Risk Management

Cr. H. 3

Course Learning Outcomes:

Upon Successful completion of this course, the student will be able to:

- **UNDERSTANDING** about Concept of Community, Society and community based disaster risk management.

- **ACQUIRE** the knowledge about the CBDRM Planning process, community based disaster risk assessment and risk management planning.

COURSE CONTENTS:

1 Introduction

- Concept of Community, Group and Society
- Social Structure and Social Organization
- Concept of Participation in Disaster Management
- Characteristics and Importance of CBDRM

2 CBDRM Process

- Selection of Community
- Characteristics of Resilient Communities
- Participatory Risk assessment
- Community Implementation
- Participatory Monitoring and Evaluation
- Actors in CBDRM

3 Tools and techniques for Participatory Community Risk Assessment

- Participatory Rural Appraisal
- Social Mobilization
- Social Assessment
- Stakeholders Analysis

4 Disaster Risk Management at Community Level

- Participatory Disaster Risk Management Planning
- Formation and Training of Community Organizations
- Community Managed Implementation
- Institutionalizations of CBDRM into public policies, planning and implementation
- Framework and Importance of Disaster Risk Communication

5 CBDRM in Pakistan

- Case studies
- Issues and Way Forward

Teaching Methodology

- Lecturing
- Written Assignments
- Interactive Sessions
- Group Activities

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. ADPC (2006) Critical Guidelines: Community Based Disaster Risk Management. Asian Disaster Preparedness Centre, Bangkok.
2. ADPC. (2004) Course Material: Course on Disaster Risk Communication at Community Level. Asian Disaster Preparedness Centre, Bangkok.
3. BLAIKIE, P. and T. Cannon, I. Davis and B. Wisner (1994) At Risk: Natural Hazards, People's Vulnerability and Disasters, London, Routledge.
4. GALLACHER, R. (n.d) Participatory Planning Processes: RALA Report No. 200", Food and Agriculture Organization, Rome, Italy.
5. BROWN, Michal Jacob (2006) Building Powerful Community Organizations. Long Haul Press, Arlington, USA.
6. PHILIPS, R., Pittman, R. H. (2009). An Introduction to Community Development. Routledge, London.
7. RAFIQ, S. Zari (2003) Community Development: Concept and Practice. Saif Printing Press, Peshawar.
8. NDMA (2012) National Disaster Management Plan 2012-2022. National Disaster management authority, Islamabad.
9. Khan A.N. (2016) Introduction to Hazards and Disasters. Al-Azhar Environmental planning and management, Peshawar

Foundation-VI

DM 551

Hydro-meteorological Hazards

Cr. H. 2+1

Course Learning Outcomes:

Upon Successful completion of this course, the student will be able to:

- **UNDERSTAND** the Hydro-meteorological processes and its linkages with natural hazards;
- **ACQUIRE** the knowledge about types of Hydro-meteorological hazards, their management and early warning system.

COURSE CONTENTS:

1. Introduction

- Concepts of Meteorology and Hydrology
- Hydrosphere and Atmospheric Circulations
- Precipitation and its types
- Drainage System and Surface Runoff

- Hydro-meteorological Processes and Its Impacts
2. **Types, Causes and Management of Hydro-meteorological Hazards**
 - Cyclones
 - Thunderstorms, Windstorm, Hail, Snow Squalls, Cloud Bursting Sand storms, Dust storms etc.
 - Floods/Flash Floods
 - Cold Wave/Intense Cold, Heat Waves/Excessive Heat etc.
 - Tide Waves, Tsunamis/Seismic sea waves,
 - Drought
 - Forest fires/Bush fires
 - Smoke Volcanic Ash/ Lahar
 - Avalanches
 - Heat Wave
 3. **Early Warning System for Hydro-Meteorological Hazards**
 - Core Components of Early Warning System
 - Stakeholders for Early Warning
 - Community Based Early Warning System
 4. **Lab Work**
 - Weather data collection using weather instruments
 - Preparation of weather maps
 - Fluvial Morphology
 - River Training
 - Flood risk mapping
 - Flood Modelling
 - Weather RADAR and Satellite based weather forecast
 - Design of mitigation structures

Teaching Methodology

- Lecturing
- Written Assignments
- Interactive Sessions
- Seminar Lectures
- Audio-Visuals

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. HYNDMAN, Donald and Hyndman, David (2010) Natural Hazards and Disasters. Brooks Cole, 3rd Revised Edition, Stamford, Connecticut, USA.
2. KELLER, Edward A. and DeVecchio, Duane E. (2011) Natural Hazards: Earth's Processes as Hazards, Disasters, and Catastrophes. Prentice Hall; 3 Edition, Upper Saddle River, New Jersey, USA.
3. Khan A.N. (2016) Introduction to Hazards and Disasters. Al-Azhar Environmental planning and management, Peshawar
4. KHAN, A. N. (2009) Integrating Disaster Management and Climate Change Adaptation into Policy Making. Proceedings of the International Disaster Management Conference -2009, Baragali – Summer Campus, University of Peshawar, Khyber Pakhtunkhwa, Pakistan.
5. KREBS, Robert E. (2003) The Basics of Earth Science. Greenwood, Westport, Connecticut, USA.
6. Rahman A. 2010. Disaster Risk Management: Flood Perspective. VDM Verlag Publishing Co. Ltd Germany, ISBN 978-3-639-29891-8, 192 Pages.
7. Rahman A., Khan AN., Shaw R. (2015) Disaster Risk Reduction Approaches in Pakistan. Springer Tokyo.
8. SENE, Kevin (2009) Hydrometeorology: Forecasting and Applications. Springer, 1 Edition, Heidelberg, Berlin, Germany.
9. Shaw R, Rahman A, Surjan A, Parvin GA. 2016. Urban Disasters and Resilience in Asia. Elsevier, New York.
10. STRAHLER, A H. and Strahler, A (2004) Physical Geography: Science and Systems of the Human Environment. John Wiley & Sons, 3 Edition, Hoboken, New Jersey, USA

Foundation-VII

DM 552

Geo-Hazards

Cr. H. 2+1

Course Learning Outcomes:

Upon Successful completion of this course, the student will be able to:

- **UNDERSTAND** the Geo-hazards, Plate tectonics and Global Distribution of Geo-hazards;
- **ACQUIRE** knowledge about the types of Geo-hazards, their management and early warning system.

COURSE CONTENTS:

1. **Introduction**
 - Geo-hazards at a Glance
 - Plate Tectonic and Plate Boundaries
 - Global Distribution of Geo-hazards

- Folding, Faulting and Fault Lines
- 2. **Types, Causes and Management of Geo-Hazards**
 - Earthquake
 - Volcanoes
 - Tsunami
 - Landslide/Mass wasting
 - Glacial Lake Outburst Floods (GLOFs)
 - Associated Hazards
- 3. **Geo-hazards Risk Assessment**
 - Hazard Inventory
 - Susceptibility Mapping
 - Elements at Risk and Exposure
 - Evaluation of Risk
- 4. **Lab Work: Prediction, Forecasting and Early Warning System for Geo-hazards**
 - Prediction of Forecasting techniques
 - Exercise on Prediction and forecasting of Geo-hazards
 - Field survey and visit to geophysical centres
 - WMO, Tsunami and earthquake prediction/forecasting and networking
 - Tsunami warning centres and shelters
 - Early Warning System for Tsunami
 - Early Warning System for Volcanos
 - Early Warning System for GLOFs
 - Early Warning System for Landslide
 - Multi-hazard Early Warning System in Pakistan and filed visit

Teaching Methodology

- Lecturing
- Written Assignments
- Interactive Sessions
- Seminar Lectures
- Audio-Visuals

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. COCH, Nicholas K. (2004) Geo-hazards Natural and Human. Copley Custom Textbooks, Connecticut, USA.
2. HYNDMAN, Donald and Hyndman, David (2010) Natural Hazards and Disasters. Brooks Cole, 3rd Revised Edition, Stamford, Connecticut, USA.
3. KELLER, Edward A. and DeVecchio, Duane E. (2011) Natural Hazards: Earth's Processes as Hazards, Disasters, and Catastrophes. Prentice Hall; 3 Edition, Upper Saddle River, New Jersey, USA.
4. Khan A.N. (2016) Introduction to Hazards and Disasters. Al-Azhar Environmental planning and management, Peshawar
5. KREBS, Robert E. (2003) The Basics of Earth Science. Greenwood, Westport, Connecticut, USA.
6. Rahman A. 2010. Disaster Risk Management: Flood Perspective. VDM Verlag Publishing Co. Ltd Germany, ISBN 978-3-639-29891-8, 192 Pages.
7. Rahman A., Khan AN., Shaw R. (2015) Disaster Risk Reduction Approaches in Pakistan. Springer Tokyo.
8. Shaw R, Rahman A, Surjan A, Parvin GA. 2016. Urban Disasters and Resilience in Asia. Elsevier, New York.
9. STRAHLER, Alan H. and Strahler, Arthur (2004) Physical Geography: Science and Systems of the Human Environment. John Wiley & Sons, 3 Edition, Hoboken, New Jersey, USA.

Foundation-VIII

DM 553

Complex and Biological Hazards

Cr. H. 3

Course Learning Outcomes:

Upon Successful completion of this course, the student will be able to:

- **UNDERSTAND** the phenomena of biological and complex hazards;
- **ACQUIRE** knowledge about the types of Biological, technological and complex hazards and their risk management.

COURSE CONTENTS:

1. **Introduction**
 - Complex Hazards
 - Technological Hazards
 - Biological Hazards
2. **Types and Management of complex hazards**
 - War
 - Insurgencies and Terrorism
 - Sectarian Violence and conflicts
 - Displaced populations

- Urban and Settlement Fire
- Famine
- 3. Types and Management Technological Hazards**
 - Industrial accidents
 - Nuclear Hazards
 - Oil and Chemical Spills
 - Air Crash
 - Transport accidents
 - Occupational Hazards Safety
- 4. Types and Management of Biological Hazards**
 - Epidemics and Pandemics
 - Transmission of biological hazards
 - Risk assessment of biological hazards
 - Controlling exposure to biological hazards
 - Disease Early Warning System (DEWS)

Teaching Methodology

- Lecturing
- Written Assignments
- Interactive Sessions
- Seminar Lectures
- Audio-Visuals

Assessment:

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. ALEXANDER, David (2002) Principles of Emergency planning and Management. Terra Publishing, University of Minnesota, US.
2. BALDWIN, C. and Runkle, R. (1967), Biohazards Symbol: Development of a Biological Hazards Warning Signal. Science 158 (798): 264–5.
3. HANSSON, S. O. (2004), Weighing Risks and Benefits', Topoi 23 (2), Pp. 145-52.
4. Rahman A. 2010. Disaster Risk Management: Flood Perspective. VDM Verlag Publishing Co. Ltd Germany, ISBN 978-3-639-29891-8, 192 Pages.

5. Rahman A., Khan AN., Shaw R. (2015) Disaster Risk Reduction Approaches in Pakistan. Springer Tokyo.
6. Shaw R, Rahman A, Surjan A, Parvin GA. 2016. Urban Disasters and Resilience in Asia. Elsevier, New York.

Foundation-IX

DM 561

Emergency Management

Cr. H. 2+1

Course Learning Outcomes:

Upon Successful completion of this course, the student will be able to:

- **UNDERSTAND** the Emergency Response Mechanism and Phases of Emergency Management;
- **ACQUIRE** knowledge about the Camp Management, Emergency Operation Centre and Phases of Emergency Management.

COURSE CONTENTS:

1. **Introduction**
 - Disasters and Emergency Situation
 - The nature of Emergency Situation
 - Principles of Emergency Response Management
2. **Phases of Emergency Management**
 - Mitigation (Risk Assessment, Precautionary Measures, Minimizing the Risk)
 - Preparedness for Response (Training, Planning, Plan, and Institutions)
 - Response (Early Warning System, Evacuation, Search and Rescue, Triage, Medical First Aid, Fire Fighting, Hospital Management, Security, Relief)
 - Recovery (Recovery and Rehabilitation, Early Recovery Strategy, Mid-term Recovery Strategy and Final Term Recovery Strategy)
3. **Camp Management**
 - Site Selection
 - Site Survey and Assessment
 - Planning and Design
 - Shelter Management
 - Registration
 - Provision of FIs and NFIs
 - Protection
 - Responsibilities of Camp Management team
 - SPHERE Standards

4. **Post Disaster Assessment**
 - Rapid Need Assessment (RNA)
 - Preliminary Damages Need Assessment (DNA)
 - Post Conflict Need Assessment (PCNA)
5. **Emergency Response Organizations**
 - International Level
 - Federal Level
 - Provisional Level
 - District and Community Level
6. **Emergency Operation Centre (EOC)**
 - Mandate of EOC
 - Major Components of EOC
 - Organogram of EOC
 - Special Powers and Legislation
 - Operational Plans of EOC
7. **Lab Work and Field work**
 - Search and Rescue training
 - Mock drill and simulation exercises on emergency response
 - Preparation of search plan
 - Preparation of Rescue and evacuation plans
 - Visit to Rescue 1122, NIDM, NDMA, PEOC-PDMA and Joint Simulations on Response Management

Teaching Methodology

- Lecturing
- Written Assignments
- Interactive Sessions
- Seminar Lectures
- Audio-Visuals

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. ALEXANDER, David (2002) Principles of Emergency planning and Management. Terra Publishing, University of Minnesota, US.

2. BUCHANAN, Sally (2000) Emergency Preparedness. Preservation Issues and Planning. Chicago, American Library Association
3. GOODMAN, Louis J. and Love Ralph N. (2003) Project Planning and Management: an Integrated Approach. East-West, Mountain View, CA.
4. VAN Der Weide, A. (2003) Project Planning and Management, LEMMA Pub. Corp, New York, USA.
5. WISNER, Ben; Blaikie, P.; Cannon, T. and Davis, I. (2004) At Risk - Natural Hazards, People's Vulnerability and Disasters. Routledge, London, UK. Biological & Complex Hazards
6. THE SPHERE PROJECT (2011) The Humanitarian Charter and Minimum Standards in Humanitarian Response, Practical Action Publishing, Schumacher Centre for Technology and Development, Bourton on Dunsmore, Rugby, CV23 9QZ, United Kingdom. Website : www.sphereproject.org

Foundation-X

DM 562

Disaster Risk Management

Cr. H. 3

Course Learning Objectives

Upon Successful completion of this course, the student will be able to:

- **UNDERSTAND** the concept of risk management, risk assessment, and risk planning.

COURSE CONTENTS:

- 1 Introduction to Disaster Risk Management**
 - Meaning and scope of disaster risk management
 - Paradigm shift in disaster risk management
 - HFA and Post HFA framework
 - SDGs, Sendai framework (2015-2030) and Paris agreement
 - Development in International protocols
- 2 Components of Risk and Risk Assessment**
 - Hazard Assessment
 - Vulnerability Assessment
 - Capacity analysis
 - Risk Assessment
 - Multi-Hazard Vulnerability and Risk Assessment
 - Perception and Attitude Assessment
- 3 Resilience Assessment**
 - Concepts and approaches
 - Adaptation and Resilience
 - Linkage between hazards, vulnerability and resilience
 - Resilience Frameworks
- 4 Disaster Risk Management**
 - Approaches to Risk Management

- Structural Risk Reduction Strategies
- Non-Structural Risk Reduction Strategies including Risk Transfer, Insurance and Risk Financing

Teaching Methodology

- Lecturing
- Written Assignments
- Documentaries
- Interactive Sessions

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. Wisner, B., P. Blaikie, T. Cannon, and I. Davis. (2004). "At Risk: Natural Hazards, People's Vulnerability and Disasters (2nd Ed.)." Rutledge, London, UK.
2. Shaw R, **Rahman A**, Surjan A, Parvin GA. 2016. Urban Disasters and Resilience in Asia. Elsevier, New York.
3. Rahman A, Khan AN, Shaw R. 2015. Disaster Risk Reduction Approaches in Pakistan. Springer, Tokyo
- 4.
5. UNISDR. (2009). Global Assessment Report on Disaster Risk Reduction, United Nations International Strategy for Disaster Reduction.
6. Comprehensive Risk Assessment for Natural Hazards. World Meteorological Organization 2006.
7. P.A. Burrough (1986), Principles of Geographical Information Systems for Land Resources Assessment, Oxford Science Publications.
8. W. N. Carter (1999) Disaster Management: Disaster Manager's Handbook, Manila: Asian Development Bank.

Detail of Subject Major Courses

MAJOR-I

DM 554

Research Approaches in Disaster Management

Cr. H. 3

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

Understand research approaches in Disaster Management.

Apply various techniques for collection, analysis and interpretation of data.

Formulate a draft research proposal

COURSE CONTENTS:

1. Introduction

- a. Elements of Research Methodology
- b. Types of Research
- c. Research Techniques in Disaster Management

2. Research Process

- a. Theory and Hypothesis
- b. Methods/Techniques of Data Collection and Analysis
- c. Questionnaire Design, Field Survey, Analysis, Interpretation
- d. Data Classification and Tabulation
- e. Sample, Sampling and sampling design

3. Statistical Techniques in Research

- a. Measures of Central Tendency
- b. Measures of Dispersion
- c. Computer Based Statistics (SPSS16/Minitab etc.)
- d. Geo-Spatial Statistical Techniques

4. Prepare a draft Research Proposal

- a. Elements of Research Proposal
- b. Review on Literature writing
- c. Methodology flow chart design
- d. Computer skills for proof reading

Teaching Methodology

- Lectures
- Research proposal
- Seminar
- lab work

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. BIRKMANN, J. (2006) Measuring Vulnerability to Natural Hazards: Towards Disaster Resilient Societies. Tokyo, United Nations University Press.
2. CRESWELL, John W. (2009) Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. Sage Publications
3. HOWARD, K. ef; Sharp, J.A. (1983) The Management of a Student Research Project. Gower Publishing Company, UK.
4. JOHN, W. Creswell (2009) Research Design: Qualitative, Quantitative, and Mixed Methods Approaches.
5. MARSHALL, Catherine; Rossman, Gretchen B. (2006) Designing Qualitative Research. Edition 4, Sage Publications, Los Angles, US.
6. MAXWELL, Joseph A. (2005) Qualitative Research Design: An Interactive Approach. Edition 2, Sage Publications, Los Angles, US.
7. MYERS, Jerome L. and Well, Arnold D. (2002) Research Design & Statistical Analysis. 2nd Edition, Routledge, London, UK

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

- **Understand** the geomorphological processes
- **Analyse** the geomorphological processes and the man-environment relationship.
- **Apply** the geomorphic techniques in the field.

COURSE CONTENTS:**1. Introduction**

- a. Introduction to Applied Geomorphology
- b. Landforms and Geomorphic agents
- c. Geomorphological Processes and Man

2. Classification of Geomorphological Processes

- a. Terrestrial Processes
 - i. Endogenic Hazards:
 - Earthquakes and seismicity
 - Volcanoes and volcanism
 - Tsunamis and sub-water processes
 - ii. Exogenic Hazards
 - Rivers, Floodplains and Flooding
 - Rainfall Variability and Drought
 - Glaciers and Associated Hazards
 - Soil Erosion by Water and Wind
 - Weathering, Causes, Implication
 - Desertification, Causes and Implication
 - Mass Movement Hazards
 - iii. Biotic Hazards
 - Animals induced
 - Plants Induced
 - Human Induced
- b. Extra-Terrestrial Process

3. Geomorphological Mapping

- a. Identification of Hazards
- b. Mapping Techniques
- c. Mapping Geomorphological Processes

4. Applied Geomorphology and Disaster Management

- a. Floods and Flood Risk Management
- b. Earthquake and Earthquake Risk Management
- c. Drought and Drought Risk Management
- d. Landslide and Landslide Management

- e. Human interventions and sustainability
- 5. Lab work, Field Survey and Practical:**
 - a. Field Study of various geomorphological processes
 - b. Field Study of Landforms and its relationship with Human activities
 - c. Labs and Practical exercises on models preparation
 - d. Geomorphological mapping

Teaching Methodology

- Lecturing
- Written Assignments
- Guest Speaker
- Field Visits
- Report Writing
- Documentaries

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. ALEXANDER, D. (2002) Principles of Emergency planning and Management. Terra Publishing, University of Minnesota, US.
2. ALLISON, R. (Edit) (2002) Applied Geomorphology: Theory and Practice. Brooks Cole, Stamford, Connecticut, USA.
3. COOKE, R. U. and Doornkamp, J. C. (1990) Geomorphology in Environmental Management: an introduction. Clarendon Press Oxford.
4. HYNDMAN, D. and Hyndman, D. (2010) Natural Hazards and Disasters. Brooks Cole, 3rd Revised Edition, Stamford, Connecticut, USA.
5. KHAN, A. N. (2009) Integrating Disaster Management and Climate Change Adaptation into Policy Making. Proceedings of the International Disaster Management Conference -2009, Baragali – Summer Campus, University of Peshawar, Khyber Pakhtunkhwa, Pakistan
6. KHAN, Amir Nawaz (2016) Introduction to Hazards and Disasters. Al-Azhar Environmental Planning and Management Centre, Peshawar

7. Rahman A, Khan AN, Shaw R. 2015. Disaster Risk Reduction Approaches in Pakistan. Springer, Tokyo
8. Rahman A. 2010. Disaster Risk Management: Flood Perspective. VDM Verlag Publishing Co. Ltd Germany, ISBN 978-3-639-29891-8, 192 Pages.
9. Shaw R, Rahman A, Surjan A, Parvin GA. 2016. Urban Disasters and Resilience in Asia. Elsevier, New York
10. VERSAPPER H.T. (1983) Applied Geomorphology: Geomorphological Survey for Environmental Development. Elsevier, New York, USA
Cooke R.U. (1987) Geomorphology and Environmental Management. In: Clark M.J., Gregory K.J., Gurnell A.M. (eds) Horizons in Physical Geography. Horizons in Geography. Palgrave, London

MAJOR-III

DM 556

Mainstreaming in Disaster Management

Cr. H. 3

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

- **UNDERSTAND** the concept of Gender and Gender Mainstreaming approaches;
- **DESCRIBE** the impacts of disaster on women and gender mainstreaming in disaster risk reduction.

COURSE CONTENTS:

1: Introduction

- Concept of Gender
- Gender Role Socialization
- Gender Mainstreaming
- Theoretical Approaches to Gender Development

2. Gender and gender relations in disasters

- Status of Women in society
- Perspective of gender: A missing element in disaster
- Differential impact of disaster on women in different life cycle stages
- Gender inequality, vulnerability and disaster

3. Role of women in disaster management

- Role in Women in Disaster Prevention, Preparedness, Mitigation and Response
- Women involvement in reconstruction and development phase following an emergency and/or disaster
- Psychosocial considerations in prevention, mitigation and preparedness

- Community mobilization through women
 - Case studies of women responding to disaster
- 4. Case Studies on Gender Mainstreaming in Disaster Management**
- Pakistan Red Crescent Humanitarian Assistance for Internally Displaced Persons
 - ERRA Approach for Reconstruction and Rehabilitation of Earthquake affected Area

Recommended Books

1. ANDERSEN, ML. and Dana, Hysock (2006) Thinking about Women: Sociological Perspectives on Sex and Gender. Allen & Bacon, New York.
2. ARIYABANDU, M. M. and Wickramasinghe, Maithree. (2005) Gender Dimension in Disaster. Raj Press, New Delhi.
3. ENARSON, Elaine and Morrow Betty H. (2000). The Gendered Terrain of Disaster: Through Women's Eyes. International Hurricane centre. USA
4. KATHY, D., Mary, E. and Lorber, J (2006) Handbook of Gender and Women's Studies U
5. MYERS, Mary (1994). Women and Children first. Introducing gender strategy in disaster preparedness, Oxfordshire: Carfax publishing limited.
6. PHILLIPS, B.D. and Morro, B.H. (2008) Women and Disasters. Bloomington: Xlibris Corporation (United States).

MAJOR-IV

DM 563

Economics of Disasters

Cr. H. 3

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

Understand the economic impacts and implications of disaster costs to the economy

Analyse disasters as an opportunity to address the underlying economic causes of disasters

COURSE CONTENTS:

- 1. Introduction**
 - a. Significance of the economic view of disasters
 - b. Economic Impacts of Disasters in Pakistan
 - c. Nature of Economic Aid after Disasters
 - d. Disasters as an economic opportunity
- 2. Economic costs of disasters**
 - a. Approaches to estimation of costs after disasters for compensation

- b. Budgetary provisions and mechanism of handling contingencies and disasters
- 3. Transfer and sharing mechanisms of disaster costs**
 - a. Formal mechanism – insurance
 - b. Informal mechanism – collateral community based approaches
- 4. Disasters as an opportunity to address economic inequality and vulnerability**
 - a. Designing of livelihood programmes to benefit the poor
 - b. Sourcing of raw materials and reconstruction activity to stimulate local economy
 - c. Handling targeted economic humanitarian assistance to avoid reinforcing vulnerabilities

Teaching Methodology

- Lectures
- Documentaries
- Seminar
- Group work
- Presentation

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. BENSON, C. and Clay, E.J (2004) Understanding the Economic and Financial Impacts of Natural Disaster, Disaster Risk Management Series No.4: The World Bank. Washington D.C.
2. GOODWIN, B.K. and Smith, V.H. (1995) The Economics of Crop Insurance and Disaster Aid. The AEI Press: Washington, D.C.
3. GROSSI, P. and Kunreuther, H. (2005) Catastrophe Modeling: A New Approach to Managing Risk. Springer: USA.
4. KERN, W. (2010) The Economics of Natural and Unnatural Disasters. W.E. Upjohn Institute for Employment Research: Michigan.
5. NATIONAL Research Council. (1999) The Impacts of Natural Disasters: A Framework for Loss Estimation: National Academy Press: Washington DC, USA.

6. OWEN, B. M., Argue, D.A., Furchtgott-Roth, H.W., Hurdle, G.J. and Mosteller, G. (1995) The Economics of a Disaster: The Exxon Valdez Oil Spill. Greenwood Publishing Group, Inc: USA.
7. WB (2010) Natural Hazards Unnatural Disasters: The Economics of Effective Prevention. The World Bank: Washington DC. USA.
8. YESCOMBE, E. R. (2007) Public-Private Partnerships: Principles of Policy and Finance. Butterworth Hienemann: UK

MAJOR-V

DM 564

Project Management in Context of Disasters

Cr. H. 3

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

Understand the functional requirements of Projects.

Design a project management workflow

COURSE CONTENTS:

1. **Introduction**
 - a. Project Management- Basic concepts
 - b. Project Management International Standards
 - c. Project planning and Documentation
2. **Project Management Methodologies**
 - a. Theory and Hypothesis
 - b. Project Cycle
 - c. Project Management Body of Knowledge (PMBOK)
3. **Project Selection Models and Types**
 - a. Project Scheduling & Critical Path Method
 - b. Decision Aiding Models
 - c. Criteria for Project Selection
 - d. Types of Project Selection Models
4. **On-Field Project Management**
 - a. Risk Management
 - b. Estimation of loss
 - c. Supply Chain
 - d. Monitoring
 - e. Evacuation
5. **Software related to project management**
 - a. Overview
 - b. Softwares and practice

Teaching Methodology

- Lectures
- Field Visits
- Seminar
- lab work

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. ALEXANDER, D. (2002) Principles of Emergency planning and Management. Terra Publishing: Minnesota, US.
2. BUCHANAN, S. (2000) Emergency Preparedness. Preservation Issues and Planning. American Library Association: Chicago, US.
3. GOODMAN, L. J. and Love, R. N. (2003) Project Planning and Management: An Integrated Approach. East-West Center: CA.
4. VAN Der Weide, A. (2003) Project Planning and Management, LEMMA.
5. WISNER, Ben; Blaikie, P.; Cannon, T. and Davis, I. (2004) At Risk - Natural Hazards, People's Vulnerability and Disasters. Routledge: London, UK

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

- **Understand** Physical, Economic, Social and Environmental Vulnerabilities in context of different hazards
- **Analyse** the dynamics of Geo-spatial and Multi-hazards Vulnerabilities.
- **Quantify** the multi-components of vulnerability

COURSE CONTENTS:

1. **Introduction to Multi-Hazards Vulnerabilities**
 - a. Hazards: Types, Intensity, Density and Frequency
 - b. Vulnerability: Types, Root and Underlying Causes
 - c. Elements at risk
2. **Geo-Spatial Characteristics**
 - a. Characteristics of Hazards
 - b. Characteristics of Vulnerability
 - c. Exposure
 - d. Dynamics of Vulnerability
 - e. Interrelationship of element at risk, hazards, exposure and vulnerability
3. **Multi-component of Vulnerability**
 - a. Compound and Complex interrelationship
 - b. Quantification of vulnerability
 - c. Presentation of Vulnerability

Teaching Methodology

- Lectures
- Written Assignments
- Seminar
- lab work

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. DISASTER Risk Management and Vulnerability Reduction
www.adpc.net/infores/adpc-documents/PovertyPaper.pdf
2. HANDBOOK: International Federation of Red Cross and Red Crescent Societies. What is VCA? An introduction to vulnerability and capacity assessment.
3. INTERNATIONAL Workshop on Disaster Risk Mitigation: Potential of Micro-Finance for Tsunami Recovery, Dhar Chakrabarti, P. G., & Bhat, M. R. (2006) Micro-finance and disaster risk reduction: Proceedings of International Workshop on Disaster Risk Mitigation: Potential of Micro-Finance for Tsunami Recovery New Delhi, October 14-15, 2005. New Delhi: National Institute of Disaster Management in association with Knowledge World.
4. MULTI Hazard Risk Assessment using GIS
www.adpc.net/audmp/rlw/themes/th1-westen.pdf
5. SMITH, Keith and Petley, David N. (2009) Environmental Hazards: Assessing Risk and Reducing Disaster. 5th Edition, Routledge, London, UK.
6. UNITED States. (2002) Catastrophe insurance risks. The role of risk-linked securities and factors affecting their use. [Washington, D.C.]: U.S. General Accounting Office
7. VULNERABILITY and Risk Assessment – Disaster Management Training Programme www.iaemeuropa.terapad.com/.../UN%20DMTP%20-%20Vulnerability.pdf

MAJOR-VIII

DM 671

Natural Hazards of Pakistan

Cr. H. 3

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

Describe the physiography of Pakistan

Understand the nature, causes, consequences, history and remedies of the natural hazards occurring in Pakistan.

COURSE CONTENTS:

1. **Physiography of Pakistan**
 - a. Landforms
 - b. Climate
 - c. Ecological region of Pakistan
 - d. Seismic zones of Pakistan

2. **Natural Hazards**
 - a. Floods
 - b. Earthquakes
 - c. Tsunami
 - d. Landslides
 - e. Desertification
 - f. Drought
 - g. Cyclone
 - h. Snow Avalanches
 - i. Glacial Hazards
 - j. Salinization
 - k. Heat and Cold Waves
 - l. Sea Water Intrusion
 - m. Deforestation
 - n. Environmental pollution
 - o. Smog
 - p. Pest infestation
 - q. Epidemics
3. **Exposure, Vulnerability and Risk related to Natural Hazard**
 - a. Physical
 - b. Economic
 - c. Social
 - d. Environmental
4. **Turning Hazards into Disasters**
 - a. Factors
 - b. Reasons
 - c. Dynamics
 - d. Triggers
5. **Disaster trends and Management framework**
 - a. Historical perspective
 - b. Management Framework (National, Provincial and District)

Teaching Methodology

- Lectures
- Written Assignments
- Seminar

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. NAWAZ, Amir (2016) Introduction to Hazards and Disasters, Al-Azhar Environmental Planning and Management Centre, Peshawar, Pakistan.
2. AHMAD, N. and Qureshi, I. A. (1995) Disaster Management in Punjab: A study of flood management in district Jhelum. Pakistan Academy for Rural Development, Peshawar.
3. BIRKMANN, J. (2006) Measuring Vulnerability to Natural Hazards: Towards disaster resilient societies. Tokyo, United Nations University Press.
4. FOSTER, H. D. (1980) Disaster Planning: The preservation of life and property. Berlin, Springer Verlag.
5. HEWITT K. (1997) Regions of Risk: A Geographical introduction to disaster, Harlow, Longman.
6. KHAN, A.N. (1996) Planning for Reduction of Flood Hazard. Proceeding of Pakistan Geographical Association, Bahawalpur Conference.
7. McENTIRE, D. (2007) Disaster Response and Recovery: New Jersey, Oxford, U

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

Acquire knowledge about the relationship between disaster risk and urbanization
Analyse the urban hazards and risk reduction measures

COURSE CONTENTS:

- 1. Introduction**
 - a. Concept of Urbanization
 - b. Causes and impacts of urbanization
- 2. Urban Morphology**
 - a. Urban forms and Pattern
 - b. City structure
 - c. Population and City Land use
- 3. Hazards in Urban Environment**
 - a. Urban Floods
 - b. Environmental Pollution
 - c. Urban Fire
 - d. Chemical Hazards,
 - e. Earthquake and Resilience etc.
- 4. Vulnerabilities in urban areas**
 - a. Population distribution,
 - b. Urban Slums
 - c. Housing structure,
 - d. Building codes and byelaws,
 - e. Accessibility
 - f. Emergency services
 - g. Hydrology and drainage system
- 5. Urban Risk Reduction**
 - a. Urban Risk and Urban Authorities
 - b. Urban Risk Reduction Strategies
 - c. Urban Disaster Management Plan

Practical:

- Field Study of any city
- Visit to various urban authorities
- Visit to Fire Brigade, Rescue, EPA

Teaching Methodology

- Lecturing

- Written Assignments
- Guest Speaker
- Field Visits
- Report Writing
- Documentaries

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

Text and Reference books:

- Written (Long Questions, Short Questions, MCQs)
- FERGUSON, Ronald F. and Dickens, William T. (1999) Urban Problems and Community Development. Brookings Institution Press.
- RAHMAN, A., Khan, A. N., Shaw R. (2016). Disaster Risk Reduction Approaches in Pakistan. SPRINGER Verlag, Tokyo, JAPAN.
- Shaw, R., Rahman, A., Surjan, A., & Parvin, G. A. (2016). Urban Disasters and Resilience in Asia. Elsevier Inc. New York.
- KHAN, A. N. (2009) Integrating Disaster Management and Climate Change Adaptation into Policy Making. Proceedings of the International Disaster Management Conference -2009, Baragali – Summer Campus, University of Peshawar, Khyber Pakhtunkhwa, Pakistan
- PELLING, Mark and Wisner, Ben (2008) Disaster Risk Reduction: Cases from Urban Africa. Earthscan Publications Ltd., London, UK.
- PUGH, Cedric (1996) Sustainability the Environment and Urbanisation. Earthscan, London, Uk
- SHAW, Rajib; Srinivas, Hari; and Sharma, Anshu (2009) Urban Risk Reduction: An Asian Perspective. Community, Environment and Disaster Risk, Emerald Group Publishing Limited. KHAN, Amir Nawaz (2016) Introduction to Hazards and Disasters. Al-Azhar Environmental Planning and Management Centre, Peshawar

MAJOR-X

DM 673

GIS and Remote Sensing in Disaster Management

Cr. H. 2+1

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

Understand the fundamental theory of Geographic Information Systems (GIS) & Remote Sensing

Apply the GIS tools to conduct hazard analysis and risk assessment

Prepare hazard & risk maps that are fit-for-purpose and effectively convey the information they are intended to.

COURSE CONTENTS:

- 1. Geographical Information System (GIS)**
 - a. Fundamental theory of Geographic Information Science
 - b. Concepts of spatial database and types (its acquisition and development).
 - c. Concept of four M's (Mapping, Modeling, Management & Monitoring) in GIS.
 - d. Spatial Data handling for disaster management.
- 2. Remote Sensing (RS)**
 - a. History, Scope and Concept of Remote Sensing
 - b. Elements of Remote Sensing
 - c. Concepts of Image resolution, swath width, cycle and limitations.
 - d. Remote Sensing data for hazard forecasting and monitoring.
- 3. Application of GIS and RS in Disaster Management**
 - a. Hazard Mapping & Risk Assessment
 - b. Role of GIS and RS in Mitigation and Preparedness
 - c. Role of GIS and RS in Disaster Response and Recovery
 - d. Role of GIS and RS in Disaster Risk Assessment
 - e. Preparation of different thematic maps; exercises on creating maps for different disasters
- 4. Practical and Lab Work**
 - a. Geo-referencing
 - b. Creation of feature class
 - c. Data input and processing
 - d. data Mosaicing
 - e. Thematic Maps and their cartographic representation
 - f. Data handling and Out put
 - g. Use of remotely sensed data
 - h. Image processing and extraction of features and information
 - i. Uses and application of raster and vector data in Disaster Management
 - j. Hazard, vulnerability and risk mapping

Teaching Methodology

- Lectures
- Written Assignments
- Lab work

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. Chang, K. T. (2010), "Introduction to Geographical Information Systems" Higher Education, McGraw-Hill
2. Clarke, K. (2010), "Getting started with Geographic Information System", 5th Edition, Prentice Hall, New York. ISBN –10: 0131494988
3. Huisman, O. and de By, R. A.(2009), "Principles of Geographic Information Systems: An Introductory Textbook", ITC Educational Textbook Series; 1, ISBN 978-90-6164-269-5
4. Gopi, S., Sathikumar, R., & Madhu, N. (2007). Advance Surveying Total Station, GIS and Remote Sensing. New Delhi, India: Dorling Kindersley.
5. Campbell, James B. (2011). Introduction to Remote Sensing, 5th Ed. The Guilford Press.
6. Foody, G.M. & Curran, P.J. (1994). Environmental Remote Sensing from Regional to Global scales. John, Wiley & Sons. Inc. 250 p.
Gibson, P. J (2000). Introductory Remote Sensing: Principles and Concepts
Rutledge

MAJOR-XI

DM 681

Climate Change and Natural Hazards

Cr. H. 2+1

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

Understand the process of climate change and its impacts

Demonstrate linkage between natural hazards and climate change.

COURSE CONTENTS:

1. Introduction

- a. Introduction to Science of Climate Change
- b. Weather and Climate
- c. Global Climatic Regions

2. **Oceans, Hydrological cycle and weather**
 - a. Surface Current, Carbon sink
 - b. Hydrological cycle
 - c. Hydro-Meteorological System
 - d. Climate change and its impact
 - e. El-Nino and La-nina Effects and climate change
3. **Causes of Climate Change and indicators**
 Causes of Climate Change (Natural and Anthropogenic)
 - Impacts of Climate Change
 - Global Warming
 - Extreme Weather Events
 - Linkage between Climate Change and Natural Hazards
 - Hydro-meteorological Hazards and Disasters
 - Global Distribution of Hydro-meteorological Disasters
 - Climate Change Adaptation and Disaster Risk Reduction
4. **Practical: Linking Adaptations and Mitigation and Lab work**
 - Uses and application of climate models
 - Forecasting and Early warning system
 - Multi-hazard forecasting and early warning mechanism in Pakistan
 - RADAR and Satellite based weather forecast
 - Mainstreaming climate change adaptation and disaster mitigation
 - Tools for Climate Change Adaptation

Teaching Methodology

- Lecturing
- Written Assignments
- Seminar Lectures
- Documentaries

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. REID, Hannah. (2014) Climate change and human development, Zed Books, London, UK

2. DOW, Kristin, Downing, Thomas, E. (2011) The atlas of climate change: mapping the world's greatest challenge, University of California Press, Berkley, UK.
3. BURROUGHS, William James (2007) Climate Change: A Multidisciplinary Approach. 2nd Edition, Cambridge University Press, London, UK.
4. GAVIN, Schmidt and Wolfe, Joshua; Jeffrey, D. Sachs (2009) Climate Change: Picturing the Science, Earthscan, London, UK.
5. KININMONTH, William (2004) Climate Change: A Natural Hazard. Multi-Science,
6. SMITH, Keith; Petley, David N. (2009) Environmental Hazards: Assessing Risk and Reducing Disaster. 5th Edition, Routledge, London, UK.

MAJOR-XII

DM 682

Techniques of Hazard Mapping

Cr. H. 2+1

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

Understand the basic elements of a map.

Illustrate the hazard variables.

Apply methods and techniques of hazard mapping.

COURSE CONTENTS:

1. **Introduction**
 - a. Maps (Definition, Importance and Use)
 - b. Types of Maps (Scale, Purpose and Content)
 - c. Basic Elements of a Map
2. **Types and variables of Hazards**
 - a. Standard definition of a hazard
 - b. Derivation of variables
 - c. Listing of map-able variables
 - d. Interlinking of variables and map components
3. **Cartography and Map drawing in Lab**
 - a. Sketch Map
 - b. Drawing Tools
 - c. Surveying Tools
 - d. Computer Aided Cartography
 - e. GIS &RS
 - f. Multi-Tool Mapping
4. **Practical: Hazard Mapping**
 - a. Data availability
 - b. Spatio-temporal dynamics
 - c. Multi-variables
 - d. Hazard mapping

- e. Vulnerability mapping
- f. Risk Mapping
- g. Multi-Hazard mapping

Teaching Methodology

- Lectures
- Written Assignments
- Seminar
- lab work

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. CRAMPTON, Jeremy W. (2010) Mapping: A Critical Introduction to Cartography and GIS. Wiley-Blackwell; 1 Edition, Hoboken, New Jersey, USA.
2. MONMONIER, Mark (1998) Cartographies of Danger: Mapping Hazards in America. University of Chicago Press, 1 Edition, USA.
3. PECKHAM, Robert Joseph and Jordan, Gyozo (2007) Digital Terrain Modelling: Development and Applications in a Policy Support Environment. Series: Lecture Notes in Geoinformation and Cartography, Springer, Berlin, Germany.
4. PETERSON, Gretchen N. (2009) GIS Cartography: A Guide to Effective Map Design. Taylor and Francis, CRC Press; 1 Edition, USA.
5. ROBINSON, H.; Morrison, Joel L.; Muehrcke, Phillip C. and Kimerling, A. J. (1995) Elements of Cartography. J. Wiley Co., New York, USA

MAJOR-XIII

DM 683

Practical Exercises in Disaster Management

Cr. H. 1+2

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

Identify the needs of practical skills of emergency response Apply the practical skills during emergency response
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COURSE CONTENTS:

- 1. Map reading and drawing**
 - a. General Maps
 - b. Topographic Maps
 - c. Weather Maps
 - d. Distance, shape and area analysis on a map
 - e. Contour and Slope analysis
 - f. Drainage Pattern analysis
 - g. Hazard Mapping
- 2. Search and Rescue**
 - a. Types
 - b. Equipment
 - c. Trainings
- 3. Fire Prevention and Fighting**
 - a. Types of Fire
 - b. Fire safety provision
 - c. Equipment and techniques
- 4. Medical First Aid**
 - a. Vital Sign
 - b. Basic Life Support
 - c. Wounds and its Types: Pre-Hospital Management.
 - d. Basic Guidelines for Management of Fractures
 - e. Burn Injuries
 - f. Safe Transportation of Patient
 - g. Foreign Body Airway Obstruction (FBAO)
 - h. First aid for victims of extreme weather events

Teaching Methodology

- Lectures
- Field work
- Seminar and Documentary
- lab work

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. ALEXANDER, David (2002) Principles of Emergency planning and Management. Terra Publishing, University of Minnesota, US.
2. BUCHANAN, Sally (2000) Emergency Preparedness. Preservation Issues and Planning. Chicago, American Library Association
3. ABRAMS, J. and Hall, P. (2006) Else/Where: Mapping — New Cartographies of Networks and Territories. University of Minnesota Design Institute, Minnesota.
4. BREWE, A. C. (2005) Designing Better Maps: A Guide for GIS Users. ESRI Press. P. 220.
5. BUCHANAN, Sally (2000) Emergency Preparedness. Preservation Issues and Planning. Chicago, American Library Association
6. Government of Pakistan (GoP) (2017) Building code of Pakistan: Fire safety provision 2016. National Disaster Management Authority, Islamabad

Detail of Elective Courses

Elective (Semester 07)

DM 674a

Climate Change Adaptation and Disasters

Cr. H. 3

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

Understand current issues of climate change adaptation.

Analyse different approaches of CCA.

COURSE CONTENTS:

1. Introduction

- Climate change and climate variability
- Major impacts of climate change on agriculture, water resources, forestry, biodiversity, human health and hydro-meteorological phenomena

2. Climate Change Adaptation

- Overview of Climate Change Adaptation
- International protocols
- Climate Change and extreme hydro-meteorological events
- Criteria for prioritization of Climate Change Adaptation

3. Climate Change Vulnerability

- Climate change and vulnerabilities

- Local coping strategies, indigenous knowledge in climate change adaptation
- 4. Climate Change Adaptation in Pakistan**
- Climate change adaptation in Pakistan
 - Climate Change and agriculture, water, forestry, biodiversity, health sectors

Teaching Methodologies:

1. Lectures
2. Documentaries and visuals
3. Interactive discussions and talks
4. Assignments and quizzes

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

- BURROUGHS, William James (2007) Climate Change: A Multidisciplinary Approach. 2nd Edition, Cambridge University Press, UK.
- COOKE, R. U. and Doornkamp, J. C. (1990) Geomorphology in Environmental Management. Clarendon Press Oxford.
- GOVERNMENT of Pakistan (GOP) (1981) Environmental Profile of Pakistan. Environment and Urban Affairs Division, Government of Pakistan, Islamabad.
- KININMONTH, William (2004) Climate Change: A Natural Hazard. Multi-Science,
- LEHMANN, Steffen (2010) The Principles of Green Urbanism: Regenerating the Post-Industrial City. Earthscan, London, UK.
- SABH, M. I. and Murty, S. (Eds.) (1988) Natural and Manmade Hazards. Academic Publisher Group.
- KHAN, A. N. (2009) Integrating Disaster Management and Climate Change Adaptation into Policy Making. Proceedings of the International Disaster Management Conference -2009, Baragali – Summer Campus, University of Peshawar, Khyber Pakhtunkhwa, Pakistan.
- INTERGOVERNMENTAL Panel on Climate Change (IPCC) (2013) Managing the Risks of Extreme Events and Disasters to Advance Climate

Change Adaptation. Cambridge University Press 32 Avenue of the Americas, New York, NY 10013-2473, USA

- Government of Pakistan (2013) National Climate Change Policy. Ministry of climate change, Islamabad

Elective (Semester 07)

DM 674b

Structural and Non-Structural Measures in DRM

Cr. H. 3

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

Understand geohazard impacts and their mitigation needs

Delineate structural and non-structural measures in DRM

COURSE CONTENTS:

1. Introduction

- Introduction to Structural and Non-Structural Measures in DRM
- The understanding on geo-hazards such as; floods, earthquakes, landslides, storms, desertification, fire etc.

2. Structural Measures

- Resistant constructions, building codes and regulatory measures
- Structural/Physical modifications and retrofitting
- Relocation in construction of community shelters
- Construction of barriers, deflections or retention systems (Dams and reservoirs, levees and flood walls, retaining walls, diversion channels)

3. Non-Structural Measures

- Disaster preparedness
- Hazard detection and early warning system
- Biological measures
- DRM policies, plans and programs
- Risk assessment and insurance
- Community awareness and educational programs

Teaching Methodologies:

- Lectures and case studies
- Documentaries and visuals
- Interactive discussions and talks
- Assignments and quizzes

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. ANNON, (1992) Soil Bioengineering for upland Slopes Protection and Erosion Protection. Engineering Field Handbook, United States Department of Agriculture.
2. ANNON, (1997) Mitigation earthquake induced landslide hazard. Division of Mines and Geology Department of Conservation.
3. BARKER, D.H. (1995) Vegetation and Slopes: Stabilization, Protection and Ecology. Thomas Telford Publishing Company, New York, USA.
4. CHANDLER, R.J. (1995) Slope Stability Engineering. Institution of Civil Engineers, Thomas Telford Publishing Company, New York, USA.
5. SHAH, B. H. (2008) Field Manual on Slope Stabilization. Environmental Recovery Programme For The Earthquake Areas, UNDP Pakistan publication, Crisis Prevention & Recovery Unit (CPRU), House # 124 Street # 11, E-7 Islamabad

Elective (Semester 07)

DM 674c

Ageing and Disaster

Cr. H. 3

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

Understand the concept of ageing within disaster management

Identify the role of senior citizens in DM

COURSE CONTENT:

1. Introduction

- Introduction to Ageing
- Social Ageing and the Life Course Perspective
- Cultural Images of Ageing
- Theoretical Analysis of ageing

2. Problems and Remedies

- Madrid International Plan of Action on Ageing, 2002
- Employment Old Age Benefit Institution
- Problems of Old Age People
- Problem of older People in disaster

3. Vulnerability, Capacity and standard

- Disasters and the Vulnerability of Older Populations
- Displacement, separation and return
- Capacities and contribution social capital during disaster
- Senior People and Sphere Standards

4. Case studies

- Case Studies: Help Age older people associations in community disaster risk Reduction

Teaching Methodologies:

- Lectures and case studies
- Documentaries and visuals
- Interactive discussions and talks
- Assignments and quizzes

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. COX, Harold G. (2004) Annual Editions: Aging 04/05. McGraw- Hill, Inc., Guilford, CT.
2. HELPAGE International (2007) Older People Associations in Community Disaster Risk reduction, Available from www.helpage.org.
3. LASSEY, William R. and Marie L. Lassey (2001) Quality of Life for Older People: An International Perspective. Upper Saddle River, NJ: Prentice Hall, Inc.
4. QUADAGNO, Jill (2008) Aging and the Life Course: an Introduction to Social Gerontology, McGraw-Hill.
5. TICHEHURST, James F., Vaughn J. Carr and Terry J. Lewin. (1996) The psychological impact of an earthquake on the elderly." International Journal of Geriatric Psychology, 943-951, UNITED Nations (2002) The Madrid International Plan of Action on Ageing, [Online] Available at http://www.un.org/esa/socdev/ageing/madrid_intlplanaction.html

Elective (Semester 07)

DM 674d

Public Private Partnerships for Disaster Risk Reduction

Cr. H. 3

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

understand the significance of Public Private Partnership (PPP) in DRM
Appraise the role of PPP in DRM

COURSE CONTENTS:

1. Introduction

- Introduction to the Public Private Partnerships concept
- Introduction to institutional and legal arrangements for PPP

2. Public private Partnership and DRR

- Public Private Partnership for Disaster Risk Reduction
- Private sector involvement in DRM
- The business case for corporate sector involvement in DRM
- The role of the private sector in DRR

3. Case studies

- Case studies of private sector involvement in DRM activities
- Current legislative and institutional framework for PPPs for DRM

4. Emerging concepts

- Way forward and evolving concepts in PPP for DRM
- Reference from Pakistan and developed world

Teaching Methodologies:

- Lectures and case studies
- Documentaries and visuals
- Interactive discussions and talks
- Assignments and quizzes

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. AKINTOYE, A., Beck, M. and Hardcastle, C (ed). (2003) Public-Private Partnerships: Managing Risks and Opportunities. Blackwell Science Limited: Oxford, UK.
2. DAVIDSON, N.M. and Malloy, R.P (2009) Affordable Housing and Public-Private Partnerships. Ashgate Publishing Ltd: England.
3. YESCOMBE, E. R. (2007) Public-Private Partnerships: Principles of Policy and Finance. Butterworth Hienemann: UK.
4. GOODWIN, B.K. and Smith, V.H. (1995) The Economics of Crop Insurance and Disaster Aid. The AEI Press: Washington, D.C.
5. PATON, D. and Johnston, J. (2006) Disaster Resilience: An Integrated Approach. Charles C. Thomas Publisher, Ltd. USA.

Elective (Semester 07)**DM 674e****Environment and Hazards Management****Cr. H. 3****Course Learning Outcomes:**

Upon successful completion of the course, the student will be able to:

Understand the basic components of environment. Relationship between Man and Environment. Interlink environmental problems with natural hazards.
--

COURSE CONTENT:

1. **Introduction**
 - Introduction to Environment and Natural Hazards
 - Environment and it's components
2. **Earth spheres and Greenhouse gases**
 - Spheres of the Earth (Litho, Hydro, Cryo, Bio, and Atmosphere)
 - Earth Heat Budget System
 - Green House Effects
 - Global Warming
3. **Environment and sustainability**
 - Sustainable Use of Resources for DRR
 - Eco-Systems, Food Chain and Energy Chain
 - Environment and Resources
 - Economic Activities & Environment
4. **Environmental Degradation**
 - Pollutions and Disasters
 - Environmental Hazards

Teaching Methodologies:

- Lectures and case studies
- Documentaries and visuals
- Interactive discussions and talks
- Assignments and quizzes

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Recommended Books:

1. KHAN, Fazle Karim (1991) A Geography of Pakistan: Environment, People and Economy. Oxford University Press – Pakistan.
2. PARK, Chris (2001) The Environment: Principles and Applications. 2nd Edition, Routledge, UK.
3. PRAMANIK, M. A. H. (1993) Impacts of Disasters on Environment & Development: International Cooperation. Diane Publishing Co.,

Elective (Semester 07)

DM 674f

Humanitarian Crisis Management

Cr. H. 3

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

- | |
|---|
| <ol style="list-style-type: none">1. To understand the dynamics of national and international conflict areas involved in humanitarian crises.2. To appreciate the challenges of humanitarian crises, interventions and management in conflict areas due to internal or external factors. |
|---|

COURSE CONTENTS:

1. Introduction

- Understanding humanitarian organisations
- Criteria and formation of humanitarian organisations

2. Humanitarian organisations and Crises

- Humanitarian organisations' crises
 - International responsibilities towards crises
 - work of humanitarian organisations
 - international aid and humanitarian organisations
 - financial status and humanitarian organisations
- 3. International protocols**
- International protocol for humanitarian organisations
 - World Humanitarian summit
 - Universal declaration of Human rights
 - Sphere standards
 - Social stratification and Disparities
- 4. Conflict in Crises management**
- Conflict areas and Challenges of humanitarian organisations
 - Conflict resolution mechanism
 - Post conflict recovery
 - Human security in crises zones
 - Best practices in crises management
- 5. Case studies**
- Case studies on humanitarian crises management

Teaching Methodologies:

- Lectures and case studies
- Documentaries and visuals
- Interactive discussions and talks
- Assignments and quizzes

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

- THOMAS, G. Weiss, Humanitarian Intervention, Polity Press, 2007, Cambridge
- MONIKA, Krause, The Good Project: Humanitarian Relief NGOs and the Fragmentation of Reason, University Of Chicago Press, 2014, Chicago

- VICTOR, Asal, David Quinn, Jonathan Wilkenfeld, Kathleen Young, Mediating International Crises (Routledge Advances in International Relations and Global Politics), Routledge, 2006, London
- Managing World Health Organisation Response in the field, http://www.who.int/hac/techguidance/tools/manuals/who_field_handbook/content/en/ accessed on March 6, 2014

Elective (Semester 07)

DM 675a

Child Friendly Disaster Management

Cr. H. 3

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

1. **DESCRIBE** Child Development and Violence Against Children;
2. **ANALYSE** the impacts of disasters on children and mainstreaming DRR into school curriculum and other educational programmes.

COURSE CONTENT:

1: Introduction

- Definition of Childhood
- Child Development
- Children's roles in family, community and cultural contexts
- Needs of children and families in preschool, inclusive and community education settings
- Social Policies for Children Protection

2: Violence against Children and its impact

- Physical abuse
- Psychological abuse
- Neglect and Emotional/ Psychological Abuse
- Sexual abuse
- Teaching Life Skills to Children regarding protection from abuse and violence

3: Impacts of Disasters in Children

- Direct and Indirect impacts of Disaster on Children
- Specific Needs of Children During Disaster
- International Convention on the Rights of Children in emergency
- International and national guidelines for child friendly disaster management and response
- Responding to Child Trauma

4: Mainstreaming DRR Education into School curricula

- Stand-alone Programmes

- Infusion Approach
- Pedagogy of DRR Education
- Methods and practices of teaching DDR curriculum at school level
- School Emergency Planning and Management
- Case studies on Child Friendly Disaster Management

Teaching Methodologies:

- Lectures and case studies
- Documentaries and visuals
- Interactive discussions and talks
- Assignments and quizzes
- Tabletop Exercises

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Recommended Books:

1. ADPC (2007) Child Focused Disaster Risk Reduction, Module 6: Community Disaster Risk Reduction Implementation, 16th Community Based Disaster Risk Management Course, Bangkok.
2. BERTI, Stefano (2003) Rights of the Child in Pakistan, World Organization against Torture, Geneva.
3. CAMERON, C. and Davies G. N.(2010). Children and Disaster Risk Reduction in Asia and the Pacific: A way Forward, [Online] Available at www.unicef.org/crc/
4. MURTHY and Josephine (2006) A Study on Non-Discrimination in the Tsunami Rehabilitation Programme in India, Save the Children Tsunami Rehabilitation Programme in India
5. SPARC (2010) State of Children in Pakistan, Society for the Protection of Rights of Child, Islamabad.

Elective (Semester 07)

DM 675b

Earthquake Hazard Risk Reduction

Cr. H. 3

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

- | |
|---|
| <ol style="list-style-type: none">1. To understand the nature, causes and consequences of the earthquake hazards2. To apply the knowledge and tools for earthquake hazards assessment and risk mitigation. |
|---|

COURSE CONTENTS:

1. **Introduction**
 - a. Basics on Earthquakes (Faults, Size and Location of Earthquakes)
 - b. Seismology, Seismic Waves and Seismometry
2. **Seismic Hazards**
 - a. Primary and Secondary Hazards (Ground Shaking, Land-Sliding, Liquefaction, Tsunami, Fires, etc.)
 - b. Strong Ground Motions Parameters
 - c. Introduction to Ground Motions Prediction Equations (GMPEs) and Applications
 - d. Introduction to Hazard Analysis (Deterministic & Probabilistic Seismic Hazard Analysis)
 - e. Introduction to local site-effects and seismic soil-response analysis
 - f. Evaluation of Landsliding and Liquefaction Hazards
 - g. Seismic Micro-Zonation
3. **Seismic Risk**
 - a. Exposure Characterization
 - b. Field Visits (understand Urban Building Typologies)
 - c. Seismic Vulnerability/Fragility Assessment
 - d. Introduction to EMS-98 Scale
 - e. Introduction to RADIUS Tool
 - f. Seismic Risk Assessment Case Studies: Damage Evaluation and Loss Estimation
4. **Seismic Risk Mitigation**
 - a. Introduction to Laboratory Methods for Earthquake Engineering Research
 - b. Laboratory Visits (Earthquake Engineering Center, UET Peshawar)
 - c. Earthquake Prediction and Early Warning Systems
 - d. Public Awareness and Preparedness
 - e. Earthquake Insurance

Teaching Methodologies:

- Lectures and case studies
- Documentaries and visuals
- Interactive discussions and talks
- Assignments and quizzes

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. STEIN, Seth, WYSESSION, M. (2006) An Introduction to Seismology, Earthquakes and Earth Structure, Blackwell Publishing Ltd.
2. COBURN, Andrew and Spence Robin (2002) Earthquake Protection. John Wiley & Sons Ltd., New York, US.
3. DOWRICK, David (2003) Earthquake Risk Reduction. John Wiley & Sons Ltd., New York, US.
4. Grunthal, G., Musson, R.M.W., Schwarz, J., and Stucchi, M. (1998). European Macroseismic Scale-1998 (EMS-98). Cahiers du Centre Europeen de Geodynamique et de Seismologie, Vol. 15.
5. RADIUS Tool: Risk Assessment Tools for Diagnosis of Urban areas against Seismic Disasters, IDNDR secretariat, OCHA, United Nations, Geneva.
6. McGuire, R.K. (2004) Seismic Hazard and Risk Analysis, Earthquake Engineering Research Institute (EERI), Oakland, CA, USA.
7. FEMA (2003). HAZUS-MH, Technical Manual, Federal Emergency Management Agency (FEMA). Washington, DC, USA.

Elective (Semester 07)

DM 675c

Quantitative Techniques for Disaster Management

Cr. H. 2+1

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

- **Understand** basics of data type, variable types and their level of measurement
- **Understand** quantitative techniques that are widely applied in disaster management and their application using interface of Statistical Package
- **Choose** and **perform** a suitable quantitative technique in their research work.

COURSE OUTLINE:

1 Introduction

- Sample and Population
- Types of variables and their level of measurement
- Quantitative and Qualitative techniques
- Measure of central tendency

- Measure of dispersion
- 2 The User interface of Statistical Package in lab**
- The Data Editor
 - Creating variables
 - Entering data
 - The output viewer
 - Saving and retrieving files
- 3 Exploring Data in Statistical Package in Lab**
- Graphing and screening data
 - Exploring groups of data
 - Tests for normality of data
- 4 Bivariate Correlation using Lab**
- Correlation concepts
 - How to measure relationship
 - Graphing relationship
 - Bivariate correlation
 - Using R-square for interpretation
 - Partial correlation
 - How to report results
- 5 Regression Analysis using Lab**
- An introduction to regression
 - Simple regression in SPSS
 - Interpreting simple regression
 - Multiple regression: the basics
 - Accuracy of regression models
 - Multiple regressions in Statistical Package
 - Methods of multiple regression
 - Categorical predictors in multiple regression
 - Interpreting and reporting multiple regression
- 6 Logistic Regression**
- Background to logistic regression
 - Methods of logistic regression
 - Logistic regression in Statistical Package
 - Interpreting the results
 - Reporting the results
- 7 Comparing two Mean**
- Testing difference between means: t-test
 - The dependent t-test
 - The independent t-test
- 8 Comparing Several Means: ANNOVA**
- The theory behind ANNOVA
 - One-way ANNOVA in Statistical Package

- Post hoc tests in Statistical Package
- Interpreting the results
- Reporting the results

9 Categorical data in Lab

- Theory of analyzing categorical data
- Pearson's chi-square test
- Running chi-square on Statistical Package
- Interpreting and reporting results

Teaching Methodology

- Lecturing
- Assignments

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. CRESWELL, J.W. (2009) Research Design: Qualitative, Quantitative and Mixed Methods Approaches. Sage Publications, Inc.: USA.
2. Ajai S. Gaur and Sanjay S. Gaur (2006). Statistical Methods for Practice and Research: A Guide to Data Analysis Using SPSS. SAGE publication New Delhi
3. Discovering statistics, using SPSS, third edition, Sage publication, 2009.
4. CHAUDHRY, S.M. (1996) Introduction to Statistical Theory (Part I-II). Ilmi Kutab Khana: Lahore
5. RENDER, B., Stair, R.M., Hanna, Jr. M.E., and Badri, T.N. (2009) Quantitative Analysis for Management (Tenth Edition). Dorling Kindersley (India) Pvt. Ltd: India

Elective (Semester 07)

DM 675d

Natural Resources and Disasters

Cr. H. 3

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

- | |
|---|
| <ol style="list-style-type: none">1. To know about the natural resources and its utilization.2. To explore the relationship of natural resources utilization and natural hazards.3. To understand the sustainable use of resources and disaster risk reduction. |
|---|

COURSE CONTENTS:

- Natural Resources and its Classification
- Utilization patterns of natural resources
- Introduction to Natural Resources and Disaster management
- Impacts of Disasters on Natural Resources
- Preservation, Conservation and Restoration of Natural Resources
- Natural Resources Policies and its Management
- Natural Resources and Human Environment Interaction
- Natural Resources and Development
- Ecological Balance Systems
- Natural Resources and Natural Hazards

Teaching Methodologies:

- Lectures and case studies
- Documentaries and visuals
- Interactive discussions and talks
- Assignments and quizzes

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. BREBBIA C. A. (2006), Management of Natural Resources, Sustainable Development and Ecological Hazards. Conti, M. E. and Tiezzi, E. (Edit), WIT Press / Computational Mechanics, WIT Press Sales Ashurst Lodge, Southampton, SO40 7AA, UK.
2. CHIRAS, Daniel D. and Reganold, John P. (2009) Natural Resource Conservation: Management for a Sustainable Future. Addison Wesley, 10 Edition, Boston, USA.

3. HAQUE, C. Emdad (Edit) (2010) Mitigation of Natural Hazards and Disasters: International Perspectives. Springer, Berlin, Germany.
4. TIETENBERG, Tom and Lewis, Lynne (2008) Environmental & Natural Resource Economics. Addison Wesley 8 Edition, Boston, USA.

Elective (Semester 07)

DM 675e

Global Regime in Disaster Management

Cr. H. 3

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

Understand the disaster management framework and legislations in the context of global conventions and treaties

Evaluate the implementation status of global treaties and conventions

COURSE CONTENTS:

Introduction

- Introduction to global regime in disaster management
- Global challenges and disasters

Past Treaties & Conventions

- The linkage between disasters and Millennium Developmental Goals (MDGs)
- International Decade for Natural Disaster Reduction (IDNDR) 1990-1999
- Yokohama Strategy and Plan of Action – Mid review IDNDR
- Johannesburg Plan of Implementation 2002
- Hyogo Framework for Action 2005-2015
- Kyoto Protocol 2008-2012
- Disaster Risk Reduction tools for Climate Change Adaptation

Current Treaties and Conventions

- SENDAI Agreement 2015-2030
- The Sustainable Development Goals (SDGs) and Disaster Management
- International Strategy for Disaster Reduction (ISDR)
Public commitment and linkage to sustainable development, enlarged networking and partnerships. Mechanisms: IATF/DR, ISDR secretariat, UN Trust Fund
- UNISDR DRR Strategy

Global Regimes at Work

- UN Organizations and DRR
- Pakistan and DRR

Teaching Methodologies:

- Lectures and case studies
- Documentaries and visuals
- Interactive discussions and talks
- Assignments and quizzes

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. INTER-AGENCY Secretariat of the ISDR (2007) Hyogo Framework for Action 2005-2015: Building the resilience of nations and communities to disasters. Geneva: UN, ISDR
2. KHAN, A. N. (2009) Integrating Disaster Management and Climate Change Adaptation into Policy Making. Proceedings of the International Disaster Management Conference -2009, Baragali – Summer Campus, University of Peshawar, Khyber Pakhtunkhwa, Pakistan.
3. SINHA, P. C. (2006) Disaster management process: Law, policy and strategy. New Delhi: SBS Publishers & Distributors Pvt. Ltd.
4. STOKEY, E., & Zeckhauser, R. (1978) A primer for policy analysis. New York: W.W. Norton

Elective (Semester 08)

DM 684a

Disaster Management Policies

Cr. H. 3

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

<p>Understand the disaster management frameworks/legislations/policies in Pakistan vis-à-vis global conventions.</p> <p>Evaluate the current national and international policies related to disaster management</p>

COURSE CONTENTS:

Introduction

- Components of Disaster Management System
Definition, Need, Objectives, Principles, Composition, Major functions
- Disaster Management Bodies at Regional, National and International level
- Guiding principles for policy
- Process of policy formulation, implementation and techniques in policy analysis
- Organizations responsible for Disaster Management in Pakistan

National Plans and Policies

- Disaster Management and National Plans
 - NDRF 2007
 - NDRP 2010
 - NDMP 2012
 - Contingency Plans
 - Provincial Plans
- Legislation for Disaster Management
 - Civil Defence Act, 1952
 - The National Calamities Act (West Pakistan Calamities Act), 1958
 - Local Government Act, 2001/2013
 - Emergency Services Ordinance/Act, 2002
 - Environmental Legislations
Such as Environmental Laws and Climate Change Policies at work
 - National Disaster Management Act – 2010
 - ERRA Act 2011
 - Pakistan Climate Change Act 2016
- National Disaster Management Policy, 2013
 - DRR Policy 2012
 - Climate Change Policy 2013

International Plans and Policies

- Analytical review of the international policies and frameworks
 - Yokohama Strategy
 - The Geneva Mandate
 - Kyoto Protocol
 - Hyogo Framework for Action (HFA)
 - Sendai Framework

Teaching Methodologies:

- Lectures and case studies
- Documentaries and visuals
- Interactive discussions and talks
- Assignments and quizzes

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. INTER-AGENCY Secretariat of the ISDR (2007) Hyogo Framework for Action 2005-2015: Building the resilience of nations and communities to disasters. Geneva: UN, ISDR
2. KHAN, A. N. (2009) Integrating Disaster Management and Climate Change Adaptation into Policy Making. Proceedings of the International Disaster Management Conference -2009, Baragali – Summer Campus, University of Peshawar, Khyber Pakhtunkhwa, Pakistan.
3. SINHA, P. C. (2006) Disaster management process: Law, policy and strategy. New Delhi: SBS Publishers & Distributors Pvt. Ltd.
4. STOKEY, E., &Zeckhauser, R. (1978) A primer for policy analysis. New York: W.W. Norton.
5. GOVERNMENT of Pakistan (GOP) (2002) National Resettlement Policy Draft. Ministry of Environment, Local Government & Rural Development, Pakistan Environmental Protection Agency, [Online], Accessed 2008, http://www.pakistan.gov.pk/redirect.jsp?action=book_mark&goto=174
6. GOVERNMENT of Pakistan (GOP) (2010) NDMA. National Disaster Management Authority, NDMA, Prime Minister’s Secretariat, Constitution Avenue, Islamabad-Pakistan, www.ndma.gov.pk
7. GOVERNMENT of Pakistan (GOP) (2011) Earthquake Rehabilitation and Reconstruction Act 2011. Earthquake Rehabilitation and Reconstruction Authority <http://www.erra.pk/aboutus/erra.asp>
8. GOVERNMENT of Pakistan (GOP) (2016) National Climate Change Policy. http://www.gcisc.org.pk/National_Climate_Change_Policy_2012.pdf

Elective (Semester 08)

DM 684b

Good Governance in Disaster Management

Cr. H. 3

Course Learning Outcomes:

By the end of this course students shall be capable of understanding the significance of good governance in disaster management and its influence on good practices in disaster management.

COURSE CONTENTS:

- Good governance ,elements, concept ,principles, practices and framework in Disaster Management
- Governance and its types
- Governance indicators (worldwide and Pakistan)
- DRR, Good Governance and Development
- Positioning disaster risk reduction in government
- Good governance initiative for disaster management in Pakistan
- The role of the good governance in disaster management
- Good governance though development assistance
- Case studies of good governance in disaster management activities
- Learning Experiences: Governance issues in disaster management
 - Ownership of initiatives
 - Participation
 - Coordination
 - Communication
 - Strengthening implementing capacity
 - Accountability
- Institutional and Policy Analysis for DRR in Pakistan
- Institutional Aid and Good Governance

Teaching Methodologies:

- Lectures and case studies
- Documentaries and visuals
- Interactive discussions and talks
- Assignments and quizzes

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. AGERE, S. (2000) Promoting Good Governance: Principles, Practices and Perspectives. Commonwealth Secretariat: London
2. COLLINS, A. E. (2009) Disaster and development. Routledge: Oxon

3. DARA. (2009) Humanitarian Responsibility Index 2008: Donor Accountability in Humanitarian Action. Palgrave Macmillan: Madrid
4. VAYUNANDAN, E. and Mathew, D. ed. (2003) Good Governance: Initiatives in India. Prentice Hall of India: New Delhi
<http://www.google.com.pk/serch?dcr>

Elective (Semester 08)

DM 684c

Disability and Disasters

Cr. H. 3

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:
 UNDERSTAND the key concepts of disability and national/International conventions on disability.

DESCRIBE how disasters affect the disable people and how to protect Persons with disabilities in disaster situation.

COURSE CONTENTS:

Introduction

- Disability and Impairment
- Causes of Disability
- Disabled status in the world
- Socio-economic issues of Persons with Disabilities in Pakistan

Conventions and Policies on Disability

- International conventions on disability
- National Policies on Disability in Pakistan

Disaster and Disability Nexus

- Disaster as a cause of disability
- Problems and Coping Mechanism during disaster
- Protection of Life & Security during Disasters
- Assessment procedures in Intervention
- Guidelines to include disability in disaster preparedness and management
- Role of CBOs in Rehabilitation of Disabled

Approaches for rehabilitation of Disable after disaster

- Professional Approaches for rehabilitation of Disable after disaster
- Sociological Approaches for rehabilitation of Disable after disaster
- Livelihood Options for the Persons with Disabilities after disaster

TEACHING METHODOLOGIES:

- Lectures and case studies
- Documentaries and visuals
- Interactive discussions and talks
- Assignments and quizzes
- Tabletop Exercises

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Recommended Books

1. ABU-HABIB , Lina (1997) Gender and Disability, Women's Experiences in the Middle East, Oxford: Oxfam (UK and Ireland)
2. CHRISTENSEN, K.M., Blair, M. E. and Holt, J.M. (2007) The Built Environment, Evacuations, and Individuals With Disabilities: A Guiding Framework for Disaster Policy and Preparation. In Journal of Disability Policy Studies Spring 2007 vol. 17 no. 4 249-254
3. MORTON, David (2010) Social Security and Disability, Dalta Printing Solutions, Inc. California.
4. DFID (2000) Disability, Poverty and Development, DFID issues paper, Department For International Development, London:
5. HANDICAP International (2004) How to Include Disability issues in Disaster Management. Handicap International, Dhaka.
6. SINGH, P. (2007) Impact of South Asian Earthquake on Disabled People in the State of Jammu and Kashmir.
<http://wecando.wordpress.com/2007/10/27/paper-impact-of-south-asian-earthquake-on-disabled-people>.

Elective (Semester 08)

DM 684d

**Health, Hygiene and Sanitation in Disaster
Management**

Cr. H. 3

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

- | |
|--|
| <ol style="list-style-type: none">1. explore the relationship of DM and Health.2. understand the consequences of disasters and Health response.3. know strategies for Health response in DM. |
|--|

COURSE CONTENTS:

- Introduction to Health Issues in Disaster Management
- Basic Elements of Public Health

- The Consequences of Disasters and Its Impacts on Public Health
- Public Health and Phases of Disaster Response
 - Acute Phase (Surgical, Rapid response, Ambulances etc.)
 - Non-Surgical
 - Chronic Phase
- Short Term Programmes
 - Mobile Clinic, Tele Health, Training, Restoration of Public Health Facilities, Safe Community, Rehabilitation Medicines, Drugs and Vaccines, Liaison with other Stakeholders of DM etc.
- Long Term Programmes
 - Medical Support
 - Rapid Response Unit
 - Field Hospital and Mobile Clinic
- Management of Health Issues in Disasters (Planning Coordination, Logistics, Manpower etc.)
- Provision of clean drinking water, safe sanitation, and adequate nutrition
- Protection from climatic effects
- Social support to affected communities.

Teaching Methodologies:

- Lectures and case studies
- Documentaries and visuals
- Interactive discussions and talks
- Assignments and quizzes

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. DRECHSEL, Pay et al. (2009) Wastewater Irrigation and Health: Assessing and Mitigating Risk in Low-income Countries. Earthscan, London, UK.
2. HUNTER, Nan D. (2009) The Law of Emergencies: Public Health and Disaster Management. Elsevier Inc., New York, US.
3. NOVICK, Lloyd F.; Morrow, Cynthia B.; Mays, Glen P. (2008) Public Health Administration: Principles for Population-Based Management. Edition 2, Jones and Bartlett Publishers, Inc.

4. PRETTO, Ernesto A. (1995) A Brief Introduction to Disaster Medicine, Emergency Public Health. Published By University of Pittsburgh.

Elective (Semester 08)

DM685a

Psychological Impacts of Disasters

Cr. H. 3

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

- | |
|---|
| <ol style="list-style-type: none">1. To understand the psychological impacts of disasters.2. To know about psychological Trauma. |
|---|

COURSE CONTENTS:

- Introduction to Psychological Impacts of Disasters
- Disaster Impacts
- Psychological Trauma
- Trauma response
 - Normal response, Basic principle, Bio psychosocial model, cultural influences
- Classification of Psychological Disorders
 - Depression, Anxiety, Post- traumatic stress disorder
- Children in Disasters
 - Development tasks, risk factors, and childhood traumatic grief
- Psychological and social support
 - Psychological first aid, coping strategies, and resiliency models

Teaching Methodologies:

- Lectures and case studies
- Documentaries and visuals
- Interactive discussions and talks
- Assignments and quizzes

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. ALLEN, J.G (1995) Coping with trauma: A Guide to self-understanding. Washington D.C: American psychiatric press.
2. MYERS, David G. (2009) Psychology. Worth Publishers, Ninth Edition, London, UK.
3. OLLENDICK, T.H., & Cerry, J. (1981) Clinical Behaviour therapy with children. New York: plenum press.
4. WORDEN, J. W. (1991) Grief counseling and Grief therapy: A Handbook For The Mental Health Professional, New York, Springer Publishing Co.
5. ZADOR, Noka (2004) Treating Psychological Trauma and PTSD. Wilson, John P.; Friedman, Matthew, J.; and Lindy, Jacob D. (Edit), The Guilford Press, 1 Edition, New York, USA

Elective (Semester 08)

DPM 685b

Flood Hazard Risk Reduction

Cr. H. 3

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

1. **UNDERSTAND** the nature, causes, consequences and mitigation of the flood hazard.
2. **INTERPRET** preparedness and response plans for effective flood risk reduction

COURSE CONTENTS:

- Introduction to Flood Hazard
- General Characteristics of Flood
- Causes of Floods
 - Meteorological
 - Hydrological
 - Anthropogenic
- Flood Intensifying Conditions
- Types of Floods (Riverine flood , Flash flood, Coastal flood, GLOF)
- Climate Change Impacts on floods
- Major Flood Impacts
- Basic Principles in Flood Hazard Assessment
- Basic Principles in Flood Risk and Vulnerability Assessment
- Integrated Flood Risk Management
- Flood Mitigation Measures
 - Structural (Engineering Protection)
 - Non-structural (Planning and Policies)
- Early Warning System for Floods

Teaching Methodologies:

- Lectures and case studies
- Documentaries and visuals
- Interactive discussions and talks
- Assignments and quizzes

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. PROVERBS, D & Brebbia, C A (2016) Flood Risk Management and Response, WIT Press, UK
2. ZORAN, V (2016) Flood Risk: The Holistic Perspective, IWA Publishing UK.
3. **SAYERS, P (2012) FLOOD RISK: PLANNING, DESIGN AND MANAGEMENT OF FLOOD DEFENCE INFRASTRUCTURE, ICE PUBLISHING, UK.**
4. **MAMBRETTI, S (2012) FLOOD RISK ASSESSMENT AND MANAGEMENT, WIT PRESS, UK**
5. **OLIVER, P C (2009) FLOOD RISK MANAGEMENT, NOVA SCIENCE PUBLISHERS, USA.**
6. MARTINI (2002) Flood & Mega flood Process and Deposit: Recent & Ancient Examples Multi-Lines Books Lahore. Pakistan.

Elective (Semester 08)

DPM 685c Basic Engineering Practices in Disaster Management Cr. H. 3

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

- | |
|--|
| <ol style="list-style-type: none">1. To understand the role of various basic disciplines of engineering2. Role of various engineering codes, guidelines and specifications3. History of disasters with specific emphasis to Pakistan in context of engineering |
|--|

COURSE CONTENTS:

1. Introduction

- Introduction to basic engineering fields
- The role of (Agricultural, Chemical, Civil, Electrical, Mechanical and Mining engineering in DM
- 2. Nature of Engineering Project**
 - Typical process of engineering project output
 - (Concept, feasibility, design, approval, execution, handover, management, maintenance, end of design life disposal).
 - Basic concept of Planning Commissioning preforms (PC-I to PC-V).
- 3. Engineering Codes/guidelines/Specifications**
 - Introduction of concept of codes, guidelines, specifications in various engineering fields.
 - (Building Code of Pakistan – Seismic Provisions, 2007; Pakistan Electric Safety Code; other international examples), Fire Safety Provisions 2017.
- 4. Case Studies**
 - History of various disasters in world with summary of engineering challenges
 - History of various disasters in Pakistan with engineering challenges

Teaching Methodologies:

- Lectures and case studies
- Documentaries and visuals
- Interactive discussions and talks
- Assignments and quizzes

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. PAKISTAN Engineering Council. Building Code of Pakistan – Seismic Provision 2007
2. PAKISTAN Engineering Council. Pakistan Electric Safety Code 2014 (in process of finalization)
3. JAMES, R., Chiles, (2002). Inviting Disaster: Lessons from the Edge of Technology, Harper Business, New York.

4. HENRY Petroski (1992). To Engineer Is Human: The Role of Failure in Successful Design, Vintage Books, New York.
5. DAVID D. A. Piesold (1991). Civil Engineering Practice: Engineering Success by Analysis of Failure, McGraw-Hill Companies
6. U.S. Army Corps of Engineers, Urban Search and Rescue Program, Shoring Operation Guide, 3rd edition, June 2013

Elective (Semester 08)

DM 685d

Role of Media in Disaster Management

Cr. H. 3

COURSE LEARNING OUTCOMES:

Upon successful completion of the course, the student will be able to:

UNDERSTAND the fundamentals of media and its nexus with DM.

ILLUSTRATE the role of Media in DM in Pakistan with special reference to the importance of media in pre-and post-disaster scenarios.

Course outline:

Introduction

- a. Media Studies, definition
- b. Historical Sketch of Media Studies
- c. Types of Media

Relationship between Media and DM

- d. Media in Disaster Management Cycle
- e. Media in Pre-Disaster Stage
- f. Media in Post Disaster response

Media in Emergencies

- g. Means of Communications
- h. Media in Emergency communications
- i. National policy and Media

Impact of Media in Disasters

- j. Positive impacts
- k. Negative impacts
- l. Code of Conduct

Media role in context of Pakistan

- m. Reactive in nature
- n. Post disaster focused
- o. Lack of Disaster journalism
- p. Policy gap

Way Forward

- q. Revised role of Media in disaster Act
- r. Unbiased journalism
- s. Focus DRR and Resilience
- t. Focus on Pre-Disaster Cycle

Teaching Methodology

- Lecturing
- Interactive Sessions
- Written Assignments
- Seminar Lectures
- Documentaries

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. Deppa, J. (1994) "the media and disasters" NYU Press; First Edition edition
2. CROUHY, Michel; Galai, Dan and Mark, Robert (2005) The Essentials of Risk Management. The McGraw Hill Co., New York, US.
3. DAMON, P. C. (2006) Introduction to International Disaster Management. Butterworth-Heinemann, UK.
4. DILLEY, Maxx (2005) Natural Disaster Hotspots: A Global Risk Analysis. World Bank and University of Columbia, US.

Elective (Semester 08)

DPM 685e

Contingency Planning in Disaster Management

Cr. H. 3

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

- | |
|--|
| <ol style="list-style-type: none">1. To understand the role of various basic disciplines of engineering2. Role of various engineering codes, guidelines and specifications3. History of disasters with specific emphasis to Pakistan in context of engineering |
|--|

COURSE CONTENTS:

- Introduction to contingency planning
- Preparedness: Organization. Training, Planning and/or Plans
- Planning Process

- Plan Preparation: Level, Components, Viability, Check list etc.
- Dynamic Nature of Disaster Management
- Contingency Planning - Planning Continuum
- Methodology & Steps
- Content of the contingency Plan
- Time Line
- Likely Actions at Federal, Provincial and District levels
- Monsoon Contingency Plan

Text and Reference books:

1. BIRKMANN, J. (2006) Measuring Vulnerability to Natural Hazards: Towards Disaster Resilient Societies. Tokyo, United Nations University Press.
2. DAMON, P. C. (2006) International Disaster Management. Butterworth-Heinemann.
3. DAMON, P. C. (2006) Introduction to International Disaster Management. Butterworth-Heinemann, UK.
4. DILLEY, Max (2005) Natural Disaster Hotspots: A Global Risk Analysis. World Bank and University of Columbia, US.
5. ELLIOT, J.E. (2006) An Introduction to Sustainable Development. Third Edition. Routledge, London UK.
6. HEWITT, K. (1997) Regions of Risk: A Geographical Introduction to Disaster. Harlow, Longman, New York, US SMITH, Keith and Petley, David N. (2009) Environmental Hazards: Assessing Risk and Reducing Disaster, Routledge, London, UK.

PART- II:

Scheme of Study for MS programme in

“Disaster Management”

**PART- II: Scheme of Study for MS programme in “Disaster Management”
Eligibility:**

1. Preference will be given to BS 4 years / MSc. (16 years of education) Disaster Management degree (HEC recognized institutes/universities) for admission in 2 years MS Disaster Management programme.
2. Those candidate having BS 4 years / MSc. in any of the subject of Earth Sciences, Environmental Sciences, Geography, Space Sciences, Biological Sciences, Management Sciences, Agriculture Sciences, Medical Sciences, Economics, Sociology, Psychology, Forestry, Architecture, Civil / Agriculture / Mining Engineering, City / Urban & Regional Planning shall have to enrol in prerequisite and/or deficiency courses as proposed by the individual Department/university and as per HEC prescribed guidelines.

Duration and Course structure:

2 years spread over 4 semesters (two semesters per year)

Degree Requirement: 30 CREDIT HOURS INCLUDING THESIS

Course Structure	Number of courses	Credit Hours
Deficiency courses (Fundamental Courses, 0 Semester)	As required*	6-9
Core courses (First semester)	4	12
Elective/specialized (Second semester)	4	12
Thesis (Third & Fourth semesters)	2 (thesis)	06 (thesis)
Total	10	30

* Mandatory for non-disaster managers. However, postgraduate diploma holder in disaster management (HEC Recognized) will be exempted.

Evaluation:

For the uniformity in the evaluation system, NCRC recommends that the minimum CGPA required to pass a semester is 2.5 out of 4.0 at graduate level or decided by the respective bodies of the university as per rules in vogue.

Layout of Courses for MS:

Four core courses and four elective courses, each with 3 credit hours to be selected in first and second semester. Number of options that shall be offered during the course of study shall depend upon the availability of faculty and lab facilities. More groups can also be added depending on the availability of

resources. More special topics could also be added to these by the board of studies of the individual departments. The respective board of studies of the departments, keeping in view the availability of staff and resources, may prepare detail outline of the course and approve it accordingly (for some of the course outline is prepared and given).

Compulsory and Core Courses

S. No.	Course Titles	Cr.hr
Compulsory course		
701	Research Methodology in Disaster Management	3
Major/ Core courses		
702	Introduction to Disaster Management	3
703	Disaster Risk Assessment	3
704	Disaster Planning and Management	3
705	Emergency Response Management	3
706	Disaster Risk and Development	3
707	Natural Hazards of Pakistan	3
708	Community Based Disaster Risk Management	3
709	Disaster Response and Recovery	3
710	Disaster Risk Reduction and Preparedness	3
711	Fundamentals of GIS and RS in Disaster Management	2+1
712	Statistical Techniques in Disaster Management	2+1
713	Climate Change Adaptation and Disaster Risk Reduction	2+1

Other core/ major Courses

S. No.	Course Titles	Cr.hr
721	Application of Geo-informatics in Disaster Management	2+1
722	Climate Change and Disasters	3
723	Management of Desertification Hazard	3
724	Disaster Management and Economy of Pakistan	3
725	Disaster Management Policies	3
726	Disaster Risk and Vulnerabilities Assessment	2+1
727	Disaster Risk Financing	3
728	Disasters Risk and Urbanization	3
729	Management of Drought Hazard	3
730	Management of Earthquake Hazard	2+1
731	Economics of Disasters	3

732	EIA and Risk Assessment	3
733	Management of Flood Hazard	2+1
734	Forecasting of the Hydro-Meteorological Hazards	3
735	Gender Mainstreaming in Disaster Management	3
736	Geomorphology and Natural Hazards	3
737	Hazards Mapping	2+1
738	Management of Landslide Hazard	3
739	Livelihoods and Disasters	3
740	Planning and Management of Disasters in Pakistan	3
741	Psychological Impacts of Disasters and its Management	3
742	Sociology of Disasters	3
743	Media in Disaster and management	3
744	Contingency Planning in Disaster Management	3
745	Peace and conflict resolution	3
746	Ecosystem Based disaster Risk Reduction	3

Thesis (Third & Fourth Semesters)

MS. Thesis will be equal to six (06) credit hours in semester 3 and 4.

Detail of Core Courses (First Semester)

Compulsory course: DM 01

DM 701 Research Methodology in Disaster Management Cr. H. 3

COURSE LEARNING OUTCOMES:

Upon successful completion of the course, the student will be able to:

- **Understand** research and **develop** research design particularly in the field of Disaster Management.
- **Know** the methods of data collection, analysis and interpretation.

COURSE OUTLINE:

- 1 **Scientific Research**
 - Research science
 - Social research concepts and components
 - Theories and concepts
 - Hypotheses
 - Variables and causation
 - Levels of measurement
 - Reliability and validity

	<ul style="list-style-type: none"> • Deductive and inductive approaches • Inductive approach: Grounded theory
2	The Research Process <ul style="list-style-type: none"> • Research problem identification • Coordination schema • Conceptualization (research questions, problem statement, objectives and conceptual framework) • Operationalization • Construction of indicators
3	Categories of Research <ul style="list-style-type: none"> • Exploratory • Descriptive • Explanatory
4	Research Design <ul style="list-style-type: none"> • Survey (including sampling design and sample size) • Case study • Experimental design
5	Data Collection and Information Gathering <p>Secondary Data Collection:</p> <ul style="list-style-type: none"> • Literature study • Analysis of articles <p>Primary Data Collection:</p> <ul style="list-style-type: none"> • Reconnaissance survey • Observation • Interviews • Key informants • Group discussion • Rural Rapid Appraisal (RRA) • Participatory Rural Appraisal (PRA) • Questionnaire survey and pre-testing
6	Data Analysis and Interpretations <ul style="list-style-type: none"> • Data processing and analysis • Qualitative data analysis • Quantitative data analysis • Hypothesis testing
7	Research Proposal <ul style="list-style-type: none"> • Structure • Components
	Teaching Methodology <ul style="list-style-type: none"> • Lecturing

- Written Assignments

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Recommended Books:

1. CRESWELL, John W. (2009) Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. Sage Publications
2. HOWARD, K. ef; Sharp, J.A. (1983) The Management of a Student Research Project. Gower Publishing Company, UK.
3. MYERS, Jerome L. Well, Arnold D. (2002) Research Design & Statistical Analysis. 2nd Edition, Routledge, London, UK.
4. TUCKER, Lyne, et.al. (1990) Research Methods and Statistical Analysis, IPS; Nottingham University U.K.

Major /Core courses

DM 702

Introduction to Disaster Management

Cr. H. 3

Course Learning Outcomes:

On the successful completion of the course, the students will be able to:

- i. **Understand** the basic concepts & Principals in Disaster Management.
- ii. **Know** the interrelation between Man and Disasters.
- iii. **Assess** the institutions .for DM in Pakistan

Course Contents:

Introduction

- Introduction to Disaster Management
- Basic Concepts in DM
- Historical evolution of DM

Types of Disasters

- Natural Disasters
- Anthropogenic Disasters
- Technological Disasters
- Complex Disasters

Disaster Management Cycle

- Basic Principles of DM
- Disaster Management Cycle

Relationship between Man and Environment

- Environmental Processes
- Man and Environment Theories
- Impacts of natural disasters

Disasters Management Institutions in Pakistan

- National Disaster Management Act and Policies
- National Disaster Management Authority (NDMA)
- Provincial Disaster Management Authorities (PDMAs)

Recommended Books:

1. BIRKMANN, J. (2006) Measuring Vulnerability to Natural Hazards: Towards Disaster Resilient Societies. Tokyo, United Nations University Press.
2. COLLINS, A.E. (2009) Disaster and Development, Routledge, London, UK.
3. DAMON, P. C. (2006) Introduction to International Disaster Management. Butterworth-Heinemann.
4. ELLIOT, J.E. (2006) An Introduction to Sustainable Development. Third Edition. Routledge, London UK.
5. HEWITT, K. (1997) Regions of Risk: A Geographical Introduction to Disaster. Harlow, Longman, New York, US.
6. SMITH, Keith and Petley, David N. (2009) Environmental Hazards: Assessing Risk and Reducing DisasterRourledge ., London, UK.

DM 703

Disasters Risk Assessment

Cr. H. 3

Course Learning Outcomes:

Upon Successful completion of this course, the student will be able to:

- **Understand** the concept of Risk in DM.
- **Know** the basic elements of Risk Assessment.
- **Develop** skills for decision making in Disasters Risk assessment

COURSE CONTENTS:

- **Basic Concepts**
 - Geomorphic Process,
 - Natural Hazard,
 - Disaster
 - Vulnerability
 - Capacity and Risk)
- **Hazard Assessment**
 - Type and Nature of Occurrence
 - Location, Density, Intensity and Frequency
 - Data Availably and Quantifying the Hazards

- **Vulnerability and Exposure Assessment**
 - Elements at Risk and Quantifying the Elements at Risk
 - Acceptance Level and Limitations
- **Capacity Assessment**
 - Classification, Level and Dimension of Capacities
 - Quantifying the Capacities
- **Risk Assessment**
 - Characteristics of Risk
 - Dynamic Pressure
 - Underlying Causes
 - Progression of Vulnerability, and Disaster Crunch Model.
 - Matrix of Risk, Risk Record and the Probability of Risk
- **Decision Making**
 - Limitations of Risk Assessment
 - Cost-Benefit Analysis
 - Acceptance Level of Risks
 - Risk Management and National Development
 - Best Option Considerations

Teaching Methodology

- Lecturing
- Written Assignments
- Interactive Sessions

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. CROUHY, Michel; Galai, Dan; Mark, Robert; (2005) The Essentials of Risk Management. The McGraw Hill Co., New York, US.
2. DAMON, P. C. (2006) Introduction to International Disaster Management. Butterworth-Heinemann, UK.
3. DILLEY, Maxx (2005) Natural Disaster Hotspots: A Global Risk Analysis. World Bank and University of Columbia, US.
4. ELLIOT, J.E. (2006) An Introduction to Sustainable Development. Third Edition. Routledge, London, UK.

5. HEWITT, K. (1997) Regions of Risk: A Geographical Introduction to Disaster. Harlow and Longman, Edinburgh, UK.
6. SMITH, Keith; Petley, David N. (2009) Environmental Hazards: Assessing Risk and Reducing Disaster Routledge, London, UK.

DM 704

Disaster Planning and Management

Cr. H. 3

COURSE LEARNING OUTCOMES:

Upon successful completion of the course, the student will be able to:

UNDERSTAND the multidisciplinary and multispectral approach in DM.

ILLUSTRATE the basic elements of planning and plan preparation in DM and role of different stake holders in DM

COURSE OUTLINE:

Introduction

- a. Disaster Planning and Management
- b. Planning Process
- c. Disaster Management
- d. Significance of Disaster Planning and Management

Disaster Management

- e. Disaster Management Cycle
- f. Stages in Disaster Management
- g. Modern Challenges in Disaster Management
- h. Key Players in Disaster Management

National Policies and Plans

- i. National Disaster Management Framework
- j. National Disaster Management Plan
- k. National Disaster Risk reduction Policy
- l. Main Elements of National Policy
- m. Institutional and Legislative Aspects

Coping with Disasters

- n. Major Requirements for Coping with Disasters
- o. The Basic Philosophy for Coping with Disasters
- p. International Disaster Assistance
- q. Role of Government, Communities, Media, NGOs and Policies
- r. Mainstreaming Hazards Mitigation into Sustainable Development

Teaching Methodology

- Lecturing
- Interactive Sessions
- Written Assignments

- Seminar Lectures
- Documentaries

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. SMITH, Keith; Petley, David N. (2009) Environmental Hazards: Assessing Risk and Reducing Disaster .Routledge, London, UK
2. CROUHY, Michel; Galai, Dan and Mark, Robert (2005) The Essentials of Risk Management. The McGraw Hill Co., New York, US.
3. DAMON, P. C. (2006) Introduction to International Disaster Management. Butterworth-Heinemann, UK.
4. DILLEY, Maxx (2005) Natural Disaster Hotspots: A Global Risk Analysis. World Bank and University of Columbia, US.
5. LEWIS, J. (1999) Development in Disaster-Prone Places, IT Press, London, UK.
6. BURTON, I.; Kates, R.W.; White, G.F. (1993) The Environment as Hazard, The Guildford Press, London, UK.

DM 705

Emergency Response Management

Cr. H. 3

COURSE LEARNING OUTCOMES:

Upon successful completion of the course, the student will be able to:

- **Understand** the emergency situation, response mechanisms, emergency response management and Guiding Principles of Emergency Planning.

COURSE OUTLINE:

Introduction

- Emergency management: a basic overview
- A brief history of emergency management in Pakistan
- The development and tasks of the emergency management system
- Characterizing emergency management activities
- Evaluation of the emergency management system

Determinants of Effective Emergency Management

- Understanding Hazard Exposure/Community Vulnerability
- Situational analysis
- Resource acquisition
- Assess Response Requirements and Capabilities
- Planning Process and planning activities: Horizontal vs Vertical
- Community Support and Community Resources
- Establishment of Local Emergency Management Committee

Emergency Management Considerations

- Direction and Control
- Communications
- Life Safety
- Property Protection
- Community Outreach
- Rehabilitation and Restoration
- Administration and Logistics
- Triage

BUILDING AN EFFECTIVE EMERGENCY MANAGEMENT ORGANIZATION

- Strengthening the capacities of Emergency Management Agencies
- PREPARATION OF EMERGENCY MANAGEMENT AGENCY'S PROGRAMME PLAN
- Staffing and Organogram
- BUDGET PREPARATION
- FUNDING SOURCES
- BUDGET MANAGEMENT

Guiding Principles of Emergency Planning

- Managing Resistance to the Planning Process
- Adopt a Holistic Approach
- Promote Multiorganizational Participation
- Identify Appropriate Actions while Encouraging Improvisation
- Link Emergency Response to Disaster Recovery and Hazard Mitigation
- Conduct Thorough Training and Evaluation
- Adopt a Continuous Planning Process

Roles and Responsibilities of Major Stakeholders in Emergency Response Management in Pakistan

- Federal Agencies
- Provisional Agencies
- District Agencies
- United Nations and INGOs
- Community, Individuals and Volunteers

Post Disaster Needs Assessment

- Rapid Need Assessment (Tools, Techniques and Methods)
- Damage Need Assessment (Tools, procedures and guidelines)

TEACHING METHODOLOGY

- Lecturing
- Written Assignments
- Interactive Sessions
- Seminar Lectures
- Audio-Visuals
- Field Visit to Rescue 1122, NEOC, PEOC and Joint Simulations on Response Management

ASSESSMENT CRITERIA:

First Term (20 %): Assignment, Quizzes, Group Activities, Simulations, Field Visit and Presentation

Mid Term (30%): Written Test (Long Questions, Short Questions and MCQs)

Final term (50%): Written Test (Long Questions, Short Questions and MCQs)

RECOMMENDED BOOKS:

1. ALEXANDER, David (2002) Principles of Emergency planning and Management. Terra Publishing, University of Minnesota, US.
2. BUCHANAN, Sally (2000) Emergency Preparedness. Preservation Issues and Planning. Chicago, American Library Association
3. GOODMAN, Louis J. and Love Ralph N. (2003) Project Planning and Management: an Integrated Approach. East-West, Mountain View, CA.
4. VAN Der Weide, A. (2003) Project Planning and Management, LEMMA, ISBN 90-5931-1523
5. WISNER, Ben; Blaikie, P.; Cannon, T. and Davis, I. (2004) At Risk - Natural Hazards, People's Vulnerability and Disasters. Routledge, London, UK.

DM 706

Disasters and Development

Cr. H. 3

Course Learning Outcomes:

Upon Successful completion of this course, the student will be able to:

- **Understand** the students about the interdependence of development measures and the natural hazards and disasters.
- **Explore** the necessity of the integration of disaster risk reduction into the development projects

COURSE CONTENTS:

- **Introduction**
 - Forging the links between disasters and development
 - NDMA Act 2010
 - The dilemma of sustainability
 - The Concept & Historical Perspective of Sustainable Development
- **Measures for Sustainable Development**
 - Medium Term Development Framework

- The Conceptual Relationship between Disasters and Development
- Disasters – A challenge for developing countries and development cooperation
- **Risk Factors in Development**
 - Global Risk Factors
 - The Disaster Risk Index
 - Risk Patterns at the National and Local Level
 - The Millennium Development Goals
 - Disaster Risk Reduction; An Instrument for Achieving Millennium Development Goals
- **Disaster and National Development**
 - Assessing the trade-offs in investing in vulnerability reduction
 - National Developmental Plans/ Legislation of Pakistan
 - Case studies

Teaching Methodology

- Lecturing
- Written Assignments
- Interactive Sessions

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. CARREÑO, M., Cardona, O., & Barbat, A. (2007) A disaster risk management performance index. *Natural Hazards*. 41 (1), 1-20.
2. DURYOG Nivaran (Organization). (2008) South Asia disaster report, 2008: Disaster and development in South Asia: connects and disconnects. Colombo: Duryog Nivaran Secretariat.
3. MIDDLETON, N. (1998) Disaster and development: The politics of humanitarian aid. London: Pluto Press.
4. PELLING, M. (2003) Natural Disaster and Development in a Globalizing World. London: Routledge.
5. UNDP. (2004) Reducing disaster risk: A challenge for development: A global report. New York: UNDP.

COURSE LEARNING OUTCOMES:

To familiarize with the physiographic personality of Pakistan:

Understand the nature, causes, consequences and remedies of the natural hazards occurring in Pakistan.

COURSE CONTENTS:**Introduction**

- Introduction to Natural Hazards
- Physiography of Pakistan
- Climate of Pakistan
- Ecological Regions of Pakistan
- Seismic Hazards Zones of Pakistan

Types and classification of hazards

- Introduction, Classification, Types, Causes, Estimation and Mitigation of Major Natural Hazards of Pakistan :
 - Floods
 - Earthquakes
 - Tsunami
 - Landslides
 - Desertification
 - Drought
 - Cyclone
 - Snow Avalanches
 - Glacial Lakes Outburst Floods (GLOFs)
 - Salinization
 - Heat and Cold Waves
 - Sea Water Intrusion

Hazards, Trends and Management

- Future Natural Hazards Trends in Pakistan
- Hazard Management Policies in Pakistan
- Structure for Disaster Risk Management in Pakistan
- Roles and responsibilities of key stakeholders for Disaster Risk Management in Pakistan

Case studies

- Case studies from some selected Natural Hazard prone areas of Pakistan

Teaching Methodology

- Lecturing
- Written Assignments
- Interactive Sessions

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Recommended Books:

1. Atta-Ur- Rahman, Amir Nawaz Khan, Rajib Shaw. 2015. Disaster Risk Reduction Approaches in Pakistan. Springer
2. Ben Wisner, J.C. Gaillard, Ilan Kelman. 2012. Handbook of Hazards and Disaster Risk Reduction. Routledge
3. AHMAD, N. and Qureshi, I. A. (1995) Disaster Management in Punjab: A study of flood management in district Jhelum. Pakistan Academy for Rural Development, Peshawar.
4. BIRKMANN, J. (2006) Measuring Vulnerability to Natural Hazards: Towards disaster resilient societies. Tokyo, United Nations University Press.
5. FOSTER, H. D. (1980) Disaster Planning: The preservation of life and property. Berlin, Springer Verlag.
6. HEWITT K. (1997) Regions of Risk: A Geographical introduction to disaster, Harlow, Longman.
7. KHAN, A.N. (1996) Planning for Reduction of Flood Hazard. Proceeding of Pakistan Geographical Association, Bahawalpur Conference.
8. McENTIRE, D. (2007) Disaster Response and Recovery: New Jersey, Oxford, UK.

DM 708

Community Based Disaster Risk Management

Cr. H. 3

COURSE LEARNING OUTCOMES:

Upon successful completion of the course, the student will be able to:

- **Understand** various participatory approaches and strategies and their application in Disaster Management.

COURSE OUTLINE:

Introduction

- Community and Society
- Evaluation of Social structure and social organization
- Myths and Realities in Disaster Situations

- Concept of Community Based Disaster Risk Management

SOCIAL CAPITAL AND PARTICIPATION THEORY

- Evolution of Social Capital Theory
- Types, Determinants, Dimensions and Levels of Social Capital
- Evolution of Participation Theory
- Application and Misuse of Participation
- Typologies of participation
- Socio-Cultural and Gender Issues in Participation

Participatory Disaster Risk Management Planning

- Rapport Building and Understanding the Community
- Participatory Community Risk Assessment
- Risk Management Planning through local stakeholders
- Participatory Implementation
- Participatory Monitoring and Evaluation

Disaster Risk Communication at Community Level/ Awareness in DRR

- Framework for Disaster Risk Communication
- Importance of Risk Communication
- Objectives of Risk Communication
- Risk Communication: Some Considerations
- Risk Communication: a Systematic Planning Approach
- Target Groups in Risk Communication
- Communicating Disaster Risks: Avoiding Myths
- Sources of Risk Messages
- Risk Communication Messages

National and International Policy Documents and CBDRM

- HFA, Sendai Framework and SDGs
- NDMA Act-2010, National DRR Policy-2013
- National Disaster Management Plan 2012-22
- Role of CBOs and NGOs

TEACHING METHODOLOGY

- Lecturing
- Written Assignments
- Interactive Sessions
- Group Activities
- Audio-Visuals

ASSESSMENT CRITERIA:

First Term (20 %): Assignment, Quizzes, Group Activities and Presentation

Mid Term (30%): Written Test (Long Questions, Short Questions and MCQs)

Final term (50%): Written Test (Long Questions, Short Questions and MCQs)

RECOMMENDED BOOKS:

1. CHAMBERS, R. (1997) Who's Reality Counts: Putting the Last First. Intermediate Technology Publications, London.
2. DERCOLE, Robert & Pigeon, P.M. (1998) Natural disasters in South East Asia and Bangladesh - Vulnerability Risks and Consequences. CRED, Brussels.
3. GUIJT, Irene and Kaul, Shah M. (1999) The myth of Community: Gender Issues in Participatory Development. Intermediate Technology Publication, London.
4. MOSSE, D, and Farrington, J. (1997) Development as Process: Concepts and Methods for Working with Complexity. Routledge, London and New York.
5. SASTRY, K. R. (2001) Improving Community Participation and People's Awareness in Disaster Reduction in Learning from Natural and Technological Disasters: Global Blueprints for Change. Institute of A. D. Hyderabad, India.
6. SAY, R. Y. (2002) Participatory Project Cycle Management (PPCM): A Planning Method for Community Development. Asian Productivity Organization (APO).

DM 709

Disaster Response and Recovery

Cr. H. 3

COURSE LEARNING OUTCOMES:

Upon successful completion of the course, the student will be able to:

EXPLAIN the importance of planned efficiency and effectiveness for disaster res and recovery

APPLY the principles of emergency management to multiple disaster types and settings, including both natural and man-made disasters.

PROPOSE a methodology for systematic planning of community wide recovery : disaster

COURSE CONTENT:

Introduction

- a. Overview of Response to Disasters
- b. Disaster Response Planning
- c. Disaster Response Roles and Responsibilities
- d. Overview of the Project Cycle

Emergency Management

- e. Initial Emergency Operations
- f. Emergency Operations Management
- g. Emergency Operations by Sectors

Response Planning

- h. Co-ordination of Planning and Planning for Co-ordination
- i. Developing and Documenting the Plan
- j. Monitoring and Evaluation
- k. Reporting of projects

Disaster Recovery

- l. Recovery Issues and Remedies
- m. Damage Need Assessment (DNA), Post Conflict Need Assessment (PCNA)
- n. Camp Coordination and Management
- o. Supply Chain and Ware House Management
- p. SPHERE standards
- q. UN Cluster System and International Appeal Process

Case Studies in International and National Context

Teaching Methodology

- Lecturing
- Interactive Sessions
- Written Assignments
- Seminar Lectures
- Documentaries

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. McENTIRE, D. A. (2015). Disaster response and recovery: Strategies and tactics for resilience (2nd ed.). Hoboken, NJ: Wiley
2. ASIAN Disaster Reduction Center, Kobe, Japan, Total Disaster Risk Management (Good Practices), 2005.
3. ECONOMIC Commission for Latin America and the Caribbean (ECLAC), 2003.
4. OXFAM. (1995). The Oxfam Handbook of Development and Relief, Oxfam, Oxford.

5. HANLEY, N., Spash, C. L. (1993). Cost-benefit analysis and the environment. Edward Elgar Publishing Ltd, Cheltenham
6. SAVE the Children (1996). Toolkits: A Practical Guide to Assessment, Monitoring, Review and Evaluation, Save the Children, London.
7. CERNEA M. M. (Ed) (1991). Putting People First, Sociological variables in rural development, Second Edition, A World Bank Publication, Oxford: Oxford University Press
8. ROBINSON, D. Hewitt, T. and Harris, J. (2000). Managing Development: understanding inter-organizational relationships, Sage Publications, London
9. WIELD D. (1999). Tools for project development within a public action framework, Development in Practice, Volume 9, Numbers 1 & 2. Sage Publications, London
10. WARREN, D.M. et al. (1995). The Cultural Dimensions of Development, Intermediate Technology Publications, London.

DM 710

Disaster Risk Reduction and Preparedness

Cr. H. 3

Course Learning Outcomes:

Upon Successful completion of this course, the student will be able to:

- **Understand** concepts and methodologies for disaster preparedness and response.
- **Suggest** workable plans for Risk Reduction

COURSE CONTENTS:

- **Conceptual and Methodological Issues**
 - Types of Disasters
 - Disaster management stages
 - Time Scale (pre, during and post disaster scenario)
 - Disaster Classification
 - Vulnerabilities, Impact and scale of damage
 - Coping Capacities Mechanism
 - Classification of damages and effects
 - Social, infrastructure, economic, environmental and overall effects of damages
- **Databases and Disaster Information**
 - Types and sources of disaster related information
 - Development of appropriate databases from community level to the national level
 - Database coordination, sharing and communication over time and space
- **Disaster Preparedness**
 - Situation Analysis (Risks, vulnerabilities & capacities)
 - Response Mechanism (existing and required)
 - Preventive measures / methodologies

- Preparedness Planning (Need for preparedness planning, Planning processes and elements)
- Mitigation Measures
- Coordination
- Resource Mobilization
- Information Management
- Early Warning System (existing and required)
- Public Education, Training and Rehearsals
- **Social and Economic Impact Assessment of Disasters**
 - Impact assessment framework/process
 - Tools and techniques
- **Contingency Planning and its Process**
 - Hazard and risk analysis, contingency prioritization
 - Scenario building
 - Preparing a contingency plan for each selected scenario
 - Rescue, relief, and evacuation planning
 - Monitoring and updating the contingencies plan
- **Integrating Disaster Preparedness with Development**
 - Mainstreaming DRR into Development
 - Structural Measures (Disaster shelters, Emergency housing, evacuation shelters, Retrofitting, etc.)
 - Non-Structural Measures
 - Legislations and Reforms (Building Code etc.)
 - Institutional Strengthening
- **Building Safer and Resilient Communities**
 - Risks and Needs of the communities:
 - Prone to natural disasters
 - Post disaster communities

Teaching Methodology

- Lecturing
- Written Assignments
- Interactive Sessions

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

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.
3. HANDBOOK for Estimating the Socio-economic and Environmental Effects of Disasters, Vol. 1 to 4, 2003.
4. Joseph Gustin, Disaster & Recovery Planning: A guide for facility managers, 4th Edition, Fairmont Press, 2002.
5. DONNA R. Childs and Stefan Dietrich, Contingency planning and disaster recovery, John Wiley and Sons, Inc., 2002.
6. WFP, Contingency Planning (Guidelines). UNHCR, Handbook for emergencies, 1982.

DM 711 Fundamentals of GIS and RS in Disaster Management Cr. H. 2+1

Course learning outcome:

Upon Successful completion of this course, the student will be able to:

- **Understand** the principles and practices in GIS and RS technology
- Apply various tools to manage pre and post Disaster DRR

Course Contents:

Concepts of Remote Sensing

- Historical evolution of GIS and Remote Sensing technology,
- Types of Remote Sensing,
- Electromagnetic spectrum, Interactions with the Atmosphere,
- Principle of Remote Sensing and Aerial photogrammetry
- Spectral Responses at various targets
- Scanners, Sensors

Data Sources, Types & Processing

- Data Sources (Analogue & Digital Data)
- Maps, satellite Images, GPS data
- Types of data sources in GIS
- Data collection and Integration
- Data models in GIS
- Datum, Projection and Coordinate System
- Data Resolution and Types of resolution

Image Classification, Processing /Enhancement and Lab work

- Principles of Image Classification
- Interpretation of elements
- Digital image processing (DIP)
- Image Interpretation/analysis

- Contrast Manipulation (level slicing, contrast stretching)
- Spatial Feature Manipulation (Spatial filtering, edge enhancement)
- Multi-image manipulations (band rationing and differencing, NDVI, HIS color space transformations)
- Unsupervised Classification
- Supervised Classification, Hybrid
- Signature selection, Supervised, unsupervised and hybrid classification,

Lab Work

- Geo-referencing
- Creation of feature class
- Data input and processing
- data Mosaicing
- Thematic Maps and their cartographic representation
- Data handling and Out put
- Use of remotely sensed data
- Image processing and extraction of features
- Hazard, vulnerability and risk mapping

Teaching Methodology

- Lecturing
- Written Assignments
- Interactive Sessions

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Recommended Books:

1. ABRAMS, J. and Hall, P. (2006) Mapping- New Cartographies of Networks and Territories. University of Minnesota Design Institute, Minnesota.
2. ARONOFF, S. (2005) Remote Sensing for GIS Managers: ESRI Press, New York.
3. CARLETON .A. (1990) Satellite Remote Sensing in Climatology: CBS Publishers and Distributor, New Delhi.
4. CARRARA and Guzitti (2001) Geographical Information System in Assessing Natural hazards: Dordrecht, Kluwer.

5. LILLESAND, T. M. (2006) Remote sensing and image interpretation: John Wiley & Sons, Inc. New York.
MASSER, I. and Blakemore, M. (1991) Handling Geographical Information: Methodology and Potential Applications. Longman. New York.

DM 712

Statistical Techniques in Disaster Management

Cr. H. 2+1

COURSE LEARNING OUTCOMES

Upon successful completion of the course, the student will be able to:

- **Understand** basics of statistics, data type, variable types and their level of measurement
- **Understand** statistical methods and techniques that are widely applied in social sciences and their application using SPSS environment
- **Choose** and **perform** a suitable statistical analysis in their research work

COURSE OUTLINE:

Introduction to Statistics

- Sample and Population
- Statistic and parameter
- Types of variables and their level of measurement
- Measure of central tendency
- Measure of dispersion

The SPSS Environment and Lab work

- The Data Editor
- Creating variables
- Entering data
- The output viewer
- Saving and retrieving files

Exploring Data in SPSS and Lab work

- Graphing and screening data
- Exploring groups of data
- Tests for normality of data

Bi-variant Correlation

- Correlation concepts
- How to measure relationship
- Graphing relationship
- Bivariate correlation
- Using R-square for interpretation
- Partial correlation
- How to report results

Regression Analysis

- An introduction to regression
- Simple regression in SPSS
- Interpreting simple regression
- Multiple regression: the basics
- Accuracy of regression models
- Multiple regressions in SPSS
- Methods of multiple regression
- Categorical predictors in multiple regression
- Interpreting and reporting multiple regression

Logistic Regression

- Background to logistic regression
- Methods of logistic regression
- Logistic regression in SPSS
- Interpreting the results
- Reporting the results

Comparing two Mean and Lab work

- Testing difference between means: t-test
- The dependent t-test
- The independent t-test

Comparing Several Means: ANNOVA and Lab work

- The theory behind ANNOVA
- One-way ANNOVA in SPSS
- Post hoc tests in SPSS
- Interpreting the results
- Reporting the results

Multivariate Analysis and Lab work

- Factor Analysis
- Discovering factors
- Factor analysis vs Principal Component Analysis
- Factor analysis in SPSS
- Factor scores
- Interpreting and reporting the results
- Reliability analysis in SPSS
- Measures of reliability
- Cronbach's alpha

Categorical data and Lab work

- Theory of analyzing categorical data
- Pearson's chi-square test
- Running chi-square on SPSS
- Interpreting and reporting results

Teaching Methodology

- Lecturing
- Assignments

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Recommended Books:

1. Ajai S. Gaur and Sanjay S. Gaur (2006). Statistical Methods for Practice and Research: A Guide to Data Analysis Using SPSS. SAGE publication New Delhi
2. Discovering statistics, using SPSS, third edition, Sage publication, 2009.
3. MYERS, Jerome L. and Well, Arnold D. (2002) Research Design & Statistical Analysis. 2nd Edition, Routledge, London, UK

DM 713

**Climate Change Adaptation and Disaster Risk
Reduction**

Cr. H. 2+1

Course Learning Outcomes:

Upon Successful completion of this course, the student will be able to:

- **Understand** the relationship between climate change adaptations and disaster mitigations.
- **Explore** the activities of all stakeholders working for climate change adaptation and disaster management in Pakistan

COURSE CONTENTS:

- **Introduction**
 - Climate change adaptations
 - Disaster mitigations
 - Climate models and international protocols
- **Natural Disaster Mitigations**
 - Floods and its mitigation.
 - Desertification and its mitigation.
 - Drought and its mitigation.
 - Landslide and its mitigation.
 - Glaciers outburst and associated hazards management.
- **Water Management and Lab work**

- Government and public sector stakeholders.
- NGOs and community participation
- Fluvial morphology
- Flood and Drought Resilience
- Hydrological modelling
- **Practical: Linking Adaptations and Mitigation and Lab work**
 - Uses and application of climate models
 - Forecasting and Early warning system
 - Multi-hazard forecasting and early warning mechanism in Pakistan
 - RADAR and Satellite based weather forecast
 - Mainstreaming climate change adaptation and disaster mitigation
 - Tools for Climate Change Adaptation

Teaching Methodology

- Lecturing
- Written Assignments
- Interactive Sessions
- Guest Speakers
- Visits of Met office

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Recommended books:

1. BURROUGHS, William James (2007) Climate Change: A Multidisciplinary Approach. 2nd Edition, Cambridge University Press, UK.
2. CLAUSSEN, Eileen (2001) Climate Change: Science, Strategies, and Solutions. Brill Co.,
3. DAVID, Satterthwaite et al. (2007) Urban Development and Climate Change. Human Settlements Working Paper Climate Change and Cities 1, International Institute for Environment and Development.
4. KININMONTH, William (2004) Climate Change: A Natural Hazard. Multi-Science, LEHMANN, Steffen (2010) The Principles of Green Urbanism: Regenerating the Post-Industrial City. Earthscan, London, UK

Other major/ core Courses

DM 721

Application of Geo-informatics in Disaster Management

Cr. H. 2+1

Course Learning outcomes:

Upon Successful completion of this course, the student will be able to:

- **Understand** the uses and application of GIS & RS technology in the field of Disaster Management
- **Apply** GIS & RS technology in the field of Disaster Management
This course would help the students to understand.

Course Contents:

1. **introduction**
 - Lithosphere, Atmosphere, Ionization, Ionic Sphere, Coupling Model, and its application in earthquake precursors,
 - Characteristics of Satellite Images,
 - Interpretation of satellite images,
 - identification and demarcation of important features,
 - Mapping from Satellite Images,
2. **Application of GIS/RS**
 - Application of GIS and RS in Disasters Forecasting and Management,
 - Navigation System
 - Identification of hazard prone areas
 - Uses and applications of multi-spectral, spatial, temporal remote sensing in flood risk management
3. **GIS based mapping**
 - Hazard mapping,
 - Vulnerability mapping,
 - Risk mapping,
 - Landslide susceptibility mapping,
 - seismic hazard mapping
4. **Case studies**
 - Comparative GIS based disaster related Case Studies,
 - Practical Exercises on creating various disasters maps using GIS software such as Arc GIS /ERDAS/MAP INFO/ILWIS.

Teaching Methodology

- Lecturing
- Written Assignments
- Interactive Sessions
- Guest Speakers
- Visits of Met office

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Recommended Books

1. ABRAMS, J. and Hall, P. (2006) Mapping- New Cartographies of Networks and Territories. University of Minnesota Design Institute, Minnesota.
2. ARONOFF, S. (2005) Remote Sensing for GIS Managers: ESRI Press, New York.
3. CARLETON .A. (1990) Satellite Remote sensing in climatology: CBS publishers and distributor, New Delhi.
4. CARRARA and Guzitti (2001) Geographical Information System in Assessing Natural hazards: Dordrecht, Kluwer.
5. LILLESAND, HOMAS M. & R.W. KIEFER, (1994): Remote Sensing and Image Interpretation: John Wiley Sons, Inc. New York.
LILLESAND, T. M. (2006) Remote sensing and image interpretation: John Wiley & Sons, Inc. New York

DM 722

Climate Change and Disasters

Cr. H. 3

Course Learning Outcomes:

Upon Successful completion of this course, the student will be able to:

- **Understand** the Man and environment interaction.
- **Interlink** the disasters and climate change.
- **Understand** the climate change at global, regional and local levels

COURSE CONTENTS:

- Introduction
- Concept of Climate Change and Disasters
- Weather and Climate
- Elements of Weather and Climate
- **Global Climate**
 - Global Climatic Regions
 - Role of Oceans
 - Surface current, El-Nino and La-lina Effect
 - Carbon Cycle

- Earth Heat Budget System
- Hydro-meteorological System
- **Causes of Climate Change**
 - Natural
 - Anthropogenic
- **Green House Effect**
 - Global Warming
 - Extreme Weather Events
 - Extreme Hydro-meteorological Events
- **Hydro-meteorology Disasters**
 - Global Distribution of Hydro-meteorological Disasters
- **Impacts of Climate Change**
 - Climate Change and Vulnerabilities
 - Climate Change Mitigation
 - Climate Change Adaptations

Teaching Methodology

- Lecturing
- Written Assignments
- Interactive Sessions
- Guest Speakers
- Visits of Met office

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. BURROUGHS, William James (2007) Climate Change: A Multidisciplinary Approach. 2nd Edition, Cambridge University Press, London, UK.
2. GAVIN, Schmidt and Wolfe, Joshua; Jeffrey, D. Sachs (2009) Climate Change: Picturing the Science, Earthscan, London, UK.
3. INTERGOVERNMENTAL Panel On Climate Change (IPCC) (2007), Climate Change 2007 - The Physical Science Basis Contribution of Working Group I to the Fourth Assessment Report of the IPCC.

4. KININMONTH, William (2004) Climate Change: A Natural Hazard. Multi-Science,
5. SMITH, Keith; Petley, David N. (2009) Environmental Hazards: Assessing Risk and Reducing Disaster. 5th Edition, Routledge, London, UK.

DM 723

Management of Desertification Hazard

Cr. H. 3

COURSE LEARNING OUTCOMES:

Upon Successful completion of this course, the student will be able to:

- **Understand** the concept and mechanism of desertification.
- **Analyse** the impact of desertification on agro-based economy
- **Evaluate** desertification and coping strategies

COURSE CONTENT:

1. Introduction

- The Concept of Desertification
- Causes and Consequences

2. Desertification Processes

- Occurrence and Distributions
- Man and Environment Relation
- Overuse of Resources
- Deforestation and Desertification

4. Mitigation Measures for Desertification

- Impacts of Desertification on Agro-based Economy
- Mitigation Measures for Desertification

5. Role of Institutions and Desertification

- Institutions, NGOs,
- Community Role in Mitigation

6. Case Studies

- Arid and Waterlogged Regions of Pakistan
- World Drought Regions

Teaching Methodology

- Lecturing
- Written Assignments
- Interactive Sessions
- Guest Speakers
- Visits of Met office

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Recommended Books:

1. ALSHARHAN, A.S.; Wood, W.W.; Goudie, A.S. Fowler, A. (2003) Desertification in Third Millennium. Proceedings of an International Conference, Dubai, 12-15 February 2000, Taylor and Francis,
2. CHOUHAN , T.S. (1992) Desertification in the World and its Control. Scientific Publishers,
3. JAIN, J. K. (1986) Combating Desertification in Developing Countries. UN Conference on Desertification, Scientific Publishers,
4. MARINI, Alberto; Talbi, Mohamed (2009) Desertification and Risk Analysis Using High and Medium Resolution Satellite Data. Springer,
5. MANNAVA, V.K.; Sivakumar, Ndegwa Ndiang'ui (2007) Climate and Land Degradation. Springer Berlin Heidelberg, Germany.

COURSE LEARNING OUTCOMES:

Upon Successful completion of this course, the student will be able to:

- **Understand** various issues created by disasters and inappropriate disaster management in developing and emerging economies like Pakistan.
- **Analyse** financial allocation made for disaster management and actual economic costs of natural hazards and disasters in Pakistan

Course Content:**1. Introduction**

- Economic Resilience to Natural and Man-made disasters
- Disaster Management in the economic perspective of governance
- Resource allocations to DRR and its critical evaluation

2. Impact of disasters

- Impacts of disasters on Balance of Trade of Pakistan
- Impacts of disasters on economic growth of Pakistan

3. Disaster and Economic policies and plan

- Mainstreaming of Disaster Management into Economic Polices of Pakistan
- Economic costs of disasters to Pakistan's economy
- National Developmental Plans
- Role of Development Finance in Disaster Management
- Process of financing development in Pakistan

4. Economy and Development

- Poverty eradication and sustainable livelihoods
- Demand and Supply of Development Finance
- Poverty Alleviation and Sustainable Livelihoods

Teaching Methodology

- Lecturing
- Written Assignments
- Interactive Sessions
- Guest Speakers
- Visits of Met office

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)
- Final Term (50%)**
- Written (Long Questions, Short Questions, MCQs)

Recommended Books:

1. FENGLER, W., Ihsan, A., & Kaiser, K. (2008) Managing Post-Disaster Reconstruction Finance -- International Experience In Public Financial Management. Policy research working papers, 4475. Washington: The World Bank.
2. KHAN, M. A. (2007) Disaster preparedness for natural hazards: Current status in Pakistan. Kathmandu: International Centre for Integrated Mountain Development.
3. NATIONAL Disaster Management Authority (Pakistan) (2007) National disaster risk management framework Pakistan. Islamabad: National Disaster Management Authority, Govt. of Pakistan.
4. QURASHI, A., Tirmizi, S. M., & Rehman, N. (2006) In the wake of the earthquake. [Rawalpindi]: ISPR.
5. RASHID, A. (2006) The worst disaster of Pakistan: The calamity, agony and revival. Rawalpindi: Image Impact.
6. STATE Bank of Pakistan (Karachi) (2005) Handbook of statistics on Pakistan economy

DM 725

Disaster Management Policies

Cr. H. 3

COURSE LEARNING OUTCOMES:

Upon successful completion of the course, the student will be able to:

Understand national DM framework and legislations with respect to international context.

Analyze national DM policies for correct application into mainstreaming for sustainable development.

COURSE CONTENTS:

1. **Introduction**
 - Evolution of national framework
 - National DM framework with respect to the hazards, vulnerabilities, dynamic pressures and disaster risks
 - International DRR policies like Yokohama Strategy, The Geneva Mandate, Kyoto Protocol, Hyogo Framework for Action (HFA) and Sendai Framework for DRR etc and national aspirations
 - Challenges and opportunities in national and international DRM and DRR frameworks
2. **DRR and DRM Structure**

- National Platforms for DRR. Their definition, objectives, principle composition and major functions.
 - National organizations working on disaster management and responsibilities of key stakeholders.
 - International and Regional DRR structure and its linkages with national platforms.
3. **Sectoral DRM Policies, Laws, Protocols and Plans**
 - National
 - Regional
 - International
 4. **DRM Legislative Framework**
 - Civil Defence Act - 1952
 - The National Calamities Act - 1958 (West Pakistan Calamities Act)
 - Local Government Ordinance - 2001
 - Emergency Services Ordinance - 2002
 - National Disaster Management Ordinance – 2006
 - Disaster Management Act - 2010
 - ERR Act - 2011
 - Environmental Legislation. Karachi Port Trust (Amendment) Ordinance – 1994, National Fund for Cultural Heritage Act – 1994, Agricultural Pesticides (Second Amendment) Ordinance-1995, AJK Environmental Protection Act – 1996 Pakistan Environmental Protection Act – 1997 and Federal Environmental Rules and Regulations.
 5. **Policy Formulation**
 - Guiding principles
 - DRM priorities
 - Processes
 - Implementation strategies and techniques
 6. **Policy Analysis**
 - Concept review
 - Application modalities
 - Implementation strategies
 - Policy writing

Teaching Methodology

- Lecturing
- Written Assignments
- Interactive Sessions
- Guest Speakers
- Visits of Met office

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Recommended Books:

1. Bardach, E. (2000) A practical guide for policy analysis. The eightfold path to more effective problem solving. New York, N.Y.: Chatham House Publishers, Seven Bridges Press. <http://www.netlibrary.com>
2. Inter-Agency Secretariat of the ISDR (2007) Hyogo Framework for Action 2005-2015: Building the resilience of nations and communities to disasters. Geneva: UN, ISDR
3. Inter-Agency Secretariat of the ISDR (2007) Words into action: A guide for implementing the Hyogo Framework. Geneva: UN, ISDR.
4. Pinkowski, J. (2008) Disaster management handbook. Boca Raton: CRC Press.
5. SINHA, P. C. (2006) Disaster management process: Law, policy and strategy. New Delhi: SBS Publishers & Distributors Pvt. Ltd.
6. Stokey, E., & Zeckhauser, R. (1978) A primer for policy analysis. New York: W.W. Norton.

DM 726

Disaster Risk and Vulnerabilities Assessment

Cr. H. 2+1

Course Learning outcome:

Upon successful completion of the course, the student will be able to:

- **Understand** different disaster risk and vulnerabilities assessment
- **Apply** various approaches in carrying out vulnerability and risk assessments

Course Contents:

1. **Risk identification**
 - Understanding of Risk and Hazards
 - Element at Risk and vulnerabilities
 - Types of vulnerabilities(social, political, economic and geographical)
 - Scale of vulnerabilities (local, regional and national level)
2. **Risk perception**
 - Theories of Risk Perception

- Underlying factors for Risk Perception
- Biases of Risk Perception
- 3. Types, magnitude and frequency relationship**
 - Risk and uncertainty
 - Certainty and probability
 - Hazard prediction - trend projection
 - Hazard prediction -magnitude/frequency analysis
 - Catastrophes
- 4. Vulnerability and Capacity Assessment (VCA)**
 - VCA ; Concepts and Definition
 - Purpose of VCA
 - Process of VCA
 - Outcome of a VCA
 - Community Based VCA
 - Disasters, vulnerability and Capacity assessment techniques
 - Disasters and development
- 5. Formulation of Spatial Data in Lab**
 - Spatial data quality, decision making and policy analysis
 - The need for spatial metadata
 - Deriving data quality information in GIS
 - Positional accuracy
 - Completeness and logical consistency
 - Attribute accuracy
 - Storing and displaying spatial metadata
- 6. Spatial Analysis for Hazard/ Risk mapping in Lab**
 - Hazard Mapping and Risk Assessment
 - Elements of Hazard Mapping
 - Approaches & Methodologies: Qualitative and Quantitative Risk Mapping
 - Elements of Hazard Mapping
 - Data Requirements & Availability
 - Data Standardization
 - Target User
 - Scale
 - Cost and Accuracy
 - Types of Hazard Mapping
 - Flood
 - Landslide
 - Seismic
- 7. Field survey: Community Hazard Mapping**
 - Need for Community Hazard Mapping
 - Process/ Methodologies
 - Community Threat
 - Scientific Information

Teaching Methodology

- Lecturing
- Written Assignments
- Interactive Sessions
- Guest Speakers
- Visits of Met office

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Recommended Books:

1. INTERNATIONAL Workshop on Disaster Risk Mitigation: Potential of Micro-Finance for Tsunami Recovery, Dhar Chakrabarti, P. G., & Bhat, M. R. (2006) Micro-finance and disaster risk reduction: Proceedings of International Workshop on Disaster Risk Mitigation: Potential of Micro-Finance for Tsunami Recovery New Delhi, October 14-15, 2005. New Delhi: National Institute of Disaster Management in association with Knowledge World.
2. UNITED States. (2002) Catastrophe insurance risks The role of risk-linked securities and factors affecting their use. [Washington, D.C.]: U.S. General Accounting Office
3. HANDBOOK: International Federation of Red Cross and Red Crescent Societies. What is VCA? An introduction to vulnerability and capacity assessment.
4. VULNERABILITY and Risk Assessment Disaster Management Training Programme www.iaemeuropa.terapad.com/.../UN%20DMTP%20-%20Vulnerability.pdf
5. DISASTER Risk Management and Vulnerability Reduction www.adpc.net/infores/adpc-documents/PovertyPaper.pdf
6. MULTI Hazard Risk Assessment using GIS www.adpc.net/audmp/rllw/themes/th1-westen.pdf

Course Learning outcome:

Upon successful completion of the course, the student will be able to:

- Understand the tools and techniques used for disaster risk financing.
- Gain hands on knowledge of disaster risk financing.

Course Contents:**1. Introduction**

- Significance of Disaster Risk Financing
- Inter-regional disaster risk financing mechanisms
- Fiscal disaster risk financing mechanisms at the country level

2. Role of public and private partnership

- The role of public-private partnerships in disaster insurance
- Cost – Benefit Analysis of Disaster Risk Financing

3. Risk Transfer

- Risk Transfer and Finance
- Risk Financing Instruments
- Micro Credit in DRR
- The role of private disaster insurance in disaster risk financing

4. Risk Financing in Pakistan

- Financial Arrangement for Disaster Management in Pakistan
 - Prime Minister's Disaster Relief Fund
 - Risk Mitigation Fund
 - Drought Emergency Relief Assistance

Teaching Methodology

- Lecturing
- Written Assignments
- Interactive Sessions
- Guest Speakers
- Visits of Met office

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Recommended Books:

1. FROOT, K. (1997) The limited financing of catastrophe risk: An overview. Cambridge, MA: National Bureau of Economic Research.
2. GLOSEMEYER, L. (1987) Pooling for natural hazard loss and the federal program. Chapel Hill, N.C.: Center for Urban and Regional Studies, University of North Carolina at Chapel Hill.
3. INTERNATIONAL Workshop on Disaster Risk Mitigation: Potential of Micro-Finance for Tsunami Recovery, Dhar Chakrabarti, P. G., & Bhat, M. R. (2006) Micro-finance and disaster risk reduction: Proceedings of International Workshop on Disaster Risk Mitigation: Potential of Micro-Finance for Tsunami Recovery New Delhi, October 14-15, 2005. New Delhi: National Institute of Disaster Management in association with Knowledge World.
4. KREIMER, A. (1999). Managing disaster risk in Mexico Market Incentives for Mitigation Investment. Washington, D.C.: World Bank, Disaster Management Facility.
5. UNITED States. (2002) Catastrophe insurance risks The role of risk-linked securities and factors affecting their use. [Washington, D.C.]: U.S. General Accounting Office

DM 728

Disasters Risks and Urbanization

Cr. H. 3

Course Learning Objectives:

After successful completion of the course, the students will be able to:

Understand the process of urbanization, its causes and impacts

Analyse urban disasters especially within urban slums and squatter settlement

Apply urban growth management strategies to cope with the urban disaster risks

Course Contents:

Introduction

- Introduction to Disasters Risk and Urbanization and their relationship

Urbanization

- Understanding of city functions and forms
- Population distribution in city and social classes
- Pattern of Urbanization in Developed and Developing Countries
- Urbanization (Definition, Causes, Impacts)
- Problems of Urbanization

Disaster Risks in Urban Environment

- Hazards in urban environment.

Fire, Chemical Hazards, nuclear, epidemics, flood, earthquake, windstorm, hailstorm etc.

- Vulnerabilities in urban areas.
- Population distribution, housing structure, building codes, accessibility conditions, emergency services etc.
- Geology, hydrology, drainage, soil etc.

Urban Risk Assessments

- Hazard, Exposure and Vulnerabilities, and Capacity assessment in urban areas.
- Risk Reduction Measures.
- Improvement of civic services, urban growth and management
- Emergency response management.

Teaching Methodologies:

- Lectures and case studies
- Documentaries and visuals
- Interactive discussions and talks
- Assignments and quizzes

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Recommended Books:

1. Eric Dickson, et.al. (2012) Urban Risk Assessments; Understanding Disaster and Climate Risk in Cities, World Bank, Washington
2. FERGUSON, Ronald F.; Dickens, William T. (1999) Urban Problems and Community Development. Brookings Institution Press.
3. Misra, R.P. (2013) Urbanization in South Asia; Focus on Mega Cities, Foundation Books, New Delhi
4. PACIONE, Michael (1990) Urban Problems: An Applied Urban Analysis. Routledge Taylor & Francis Group,
5. PELLING, Mark; Wisner, Ben (2008) Disaster Risk Reduction: Cases from Urban Africa. Earthscan Publications Ltd., London, UK.
6. PUGH, Cedric (1996) Sustainability the Environment and Urbanisation. Earthscan, London, UK

7. Rahman A, Khan AN, Shaw R. 2015. Disaster Risk Reduction Approaches in Pakistan. Springer, Tokyo
8. Shaw R, Rahman A, Surjan A, Parvin GA. 2016. Urban Disasters and Resilience in Asia. Elsevier, New York.
9. SHAW, Rajib; Srinivas, Hari; Sharma, Anshu (2009) Urban Risk Reduction: An Asian Perspective. Community, Environment and Disaster Risk, Emerald Group Publishing Limited.

DM 729

Management of Drought Hazard

Cr. H. 3

COURSE LEARNING OUTCOMES:

Upon successful completion of the course, the student will be able to:

- **Understand** the nature, causes, consequences and remedies of the drought hazard.

COURSE OUTLINE:

1. Introduction and Overview

- Hydrologic cycle and processes
- Hydrologic measurements
- Extreme hydro-met events
- Drought as Natural hazard
- Types and Classification of Drought
- Standardised Precipitation Index
- Standardised Evapo-transpiration index
- Drought and Koppen climate classification

2. Hydrology of Droughts

- Estimation techniques (unit hydrograph, statistical analysis)
- Drought types and severity
- Hydrologic and hydraulic models
- Fluvial morphology

3. Forecasting and Warning System

- Overview of forecasting models
- Tools and techniques for drought forecasting
- Weather RADARS and Satellite based approaches
- Drought Warning and adaptations
- Warning procedure and dissemination

4. Impacts and Assessment

- Impacts: physical, socio-economic and environmental
- Drought Assessment tools and techniques
- Drought assessment indices

- Vulnerability and capacity assessment
 - Stakeholder participation
- 5. Droughts and Mitigation**
- Mitigation and Adaptation Measures
 - Drought Damages
 - Drought Management
 - Institutional Arrangement
 - Collaboration and Coordination
- 6. Risk Management**
- Framework of risk management
 - Risk decision-making principles
 - Risk assessment methods
 - Prevention, preparedness and mitigation
 - Tools, strategies and organizational arrangements
- 7. Case Studies from Pakistan and around the Globe**

Teaching Methodology

- Lecturing
- Written Assignments
- Documentaries

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Recommended Books:

1. AHMAD, S. H.; Qureshi, Z.; Majeed, R.; Saleem, M. (2004) Drought Mitigation in Pakistan: Current Status and Options for Future Strategies . IWMI, Working Paper 85.
2. LENA, M. Tallaksen; Van Lanen, A. J. (2004) Hydrological Drought: Processes and Estimation Methods for Stream Flow and Ground Water. Developments in Water Science, Elsevier, New York, US.
3. MANNAVA, V.K.; Sivakumar, Ndegwa Ndiang'ui (2007) Climate and Land Degradation. Springer Berlin Heidelberg, Germany.
4. Rahman A, Khan AN, Shaw R. 2015. Disaster Risk Reduction Approaches in Pakistan. Springer, Tokyo

5. RICHARD A. Warrick (Latest version) Drought hazard in the United States: A Research Assessment. University of Colorado Press, Boulder, Co., US.
6. Shaw R, Rahman A, Surjan A, Parvin GA. 2016. Urban Disasters and Resilience in Asia. Elsevier, New York.

DM 730

Management of Earthquake Hazard

Cr. H. 2+1

COURSE LEARNING OUTCOMES:

Upon successful completion of the course, the student will be able to:

Understand the nature, causes and consequences of the earthquake hazards

Apply the knowledge and tools for earthquake hazards assessment and risk mitigation

Course outline:

1. Introduction

- a. Basics on Earthquakes (Plate Tectonics, Faults, Size and Location of Earthquakes)
- b. Seismology, Seismic Waves and Seismometry
- c. Introduction to national/international Seismic Monitoring Stations and Networks

2. Seismic Hazards and Lab work

- a. Primary, Secondary and Tertiary Hazards (Ground Shaking, Land-Sliding, Liquefaction, Tsunami, Fires, etc.)
- b. Strong Ground Motions Parameters and Characterization
- c. Attenuation Relationships/Ground Motions Prediction Equations (GMPEs) and Applications
- d. Seismic Hazard Analysis (Deterministic & Probabilistic Seismic Hazard Analysis)
- e. Case Studies: DSHA and PSHA
- f. Local site-effects, geotechnical investigations and seismic soil-response analysis (Deep Soil,)
- g. Evaluation of Landsliding and Liquefaction Hazards
- h. Seismic Micro-Zonation and Zoning

3. Seismic Risk and Lab work

- a. Exposure Characterization
- b. Field Visits (understand Urban Building Typologies)
- c. Seismic Vulnerability/Fragility Assessment (Empirical, Experimental, Analytical)
- d. Seismic Hazard Assessment Procedures (CRISIS/EZ-FRISK, OpenSHA)

- e. Vulnerability of lifeline Structures (Transportation, Bridges, Dams, Electrical Communication, etc.)
 - f. Introduction to Earthquake Loss Estimation Tools/Methods/Procedures (EMS-98, RADIUS, GEM, etc.)
 - g. Seismic Risk Assessment Case Studies: Damage Assessment and Loss Estimation
- 4. Seismic Risk Mitigation and Lab based exercises**
- a. Traditional and Vernacular Constructions as Earthquake-Resistant
 - b. Building Codes and Standards/Guidelines for Earthquake-Resistant Constructions
 - c. Field survey and building codes applications
 - d. Design and Drawing of Seismic resilient structures
 - e. Advanced Risk Mitigation Techniques (Strengthening/Retrofitting, Isolation, Seismic Energy Dissipation Devices)
 - f. Earthquake Prediction and Early Warning Systems
 - g. Earthquake Insurance Modelling

Teaching Methodology

- Lecturing
- Written Assignments
- Case Studies
- Mini Projects
- Softwares Application

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. BOLT, A.B., FREEMAN, W.H. (1987) Earthquakes. New York, USA.
2. STEIN, Seth, WYSESSION, M. (2006) An Introduction to Seismology, Earthquakes and Earth Structure, Blackwell Publishing Ltd.
3. COBURN, Andrew and Robin, Spence (2002) Earthquake Protection. John Wiley & Sons Ltd., New York, US.
4. DOWRICK, David (2003) Earthquake Risk Reduction. John Wiley & Sons Ltd., New York, US.

5. Grunthal, G., Musson, R.M.W., Schwarz, J., and Stucchi, M. (1998). European Macroseismic Scale-1998 (EMS-98). Cahiers du Centre Europeen de Geodynamique et de Seismologie, Vol. 15.
6. RADIUS Tool: Risk Assessment Tools for Diagnosis of Urban areas against Seismic Disasters, IDNDR secretariat, OCHA, United Nations, Geneva.
7. CRISIS (2007). Program for Computing Seismic Hazard. UNAM, Mexico.
8. EZ-FRISK. Seismic hazard analysis.
9. OpenSHA: open-source platform for Seismic Hazard Analysis. www.opensha.org
10. DeepSoil. 1D Equivalent Linear and Nonlinear Site Response Analysis. UIUC, USA.
11. McGuire, R.K. (2004) Seismic Hazard and Risk Analysis, Earthquake Engineering Research Institute (EERI), Oakland, CA, USA.
12. FEMA (2003). HAZUS-MH, Technical Manual, Federal Emergency Management Agency (FEMA). Washington, DC, USA.
13. BOZORGNIYA, Y., Bertero, V.V. (2006) Handbook: Earthquake Engineering – From Engineering Seismology to Performance-Base Engineering. CRC Press
14. BCP-SP (2007) Building Code of Pakistan – Seismic Provisions. Ministry of Housing and Works, Islamabad.
15. GEM: Open Tools for Earthquake Loss Modelling. Pavia, Italy.

DM 731

Economics of Disasters

Cr. H. 3

COURSE LEARNING OUTCOMES:

Upon successful completion of the course, the student will be able to:

Understand the positive role of economics in achieving disaster risk reduction

Apply tools and techniques for the proper assessment of disaster damages

Course Contents:

Introduction

- Understanding the economic and financial impacts of disasters
- Economic Impacts of Disasters in Pakistan
- Nature of Economic Aid after Disasters

Level of Economic impacts

- Macro-economic impacts of disaster
- Micro-economic Impacts of Disasters

Risk sharing and financing

- Insurance Against Disaster Losses
- Financial and economic tools

- Effects of Disasters on Capital Accumulation
- Economic Resilience to Disasters
- Public Finance and Disasters

Cost of Disasters

- Economic cost of Disasters
- Cost – Benefit Analysis of DRR
- Financing the Cost of Future Disasters
- Significance of Insurance in risk reduction across developing countries
- Making Disaster Risk Reduction and Insurance Work Together.

Teaching Methodology

- Lecturing
- Written Assignments
- Case Studies
- Mini Projects
- Softwares Application

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Recommended Books:

1. JONES, E. C., & Murphy, A. D. (2009) The political economy of hazards and disasters. Lanham: AltaMira Press.
2. KERN, W. S. (2010) The economics of natural and unnatural disasters. Kalamazoo, Mich: W.E. Upjohn Institute for Employment Research
3. LOMBORG, B. (2007) Solutions for the world's biggest problems: Costs and benefits. Cambridge: Cambridge University Press
4. PELLING, M., Özerdem, A., & Barakat, S. (2002) The macro-economic impact of disasters. Emmitsburg, MD: National Emergency Training Center].
5. ROSE, A., & Liao, S.-Y. (2005) Modeling regional economic resilience to disasters: A computable general equilibrium analysis of water service disruptions. Emmitsburg, MD: National Emergency Training Center].
6. WORTHINGTON, A., & Valadkhani, A. (2004) Measuring the impact of natural disasters on capital markets: An empirical application using

intervention analysis. Emmitsburg, MD: National Emergency Training Center.

DM 732

EIA and Risk Assessment

Cr. H. 3

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

1. Understand the entire EIA / IEE processes for minimising occurrences of natural vs man-made disasters associated with new development schemes
Apply EIA techniques for impacts analysis of development projects in different sectors

Course Contents:

1. Introduction

- Introduction to Basic Concepts in Environment and its Main Components
- Interdependence / Interrelationship between the Environment and Development, Environment as Repository of Resources for Development, Development' Influence on the Environment
- IEE / EIA Concepts and its Rationale for New Development Projects / Programs

2. Environmental Legislations in Pakistan

- Environmental Legislations (Pakistan Environmental Protection Ordinance 1983, Pakistan Environmental Protection Act 1997),
- Main Features and Legislative Provisions for IEE / EIA
- IEE / EIA Regulations 2000, Public Participation and Post Auditing / Monitoring under the Regulations

3. EIA /IEE Process and methodologies

- Overview of EIA Processes and its Relation / Integration at the Project Level
- EIA Methodologies, Concept and their Classification vis a vis Advantages and Disadvantages of Different Methodologies,
- Categorisation of Development Projects and Impacts Analysis of Sectoral Development Projects

4. Baseline data and mitigation

- Baseline Data Collection and Impacts Predictions in EIA
- Public Involvement in EIA: Public Consultation, Review and Public Hearing for Minimization of Adverse Impacts Causative of Potential Disasters.
- Mitigation Measures and Development of Environmental Management Plan (EMP)

Teaching Methodology

- Lecturing

- Written Assignments
- Case Studies
- Mini Projects
- Softwares Application

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Recommended Books:

1. CLARK, B. D., Chapman, K., Bisset, R, Wathern, P. and Barret, M., (2001) A Manual for the Assessment of Major Developments: London.
2. ESCAP (1985) Environmental Impact Assessment: Guidelines for Planners and Decision Makers, ESCAP, Bangkok.
3. GOVERNMENT of Pakistan (GoP), (1997) Pakistan Environmental Protection Act 1997, Gazette of Pakistan.
4. GOVERNMENT of Pakistan (GoP), (2000), Review of Initial Environmental Examination and Environmental Impact Assessment Regulations 2000, Ministry of Environment, LG & RD, Islamabad.
5. Rahman A. 2010. Ex Post Environmental Impact Assessment: A Regional Perspective. VDM Verlag Publishing co. Ltd Germany, ISBN 978-3-639-19563-7. Pages-293.
6. UNITED Nations Environment Programme, (1988) Environmental Impact Assessment: Basic Procedures for Developing Countries. UNEP, Nairobi.
7. WATHERN, P. (2000) Environmental Impact Assessment: Theory and Practice, Academic Division of Unwin Hyman Ltd.

DM 14

Management of Flood Hazard

Cr. H. 2+1

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:
 understand the nature, causes, consequences and remedies of the flood hazard
 apply flood management techniques

Course Contents:

Introduction

- Overview of Flood Hazard
- Characteristics of Flood
- Floodplain and flood management

Types, Causes and impact of floods

- Types of Floods (Riverine flood , Flash flood, Coastal flood, GLOF)
- Causes of Floods
 - Meteorological
 - Hydrological
 - Anthropogenic
- Flood Intensifying Conditions
- Impacts of flood

Flood and assessment models and lab based exercises

- Flood Hazard Assessment
- Integrated Flood Risk Management
- Flood modelling
- Use of HEC-RAS and Geo-RAS

Flood Management and field survey

- Flood and Challenges in Flood management
- Flood dealing line agencies and their responsibilities
- Flood Mitigation Measures
 - Structural (Engineering Protection) and design
 - Non-structural (Forecasting techniques, Planning and Policies)
- Early Warning System for Floods

Field survey

- Flood hazard mapping and zonation
- Land use planning and zoning in floodplain

Recommended Books:

1. HEWITT, K. (1997) Regions of Risk: A Geographical introduction to disaster, Harlow, Longman.
2. KUMAR, N (2006) Disaster Management Progressive international Agencies (PVT) Limited, New Delhi, India.
3. MARTINI (2002) Flood & Mega flood Process and Deposit: Recent & Ancient Examples Multi-Lines Books Lahore. Pakistan
4. ROSENFELD, C. (1994) Flood Hazards Reduction: GIS maps, survival strategies in Bangladesh. Geo Info Systems, Dacca.
5. SMITH, K. (1992) Environmental Hazards: Assessing and reducing disasters. Routledge, London, UK.
6. WISNER, Piers Blaike (2004) At Risk- Natural Hazards, Peoples, Vulnerability and Disaster, Ben Vanguard Books (PVT) Limited Lahore.

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

Understand the causes, consequences and impacts of hydro-meteorological hazards.

Apply the forecasting techniques of hydro-meteorological hazards.

Course Contents:**Introduction to course**

- Introduction to the forecasting of hydro-meteorological hazards.
- Atmospheric circulations
- Climatology and Meteorology

Atmosphere and weather phenomena

- Vertical and horizontal distribution of temperature and pressure.
- Types of clouds and precipitation.
- Measuring instruments.
- Weather phenomenon
- Weather forecast and tools

Meteorology, Hydrology and Hazards

- Physiography and climate
- Meteorology and Hydrology
- Types of hydro-meteorological hazards.
- Basic elements of hydro-meteorological hazards (Intensity, density, exposed population and property)

Forecasting of Hydro-metrological hazards

- Measuring and presentation of the hydro-meteorological hazards (Scale, level and end user).
- Use of modern technology in forecasting
- Multi-hazard Forecasting system
- Major stakeholders (Government, public and international institutions).
- Forecasting of hydro-meteorological hazards.
- Early warning system for different hazards.

Recommended Books:

- 1 CAMPUS, Stefano et al. (2007) Evaluation and Prevention of Natural Risks (Balkema-Proceedings and Monographs in Engineering, Water, an). Taylor & Francis, 1 Edition, UK.
- 2 MILES, Elizabeth (2005) Forecasting the Weather. Heinemann-Raintree, UK.
- 3 RODGERS, Alan; Streluk, Angella (2007) Forecasting the Weather (Measuring the Weather). Heinemann Educational Books, UK.
- 4 SENE, Kevin (2010) Hydrometeorology: Forecasting and Applications. Springer, Berlin, Germany.

- 5 SINGH, R. P.; Vijay, P. (2009) Applied Hydrometeorology. Springer and Capital Publishing Company, ISBN: 978-1-4020-9843-7

DM 735

Gender Mainstreaming in Disaster Management

Cr. H. 3

COURSE LEARNING OUTCOMES:

Upon successful completion of the course, the student will be able to:
Understand the impacts of disaster on women and
Analyse the contribution of women in disaster management

COURSE CONTENTS:

1. Introduction

- Basic Concepts of gender
- Difference between Women's Studies and Gender Studies
- Gender lens, sex disaggregated data, gender discrimination.
- Gender sensitivity and gender sensitization.
- Importance of gender analysis in framing policies, programs and projects
- Gender equality and equity
- Understanding the concept of gender division of labor

2. Gender Mainstreaming

- Explanation of the concept
- Importance of gender mainstreaming in policies, programmes and projects
- Strategies for gender mainstreaming
- Process of gender mainstreaming in an organization
- Qualities required at individual level for gender mainstreaming policies
- Strategies for successful implementation of gender mainstreaming in an organization

3. Gender and Development

- Effect of development process on women and men
- Women and development
- Approaches to gender and development
- The Welfare Approach
- The WID Approach
- Women and Development Approach (WAD)
- The Efficiency Approach
- The Empowerment Approach
- Gender and Development Approach (GAD)

4. Gender inequality

- Distributive and Relational aspects of gender inequality
 - Norms of Patriarchy
 - Impact of Modernization
 - Impact and influence of supreme powers in the developing countries
 - Colonialism, imperialism and development
 - Impact of Colonialism and imperialism on women development
 - Women in development programmes
- 5. Gender equality and the Sustainable Development Goals**
- The Millennium Development Goals
 - Indicators of gender equality
 - Gender equality and poverty
 - Gender equality and health & nutrition goals
 - Gender equality and environment
 - Analysis of situation in Pakistan
- 6. Gender and gender relations in disasters**
- Perspective of gender: A missing element in disaster
 - Gender inequality, vulnerability and disaster
 - Gender Specific Needs and Issues
- 7. Role of women in disaster management**
- Differential impact of disaster on women in different life cycle stages
 - Women involvement in reconstruction and development phase following an emergency and/or disaster
 - Psychosocial considerations: prevention, mitigation and preparedness
 - Community mobilization through women
 - Gender Equality and Human Development Outcomes: Enhancing Capabilities
 - Case studies of women responding to disaster

TEACHING METHODOLOGY

- Lecturing
- Written Assignments
- Interactive Sessions
- Audio-Visuals
- Seminar Lectures
- Field Visits

ASSESSMENT CRITERIA:

First Term (20 %): Assignment, Quizzes, Group Activities and Presentation

Mid Term (30%): Written Test (Long Questions, Short Questions and MCQs)

Final term (50%): Written Test (Long Questions, Short Questions and MCQs)

Recommended Books:

1. ANDERSEN, ML. and Dana, Hysock (2006) Thinking about Women: Sociological Perspectives on Sex and Gender. Allen & Bacon, New York.

2. ARIYABANDU, M. M. and Wickramasinghe, Maithree. (2005) Gender Dimension in Disaster. Raj Press, New Delhi.
3. BRAWD SHAH, Sarah. (2013). Gender, Development and Disaster. Edward Elgar Cheltenham, United Kingdom
4. ENARSON, Elaine and Chakrabarti, P G Dhar (2009). Women, Gender and Disaster: Global Issues and Initiatives. SAGE Publication Lts California, USA
5. PACHLOK, Shelley (2013) Into the Fire: Disaster and Remaking of Gender. University of Toronto Press, London 2013

DM 736

Geomorphology and Natural Hazards

Cr. H. 3

COURSE LEARNING OUTCOMES:

Upon successful completion of the course, the student will be able to:

- Acquire the knowledge about the formation of various landforms on the surface of the earth.
- Understand the geomorphic processes by which various types of structures developed on the earth surface
- Apply the relationship between geomorphic processes and natural hazards

COURSE CONTENTS:

- Introduction to Geomorphology (Scope and Importance, Geomorphology and Environment, Geomorphic Change and Man)
- Geomorphological processes and its classification;
- weathering and erosion;
- Glaciers, their erosional and depositional landforms;
- Geological work of wind and associated features;
- Erosional and depositional work of surface and subsurface water;
- Valley and base-level development and its types;
- Drainage pattern, Drought
- Desertification, Causes and its Implications
- Stream meandering and development of flood plains;
- The erosional and depositional work of sea; development of coastal landforms;
- geomorphic cycles and associated landforms produced by tectonics and volcanic activity
- Effect of landslides and volcanoes on geomorphological land forms
- Introduction to topographic maps; aerial photographs and satellite imageries.
- Monitoring of Geomorphological Changes in the Environment
- Techniques of Geomorphological Mapping
- Geomorphology and Environmental Management

- Geomorphology in Disaster Planning and Management

Teaching Methodology:

- Lectures
- Field visits
- Assignments
- Documentaries

Assessment Criteria:

- Subjective and objective type questions
- Assignments
- Quizzes
- Viva voce

Recommended Books:

1. Geomorphology: The Mechanics and Chemistry of Landscapes, Robert S. Anderson, Suzanne P. Anderson, 2010, Cambridge University Press
2. Landscapes and Geomorphology: A Very Short Introduction, Andrew Goudie, Heather Viles, 2010, Oxford University Press.
3. Process Geomorphology by Ritter, Kochel and Miller, 2002, the McGraw-Hill Company.
4. Tectonic Geomorphology, Douglas W. Burbank, Robert S. Anderson, 2000, John Wiley and Sons.
5. AMALKAR, K. Sen (1993) Desertification and its control in the Thar, Sahara and Sahel Regions. Scientific Publishers, Jodpur, India.
6. CAMPUS, Stefano et al. (2007) Evaluation and Prevention of Natural Risks (Balkema-Proceedings and Monographs in Engineering, Water, an). Taylor & Francis, 1st Edition, UK.
7. COOKE, R. U. and Doornkamp, J. C. (1990) Geomorphology in Environmental Management (New Edition). Clarendon Press Oxford.
8. COSTA, J. E. and Baker, V. R. (1981) Surficial Geology: Building with Earth. John Wiley and Sons, New York, US.
9. CROUHY, Michel; Galai, Dan; Mark, Robert; (2005) The Essentials of Risk Management. The McGraw-Hill Co., US.
10. DAMON, P. C. (2006) Introduction to International Disaster Management. Butterworth-Heinemann, UK
11. SABH, M. I. El & t. S. Murty (1988) Natural and Manmade Hazards. Academic Publisher Group.

DM 18

Hazard Mapping

Cr. H. 2+1

Course Learning outcome:

Upon successful completion of the course, the student will be able to:

- i. To understand the hazard mapping.

- i. To apply various method and techniques of hazard mapping.

Course Contents:

- Introduction to Techniques of Hazards Mapping
- Maps (Definition, Importance and Use)
- Types of Maps (Scale, Purpose and Content)
- Basic Elements of a Map
- Map Making Techniques
 - a. Sketch Map
 - b. Drawing Tools
 - c. Surveying Tools
 - d. Computer Aided Cartography
 - e. GIS
 - f. Multi-Tool Mapping
- Types of Hazards
- Global Distribution of Hazards
- Spatial Distribution of a Hazard
- Basic Elements of a Hazards to be Mapped
- Hazard and Scale of a Map (Level of the Representation of a Hazard)
- Limitation of Hazards Mapping
- Drought Hazard Mapping
- Earthquake Hazard Mapping
- Use of GIS for Hazards Mapping
- Hazard zonations

Recommended Books:

1. BOBROWSKY, Peter T. (2001) Geo-Environmental Mapping: Methods, Theory and Practice. Taylor and Francis,
2. COOKE, R. U. and Doornkamp, J. C. (1990) Geomorphology in Environmental Management (New Edition). Clarendon Press Oxford.
3. PECKHAM, Robert Joseph and Jordan, Gyozo (2007) Digital Terrain Modelling: Development and Applications in a Policy Support Environment. Series: Lecture Notes in Geoinformation and Cartography, Springer, Berlin, Germany.
4. ROBINSON, H.; Morrison, Joel L.; Muehrcke, Phillip C. and Kimerling, A. J. (1995) Elements of Cartography. J. Wiley Co., New York, USA

DM 738

Management of Landslide Hazard

Cr. H. 3

Upon successful completion of the course, the student will be able to:

- **UNDERSTAND** the nature, causes and consequences of land slide.
- **EXPLORE** the remedies for the victims of landslide hazards.

COURSE CONTENT:

- 1. Introduction**
 - Landslide and Mass-Movement
 - Classification of Landslides
- 2. Causes of Land sliding**
 - Factors Responsible for Triggering the Landslides
 - Inventory of the Landslide Hazards
 - Slope Stability and Instability and their Classification
- 3. Risk Assessment**
 - Elements at Risk
 - Landslide Risk Assessment
- 4. Risk Management**
 - Landslide Hazard Management
 - Community Based Landslide Hazard Management
 - Slope Stabilization
 - a. Engineering Methods
 - b. Bio-Engineering Methods
 - c. Soil Bio-Engineering Methods
- Preparedness (Community, Institutions, Early Warning System etc.)
- 5. Case Studies from Pakistan and rest of the world**

Teaching Methodology:

- Lectures
- Field visits
- Assignments
- Documentaries

ASSESSMENT CRITERIA:

First Term (20 %): Assignment, Quizzes, Group Activities and Presentation

Mid Term (30%): Written Test (Long Questions, Short Questions and MCQs)

Final term (50%): Written Test (Long Questions, Short Questions and MCQs)

RECOMMENDED BOOKS:

1. ALCÀNTARA-Ayala, Irasema; Goudie, Andrew (2010) Geomorphological Hazards and Disaster Prevention. Cambridge University Press.
2. FIELD Manual on Slope Stabilization (2008) United Nations Development Programme - Pakistan, Environmental Recovery Programme, Islamabad.
3. GLADE, Thomas; Anderson, Malcolm; Crozier, Michael J. (2005) Landslide Hazard and Risk. John Wiley & Sons Ltd., New York, US.
4. SASSA, Kyōji; Canuti, Paolo (2008) Landslides - Disaster Risk Reduction .Springer-Verlag ,Berlin, Germany.

Course Objectives:

After successful completion of the course, the students will be able to:

Understand the interdependence of disasters and livelihoods.

Analyse the livelihood opportunities and activities within disaster prone areas in Pakistan.

Evaluate the strategies for the adaptation of sustainable livelihood within disaster prone areas.

Course Contents:**Introduction**

- Introduction to Livelihood Assets
- Introduction to Sustainable Livelihood Framework (SLF)

Sustainable Livelihood and Disasters

- Vulnerability context of the livelihood framework
- Concept of Interdependence of Disaster Risk Reduction, Vulnerability and Livelihoods
- Disaster Risk Reduction a necessity for Sustainable Development
- Investment in DRR for sustainable livelihoods
- Risk Reduction with sustainable livelihood
- Enhancing resilience through livelihoods
- Supply chains and natural hazards
- Vulnerable livelihoods and risk factors
- Best Practices in Livelihoods

Teaching Methodologies:

- Lectures and case studies
- Documentaries and visuals
- Interactive discussions and talks
- Assignments and quizzes

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Recommended Books:

1. ARIYABANDU, M. M., & Bhatti, A. (2005) Livelihood centred approach to disaster management: A policy frame work for South Asia. Colombo: ITDG South Asia and Rural Development Policy Institute (RDPI), Islamabad
2. CLOT, N., & Carter, J. (2009) Disaster risk reduction: A gender and livelihood perspective. InfoResources focus no. 2/09. Zollikofen, Switzerland: InfoResources.
3. DOWNING, T. E. (2002) Linking Sustainable Livelihoods and Global Climate Change in Vulnerable Food Systems. ERDE -BERLIN-. 133, 363-378.
4. FOOD and Agriculture Organization of the United Nations, & International Labour Organization. (2008). The livelihood assessment tool-kit Analysing and responding to the impact of disasters on the livelihoods of people. Rome: Food and Agriculture Organization. http://www.fao.org/fileadmin/templates/tc/tce/pdf/Livelihood_Assessment_Toolkit.pdf.
5. KABIR, M. A. (2000) The vulnerable livelihoods of slum dwellers: A study on Dhaka city. The Hague: ISS.
6. KRISHNA, S. (2004) Livelihood and gender: Equity in community resource management. New Delhi: Sage Publications.
7. Sen, Amartya, (1981) Poverty and Famines: An Essay on Entitlement and Deprivation, Oxford University Press, New York.

DM 740

Planning and Management of Disasters in Pakistan

Cr. H. 3

COURSE LEARNING OUTCOMES:

Upon successful completion of the course, the student will be able to:

- **UNDERSTAND** Disaster Planning and Management and Disaster Management Framework of Pakistan.
- **ACQUIRE** knowledge about disaster management structure and the integration of DRR with the development planning.

COURSE CONTENT:

1. **Introduction**
 - Concept of Planning
 - Types of Planning
 - Resources and Core Competencies for Planning
2. **Disaster Planning and Management**
 - History of Disaster Management in Pakistan
 - Significance in Pakistan
 - Disaster Management Cycle as a Planning Tool and guide
 - Guidelines for formulation of DRR Plans in Pakistan
 - Major requirements for coping with disasters (Organization, Planning and , Training

3. **Disaster Management Related Legislation in Pakistan**
 - The west Pakistan National Calamities Act 1958
 - Civil Defense Act
 - National fund for cultural Heritage act, 1994
 - Pakistan environmental protection act, 1997:
 - Local government acts
 - Emergency services acts and bills
 - National disaster management act-2010
 - National climate change act-2017
4. **Disaster Management Policies of Pakistan**
 - National Disaster Management Policies
 - National Climate Change Policies
 - National Environmental Policies
5. **Disaster Management Plans**
 - International DRR Strategies and Obligations of Pakistan
 - National Level DRR Plan and Strategies
 - Provincial Level DRR Plan and Strategies
 - District Level DRR Plans and Strategies
6. **Institutional System for Disaster Management n Pakistan**
 - National Level Structure
 - Provincial Level Structure
 - District Level Structure
 - Sub-District level Structure
7. **DRR and National Development Plans: Gaps and Challenges**
 - Five and Ten Perspective Plans and DRR
 - National Environmental Action Plans and DRR
 - The Pakistan National Conservation Strategy
 - Poverty Reduction Strategy Paper

Recommended Books:

1. AHMAD, N. and Qureshi, I. A. (1995) Disaster Management in Punjab: A study of flood management in district Jhelum. Pakistan Academy for Rural Development, Peshawar.
2. BIRKMANN, J. (2006) Measuring Vulnerability to Natural Hazards: Towards disaster resilient societies. Tokyo, United Nations University Press.
3. FOSTER, H.D. (1980) Disaster Planning: The preservation of life and property. Berlin, Springer Verlag.
4. HEWITT K. (1997) Regions of Risk: A Geographical introduction to disaster, Harlow, Longman.
5. KHAN, A.N. (1996) Planning for Reduction of Flood Hazard. Proceeding of Pakistan Geographical Association, Bahawalpur Conference.
6. McENTIRE, D. (2007) Disaster Response and Recovery: New Jersey, Oxford, UK.

COURSE LEARNING OUTCOMES:

Upon successful completion of the course, the student will be able to:

- **Understand** the psychological impacts of disasters and strategies for management of post-traumatic stress disorders.

COURSE CONTENT:

- **Introduction**
 - Mental Health and Psychosocial Issues in Post Disaster Situation
 - Recognizing Normal Psychological Reactions to Disasters
 - Distress vs. Disorder
- **Trauma response**
 - Normal response
 - Basic principle
 - Bio psychosocial model
 - Cultural influences
- **FACTORS INFLUENCING EMOTIONAL REACTIONS TO DISASTERS**
 - Origin of the disaster
 - Degree of personal impact
 - Size and scope of the disaster
 - Probability of recurrence
 - Characteristics of survivors
 - Common disaster-related stress reactions (Emotional reactions, Cognitive reactions, Physical reactions and Interpersonal reactions)
- **Classification of Psychological Disorders**
 - Traumatic grief
 - Depression
 - Anxiety
 - Post- traumatic stress disorder
- **Psychological support**
 - Psychological first aid
 - Coping strategies
 - Resiliency models.
- **Community Mental health programmes**
 - Provision of Recreational Activities
 - Cash for Work Programme
 - Food for Work Programme
 - Cash and Food for Training
 - Child Friendly Spaces

TEACHING METHODOLOGY

- Lecturing
- Written Assignments
- Interactive Sessions
- Audio-Visuals

ASSESSMENT CRITERIA:

First Term (20 %): Assignment, Quizzes, Group Activities and Presentation

Mid Term (30%): Written Test (Long Questions, Short Questions and MCQs)

Final term (50%): Written Test (Long Questions, Short Questions and MCQs)

Recommended Books:

1. ALLEN, J.G (1995) Coping with trauma: A Guide to self-understanding. Washington D.C: American psychiatric press.
2. OLLENDICK, T.H., & Cerry, J. (1981) Clinical Behaviour therapy with children. New York: plenum press.
3. WORDEN, J.W. (1991).Grief counseling and Grief therapy: A handbook for the mental health professional New York: Springer Publishing Co.

DM 742

Sociology of Disasters

Cr. H. 3

COURSE LEARNING OUTCOMES:

Upon successful completion of the course, the student will be able to:

- **UNDERSTAND** the framework for thinking about disasters in a sociological perspective.
- **ACQUIRE** knowledge about the impacts of disaster on social system and the vice versa, Social Stratification and disasters, and the role of Social Capital theory in disaster management.

COURSE CONTENT:

1. **Introduction**
 - Sociology and the Study of Disasters
 - Social System, Ecological Networks and Disaster
 - Role of Ideologies (Faith, Belief and Religion) in Disasters
 - Myths, Realities and Cultural Representation of Disaster
2. **Sociological Perspective on Disaster**
 - Structural Functionalism
 - Conflict Perspective
 - Symbolic Interactionism Perspective
 - Human Ecology
 - Political Economy
3. **Impacts of Disasters on Social System**
 - Behavioural Response to Disaster

- Trauma: Individual, Social and Cultural
 - Disaster and Displacement (Local and International)
 - Impacts on Social Fabric of Society
 - Consequences of Post disaster relocation and prospects for recovery
 - Linking Disasters within Contemporary Social Problems
- 4. Social Stratification and Disasters**
- Linkages between Social Vulnerability and Inequality
 - Disasters and Social Class (Race, Creed, Caste and Economic groups)
 - Gender Inequality and Disaster
 - Disasters, language barrier and disabilities
 - Disasters as an agent of social change
- 5. Social Capital and Disaster**
- Definitions, forms, and measurement of social capital
 - Social capital, neoliberalism, and rational choice theory
 - Role of Social Capital in Disaster Management

TEACHING METHODOLOGY

- Lecturing
- Written Assignments
- Interactive Sessions
- Group Activities
- Webinars
- Seminar Lectures
- Audio-Visuals

ASSESSMENT CRITERIA:

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

First Term (20 %): Assignment, Quizzes, Group Activities and Presentation

Mid Term (30%): Written Test (Long Questions, Short Questions and MCQs)

Final term (50%): Written Test (Long Questions, Short Questions and MCQs)

RECOMMENDED BOOKS:

1. ANDERSEN, ML. and Dana, Hysock (2006) Thinking about Women: Sociological Perspectives on Sex and Gender. Allen & Bacon, New York.
2. ALBROW, Martin (1999) Sociology the Basic. Routledge, London.
3. BROOM, Leonard and Selznick (1990) Sociology. Harper and Row Publisher, London.
4. FISCHER, Henry W. (1998) Response to Disaster: Fact versus Fiction & Its Perpetuation. The Sociology of Disaster. 2nd Edition. University Press of America, Lanham, Maryland.

5. ERIKSON, Kai (1976) Everything in Its Path. Simon and Schuster, New York.
6. PRESTON, Richard. (1994) The Hot Zone. Random House, New York.
7. Popenoe, David (1974) Sociology latest edition, New York

DM 743

Media and Disaster Management

Cr. H. 3

COURSE LEARNING OUTCOMES:

Upon successful completion of the course, the student will be able to:

UNDERSTAND the fundamentals of media and its nexus with DM.

ILLUSTRATE the role of Media in DM in Pakistan with special reference to the importance of media in pre and post-disaster scenarios.

Course outline:

1. **Introduction**
 - Media Studies, definition
 - Historical Sketch of Media Studies
 - Types of Media
2. **Relationship between Media and DM**
 - Media in Disaster Management Cycle (Expand Contract DM Model)
 - Media in Pre-Disaster Stage
 - Media in Post Disaster response
3. **Media in Emergencies**
 - Means of Communications
 - Media in Emergency communications
 - National Institutions/policies and Media (PEMRA)
4. **Impact of Media in Disasters**
 - Positive impacts
 - Negative impacts
 - Code of Conduct
5. **Media role in context of Pakistan**
 - Reactive in nature
 - Post disaster focused
 - Lack of Disaster journalism
 - Policy gap
6. **Way Forward**
 - Revised role of Media in disaster legislations
 - Unbiased journalism
 - Focus on DRR and Resilience
 - Focus on Pre-Disaster Cycle

Teaching Methodology

- Lecturing
- Interactive Sessions
- Written Assignments
- Seminar Lectures
- Documentaries

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. Deppa, J. (1994) "the media and disasters" NYU Press; First Edition
2. CROUHY, Michel; Galai, Dan and Mark, Robert (2005) The Essentials of Risk Management. The McGraw Hill Co., New York, US.
3. DAMON, P. C. (2006) Introduction to International Disaster Management. Butterworth-Heinemann, UK.
4. DILLEY, Maxx (2005) Natural Disaster Hotspots: A Global Risk Analysis. World Bank and University of Columbia, US.
5. Government of Pakistan (GoP) PEMRA Ordinance, Islamabad

DM 744

Contingency Planning in Disaster Management

Cr. H. 3

Course Objectives:

After successful completion of the course, the students will be able to:

Understand the role of various agencies related to contingency planning

Evaluate the contingency planning of DM related agencies

Course Contents:

Introduction

- Introduction to contingency Planning
- Preparedness: Organization. Training, Planning and/or Plans
- Contingency Planning and its Process
- Hazard and risk analysis, contingency prioritization

- Scenario building in contingency planning
- Preparing a contingency plan for each selected scenario
- Rescue, relief, and evacuation planning

Contingency Planning at work

- Monitoring and updating the contingencies plan. Plan Preparation: Level, Components, Viability, Check list etc.
- Dynamic Nature of Disaster Management
- Contingency Planning - Planning Continuum
- Methodology & Steps
- Content of the contingency Plan
- Time Line
- Likely Actions at Federal, Provincial and District levels
- Monsoon Contingency Plan
- Case Studies (Evaluation of various contingency plans by PDMA and LGUs)

Recommended Books:

1. BIRKMANN, J. (2006) Measuring Vulnerability to Natural Hazards: Towards Disaster Resilient Societies. Tokyo, United Nations University Press.
2. DAMON, P. C. (2006) International Disaster Management. Butterworth-Heinemann.
3. DAMON, P. C. (2006) Introduction to International Disaster Management. Butterworth-Heinemann, UK.
4. DILLEY, Max (2005) Natural Disaster Hotspots: A Global Risk Analysis. World Bank and University of Columbia, US.
5. ELLIOT, J.E. (2006) An Introduction to Sustainable Development. Third Edition. Routledge, London UK.
6. HEWITT, K. (1997) Regions of Risk: A Geographical Introduction to Disaster. Harlow, Longman, New York, US.
7. SMITH, Keith and Petley, David N. (2009) Environmental Hazards: Assessing Risk and Reducing Disaster Routledge, London, UK.

DM 745

Peace and Conflict Resolution

Cr. H. 3

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

- **UNDERSTAND** Peace, Conflict, Violence and Terrorism;
- **APPLY** knowledge about achieving peace with justice and post conflict development.

COURSE CONTENTS

INTRODUCTION

- Introduction to Peace and Conflict Studies

- Defining Peace, Conflict and Violence
- History and Politics of War and Peace
- Theories of Violence and Conflict

CONFLICT ANALYSIS AND RESOLUTION

- Human Needs Theory and Conflict Resolution
- Conflict Analysis and Resolution Principles and Methods
- Conflict Resolution Skills and Techniques

TERRORISM AND CONFLICT IN PAKISTAN

- History of terrorism
- Impact on Society (Human, Environmental, Economic and Social)
- Post Conflict Need Assessment
- Post Conflict Recovery
- Case Studies on Conflict Management and Post Conflict Development

ACHIEVING PEACE WITH JUSTICE

- Conflict Transformation, Reconciliation and Peace building
- Human Rights and Peace with Justice
- International Peace and Security
- Nonviolence and Social Movements
- Gender Issues in Conflict and Post-Conflict
- Final Reflections, Integration and Evaluations

TEACHING METHODOLOGIES:

- Lectures and case studies
- Documentaries and visuals
- Interactive discussions and talks
- Assignments and quizzes
- Tabletop Exercises

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Recommended Books:

JEONG, H W (2017) Peace and Conflict Studies, an Introduction, Routledge, USA

COOPER, R & Finley, L (2014) Peace and Conflict Studies Research, Information Age Publication Inc, USA

BARASH, D. P & Webel, C. P (2014) Peace and Conflict Studies 3rd Ed. SAGE Publications, USA.

CORTRIGHT, D. (2008) “What is peace?” in Peace: A History of Movements and Ideas. Cambridge, Cambridge University Press, UK

ALGER, C. F. (2007) “Peace Studies as a Transdisciplinary Project” in Webel, C. & Galtung, J. (eds) Handbook of Peace and Conflict Studies. New York: Routledge, UK

BARASH, D. P. (2002) “The Meanings of Peace” in Peace and Conflict Studies. Sage Publications, USA

WILKINSON, R. (2005) “Inequality: more hostile, less sociable societies” in The Impact of Inequality. Routledge, USA

BARASH, D. P. (ed.) (2000) “Introduction” in Approaches to Peace: A Reader in Peace Studies. Oxford University Press, UK

DM 746

Ecosystem Based Disaster Risk Reduction

Cr. H. 3

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

- I. **UNDERSTAND** fundamental knowledge of basic concepts and approaches related to Ecosystem based DRR (Eco-DRR) and Ecosystem based Adaptation (EbA)
- II. **EXPLAIN** Disaster Risk trends, Disaster Risk Reduction (DRR) gap analysis and linkages to the environment
- II. **APPLY** working knowledge about the tools for assessing risks and Eco-DRR/Climate Change Adaptation (CCA)

Course outline:

1. **Introduction**
 - a. Global data on risk, disasters and ecosystems
 - b. Linking CCA and DRR

- c. Modelling Risk, Vulnerability and Sustainable Development
- d. Data and tools for vulnerability assessments
- 2. Ecosystem based DRR (Eco-DRR)**
 - a. Linking global environmental problems and disasters
 - b. Fundamental concepts of ecosystems and ecosystems services
 - c. Linking sustainable development, disasters and environment
 - d. Major eco-zones, hazards and impact on populations
 - e. Ecosystem services for vulnerability reduction
 - f. Ecological Engineering for DRR
 - g. Valuing ecosystem services
- 3. Eco-DRR instruments and approaches**
 - a. Introduction to instruments and approaches for Eco-DRR
 - b. Spatial planning tools and approaches for DRR
 - c. Integrated Water Resources Management/River basin management (IWRM)
 - d. Integrated Coastal Zone Management (ICZM)
 - e. Managing ecosystems for urban risk reduction
 - f. Protected Areas
 - g. Ecosystem-based Adaptation (EbA)
 - h. Community-based Ecosystem and Disaster Risk Management.
- 4. Mainstreaming Environment and DRR in development**
 - a. Fundamentals of effective advocacy
 - b. Mainstreaming Eco-DRR
 - c. Economics of DRR
- 5. Case Studies in International and National Context**

Teaching Methodology

- Lecturing
- Interactive Sessions
- Written Assignments
- Seminar Lectures
- Documentaries

Assessment

Note: Each university can adopt the assessment of this course as per their approved criteria. However, the committee proposed the following assessment criteria:

1st Term (20%)

- Assignments/Quizzes and Presentations

Mid Term (30%)

- Written (Long Questions, Short Questions, MCQs)

Final Term (50%)

- Written (Long Questions, Short Questions, MCQs)

Text and Reference books:

1. RENAUD, F.G., Sudmeier-Rieux, K. & Estrella M (2013) *The Role of Ecosystems for Disaster Risk Reduction*, United Nations University Press: Tokyo.
2. BIRKMANN, J. (2006) *Measuring vulnerability to promote disaster-resilient societies: Conceptual frameworks and definitions*. In: *Measuring Vulnerability to Natural Hazards, Towards Disaster*, Tokyo: UNU Press.
3. TIERNEY, K. & Bruneau M (2007) *Conceptualizing and Measuring Resilience, A Key to Disaster Loss Reduction*. In *TR News*, 14-15. Washington, D.C.: Transportation Research Board of the National Academies.
4. WISNER, B., Blaikie, P., Cannon T. & Davis I (2004) *At Risk, Natural Hazards, People's Vulnerability and Disasters*. London and New York: Routledge
5. GUNDERSON, L.H., Allen C.R & Holling C.S (2010) *Foundations of Ecological Resilience*. Island Press, Washington, Covelo, London
5. CAVALLO, Cavallo, E., Noy, I., Galiani S. & Pantano J. (2010) *Catastrophic Natural Disasters and Economic Growth*, Inter-American Development Bank, IDB Working Papers Series No. IDB-WP-183.
6. CHAPIN, Chapin, F.S., Kofinas G.P. & Folke C (2009) *Principles of Ecosystem Stewardship. Resilience-based natural Resource management in a changing word*. Springer
7. ESTRELLA, M and N Saalismaa (2010). *Demonstrating the Role of Ecosystem-based Management for Disaster Risk Reduction. A Policy Paper Presented to the UNISDR Global Assessment team in preparation for the 2011 GAR*

Recommendations by NCRC for the Implementation of BS/MS Disaster Management

1. Recognition of DM Programme

- 1.1. Recognition of Disaster Management as a science subject by the HEC and other National bodies.
- 1.2. Disaster Management must be treated at par with other basic sciences by the HEC.
- 1.3. Opening of Disaster Management Departments in all general public and private sector universities of the country.
- 1.4. Facilitate curricula development at School and College levels through relevant bodies.
- 1.5. The broad spectral domain of Disaster Management provides an opportunity for a wide range of useful multi-disciplinary associations with other subject areas. Therefore, HEC is to advise the institutions to provide maximum range of combinations both with BS science and humanities groups.

2. Labs/Equipment

- 2.1. Provision of computers for Disaster Management labs. There should be Central Computer lab in each institution/colleges to provide computing facility to the different disciplines of sciences including Disaster Management. The GIS and Remote Sensing software should be provided at least to the post graduate level institution where Disaster Management is taught.
- 2.2. Sufficient funds should be allocated by the Institutions for the purchase of teaching aids, surveying and computing equipment/instruments, GPS and other field surveys equipment.

3. Workshops/Seminars/Conferences

- 3.1. National level workshop should be organized by HEC to discuss the problems related to the implementation for 4 year BS and 2 year MS Disaster Management curriculum at the national level.
- 3.2. Workshops/seminars/conferences should be arranged at regular interval for the capacity building of all stakeholders related to disaster management.
- 3.3. Facilitating knowledge sharing through workshops, seminars and conferences among scientific community.

4. Library Facilities

- 4.1. Development of well-equipped seminar libraries and provision of funds for appropriate collection of journals, literature and reference material including government publications.
- 4.2. HEC to facilitate publication of monographs, reports and books in Disaster Management.
- 4.3. HEC to provide robust, internet facility for access to online journals, e-books, reports, satellite data and video streaming.

5. Research Support

HEC to provide adequate funds for field works/research works related to Disaster Management to the institutions.

6. Refresher Courses

6.1. Organizing refresher courses regularly for postgraduate teachers in collaboration with NDMA, PDMAs, RESCUE 1122, Survey of Pakistan, Meteorological Department of Pakistan, Geological Survey of Pakistan, and SUPARCO etc. related to Instrumental Surveying, GIS, Remote Sensing, Emergency Response Management, Disaster Risk Assessment etc.

6.2. Refresher courses should be arranged at regular intervals for all teachers (Disaster Management) to keep them abreast with continuing changes in the discipline in the given fields.

6.3. The HEC may advise subordinate institutions to run short-term courses during summer vacation within the ramifications of disaster management enabling disaster management teachers to enhance their knowledge.

**COMPULSORY COURSES IN ENGLISH FOR BS
(4 YEAR) IN BASIC & SOCIAL SCIENCES**

English I (Functional English)

Objectives: Enhance language skills and develop critical thinking.

Course Contents:

Basics of Grammar
Parts of speech and use of articles
Sentence structure, active and passive voice
Practice in unified sentence
Analysis of phrase, clause and sentence structure
Transitive and intransitive verbs
Punctuation and spelling

Comprehension

Answers to questions on a given text

Discussion

General topics and every-day conversation (topics for discussion to be at the discretion of the teacher keeping in view the level of students)

Listening

To be improved by showing documentaries/films carefully selected by subject teachers

Translation skills

Urdu to English

Paragraph writing

Topics to be chosen at the discretion of the teacher

Presentation skills

Introduction

Note: Extensive reading is required for vocabulary building

Recommended Books:

1. **Functional English**
 - a) Grammar

1. Practical English Grammar by A.J. Thomson and A.V. Martinet. Exercises 1. Third edition. Oxford University Press. 1997. ISBN 0194313492
 2. Practical English Grammar by A.J. Thomson and A.V. Martinet. Exercises 2. Third edition. Oxford University Press. 1997. ISBN 0194313506
- b) Writing
1. Writing. Intermediate by Marie-Christine Boutin, Suzanne Brinand and Françoise Grellet. Oxford Supplementary Skills. Fourth Impression 1993. ISBN 0 19 435405 7 Pages 20-27 and 35-41.
- c) Reading/Comprehension
1. Reading. Upper Intermediate. Brian Tomlinson and Rod Ellis. Oxford Supplementary Skills. Third Impression 1992. ISBN 0 19 453402 2.
- d) Speaking

English II (Communication Skills)

Objectives: Enable the students to meet their real life communication needs.

Course Contents:

Paragraph writing

Practice in writing a good, unified and coherent paragraph

Essay writing

Introduction

CV and job application

Translation skills

Urdu to English

Study skills

Skimming and scanning, intensive and extensive, and speed reading, summary and précis writing and comprehension

Academic skills

Letter/memo writing, minutes of meetings, use of library and internet

Presentation skills

Personality development (emphasis on content, style and pronunciation)

Note: documentaries to be shown for discussion and review

Recommended Books:

Communication Skills

- a) Grammar
 - 1. Practical English Grammar by A.J. Thomson and A.V. Martinet. Exercises 2. Third edition. Oxford University Press 1986. ISBN 0 19 431350 6.

- b) Writing
 - 1. Writing. Intermediate by Marie-Christine Boutin, Suzanne Brinand and Françoise Grellet. Oxford Supplementary Skills. Fourth Impression 1993. ISBN 019 435405 7 Pages 45-53 (note taking).
 - 2. Writing. Upper-Intermediate by Rob Nolasco. Oxford Supplementary Skills. Fourth Impression 1992. ISBN 0 19 435406 5 (particularly good for writing memos, introduction to presentations, descriptive and argumentative writing).

- c) Reading
 - 1. Reading. Advanced. Brian Tomlinson and Rod Ellis. Oxford Supplementary Skills. Third Impression 1991. ISBN 0 19 453403 0.
 - 2. Reading and Study Skills by John Langan
 - 3. Study Skills by Richard York.

English III (Technical Writing and Presentation Skills)

Objectives: Enhance language skills and develop critical thinking

Course Contents:

Presentation skills

Essay writing

Descriptive, narrative, discursive, argumentative

Academic writing

How to write a proposal for research paper/term paper

How to write a research paper/term paper (emphasis on style, content, language, form, clarity, consistency)

Technical Report writing

Progress report writing

Note: Extensive reading is required for vocabulary building

Recommended Books:

Technical Writing and Presentation Skills

- a) Essay Writing and Academic Writing
 1. Writing. Advanced by Ron White. Oxford Supplementary Skills. Third Impression 1992. ISBN 0 19 435407 3 (particularly suitable for discursive, descriptive, argumentative and report writing).
 2. College Writing Skills by John Langan. McGraw-Hill Higher Education. 2004.
 3. Patterns of College Writing (4th edition) by Laurie G. Kirszner and Stephen R. Mandell. St. Martin's Press.
- b) Presentation Skills
- c) Reading

The Mercury Reader. A Custom Publication. Compiled by northern Illinois University. General Editors: Janice Neulib; Kathleen Shine Cain; Stephen Ruffus and Maurice Scharon. (A reader which will give students exposure to the best of twentieth century literature, without taxing the taste of engineering students).

Pakistan Studies (Compulsory)

Introduction/Objectives:

- Develop vision of historical perspective, government, politics, contemporary Pakistan, ideological background of Pakistan.
- Study the process of governance, national development, issues arising in the modern age and posing challenges to Pakistan.

Course Outline:

1. **Historical Perspective**
 - a. Ideological rationale with special reference to Sir Syed Ahmed Khan, Allama Muhammad Iqbal and Quaid-i-Azam Muhammad Ali Jinnah.
 - b. Factors leading to Muslim separatism
 - c. People and Land
 - i. Indus Civilization
 - ii. Muslim advent
 - iii. Location and geo-physical features.
2. **Government and Politics in Pakistan**

Political and constitutional phases:

 - a. 1947-58
 - b. 1958-71
 - c. 1971-77
 - d. 1977-88
 - e. 1988-99
 - f. 1999 onward
3. **Contemporary Pakistan**
 - a. Economic institutions and issues
 - b. Society and social structure
 - c. Ethnicity
 - d. Foreign policy of Pakistan and challenges
 - e. Futuristic outlook of Pakistan

Recommended Books:

1. Burki, Shahid Javed. *State & Society in Pakistan*, The Macmillan Press Ltd 1980.
2. Akbar, S. Zaidi. *Issue in Pakistan's Economy*. Karachi: Oxford University Press, 2000.
3. S.M. Burke and Lawrence Ziring. *Pakistan's Foreign Policy: An Historical analysis*. Karachi: Oxford University Press, 1993.
4. Mehmood, Safdar. *Pakistan Political Roots & Development*. Lahore, 1994.
5. Wilcox, Wayne. *The Emergence of Bangladesh.*, Washington: American Enterprise, Institute of Public Policy Research, 1972.

6. Mehmood, Safdar. *Pakistan Kayyun Toota*, Lahore: Idara-e-Saqafat-e-Islamia, Club Road, nd.
7. Amin, Tahir. *Ethno - National Movement in Pakistan*, Islamabad: Institute of Policy Studies, Islamabad.
8. Ziring, Lawrence. *Enigma of Political Development*. Kent England: WmDawson & sons Ltd, 1980.
9. Zahid, Ansar. *History & Culture of Sindh*. Karachi: Royal Book Company, 1980.
10. Afzal, M. Rafique. *Political Parties in Pakistan*, Vol. I, II & III. Islamabad: National Institute of Historical and cultural Research, 1998.
11. Sayeed, Khalid Bin. *The Political System of Pakistan*. Boston: Houghton Mifflin, 1967.
12. Aziz, K.K. *Party, Politics in Pakistan*, Islamabad: National Commission on Historical and Cultural Research, 1976.
13. Muhammad Waseem, *Pakistan Under Martial Law*, Lahore: Vanguard, 1987.
14. Haq, Noor ul. *Making of Pakistan: The Military Perspective*. Islamabad: National Commission on Historical and Cultural Research, 1993.

ISLAMIC STUDIES (Compulsory)

Objectives:

This course is aimed at:

- 1 To provide Basic information about Islamic Studies
- 2 To enhance understanding of the students regarding Islamic Civilization
- 3 To improve Students skill to perform prayers and other worships
- 4 To enhance the skill of the students for understanding of issues related to faith and religious life.

Detail of Courses:

Introduction to Quran Studies

- 1) Basic Concepts of Quran
- 2) History of Quran
- 3) Uloom-ul -Quran

Study of Selected Text of Holly Quran

- 1) Verses of Surah Al-Baqra Related to Faith (Verse No-284-286)
- 2) Verses of Surah Al-Hujrat Related to Adab Al-Nabi (Verse No-1-18)
- 3) Verses of Surah Al-Mumanoon Related to Characteristics of faithful (Verse No-1-11)
- 4) Verses of Surah al-Furqan Related to Social Ethics (Verse No.63-77)
- 5) Verses of Surah Al-Inam Related to Ihkam(Verse No-152-154)

Study of Selected Text of Holly Quran

- 1) Verses of Surah Al-Ihzab Related to Adab al-Nabi (Verse No.6,21,40,56,57,58.)
- 2) Verses of Surah Al-Hashar (18,19,20) Related to thinking, Day of Judgment
- 3) Verses of Surah Al-Saf Related to Tafakar,Tadabar (Verse No-1,14)

Seerat of Holy Prophet (S.A.W) I

- 1) Life of Muhammad Bin Abdullah (Before Prophet Hood)
- 2) Life of Holy Prophet (S.A.W) in Makkah
- 3) Important Lessons Derived from the life of Holy Prophet in Makkah

Seerat of Holy Prophet (S.A.W) II

- 1) Life of Holy Prophet (S.A.W) in Madina
- 2) Important Events of Life Holy Prophet in Madina
- 3) Important Lessons Derived from the life of Holy Prophet in Madina

Introduction To Sunnah

- 1) Basic Concepts of Hadith
- 2) History of Hadith

- 3) Kinds of Hadith
- 4) Uloom-ul-Hadith
- 5) Sunnah & Hadith
- 6) Legal Position of Sunnah

Selected Study from Text of Hadith

Introduction To Islamic Law & Jurisprudence

- 1) Basic Concepts of Islamic Law & Jurisprudence
- 2) History & Importance of Islamic Law & Jurisprudence
- 3) Sources of Islamic Law & Jurisprudence
- 4) Nature of Differences in Islamic Law
- 5) Islam and Sectarianism

Islamic Culture & Civilization

- 1) Basic Concepts of Islamic Culture & Civilization
- 2) Historical Development of Islamic Culture & Civilization
- 3) Characteristics of Islamic Culture & Civilization
- 4) Islamic Culture & Civilization and Contemporary Issues

Islam & Science

- 1) Basic Concepts of Islam & Science
- 2) Contributions of Muslims in the Development of Science
- 3) Quran & Science

Islamic Economic System

- 1) Basic Concepts of Islamic Economic System
- 2) Means of Distribution of wealth in Islamic Economics
- 3) Islamic Concept of Riba
- 4) Islamic Ways of Trade & Commerce

Political System of Islam

- 1) Basic Concepts of Islamic Political System
- 2) Islamic Concept of Sovereignty
- 3) Basic Institutions of Govt. in Islam

Islamic History

- 1) Period of Khlaft-E-Rashida
- 2) Period of Ummayyads
- 3) Period of Abbasids

Social System of Islam

- 1) Basic Concepts Of Social System Of Islam
- 2) Elements Of Family
- 3) Ethical Values Of Islam

Reference Books:

- 1) Hameed ullah Muhammad, "Emergence of Islam" , IRI, Islamabad
- 2) Hameed ullah Muhammad, "Muslim Conduct of State"
- 3) Hameed ullah Muhammad, "Introduction to Islam
- 4) Mulana Muhammad Yousaf Islahi,"
- 5) Hussain Hamid Hassan, "An Introduction to the Study of Islamic Law" leaf Publication Islamabad, Pakistan.
- 6) Ahmad Hasan, "Principles of Islamic Jurisprudence" Islamic Research Institute, International Islamic University, Islamabad (1993)
- 7) Mir Waliullah, "Muslim Jurisprudence and the Quranic Law of Crimes" Islamic Book Service (1982)
- 8) H.S. Bhatia, "Studies in Islamic Law, Religion and Society" Deep & Deep Publications New Delhi (1989)
- 9) Dr. Muhammad Zia-ul-Haq, "Introduction to Al Sharia Al Islamia" Allama Iqbal Open University, Islamabad (2001)

**COMPULSORY MATHEMATICS
COURSES FOR BS (4 YEAR)**

(FOR STUDENTS NOT MAJORING IN
MATHEMATICS)

1. MATHEMATICS I (ALGEBRA)

Prerequisite(s): Mathematics at secondary level

Credit Hours: 3 + 0

Specific Objectives of the Course: To prepare the students, not majoring in mathematics, with the essential tools of algebra to apply the concepts and the techniques in their respective disciplines.

Course Outline:

Preliminaries: Real-number system, complex numbers, introduction to sets, set operations, functions, types of functions.

Matrices: Introduction to matrices, types, matrix inverse, determinants, system of linear equations, Cramer’s rule.

Quadratic Equations: Solution of quadratic equations, qualitative analysis of roots of a quadratic equations, equations reducible to quadratic equations, cube roots of unity, relation between roots and coefficients of quadratic equations.

Sequences and Series: Arithmetic progression, geometric progression, harmonic progression.

Binomial Theorem: Introduction to mathematical induction, binomial theorem with rational and irrational indices.

Trigonometry: Fundamentals of trigonometry, trigonometric identities.

Recommended Books:

Dolciani MP, Wooton W, Beckenback EF, Sharron S, *Algebra 2 and Trigonometry*, 1978, Houghton & Mifflin, Boston (suggested text)

Kaufmann JE, *College Algebra and Trigonometry*, 1987, PWS-Kent Company, Boston

Swokowski EW, *Fundamentals of Algebra and Trigonometry* (6th edition), 1986, PWS-Kent Company, Boston

**Statistics-I
Credit 3 (2-1)**

Definition and importance of Statistics in Agriculture, Data Different types of data and variables

Classification and Tabulation of data, Frequency distribution, stem-and-Leaf diagram, Graphical representation of data Histogram, frequency polygon, frequency curve.

Measure of Central tendency, Definition and calculation of Arithmetic mean, Geometric mean, Harmonic mean, Median quantiles and Mode in grouped and ungrouped data.

Measure of Dispersion, Definition and Calculation of Range, quartile deviation, Mean deviation, Standard deviation and variance, coefficient of variation.

Practical:

- a. Frequency Distribution
- b. Stem-and-Leaf diagram
- c. Various types of Graphs
- d. Mean, Geometric mean Harmonic Mean,
- e. Median, Quartiles Deviation, mean Deviation.
- f. Standard Deviation, Variance, Coefficient of variation,
- g. Skewness and kurtosis

Recommended Books:

1. Introduction to Statistical Theory Part- I by Sher Muhammad and Dr. Shahid Kamal (Latest Edition)
2. Statistical Methods and Data Analysis by Dr. Faquir Muhammad
3. A. Concise Course in A. Level Statistic with world examples by J. Crashaw and J. Chambers (1994)
4. Basic Statistics an Inferential Approach 2nd Ed. (1986) Fran II. Dietrich-II and Thomas J. Keans

Statistics-II**Credit 3 (2-1)**

Sampling Probability and non-Probability Sampling, Simple random sampling stratified random sampling Systematic sampling error, Sampling distribution of mean and difference between two means. Interference Theory: Estimation and testing of hypothesis, Type—I and type-II error, Testing of hypothesis about mean and difference between two means using Z-test and t-test, Paired t-test, Test of association of attributes using X^2 (chi-square) Testing hypothesis about variance.

Practical:

- a. Sampling random sampling
- b. Stratified random sampling.
- c. Sampling distribution of mean
- d. Testing of hypotheses regarding population mean
- e. Testing of hypotheses about the difference between population means
- f. Chi-square test
- g. Testing of Correlation Coefficient
- h. Fitting of simple linear regression
- i. One-way ANOVA
- j. Two-way ANOVA

Recommended Books:

1. Introduction to Statistical Theory Part-II by Sher Muhammad and Dr. Shahid Kamal (Latest Edition)
2. Statistical Methods and Data Analysis by Dr. Faquir Muhammad
3. Principles and Procedures of Statistics A Bio-material approach, 2nd Edition, 1980 by R. G. D Steal and James H. Tarric
4. Statistical Procedures for Agricultural Research 2nd Edition (1980) by K. A. Gomez and A. A. Gomez

INTRODUCTION TO INFORMATION AND COMMUNICATION TECHNOLOGIES

Course Structure: Lectures: 2 Labs: 1 **Credit Hours:** 3

Pre-requisite: **None** **Semester:** 1

Course Description:

This is an introductory course on Information and Communication Technologies. Topics include ICT terminologies, hardware and software components, the internet and World Wide Web, and ICT based applications.

After completing this course, a student will be able to:

- Understand different terms associated with ICT
- Identify various components of a computer system
- Identify the various categories of software and their usage
- Define the basic terms associated with communications and networking
- Understand different terms associated with the Internet and World Wide Web.
- Use various web tools including Web Browsers, E-mail clients and search utilities.
- Use text processing, spreadsheets and presentation tools
- Understand the enabling/pervasive features of ICT

Course Contents:

Basic Definitions & Concepts

Hardware: Computer Systems & Components

Storage Devices, Number Systems

Software: Operating Systems, Programming and Application Software

Introduction to Programming, Databases and Information Systems

Networks

Data Communication

The Internet, Browsers and Search Engines

The Internet: Email, Collaborative Computing and Social Networking

The Internet: E-Commerce

IT Security and other issues

Project Week

Review Week

Text Books/Reference Books:

1. Introduction to Computers by Peter Norton, 6th International Edition, McGraw-Hill

2. Using Information Technology: A Practical Introduction to Computer & Communications by Williams Sawyer, 6th Edition, McGraw-Hill
3. Computers, Communications & information: A user's introduction by Sarah E. Hutchinson, Stacey C. Swayer
4. Fundamentals of Information Technology by Alexis Leon, Mathews Leon, Leon Press.