Curriculum

Department of Disaster Science and Management

Faculty of Earth and Environmental Sciences

University of Dhaka

Master of Science (M.S.) in Disaster Science and Management

Department of Disaster Science and Management
Faculty of Earth and Environmental Sciences
University of Dhaka
(M.S. Curriculum)

1. Introduction to the Department:

On the first day of July 1921 the University of Dhaka opened its doors to students with Sir P.J. Hartog as the first Vice-Chancellor of the University. The University was set up in a picturesque part of the city known as Ramna on 600 acres of land. The University started its activities with 3 Faculties, 12 departments, 60 teachers, 877 students and 3 dormitories (Halls of Residence) for the students. At present the University consists of 13 Faculties, 83 Departments, 12 Institutes, 20 residential halls, 3 hostels and more than 56 Research Centers. The Department of Disaster Science and Management is one of its new additions.

The Department of Disaster Science and Management started its journey in 2012 with a vision to provide international standard high-quality education and research in the area of hazard science and disaster management. Perhaps, the department aims to emphasize more on research. As hazards and climate change are two crucial phenomena, the whole world is experiencing now; the department would like to manage the extreme events based on solid understandings of science inherent to those phenomena.

Particularly countries like Bangladesh experiencing extreme events very frequently need efficient manpower to guide the community in the proper way as well as to broaden the existing understanding of hazards and climate change from real life experiences.

The world is not only threatened by natural extreme events but also, anthropogenic disasters like terrorism, war, and technological disasters have a tremendous impact on socio-economical imbalance. Along with these social aspects, gender issues in disaster management also need to be addressed in a more sophisticated way.

So far, huge knowledge has been agglomerated from numerous national and international projects working on reducing the risk and vulnerability of crisis situations. It's high time to bring this knowledge in an academic format and to enhance the existing knowledge. This is how the department has emerged. Currently the department is offering Bachelor and masters program in disaster science and management.

2. General Objective of the Program:

Disasters are no longer seen as the hazardous events created entirely by natural or man-made processesrather as manifestations of unresolved problems of development. In the current paradigm shift from theresponse and recovery to the disaster risk management, attention has been given to holistic approaches.The paradigm shift makes sure that the scientific and

technological application and innovation arecrucial for risk reduction and aware of sustainable development. The advancement of knowledge onscientific and social aspects to resilient crisis management has also evolved as an imperative forsustainable development.

Giving due attention on the paradigm shift, which directs disaster management toevolve as a Discipline, the curriculum of the Master of Science (M.S.) degree has been designed.

3. Structure of the Curriculum:

Department of Disaster Science and Management is established in 2012 and going to start regular master degree from session 2016-2017. Under the Semester System, the one-year M.S. Degree in Disaster Science and Management (DSM) at the University of Dhaka is a program comprised of two semesters. Duration of each semester is 26 weeks. Students are required to attend the entire courses equivalent to 35 credit hours in Disaster Science and Management (DSM) Master's program to obtain the degree.

There will be two groups in Masters Courses in Disaster Science and Management. One group will be termed as **Masters by project work- Project Group** and the other will be termed as **Masters by research work - Thesis Group**. Students of both Groups will have to take a total of 35 credit hours equivalent courses.

3.1 Definition of Credit and Distribution of Courses over the Semester

Each semester shall be 26 weeks

- 17 weeks of class teaching
- 2 weeks for preparation
- 3 weeks for holding the semester final examination
- 4 weeks for result publication

For a 3 credit hour courses there shall be three lecture classes per week i.e., a total of 45 lecture classes of 1-hour duration and for 2 credit hours course, there shall be two lecture classes per week i.e., a total of 30 lecture classes of 1-hour duration.

3.2 Structure of the Proposed Syllabus

- **Thesis Group** will have to take five theory courses equaling 15 credits hours, one specialized course equivalent to 3 credit hours, two laboratory course equaling 6 credit hours and one comprehensive oral exam of 2 credit hours totaling 26 credit hours designated as Compulsory Courses. Moreover, they have to pursue research work equivalent to 9 credit hours.
- **Project Group** will have to take 21 credit hours equivalent theory & specialized courses, 9 credit hours equivalent three laboratory courses and one comprehensive oral exam of 2 credit hours totaling 32 credit hours designated as Compulsory Courses. Moreover, they have to pursue project work equivalent to 3 credit hours.

- Students of both groups (Project and Thesis Group) will have to take five compulsory theory courses and two lab courses equaling 21 credit hours in the first semester.
- Project Group students will have to take two theory courses from specialized field equivalent to 6 credit hours in their second semester. And thesis group students, on the other hand, shall have to take one course from the specialized field.

The Tables below summarizes all of the above:

Course Distribution	Thesis Group
Compulsory Theory Courses: 5	15 credit hours
Compulsory Lab Course: 2	6 credit hours
Comprehensive Oral Exam:1	2 credit hours
Specialized Course:1	3 credit hours
Thesis Work	9 credit hours
Total Credits	35 credit hours

Course Distribution	Project Group
Compulsory Theory Courses: 5	15 credit hours
Compulsory Lab Course: 3	9 credit hours
Comprehensive Oral Exam:1	2 credit hours
Specialized Courses:2	6 credit hours
Project Work	3 credit hours
Total Credits	35 credit hours

Compulsory Theory and Lab Courses for M.S. Programme (Thesis and Project Group)

Course ID	Title	Credit
DSMMT:501	**Disaster Impact Assessment**	**3**
DSMMT:502	**Humanitarian Emergency & Crisis Management**	**3**
DSMMT:503	**Urban Resilience: Theory and Practices**	**3**
DSMMT:504	**Climatic Risk Assessment & Extreme Event Modeling**	**3**
DSMMT:505	**Integrated Water and Agricultural Risk Management**	**3**
DSMML:506	**Advanced Research Methodology**	**3**
DSMML: 507	**Advanced Remote Sensing and GIS**	**3**

Specialized Theory and other Courses for M.S. Programme

Course ID	Title	Credit
DSMMT:508	**Institutional, Organizational and Social System**	**3**
DSMMT:509	**Disaster Statistics and Economic Modeling**	**3**
DSMMT:510	**Public Policy and Governance for Disaster Management**	**3**
DSMML:511	**Geo-hazard Modeling and Mapping**	**3**
DSMMP:512	**Masters Project Work**	**3**
DSMMT:513	**Thesis Work**	**9**
DSMMV:514	***Viva vocé***	**2**

Course Structure: M.S. Programme in Disaster Science and Management (Thesis Group)

Course ID	1st Semester	Credit	Course ID	2nd Semester	Credit
DSMMT:501	Disaster Impact Assessment	3	DSMMT: 513	Thesis	9
DSMMT:502	Humanitarian Emergency & Crisis Management	3	DSMMT/ DSMML :	Specialized course	3
DSMMT:503	Urban Resilience: Theory and Practices	3	DSMMV: 514	*Viva vocé*	2
DSMMT:504	Climatic Risk Assessment & Extreme Event Modeling	3	Total Credit		14
DSMMT:505	Integrated Water and Agricultural Risk Management	3			
DSMML: 506	Advanced Research Methodology	3			
DSMML: 507	Advanced Remote Sensing and GIS	3			
Total Credit		**21**	**Total Programme Credit**		**35**

Course Structure: M.S. Programme in Disaster Science and Management (Project Group)

Course ID	1st Semester	Credit	Course ID	2nd Semester	Credit
DSMMT:501	Disaster Impact Assessment	3	DSMMT:	Specialized course	3

DSMMT:502	Humanitarian Emergency & Crisis Management	3	DSMMT:	Specialized course	3
DSMMT:503	Urban Resilience: Theory and Practices	3	DSMML : 511	Geo-hazard Modeling and Mapping	3
DSMMT:504	Climatic Risk Assessment & Extreme Event Modeling	3	DSMMP:512	Project Work	3
DSMMT:505	Integrated Water and Agricultural Risk Management	3	DSMMV:514	*Viva vocé*	2
DSMML: 506	Advanced Research Methodology	3	Total Credit		14
DSMML: 507	Advanced Remote Sensing and GIS	3			
Total Credit		**21**	**Total Programme Credit**		**35**

4. Assessment System:

4.1. Evaluation

Theory courses

Marks Distribution		
Class Assessment	Class attendance	05%
	In-course and/or Assignment	25%
Course Final Examination		70%
Total		100%

Practical courses

Marks Distribution		
Class Assessments	Class Attendance	10%
	Continuous Assessment	30%
Course final Examination		60%
Total		100%

Project Works

Marks Distribution

Written Dissertation	60%
Final Defence	20%
Research Proposal	10%
Proposal Defence	10%
Total	100%

Class Attendance

Five percent of marks in theory courses and twenty percent of marks in practical courses are added from class attendances.

Marks of attendances

Attendance %	**Marks** (Theory)	**Marks** (Practical)
90 and above	05	10
85 to 89	04	8
80 to 84	03	6
75 to 79	02	4
60 to 74	01	2
Less than 60	00	00

In course and/or assignments

Twenty five percent of marks in theoretical course are added from In-course and/or assignments. Assessment may be done by taking class test and/or by giving assignments.

For practical courses, thirty percent marks shall be allocated for the continuous class assessment.

The course teacher will announce the dates of in-course examinations at the beginning of the course. The in-course assessment will be of one hour duration and the teacher concerned will be responsible to assess the students of his/her course. There will be 1/2 test for each course. In theoretical courses assignment will be selected from the course syllabus or from topics related to course syllabus. Assignment may consist of written report or presentation or both.

4.2: Course Final Examination (Theory and practical Courses)

For appearing in the semester final examination, every student is required to have authorized examination admit card supplied by the Controller of Examination on payment of dues (for each semester).

Eligibility of Setting for the Final Exam

- Student having 75% or more attendance on average (collegiate) are eligible to appear in the final examination.

- Student having 60-74% attendance are considered to be non-collegiate and will be eligible to sit for the final examination on payment on fine tk. 1,000/= (One thousand).

- Student having attendance less than 60% will not be allowed to sit for the final examination but may seek readmission in the program.

- Student must have at least 30% attendance for readmission.

Preparatory Leave (PL)

All academics activities (classes, class assessment etc) will have to be completed before 15 days of semester final exam for smooth functioning of the exam (exam registration, submitting class assessment, and preparation of students for exam). AC can reduce the time only in special circumstances.

Duration of Exam

The duration of theoretical course final examinations will be as follows:

Credit	Duration of Examination
3 credit course	3 hours

Duration of practical examinations will be 4 hours irrespective of credit hours. The Class Test(s) for In-course Assessment will be taken usually after covering 40% of the course topics and the Course Final Examination on completion of the entire course. For each semester, the Departmental Academic Committee may fix an "In-course Examination/Class Test Week" for conducting the tests.

Evaluation of Examination Script

In Final Examination, each theory course will be evaluated by two teachers of the department or outside (who may be either from DU or outside DU). In single teacher course the semester final test scripts must be evaluated by two teachers, one of whom must be the course teacher, and another, a suitable second examiner who may be either from DU or outside DU.

Evaluation by Third Examiner

In the semester final examination if the difference of marks in any course is more than 20%, the script will be evaluated by a third examiner. The final marks obtained will be averaged of the nearest two marks, or third examiners marks if the difference between his/her marks and the two other examiner's marks are the same.

Evaluation of Practical Courses

Evaluation of practical courses will be done by course teacher/teachers. No option for second or third examination is allowed in practical courses.

Research Project Conduction and Project Supervisor Selection

In order to develop skilled personnel in problem identification, work-methodologies, scientific interpretation, producing a standard report; individual student shall carry out a supervised study independently on a specified topic. A project will be developed by each student with the guidance from his supervisor/co-supervisor which is to be approved by the Academic Committee of the department. Students shall contact with faculty of their field of interest for the selection of supervisor and/or co-supervisor. The Academic committee shall approve the final list of supervisors. On completion of the Project, each student shall defend and submit written Project Report on the work undertaken. Upon the decision of Academic Committee project may also be completed by group work as well with field visit. Students may also carry out internship at an organization/NGO/Agency or Industry upon the approval of the academic committee.

Evaluation of Research Project

The written dissertation will be evaluated by Project Supervisor, Co-supervisor and an assigned Expert (assigned by the academic committee). For the presentation of project, supervisor, co-supervisor, assigned expert and a representative of the respective Exam Committee will evaluate each student's presentation. Other faculty members/ supervisors can be present during the presentation of a project. Marks distribution has been shown above.

Viva voce

Viva shall be evaluated by the examination committee of the semester at the end of the semester final exam.

4.3: Grading Scale and Grades

At the time of evaluation all marks will be entered in numerical form. Only at the time of submitting the final grade sheet and while finalizing the results in the tabulation sheet, grades will be entered in both numerical and letter grade form.

Marks can be given in fraction up to two decimals. If the total marks of a course are in fraction. They should be raised to the higher whole number.

GPA and CGPA can be in fraction up to two decimals. The second decimal will be raised to the next higher number if the third decimal number is 5 or above.

Transcript issued to the students will include Letter Grades, Grade Point (GP), Grade Points Average (GPA), and Cumulative Grade Point Average (CGPA). Transcript will not include numerical grades.

Numerical Grades, Letter Grades, and Grade Point Averages (GPA), and Cumulative Grade Point Average (CGPA) will be given according to the following scale:

Numerical Marks	Letter Grades	Grade Points
80 above	A+	4.00
75 -79	A	3.75
70 – 74	A-	3.5
65 -69	B+	3.25
60 – 64	B	3.00
55 -59	B-	2.75
50 – 54	C+	2.50
45 -49	C	2.25
40 – 44	D	2.00
Less than 40	F	0.00
Incomplete (does not take an exam)	I	0.00
Withdrawn (does not attend any class and take any exam)	W	0.00

Calculation of GPA and CGPA

GPA (Grade Points Average) will be calculated by multiplying the course credits by the GP (Grade Points) obtained in the courses and dividing the total by total credits. CGPA of more than one semester will be calculated by adding the GPA of the semesters concerned multiplied by the semester credits and dividing the results by the total credits of the semesters.

GPA of One Semester

$$= \frac{Credits\ of\ Course\ A \times GP\ obtain\ in\ Course\ A + \cdots + Credits\ of\ Course\ Z \times GP\ obtain\ in\ Course\ Z}{Total\ Credits\ of Courses\ of\ the\ semester}$$

CGPA of Year One

$$= \frac{Total\ GP\ of\ 1st\ Semester + Total\ GP\ of\ 2nd\ Semester}{Total\ Credits\ of\ 1st\ and\ 2nd\ semester}$$

CGPA of eight Semesters

$$= \frac{Total\ GP\ of\ 1st\ Semester + \cdots + Total\ GP\ of\ 8th\ Semester}{Total\ Credits\ (152)}$$

4.4: Promotion

Promotion will be year wise. Minimum CGPA (Cumulative Grade Point Average) 2 is needed only for promoting from second semester to third semester. Minimum CGPA 2.25 is needed for promoting fourth to fifth semester, and minimum CGPA 2.50 is needed for promoting from sixth to seventh semester. **For final degree a student must have to secure minimum CGPA 2.50.**

Promotion from first to second semester, third to fourth semester, fifth to sixth semester and seventh to eighth semesters will be automatic for those students having sixty percent attendance.

The minimum CGPA of a student, as mentioned above, is calculated taking into consideration the grade points obtained in courses of all previous class years. Besides, a student failing to clear up university or departmental dues shall not be promoted to the next class year.

4.5: Final Degree

For M.S. degree a student need to complete 160 credit hours without F grade in any course, have to secure minimum CGPA 2.5.

4.6: Retaking of Examinations and Improvement of Grades

Improvement of grade/grades is applicable only for the students who get promoted.

A student securing GPA C+ (2.50) or lower in any course may improve his/her grades by retaking the examination/examinations of the course/courses only once with the available ***immediate next batch*** at his/her own risk. In this particular case, marks of the previous class assessment will be added with the improved (if) final exam marks of final exam.

Retaking or improvements are not allowed in practical and field works based courses.

A student with F grade only in any course/courses will be allowed to improve the grade/grades by retaking the examination/examinations of the concerned course/courses for the ***second time with the available following batch*** if he/she gets F in the first improvement test/tests, he/she will get the final chance of improvement but he/she must take his/her improvement with the following batch.

Improvement of midterm exam shall not be allowed.

In all cases class assessment marks will be retained.

In addition to the usual fees, a fine will be imposed for each course to be retaken as per university rules.

The student have to be mentally prepared to take the test of particular course even if it is held on the same day of his/her other examination.

The same rules will be applicable in the case of any student getting absent (I) in any course/courses.

4.7: Class Representatives

Each batch will have two class representatives (one male and one female) to maintain liaison with the course coordinator and the course teachers regarding their progress and problems. Student advisor/advisors will select class representatives. Class representatives can continue whole academic period to serve the class or in every semester new representative can be selected from the class.

4.8: Course Teacher

Course teacher shall be finalized before the beginning of a semester by AC. The AC can make necessary change in course teacher if necessary (going on leave, illness etc). More than one teacher can take one courses if necessary.

Course teacher will take classes of designated courses and arrange field visit if necessary for the courses (i. e visiting Bangladesh Meteorological Department).

The course teacher shall submit class assessment marks (attendance, mid-terms, presentation, and assignment), two copies to the chairman of the examination committee, and one copy to the controller of the examination at least fifteen days before semester final exam.

The course teacher and second examiner will submit two copies of mark-sheets (final exam) to the chairman of the examination committee, and one copy to the controller of the examination.

4.9: Course Coordinator

The AC of the department will also select a course coordinator for each semester, who may be a member of the examination committee, for smooth functioning of the program. AC can change course coordinator if necessary.

The course coordinator will prepare routines, arrange and monitor classes and attendances, ensure smooth functioning of the academic work, and help the chairman in getting questions from the question setters, holding examination, preparing exam routines, and publishing examination results.

Ensure submission of all class assessments of a particular semester fifteen days before the semester final exam. Courses coordinator will arrange posting of relevant notices on notice board.

In case of the Course Coordinator falling sick, going on leave, or is unwilling to continue, the academic committee will nominate a substitute.

4.10: Examination committee

The Academic committee of the department shall form an examination committee for each semester for three years. The committee will include a chairman and three members. The Academic Committee can make changes in examination committee if necessary. In special case, out of the three members the committee may have an external member who may be from DU or outside DU.

The selected course coordinator by the AC of the department may be a member of the examination committee, for smooth functioning of the program. If the AC decides, the chairman of examination committee can function as the course coordinator without any monetary benefit for the latter.

In case of any member of committee falling sick, going on leave, or is unwilling to be on the committee, the academic committee will nominate a substitute.

Chairman of the Examination Committee

He/she will be responsible for getting questions from the course teachers, moderating and printing the questions, holding of examinations, and publication of results. If the chairman desires, he/she may request the course coordinator to collect questions from the course teachers.

The chairman of examination committee will take necessary initiatives (formulating exam routines, issuing letter for seeking class assessment marks from course teachers, seeking question papers from examiners etc) of semester final examination at least one month before the starting of final examination.

4.11: Tabulation and Tabulator of the Examination Results

Two teachers of the department will act as tabulators. The chairman of the examination committee and the course coordinator will select the tabulators who should be preferably member of examination committee.

The course teacher and second examiner will submit two copies of mark-sheets (final exam) to the chairman of the examination committee, and one copy to the controller of the examination.

The course teacher will submit class assessment marks (attendance, mid-terms, presentation, and assignment), two copies to the chairman of the examination committee, and one copy to the controller of the examination at least fifteen days before semester final exam.

The two tabulators will enter the class assessment marks and semester final marks (average of first and second examiner) in to tabulation sheets and process the examination results

In the semester final examination if the difference of marks in any courses is more than 20%, the script will be evaluated by third examiner. The final marks will be average of nearest two marks, or the third examiner's marks if the difference between his/her marks and two other examiner's marks are the same.

The tabulator will help the controller office to prepare three copies of computerized tabulation sheets. The controller's office will send one copy to the chairman of the department for preservation.

The controller's office will publish the examination results at the end of semester and issue the transcripts.

4.12: Plagiarism and Referencing

Plagiarism is use of intellectual material produced by another parson without acknowledging its source. Common examples are copying, paraphrasing (published, unpublished or web based) from others without acknowledging the authors.

Plagiarism is a serious academic offence and violation of academic and student conduct rules. It is regarded as stealing of intellectual properties. **It is punishable with falling grades or possibly more severe action.**

Referencing is the process of acknowledgement of the sources (words and ideas of another author) used in easy, assignment, dissertation or anything else.

5. Course Structure:

Course Number and Title:
DSMMT: 501 Disaster Impact Assessment

Credit and Credit Hours:03 (45 Hours)

Introduction to the Course:

Natural disasters cause terrific human suffering.They also create substantial physical and economic damage,which can spill over outside the disaster area. As a result, disasters may destroy a country's overall economic developmenttemporarily, or permanently. There is relationship between naturaldisasters and economic growth. So proper mitigation and adaption options are required to lessen the impact of disasters on economic and social aspects. This course is, therefore, to exercise the tools and techniques that can be applied/adopted to assess the disaster impact and their mitigation options.

Course Contents:

1. Scope of Risk & Impact Assessment
2. Hazard Identification Tools, Hazard Analysis, Natural and Technological Hazard Assessment
3. Elements at Risk, Types of Elements at Risk, Exposure Analysis, Vulnerability Assessment,Components and Characteristics of Vulnerability, Conceptual Frameworks of Vulnerability, Vulnerability Assessment Methods: physical, socio-economic, environmental & systemic
4. The purpose of Risk Assessment, Qualitative and Quantitative Approach to Risk Assessment/Risk Estimation
5. Risk Modeling: Concept and Steps, Risk Modeling Tools (e.g. HAZUS, CAPRA, The OpenQuake)
6. Environmental Impact Assessment (EIA), Social Impact Assessment (SIA)
7. Multi-hazard Risk Assessment Framework,Step by step Multi-hazard Risk Assessment,Risk Evaluation, Risk perception, Risk Transfer

Learning Outcomes:

Upon completing the course the student will –

1. Get a comprehensive understanding of Disaster Impact Assessment framework.
2. Be able to know how to assess the economic, environmental and social impact.
3. Be able to take the decision of proper risk reduction measures based on estimated impact

Number of Classes: **45**

Instructional Strategies:

Visual aids like Multimedia will be used to present lectures. All the materials will be provided in soft copies or hard copies. Soft copies will be provided through common group email account. Teaching methods will be: lectures, group discussion, exercises, case studies, assignments, presentations. Question and answer sessions, and report writing will be used to increase participation.

References:

1. Birkmann J. (2013) Measuring Vulnerability to Natural Hazards: Towards Disaster Resilient Societies. United Nations University Press. Japan.
2. Macaulay T. (2008) Critical Infrastructure: Understanding its Component Parts, Vulnerabilities, Operating Risks, and Interdependencies. CRC Press. US.
3. Ostrom L.T. &Wilhelmsen C.A. (2012) Risk Assessment: Tools, Techniques and Their Application. Wiley-Blackwell. US.
4. Schneider S.K. (2011) Dealing with Disaster: Public Management in Crisis Situations. 2nd Edition. M.E. Sharpe. US.
5. Schumann A.H. (2011) Flood Risk assessment and Management. Springer. Netherlands.
6. Ulrich Ranke (2016) Natural Disaster Risk Management: Geoscience and Social Responsibility, Springer, New York
7. Wisner B. (2004) At Risk: Natural Hazards, People's Vulnerability, and Disasters. Routledge. US.fa
8. Westen et al (2011), A Guidebook of Multi-hazard Risk Assessment, Public Works

Course Number and Title:
DSMMT: 502Humanitarian Emergency & Crisis Management

Credit and Credit Hours: 03 (45 Hours)

Introduction to the Course:

Nowadays, we are facing many humanitarian emergency and crisis all over the world due to disasters, arms conflict and terrorism. In this course students will get ideas about humanitarian emergency & crisis, their origin, management etc. elaborately.

Specific Objectives:

To get complete ideas about humanitarian emergency and crisis and management procedures.

Course Contents:

1. **Introduction:**

   Complex Humanitarian Emergency, Origin and evolution of the definition. Related concepts. Difference between man-made and natural disasters: characteristics. Who are the players? A brief description of the network of local, national and international actors.

2. **Practical and conceptual problems with a humanitarian crisis:**

   Uncertainty on how and when to intervene (accompanied by a lack of preparedness). The difficulties in linking relief, rehabilitation, and development. Declining resources and disparities in allocation. The roles and management of the organizations involved inter-

organizational coordination and competition, as well as the tension between organizational control and local participation.

3. **Root causes of humanitarian crisis: breakdown of societies:**

   Vulnerabilities and Prevention. Causes: Exclusion (economic, social, political). Authoritarianism and corruption, Development failures and structural adjustment, Colonialism, War economies. Resource constraints: population pressures and environmental deterioration.

4. **Humanitarian theories:**

   Humanitarianism, Theory, and practice of humanitarian intervention, Three Grotian Theories of Humanitarian Intervention, Eight Theories of Humanitarian Intervention

5. **Humanitarian interventions:**

   Types of intervention: military (peacekeeping) or civilian. Prevention, Peacemaking, and Rebuilding. How do complex humanitarian emergencies differ from long-term deprivation? When is it "right" and/or "legal" to intervene? When not to intervene? Who should decide? What is the least that should be done to help? Who will oversee the quality of relief?

6. **Humanitarian actors and coordination:**

   The military: The emerging and controversial role of the military in "humanitarian interventions." Media, Donor, Country Governments. NGOs: Theoretical overview: what are they, why have they emerged, whose interests do they serve and why? Distinguishing between public service contractors, solidarity organizations, neutral organizations and impartial organizations. North-South issues. Funding arrangements and the broader issue of donors and their policies. UN System: Roles, responsibilities, and mandates. Roles of states and national sovereignty. Execution of programs & examples of UN-led humanitarian interventions: political rationale, funding levels, assignment for leadership and coordination. Regional Organizations. The aid chain and coordination.

7. **Victims, beneficiaries or participants? The local population, internally displaced people, and refugees:**

   Outcomes of actions: conflict resolution, refugee resettlement, social and political reconstruction. What goes right? What goes wrong? Where do we go from here? Coping mechanisms, capacities, capabilities, and vulnerabilities. Participation.

8. **Rebuilding reconsidered: linking relief and development:**

   Importance of a long-term development perspective: lives and livelihood. It is important to stress the linkages among political aspects, human rights, and participation. Three areas:

security: a transition from war to peace and non-violent ways of conflict resolution; politics: a transition from an authoritarian or totalitarian system to an open, participatory system of governance (including civil society building); and economy: a transition to (re-)building economic capacities, often with a higher degree of equity. Accountability and evaluation. What happens if the spotlight is turned off?

9. **Practical humanitarian actions:**

Water and Sanitation, Livelihoods and Food Security in Humanitarian Crises, Nutrition in Humanitarian Crises, Management of Diseases in Humanitarian Crises, Shelter in a Humanitarian Setting, Protection of Displaced Populations: Human Rights & Humanitarian Law, Emerging Risks, Challenges, and Opportunities for Future Humanitarian Emergencies

10. **Criticisms, alternatives, and solutions:**

Do no harm: aid can support peace or war, the criticism on humanitarianism (De Waal) and the response, Ethics and Humanitarian Standards, SPHERE, HAP, Southern challenges

Learning Outcomes:

- To learn what is emergency and crisis and their causes.
- To learn how to manage emergency and crisis
- To get an overview of world's present emergencies and crisis.

Number of Classes: 45

Instructional Strategies: Visual aids like Multimedia will be used to present lectures. All the materials will be provided in soft copies or hard copies. Soft copies will be provided through common group email account. Teaching methods will be: lectures, group discussion, exercises, case studies, assignments and presentations. The techniques of experiential learning like role play, question and answer sessions, practical research and report writing will be used to increase participation. Students are expected to be enthusiastically involved in the classroom activities. In addition, problem solving, and on-line discussions will be highly appreciated.

References:

1. Gourevitch, P. (1998) *We wish to inform you that tomorrow we will be killed with our families: Stories from Rwanda*, Picador USA, New York.
2. Moore, J. (1998) *Hard Choices*, Introduction & Ch. 1, pp. 1-28.
3. Weiss, T. G., Collins, C. (2000) *Humanitarian Challenges and Intervention*, (Ch. 1: Evolution of the Humanitarian Idea) Westview Press, second edition, pp. 13-38.
4. Crocker, Hampson, Aall (1996) pp. 1-170.

5. Keen, D. (1998) The Economic Functions of Violence in Civil Wars, *Adelphi Paper*, **320**, The International Institute for Strategic Studies, Oxford University Press, Oxford, 88 pp.
6. Hatzfeld, J. *(Translated by Linda Coverdale)* (2006) Life Laid Bare: The Survivors in Rwanda Speak. Other Press, New York. 2006.
7. Lee, S.P (2010) HUMANITARIAN INTERVENTION—EIGHT THEORIES. In *Diametros № 23 (March 2010): 22-43 22*.
8. Totten, S. & Parsons, W.S. (edited) (2013) Centuries of Genocide: Essays and Eyewitness Accounts (4th Edition). Routledge: New York.
9. Crocker, Hampson, Aall (1996) pp. 173-273, 287-341, 379-417.
10. Task Force on Ethical and Legal Issues in Humanitarian Assistance (1994) *The Mohonk Criteria for Humanitarian Assistance in Complex Emergencies*, World Conference on Religion and Peace, New York.
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21. Anderson, M.B. (1999) *Do No Harm: How Aid Can Support Peace ¾ Or War*, Lynne Riener Publishers, Boulder.
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Course Number and Title:

DSMMT: 503 Urban Resilience: Theory and Practices

Credit and Credit Hours:03 (45 Hours)

Introduction to the Course:

Cities grow faster and every day the urban areas are being increased, which creates pressure on exiting infrastructures/facilities, economy and standard of living. Again, the growth of urban areas is not as much as the growth of population. As a result, the urban population density is hiking always that increases the exposure to the human lives to the urban disaster like earthquake, flood, and fire and build collapse etc. This leads to make urban setting vulnerable day by day. So to make urban areas more resilient is a great concern for city / disaster management authority and urban dwellers. To avoid losses from disasters, and to prevent affected citizens from falling into poverty, improved urban resilience can safeguard for its generations. Hence this course is designed to highlight the theories, techniques and best practices for attaining urban resilience in a sustainable way.

Course Contents:

1. Principles of Urban Resilience: Urban Disaster Resilience, Risk, Uncertainty, and Complexity, Disaster Risk Management and Opportunities for Resilience Social Resilience, Land Use Planning, Urban Ecosystems, Urban Upgrading, Incorporating Resilience into the Project Cycle,
2. Tools for Building Urban Resilience: Risk Assessment, Risk-Based Land Use Planning, Urban Ecosystem Management, Urban Upgrading, Community and Stakeholder Participation, Disaster Management Systems, Data Gathering, Analysis, and Application, Risk Financing and Transfer Approaches
3. Climate Resilient Cities: Understanding the Impacts of Climate Change and Disaster Risk Management, Explaining Climate Change Impacts and Disaster Risk Management, Assessment Exercise: Discovery of a "Hot Spot", Information Exercise: Creating a City Information Base, Sound Practice Examples of Adaptation and Mitigation
4. Pillars of Urban Risk Assessment: Hazard Impact Assessment, Institutional Assessment, and Socioeconomic Assessment
5. Techniques for Urban Disaster Mitigation:focus on Earthquake, Fire and Water Logging
6. The Practice of Urban Resilience: Water Supply and Wastewater Systems, Energy and Communication Systems, Transportation Systems
7. Work place safety and public health issues in urban settings
8. Learning from Cities: Delta Cities, Coastal Cities, and Densely Populated Cities
9. Resilient Cities and Climate Adaptation Strategies
10. Risk Assessment of Action Planning and Implementation

Learning Outcomes:

Students should be able to -

1. Understand urban setting, risk and resilience.
2. Identify the urban risk resulting from natural hazards and climate change.
3. Apply urban vulnerability and risk assessment methods, including social techniques towards resilient city.
4. Know the best practices for tackling disaster and climate-related impact.
5. Know how to incorporate this risk information into action plans.

Number of Classes: **45**

Instructional Strategies:

Visual aids like Multimedia will be used to present lectures. All the materials will be provided in soft copies or hard copies. Soft copies will be provided through common group email account. Teaching methods will be: lectures, group discussion, hands-on exercises, case studies, assignments, presentations. Question and answer sessions and report writing.

References:

1. Abhas K. Jha et al (2013) Building Urban Resilience: Principles, Tools, and Practices, a World Bank Publication
2. Eric Dickson and et al (2012) Urban Risk Assessments: Understanding Disaster and Climate Risk in Cities
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4. Ulrich Ranke (2016) Natural Disaster Risk Management: Geoscience and Social Responsibility, Springer, New York
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7. Pelling, M. 2010. Review and Systematization of Disaster Preparedness Experiences in Urban Areas in the Caribbean Region. Oxford, U.K.: Oxfam.
8. 10 Pelling, M., and B. Wisner. 2009. Disaster Risk Reduction: Case Studies from Urban Africa. London: Earthscan Publications Ltd.
9. Tools for Building Urban Resilience: Integrating Risk Information into Investment Decisions. Pilot Cities Report—Jakarta and Can Tho (World Bank 2012).
10. UNISDR. 2015. Sendai Framework for Disaster Risk Reduction 2015-2030. The United Nations Office for Disaster Risk Reduction (UNISDR), United Nations - Headquarters (UN), Geneva Switzerland, 32 p.

Course Number and Title:
DSMMT: 504Climatic Risk Assessment and Extreme Event Modeling

Credit and Credit Hours: 03 (45 Hours)

Introduction to the Course:
Day by day extreme atmospheric events are increasing due to climate change. In this course student will learn about the climatic risk assessment techniques use model to predict extreme climatic events.

Specific Objectives:
Learning climatic risk assessment technique and using climatic models to predict extreme climatic events.

Course Contents:

1. **Introducing Climate Modeling:** Types of Climate Models: Energy Balance Climate Model, One-dimensional Radiative-convective Climate Model, and Dimensionally Constrained Climate model, General Circulation Models, Paleoclimatic Model, and Projections of Future Climate Change, Processes of Climatic Model Development, Sensitivity of Climate Model & Model Evaluation.
2. **Physical Processes in the Climate System:** Conservation of moment, Equation of (Application- height-pressure-temperature relation, thermal circulation, sea level rise due to oceanic thermal expansion, temperature equation (Application: the dry adiabatic lapse rate near the surface, decay of a sea surface temperature anomaly), Continuity equation (Application: coastal upwelling, equatorial upwelling, conservation of warm water mass in an idealized layer above the thermocline), Moisture equation and salinity equation, Moist processes, Wave processes in the atmosphere and ocean (e.g. Gravity waves, Kelvin waves, Rossby waves).
3. **Climate Model:** Constructing a Climate Model (An Atmospheric model, Treatment of sub-grid scale processes, Resolution and computational cost, An ocean model and ocean-atmosphere coupling, Land surface, snow, ice and vegetation, Summary of principal climate model equations, Climate system modeling), Numerical representation of atmospheric and oceanic equations (Finite-difference versus spectral models, Time-stepping and numerical stability, Staggered grids and other grids, Parallel computer architecture), Parameterization of small-scale processes (Mixing and surface fluxes, Dry convection, Moist convection, Sea ice and snow, The hierarchy of climate models, Climate simulations and climate drift, Evaluation of climate model simulations for present-day climate (Global Climate Models e.g. GCM, Regional Climate Models e.g.

PRECIS, Atmospheric model climatology from specified SST, Climate model simulation of climatology, Simulation of ENSO response), Evaluation of climate models.

4. **Climate Model Scenarios for Global Warming:** Greenhouse gases, aerosols and other climate forcing, Global-average response to greenhouse warming scenarios, Spatial patterns of warming for time-dependent scenarios, Climate response time in transient climate change, Ice, sea level, extreme event, Climate change observed to date, Emissions paths and their impacts.

5. **Year-to-Year Climate Prediction:** El Niño prediction, Other inter-annual climate phenomena and prospects for seasonal-to- inter-annual climate prediction (e.g. Hurricane season forecasts, Sahel drought, North Atlantic oscillation and annular modes)

Learning Outcomes:

- How to assess climatic risk
- How to run climate model
- How to evaluate results provided by climate model etc.

Number of Classes: 45

Instructional Strategies:
Visual aids like Multimedia will be used to present lectures. All the materials will be provided in soft copies or hard copies. Soft copies will be provided through common group email account. Teaching methods will be: lectures, group discussion, exercises, case studies, assignments and presentations. The techniques of experiential learning like role play, question and answer sessions, practical research and report writing will be used to increase participation. Students are expected to be enthusiastically involved in the classroom activities. In addition, problem solving, and on-line discussions will be highly appreciated.

References:

1. Neelin J.D., 2011. Climate Change and Climate Modeling, Cambridge University Press, London
2. Dr. Philip J. Rasch (auth.), Philip J. Rasch (eds.), 2012. Climate Change Modeling Methodology: Selected Entries from the Encyclopedia of Sustainability Science and Technology, Springer-Verlag New York
3. SaeidEslamian, 2014. Handbook of engineering hydrology: Modeling, climate change, and variability, CRC Press/Taylor & Francis Group, Boca Raton
4. YongyutTrisurat, Rajendra P. Shrestha, Rob Alkemade Land Use, 2011. Climate

Change and Biodiversity Modeling: Perspectives and Applications, Information Science Reference, Hershey
5. N. Gobron, F. Mélin, B. Pinty (auth.), Martin Beniston, Michel M. Verstraete (eds.), 2001. Remote Sensing and Climate Modeling: Synergies and Limitations, Springer Netherlands
6. Azadeh Ramesh, 2013. Response of Flood Events to Land Use and Climate Change: Analyzed by Hydrological and Statistical Modeling in Barcelonnette, Springer Netherlands
7. Leila Maria Véspoli de Carvalho, Charles Jones (eds.), 2016. The Monsoons and Climate Change: Observations and Modeling, Springer International Publishing, Switzerland
8. Dr. Philip J. Rasch (auth.), Philip J. Rasch (eds.), 2012. Climate Change Modeling Methodology: Selected Entries from the Encyclopedia of Sustainability Science and Technology, Springer-Verlag New York
9. John B. Drake, 2014. Climate modeling for engineers and scientists, SIAM-Society for Industrial and Applied Mathematics, Philadelphia
10. Randall, D.A., R.A. Wood, S. Bony, R. Colman, T. Fichefet, J. Fyfe, V. Kattsov, A. Pitman, J. Shukla, J. Srinivasan, R.J. Stouffer, A. Sumi and K.E. Taylor, 2007:
11. Climate Models and Their Evaluation. In: Climate Change 2007: The Physical Science Basis. The contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M.Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Course Number and Title:
DSMMT: 505 Integrated Water and Agricultural Risk Management

Credit and Credit Hours:Credit 03 (45 Hours)

Introduction to the Course:
This Course will provide insight knowledge on different theory and available tools in this area to deal with water and agricultural risk managements. This course covers wide ranges of risk and possible solutions on water and agricultural aspects.

Specific Objectives:
Students would be able to identify and apply appropriate methods of assessing these risks and to demonstrate an understanding of the decision process behind the management of such water and

agricultural risks and to explain the possible consequences in a given situation where these risks will occur and their likely impacts on the water, agriculture and finally the populations.

Course Contents:

1. **Environmental, Water and Agricultural Risk and Perception**

Integration of water, agriculture, and environment – the need and its study approach. Various types of water, agricultural and environmental risks, the perception of risk and how it varies with context, attitudes towards risk based on psychological, cultural and other dimensions. The role of various societal groups (the media, NGOs, etc) in risk issues.

2. **Water and Environmental Pollution Prevention and Remediation Technologies**

Water treatment process train, Ultra- and Microfiltration – Basic principles. Membrane materials, pore size, and fouling mechanisms. Overview of ultra- and micro-filtration elements and systems. Fouling in MF/UF systems, fouling control and pre-treatment. Reverse osmosis and Nano-filtration – Basic principles. Overview of RO and NF membranes and elements. Summarizing process design of RO systems. Conventional pre-treatment techniques for RO and NF. Particulate fouling and pre-treatment– Fouling due to suspended and colloidal matter, parameters to predict fouling, Biofouling and pre-treatment– Pre-treatment for bio-fouling, principles, parameters AOC and BDOC, membrane fouling simulator. Fouling due to Oil compounds spills. Advanced oxidation processes – Fundamentals of AOPs including ozone, H2O2, UV, and combinations; application. Air quality monitoring- Common and Criteria pollutants, solid waste management- site selection and leachate management, Aquifer vulnerability assessment.

3. **Modelling of Environmental Processes/Contaminants:** Examples of models applied in Environment, soil, and water. Overview of the types of models applied, strengths and weaknesses of various models. Illustrating the impact of models and model outputs on climate change to local flooding risk.

4. **Agricultural systems and its historical development underworld and Bangladesh context**: The future direction of production and productivity of Bangladesh agriculture: Vision, mission, and road-map. Agricultural environments of Bangladesh with the specific role of water.

5. **Environmental constraints: Land, water, and climate**.

6. **Qualitative analysis of water-environment-based agriculture**: _Agroecosystems‘ approach. **Quantitative analysis of water-environment-based agriculture**: a Formal modeling approach. Improved productivity of water-environment-driven agriculture: Application of qualitative and quantitative approach for _Crop system‘. 13

7. **Improved productivity of water-environment-driven agriculture:** Application of qualitative and quantitative approach for _Livestock system‘

8. **Improved productivity of water-environment-driven agriculture**: Application of qualitative and quantitative approach to ‗Fish system'. Improved productivity of waterenvironment-driven agriculture: Application of qualitative and quantitative approach for ‗integrated agricultural system'.

9. Scientific writing and presentation of agricultural systems analysis.

Learning Outcomes:
By the end of the course, students will be able to:

1. Understand the wide range of water and agricultural hazards and risks within Bangladesh.

2. Aim at improving environmental quality by using different types of pollution prevention technologies.

3. Promote environmental sustainability through cleaner production and pollution prevention.

4 Have a clear physical representations of the environmental processes through Modelling which are feasible for a short time period analysis.

5. Derive important facts from research data for the development of water environmental based agriculture of Bangladesh through qualitative and quantitative statistical analysis.

References:

1. PARK, Chris (2001) The Environment: Principles and Applications. 2nd Edition, Routledge, UK.

2. SMITH, Keith, and Petley, David N. (2009) Environmental Hazards: Assessing Risk and Reducing Disaster. 5th Edition, Routledge, London, UK.

3. WOODS, Michael and Woods, Mary B. (2008) Environmental Disasters. Minneapolis: Lerner Publications Company.

4. Cramer, G.M., Ford, R.A. & Hall, R.L. 1978, "Estimation of toxic hazard - a decision tree approach", Food and cosmetics toxicology, vol. 16, no. 3, pp. 255-276.

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6. IGHRC (2006) Guidelines on route-to-route extrapolation of toxicity data when assessing health risks of chemicals MRC IEH, Leicester, the UK available at http://ieh.cranfield.ac.uk/ighrc/pdf/cr%20reports/cr12%5B1%5D%5B1%5D.pdf

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8. Defra/Cranfield (2011) Guidelines for Environmental risk assessment and management (Green Leaves III) available athttps://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69450/pb13670-green-leaves-iii-1111071.pdf

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10. Sjöberg L., Moen, B.E., Rundmo T. Explaining risk perception. An evaluation of the psychometric paradigm in risk perception research, Rotunda, available at http://www.svt.ntnu.no/psy/Torbjorn.Rundmo/Psychometric_paradigm.pdf

11. BARC. 2012. Agricultural Research Vision 2030. Project Coordination Unit (PCU) National Agricultural Technology Project (NATP): Phase-1, Bangladesh Agricultural Research Council (BARC), Farmgate, Dhaka-1215, Bangladesh.

12. Brammer H. 2012. The Physical Geography of Bangladesh. University Press Limited. Dhaka, Bangladesh.

13. Conway G.R. 1986. Agroecosystem analysis. Agricultural Administration. 20: 31-55. 14

14. Groom B. 2012. Climate Change Adaptation: The Bangladesh Experience. World Wide Fund for Nature – Pakistan.

15. Hossain S.M.A. et al. (Eds). 1993. Farming Systems Research. Graduate Training Institute, Bangladesh Agricultural University, Mymensingh, Bangladesh.

16. Kabir, M.S., M.U. Salam, A. Chowdhury, N.M.F. Rahman, K.M. Iftekharuddaula, M.S. Rahman, M.H. Rashid, S.S. Dipti, A. Islam, M.A. Latif, A.K.M.S. Islam, M.M. Hossain, B. Nessa, T.H. Ansari, M.A. Ali and J.K. Biswas. 201). Rice Vision for Bangladesh: 2050 and Beyond. Bangladesh Rice Journal. 19: 1-18.

17. Kaida Y. (Ed). 1990. Agricultural and Rural Development in Bangladesh: A Review of Related Studies. JSARD Pub. No. 19. Japan International Cooperation Agency (JICA), Dhaka, Bangladesh.

18. Penning de Vries F.W.T., D.M. Jansen, H.F.M. ten Berge and A. Bakema. 1989. Simulation of Ecophysiological Processes of Several Annual Crops. Pudoc, Wageningen, Netherlands.

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20. Salam M.U. 1992. A Systems Approach to the Potential Production of Boro Rice in the Haor Region of Bangladesh. Ph.D. Thesis, University of Reading, UK.

21. Spedding C.R.W. 1975. The Biology of Agricultural Systems. Academic Press, London, UK.

22. Timsina J. and E. Humphreys. 2006. Applications of CERES-Rice and CERES-Wheat in research policy and climate change studies in Asia: a review. International Journal of Agricultural Research 1: 202–225.

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24. Van Keulen H. and J. Wolf (Eds). 1986. Modelling of Agricultural Production: Weather, Soils, and Crops. Pudoc, Wageningen, Netherlands.

25. World Bank. 2000. Bangladesh: Climate Change and Sustainable Development. Report No. 21104, World Bank Office, Dhaka, Bangladesh.

Course Number and Title:
DSMML 506: Advanced Research Methodology

Credit and Credit Hours: 03 (45 Hours)

Introduction to the Course:
This course will provide an opportunity for students to establish or advance their understanding of research through critical exploration of research language, ethics, and approaches. The course introduces the language of research, ethical principles and challenges, and the elements of the research process within quantitative, qualitative, and mixed methods approaches. Students will use these theoretical underpinnings to begin to critically review literature relevant to their field or interests and determine how research findings are useful in forming their understanding of their work, social, local and global environment. Based on the learning, the students will prepare their thesis/project proposal in this course. In addition, the ideal format for submitting a project proposal to achieve research grant will also be addressed in this course. Finally, students should able to know how to present the expected project outcomes to the professional audience.

Specific Objectives:

- Understand concepts and definitions of research;
- Select a tentative research problem that will be subsequently developed into a research proposal;
- Identify various paradigms for conducting research;
- Understand the process of developing a research project;
- Know and use library reference sources and services;
- Understand the organizational skill necessary for good research;
- Demonstrate the ability to think and interact critically with primary and secondary materials as well as with fellow students and the instructor;
- Learn how to write with clarity and grace.

Course Contents:

1. Science, Research and Scientific Enterprise
2. Concept Measurements, Challenges & Constraints in Conducting Research
3. Literature Review
4. Formulating Problems, Objectives and Questions; Assumption and Hypothesis
5. Frameworks: Conceptual, Process, Analytical and Research Framework
6. Research Methods: Pre-field work, Field Work & without Field Work
7. Citation and Reference List; Bibliographic Engines e.g. Mandalay.
8. Causal research design: Conditions of causality, concomitant variation, time order of occurrence of variables, experiment and experimental design, internal and external validity, history, maturation, testing and instrumentation effects, statistical regression effects, selection bias, mortality effect, randomization, matching, experimental designs (pre-experimental, true experimental, quasi-experimental and statistical).
9. Critical Reading and Technical Writing, Argumentation
10. Ethics and Professionalism in Science
11. Data and Data Collection Methods: Data, Measurement Scale, Sampling Methods, Type of Data (Primary and Secondary), Sources of Data (Primary and Secondary), Data Collection Methods Quantitative, Qualitative (Observation Methods, Questionnaires, Methods, Interview, RRA/PRA, FGD); Factor analysis: Factor analysis model, key statistics, conducting factor analysis, principal component analysis, determination of variables and number of factors, interpretation
12. Quantitative Data Analysis, Interpretation and Result Validation Methods: Univariate methods, bivariate methods, time series analysis, signal processing, spatial analysis, image processing, multivariate analysis and directional data analysis.
13. Research Presentation and Publication: Scientific Articles, Publication of Report, Grey Literature, Conference Paper, Presentation of Research, Poster.
14. Research Proposal: Research or Project proposal preparation and defense.
15. Project proposal preparation for a research grant.

Learning Outcomes:

Upon completing the course the student will be able to:

- Identify the main characteristic of scientific research.

- Develop the capability to find, evaluate and summarize pertinent scientific literature to find the scope and to formulate their research problem.
- Develop the skills how to read any research output critically and write technically.
- Construct the framework to be followed in the thesis/project work.
- Know how to store, manage, and use the bibliographic data in scientific writing.
- Critically evaluate & choose the methods & techniques they have learned so far.
- Emphasize research ethics and professionalism.

Number of Classes: Total of 45 lecture classes of 1 hour duration.

Instructional Strategies:

Visual aids like Multimedia will be used to present lectures. All the materials will be provided in soft copies or hard copies. Soft copies will be provided through common group email account. Teaching methods will be: lectures, group discussion, exercises, case studies, assignments and presentations. The techniques of experiential learning like role play, question and answer sessions, practical research and report writing will be used to increase participation. Students are expected to be enthusiastically involved in the classroom activities. In addition, problem solving and on-line discussions will be highly appreciated.

References:

1. B.D. Phillips. 2014. *Qualitative Disaster Research: Understanding Qualitative Research*, Oxford: Oxford University Press.
2. D.G. Rossiter (2011) Research Skills and Methods, An ITC Publication
3. Damodar N. Gujarati and Dawn C. Porter. 2009, *Basic Econometrics*, 5th Edition, McGraw-Hill Irwin, international edition.
4. Paul J. Gertler, Sebastian Martinez, Patrick Premand, Laura B. Rawlings, and Christel M. J. Vermeersch. 2011. *Impact Evaluation in Practice*, Washington DC: World Bank.
5. Shahidur R. Khandker, Gayatri B. Koolwal, Hussain A. Samad. 2010. *Handbook on Impact Evaluation: Quantitative Methods and Practices*, Washington DC: World Bank.
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Course Number and Title:
DSMML: 507 Advanced Remote Sensing and GIS

Credit and Credit Hour:03 (45 Hours)

Introduction to the Course:
Remote Sensing (RS) dataset is widely being used, nowadays, in Disaster Management Cycle. Effective disaster management needs information before, during and after the event for risk reduction, response and crisis management. So real time data or data of temporal nature is essential for proper disaster management (DM). DM also needs data of remote and inaccessible areas. These needs of DM make Remote Sensing data is a must. On the other hand, GIS is a tool to accommodate data from various sources like, RS, GPS (Global Positioning System), field survey (spatial and non-spatial info) and data from other sources or thematic areas to perform analysis for suggesting options for taking appropriate decision for DM. Also GIS is a strong platform for data visualization for individual thematic area and a mashup of different themes.

Course Contents:

1. Advanced Concepts and Principles of Remote Sensing: Air- and Space-borne
2. Advanced Concept of Geo-information Science: Time Series Analysis, Network Analysis, Terrain Analysis, Process Modeling, Data Quality and Accuracy Assessment, Concept and Application of Geo-health,Web-GIS and Crowdsourcing, Customization, Scripting and programming, Geo-database, spatial database, Model builder.
3. Advanced Image Classification: Support Vector Machine, Super Resolution Mapping, Markov Random Field, Sub-Pixel Analysis of Optical Imagery, Object-based image classification, Radar Image Analysis: Interferometry &Polarimetry, Lidar Image Analysis
4. Damage Mapping using Optical, UAV and Radar Image.
5. Remote sensing application in Disaster risk reduction. Cyclone and flood inundation modeling and mapping, Landslide hazard mapping, drought and salinity mapping and modeling, chemical and technological hazard modeling

Learning Outcomes:
Upon completion of this course:

1. The student should able to learn the advanced concept of Geo-information Science and Earth Observation.
2. The student should be able to apply this knowledge using state-of-the-art GIS tools.
3. Thus, the student should enable themselves to solve real-life problems in the context of Disaster Science and Management based on spatial knowledge.

Number of Classes: **45**

Instructional Strategies:
Visual aids like Multimedia will be used to present lectures. All the materials will be provided in soft copies or hard copies. Soft copies will be provided through common group email account. Teaching methods will be: lectures, group discussion, hands-on exercises in RS & GIS Lab, case studies, assignments, presentations. Question and answer sessions, and report writing will be used to increase participation.

References:

1. Lillesand T.M., Kiefer R.W. and Chipman J.W. (2004) Remote Sensing and Image Interpretation. 5th edition. Wiley-Blackwell. US.
2. ITC (2010) A Core Book of Geo-information Science and Earth Observation: A System based Approach.
3. Richards J.A. (2013) Remote Sensing Digital Image Analysis, Springer, New York
4. Weng Q. (2009) Remote Sensing & GIS Integration: Theories, Methods, and Applications. McGraw Hill. US.

Course Number and Title:
DSMMT 508: Institutional, Organizational & Social System

Credit and Credit Hours: 03 (45 Hours)

Introduction to the Course:
This course introduces students about the objective of linking broad organizational and institutional social forces in the field of disaster management. Through this course Students will develop understanding of the disaster management perspective through study of content and the processes used by disaster managers to discover, describe, explain, and/or predict the institutional, organizational and social systems. Students must understand the diversities and complexities of the organizational and social world, past and present, from a critical analytical perspective, and methodologies, and come to an informed sense of contemporary disaster management approaches. This course will give students a grounded experience of how disasters impact on people and their societies, their political cultures and institutions. This course is designed to emphasize: The ability to see how individual lives are connected with wider social and cultural processes and forces; and the ability to work both independently and cooperatively in the application of sociological or anthropological ideas.

Specific Objectives:
The objectives of this course are:

- To provide students with a relatively detailed understanding of some of the major theoretical perspectives and recent development of Institutional, Organizational & Social System regarding disaster management,
- To illustrate how these perspectives are tested,

- To develop an ability to critique, improve upon, and/or extend the execution of an organizational and institutional research program in disaster science and management, and
- To present and discuss research ideas.

Course Contents:

1. **The Organization and its Environment:** Internal Organizational Design, The population ecology approach, the resource dependence approach & the institutionalist approach.
2. **Social Movements & Social Networks:** Social movements in organizational theory perspective.
3. **Institutional Systems:** Functional systems, independence of systems, Cognitive systems, cultural systems
4. **Institutional Organizational Analysis:** Change and transformation
5. **Institutional Arrangements for Disaster Management:** institutional mechanism and their functions.
6. **Bangladesh Disaster Management Authority:** Powers and functions of the National, State and District Disaster Management Authority, District Crisis Management Group/Incident Command System & Emergency Operation Centre
7. **The Role of International Organizations in Disaster Response:** Functioning, Actors, and Problems.

Learning Outcomes:

Learning outcomes of the course are that students recall information about, demonstrate an understanding of, apply and evaluate information in these key areas: Critical Thinking, Institutional Systems of Disaster Management, and Social System Theory, Social Institutions, and Organizational stratification.

By the end of the Course students will be able to:

- Outline the underlying factors that affect social structure (i.e., cultural, economic, political, etc.) and the culturally significant institutions and processes that change over time and influence social behavior. Through class discussion, written projects, quizzes and/or exams, students will be able to communicate their understanding of these relevant concepts.
- Develop and communicate hypothetical explanations for intuitional and organizational behavior within the field of disaster management or social context.
- Recognize the prevailing global priorities and frameworks for intuitional, organizational and social systems.
- Draw on the social and behavioral sciences to evaluate contemporary problems using social science research methodology.

Number of Classes: Total of 45 lecture classes of 1 hour duration.

Instructional Strategies:

Visual aids like Multimedia will be used to present lectures. All the materials will be provided in soft copies or hard copies. Soft copies will be provided through common group email account. Teaching methods will be: lectures, group discussion, exercises, case studies, assignments and presentations. The techniques of experiential learning like role play, question and answer sessions, practical research and report writing will be used to increase participation. Students are expected to be enthusiastically involved in the classroom activities. In addition, problem solving and on-line discussions will be highly appreciated.

References:

1. Meyer & Rowan (1977), "Institutional organizations: formal structure as myth and ceremony"
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Course Number and Title:
DSMMT: 509 Disaster Statistics and Economic Modeling

Credit and Credit Hours: 03 (45 Hours)

Introduction to the Course:
Disaster affects economy in a numerous way. Understanding the real scenario of disaster impact scenario and make the society resilience proper estimation of communities' capacity is required. This advance course will focus on analysis of dynamic behavior of economic shift and changes due to disaster and possible solutions.

Specific Objectives:
This course will prepare students for doing advance research in quantitative fields of disaster and economic, Damage and Los Assessment, Impact Assessment.

Course Contents:

1. **Introduction:** Economic dimensions of disasters, effects on expenditure and income sides of the economy, consumption, investment, markets, economic growth and business

cycles, money supply, inflation, credit, the fiscal policy including revenue and subsidy, insurance, and market and government failures.

2. **Economic modeling:** the Circular flow of the economy, household, labor market, firm, industry, macro modeling and national income accounting.
3. **Econometric modeling:** Multivariate regression; logit, probit and Tobit models, ARIMA, hedonic pricing model, forecasting models, an econometric model with panel data.
4. **Economic systems analysis:** Single and Multi-Region Input-Output Tables, Environmentally Extended Social Accounting Matrix (EESAM), SAM-based assessment of disasters, and computable general equilibrium modeling.
5. **Advances in national accounting:** Experimental ecosystem accounting, System of Environmental-Economic Accounting, valuation, catastrophic loss, and physical and monetary balance in national accounting.
6. **Economic modeling of climate change:** Integrated assessment models — DICE, RICE and PAGE models, G-Cubed model, and Stern Review.
7. **Macroeconomic modeling for climate change:** Welfare maximization, intergenerational choice and time discount, production function, factor inputs, estimating capital stock, effects on nominal and real sectors.

Learning Outcomes:

Upon completing the student will get the advanced concept of disaster economics. They should figure out the trend of disaster statistics and realize the necessity of disaster database. They should know how to apply economic modeling utilizing these data to perform economic system analysis. Moreover, the students shall learn how to incorporate the information derived from Damage and Need Assessment in development plan and policies.

Number of Classes: 40

Instructional Strategies:

Visual aids like Multimedia will be used to present lectures. All the materials will be provided in soft copies or hard copies. Soft copies will be provided through common group email account. Teaching methods will be: lectures, group discussion, exercises, case studies, assignments and presentations. The techniques of experiential learning like role play, question and answer sessions, practical research and report writing will be used to increase participation. Students are expected to be enthusiastically involved in the classroom activities. In addition, problem solving and on-line discussions will be highly appreciated.

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Course Number and Title:
DSMMT 510: Public Policy and Governance for Disaster Management

Credit and Credit Hours: 03 (45 Hours)

Introduction to the Course:
This course discusses disaster governance and global policy perspectives for Disaster Management. The course will describe in detail the necessary steps for the measurement of indicators, including the information to be compiled, the assessment process, recommendations for public policy and examples based on the application conducted on governance related to disaster management in different regions as well as in Bangladesh. The course will take the student into the intersecting research communities of development, disasters, public policy, governance and poverty alleviation in studying how disasters impact on human, social and political behavior, and how disaster impacted populations respond to these crisis events in the context of disaster management approach.

Specific Objectives:
This course, Public Policy and Governance for Disaster Management tends to:

1. Provide students with critical perspectives of disaster governance and global policy perspectives for Disaster Risk Reduction.
2. Explore the issues of participatory disaster governance, the role of decentralization of disaster resources and responsibilities, and best policy practice principles and governance in preparedness, mitigation, response and recovery and reconstruction
3. Analyze the roles of the various phases of disaster management and issues concerning planning and policies in different phases.
4. Understand the role of federal, state, and local governments in disaster planning and policies.

Course Contents:
1. **The general framework of governance for disaster risk management:** Risk Identification (RI), Risk Reduction (RR), Disaster Preparedness (DP), Recovery Planning (RC) & Financial Protection (FP).
2. **Assessment of Risk Awareness and Emergency Response Capability:** planning, prevention, and preparedness
3. **Disaster Risk Reduction, Governance & Mainstreaming:** DRR and Governance, UNDP Role, Conducting DRR Analysis & Analysis of the UNDP Global Disaster Risk Governance Portfolio.

4. **Disaster Management and Theories of Public Policy:** Normative Political Theories, Public Management Models, Role of Theory in Emergency Management, Bureaucratic Politics Theories and Emergency Management, Public Management Theory,
5. **Public policy & disaster risk management:** Institutional Context, Policymaking process, Assessing Disaster Risk Management Arrangements, Community Engagement, Cooperative Funding & Shared Policy Vision
6. **Disaster Governance in Bangladesh**
7. **National Disaster Management Policy of Bangladesh:** Policy Statement, Policy Implementation Agencies, and Structures Implementing Structures, Operational Mechanism, Financing Options for the Policy & Policy Review, Monitoring and Evaluation.

Learning Outcomes:

In this course the students will be able to relate the following issues, especially in the disaster management sector:

- Capacity development
- Past initiatives & best practices
- Cooperation with agencies
- Multi-sectoral synergy

By the end of the Course students will be able to:

- Understand the comprehensive emergency management and related plans and policies;
- Analyze the factors affecting short and long-term recovery and rebuilding and the role of planners and policy-makers;
- Identify the fundamental changes in governance of disaster management that have led to the increasing usage of intergovernmental, interagency, and intersectoral networks;
- Practice and apply various techniques and tools for improving the disaster management policies;
- Suggest courses of action for improving performance of disaster management governance networks.

Number of Classes: Total of 45 lecture classes of 1 hour duration.

Instructional Strategies:

Visual aids like Multimedia will be used to present lectures. All the materials will be provided in soft copies or hard copies. Soft copies will be provided through common group email account. Teaching methods will be: lectures, group discussion, exercises, case studies, assignments and presentations. The techniques of experiential learning like role play, question and answer sessions, practical research and report writing will be used to increase participation. Students are expected to be enthusiastically involved in the classroom activities. In addition, problem solving and on-line discussions will be highly appreciated.

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511 MISSING

Course Number and Title:
DSMMP: 512Masters Project Work

Credit:03 (Three)

Introduction to the Course:
In this coursestudents will select a small research topic. Then conduct research under supervision of faculty member and present their outcomes as verbal presentation as well as written form

Specific Objectives:

To learn how to conduct research independently as well in group under supervisor of faculty members.

Course Contents: Project Work

Learning Outcomes:

- They will learn to conduct research independently as well under supervisor of faculty members in group.
- Learning data collection methods
- Learning data analysis and presentation methods etc.

Number of Classes: No class. Student will meet their supervisor and co-supervisor regularly.

Instructional Strategies: Student will get supervision from faculty or professional both from the department and from industry. They must present and defend their research proposal (presentation). During final examination they must defend (presentation) their research project and must submit written copy for evaluation.

Course Number and Title:
DSMMP:513Thesis Work

Credit:09 (Nine)

Introduction to the Course:
In this coursestudents will select a research topic. Then conduct research under supervision of faculty member and present their outcomes as verbal presentation as well as written form.

Specific Objectives:
To learn how to conduct research independently as well in group under supervisor of faculty members.

Course Contents: Thesis Work

Learning Outcomes:

- They will learn to conduct research independently as well under supervisor of faculty members in group.
- Learning data collection methods
- Learning data analysis and presentation methods etc.

Number of Classes: No class. Student will meet their supervisor and co-supervisor regularly.

Instructional Strategies: Student will get supervision from faculty or professional both from the department and from industry. They must present and defend their research proposal (presentation). During final examination they must defend (presentation) their research thesis and must submit written copy for evaluation.

Course Number and Title:
DSMMV: 514 (*Viva vocé*)

Credit: 02

Introduction and Objective:
Viva vocé ("living voice"), by tradition, is an oral examination that is carried out not as a substitute, but to complement the written exam. The course is designed to ensure the development of the student's ability to apply, analyze, evaluate and create using the acquired knowledge along with the ability to remember and understand. This course is unique in a sense that it does not have a scheduled class time but the all the courses up to 2nd semester and before constitutes the syllabus. Also, this course is designed to ensure a comprehensive understanding of the subject as a whole with clear a conceptual framework which can help the students explain, evaluate and create the correlations among the individual courses.

Content:
The course contents include the courses taught up to 2nd Semester.

Learning Outcomes:
- Develop and demonstrate oral communication ability;
- Provide experience with the communications identified as most challenging in the workplace, i.e., interaction with a superior;
- Help students develop explanatory skills, powers of persuasion, oral poise and self-confidence
- Understand and demonstrate the principles of audience-centered message adaptation;
- Locate, use, and correctly cite appropriate evidence in supporting their claims;
- Demonstrate communication behaviors appropriate for effective comprehensive and supportive listening;

Instructional Strategies:
Rapport Building. Discussion on topics. Questions and Answers.

Assessment:
The oral exam is to be conducted by the Exam Committee for the respective session. The committee consists of four faculty members led by a chairman. The members evaluate the performance of a student individually and discretely; the average of which is the number that is awarded to the student and is graded accordingly.

Reference:
Provided in the individual courses.