POSTGRADUATE

Handbook

Department of

URBAN AND REGIONAL PLANNING

Chittagong University of Engineering & Technology

Chattogram-4349, Bangladesh.

Published By

DEPARTMENT OF URBAN AND REGIONAL PLANNING
Chittagong University of Engineering & Technology (CUET)
Chattogram-4349, Bangladesh.

Compiled By

Dr. Muhammad Rashidul Hasan, Professor and Head, Dept. of URP, CUET
K. M. Ashraful Islam, Assistant Professor, Dept. of URP, CUET
Md. Rakibul Hasan Kauser, Lecturer, Dept. of URP, CUET

Contact

Dr. Muhammad Rashidul Hasan
Head
Department of URP, CUET, Chattogram- 4349, Bangladesh.
Telephone: +88-0302-556131 Ext.-3500, Fax: +88-031-714910
Email: headurp@cuet.ac.bd, headurpcuet@yahoo.com

Publication

First Edition : August 2022

Print & Decoration

ahala printers
102, Sirazuddowla Road, Chandanpura
Chattogram, Bangladesh.
ahalaprinters@gmail.com

Contents

Message *from* Vice-Chancellor

It is my great pleasure to welcome you all to Chittagong University of Engineering & Technology (CUET) which is one of the leading Higher Education Institutes in Bangladesh. My sincere congratulations to the new students on their successful admission into CUET.

CUET is dedicated to excellence in technical education and research in line with its vision. It was established in 1968 as Chittagong Engineering College and converted into a public University in September 2003.

The university is aimed to take the leadership in promoting technological developments and management of the nation by strengthening engineering, science and technological education and research. Our strategic location, industrial environment, good academic faculties and capable staffs have made CUET an excellent place for teaching, learning and research for more than 50 years. We have been training graduates of proven ability since its establishment. In order to accomplish our vision and mission, we are sincerely striving to establish our image of "Student- Centered Institution" by working closely with our student community. We strongly value our collaboration with industries, professional associations and institutions of higher education in Bangladesh and abroad.

So far the importance of Urban and Regional Planning for a developing country like Bangladesh can hardly be emphasized. However, increasing urbanization, degrading environmental qualities, severe transportation problem, inequalities between groups of people and regions and ever increasing poverty even after several decades of existence as an independent state has made the government realizing that planning is a burning issue for the country.

The expertise of the faculties and the facilities in the Departmental laboratories are able to provide an up-to-date technological support to various public and private organizations in the country. The graduates from the Department can pursue careers in different public and private agencies, consulting firms or in teaching and research outlets. Nevertheless, the Department is persistent in its effort to improve its research facilities to meet the growing needs and to cope with the fast changing technological challenges.

Best wishes to your future endeavor to develop yourself as a professional planner. I wish you all the success.

Prof. Dr. Mohammad Rafiqul Alam
Vice-Chancellor
Chittagong University of Engineering & Technology
Chattogram-4349, Bangladesh

Message *from* Dean

The importance of Urban and regional Planning for a developing country like Bangladesh can hardly be over emphasized. A skilled planner is taught and trained with interdisciplinary fields of study to deal with integral solution to challenges created by urbanization and globalization. URP discipline is the host to education, research and practice in the planning field with great professors and most up-to-date labs and facilities. To promote development of the physical environment of this country/region, increased number of planners should be produced.

The Department of Urban and Regional Planning (DURP) was established in 2009 under the Faculty of Architecture and Planning, offering Bachelor degree in Urban and Regional Planning. In view of meeting the growing demand of planners in government and nongovernment organizations, universities and research institutes, DURP has introduced this bachelor program. Under this program, 30 students are enrolled each year. DURP is highly motivated and aimed to take the leadership in the promotion of development planning and management of the nation by strengthening education and research environments.

Through the way of its development, a handbook was designed for the new academic student so that the students get acquainted with the academic rules and regulations, ordinance relating to student discipline etc. from the starting day of their academic studies.

Finally, I look forward to warm welcoming you at naturally pristine CUET campus and wishing all the best to your future endeavor to become a world class planner.

Prof. Dr. Mohammad Kamrul Hassan
Dean
Faculty of Architecture and Planning
Chittagong University of Engineering & Technology (CUET)
Chattogram-4349, Bangladesh

Preface

The Department of Urban and Regional Planning (URP), established in 2009 under the Faculty of Architecture and Planning, is currently offering the Bachelor degree in Urban and Regional Planning and conform to the growing demand of Planners in government and nongovernment organizations, universities and research institutes. A minimum of 159 credit hours must be completed within four academic years to fulfill the entire requirement of this degree. Under this program 30 students are enrolled each year. Up to now 11 batches of students have been admitted whereas six batches have been graduated. The graduates are serving in many Governmental and Non-Governmental Organizations with good reputation. Besides the primary concern with human settlement development, planning at the urban, rural and regional level; the Department introduces some courses on hilly region planning and development, water resources and drainage planning etc. based on the local needs. The department provides one of the best programs on urban and regional Planning in Bangladesh. The activities of the Department focus on several aspects including physical, environmental, economic, political and institutional aspects. Teaching on planning at the Department also encompasses within urban and rural Planning, regional and local planning etc. The balanced curriculum as offered for the Bachelor in Urban and Regional Planning is rich in theoretical perspectives with required practical approaches.

You will be glad to know that the expertise of the faculties and the facilities in the Departmental laboratories are able to provide up-to-date technological support to various public and private organizations in the country. The graduates from the Department can pursue careers in different public and private agencies, consulting firms or in teaching and research outlets. Nevertheless, the Department is persistent in its effort to improve its research facilities to meet the growing needs and to cope with the fast changing technological challenges.

I wish you all the success in the time you stay at CUET and the time beyond.

Dr. Muhammad Rashidul Hasan
Head, Department of Urban and Regional Planning
Chittagong University of Engineering & Technology (CUET)
Chittagong-4349, Bangladesh

CHAPTER 1
General Information

1.1 Introduction

Chittagong University of Engineering & Technology (CUET) is one of the prominent and leading, autonomous self-degree-awarding university of Bangladesh in the field of Engineering education. It is unique and incompatible due to its proximity to Chittagong, the major sea-port of the country. The University is situated alongside the Chittagong-Kaptai road, 25 km away from the heart of the Chittagong city, the commercial capital of Bangladesh and 20km away from the Kaptai Hydro-Electric Power plant. The University has a beautiful hill side land of about 171 acres with panoramic natural view. The main vision of CUET is to send out graduates with trained and educated minds, to serve as a source of intellectual potentiality. To foster and promote a distinctive educational institute identity and spirit it one of the basic goals of this university.

1.2 Historical Background of CUET

Former Bangladesh Institute of Technology, Chittagong, abbreviated as BIT Chittagong is presently Chittagong University of Engineering & Technology (CUET). This Institute was created out of Engineering College, Chittagong that was established in 1968. The history of CUET describe chronologically below:

CUET Gate

August 28, 1962: To meet the increasing demand of professional engineers for the national economic council of the Government of Pakistan decided to establish the Engineering College, Chittagong.

December 28, 1968: The College started functioning by admitting 120 students in its first academic session under the faculty of Engineering, University of Chittagong.

July 1, 1986: The College was declared as a self degree-awarding institution and was renamed “Bangladesh Institute of Technology (BIT)” Chittagong.

September 1, 2003: To enlarge the engineering education, the institution was converted into a university named as Chittagong University of Engineering & Technology (CUET).

Teacher-Student Centre

1.3 Mission & Objectives

The mission of CUET is to educate students in the field of engineering and applied sciences and to contribute to the advancement of knowledge that will best serve the nation and the world as well.

The university is committed to establish itself as a center of excellence in creating and disseminating knowledge, and to share the knowledge with others for betterment of the mankind.

1.4 Vision

- The Chittagong University of Engineering & Technology has been established to advance, maintain and increasingly values the results of intellectual endeavor. If Bangladesh is to prosper, educational institutes must play the central role in higher learning, research and teaching to increase her intellectual pursuit. In this context, the CUET has set a two-fold vision.
- Firstly, to send out graduates with trained and educated minds, to serve as a source of intellectual potentiality.
- Secondly, test to be a premier research Institute, internationally known for its excellence and contributions to knowledge, teaching and graduates.

1.5 Goals

- To foster and promote a distinctive educational institute identity spirit.
- To pursue excellence in research that will contribute to Knowledge and learning.
- To pursue excellence in curriculum, teaching and to a standard befitting an international research institute.
- To develop and maximize the effectiveness of all staffs.
- To attract students with thirst of Knowledge, to encourage and support them in their progress.
- To maintain the principle of academic freedom and to maintain the institutional autonomy.
- To contribute to the betterment of society be responsive to its needs.
- To provide high quality, responsive and cost-effective support service for research, learning and teaching.

1.6 Administration

Vice Chancellor's Building

The Honorable President of the People's Republic of Bangladesh is the Chancellor of this university. The syndicate is the principle executive body of the university and consists of 16 members. The academic council, the Finance Committee and the Planning & Development Committee, etc. Assist the Syndicate. The academic council, comprising the faculty of the university and other external expert members, is the educational body of the university.

1.7 Academic Activities

Postgraduate courses under the faculty of Engineering, faculty of Electrical & Computer Engineering and the faculty of Architecture & Planning extend over four years and lead to B. Sc Engineering degree in Civil, Electrical & Electronics, Mechanical, Computer Science & Engineering, Architecture and Urban & Regional Planning.

Postgraduate studies and research are now among the primary functions of this University. Department of Civil Engineering, Electrical & Electronics Engineering, Physics, Mathematics and Chemistry offers M. Sc. Engg./ M. Engg./ M.phill./ Phd degrees. In additional to its own research programs, the university undertakes research programs sponsors by outside organizations. The laboratory facilities of the university are also utilized to solve problems and to provide up to date engineering and technological knowledge to the various organizations of the country. The university is presently in its efforts to improve its research facilities, staff position, courses and curriculum to meet the growing technological challenges.

Faculties, Teaching Departments:

Faculty	Department	Degrees offered
Civil	Civil	Bsc. Msc. Phd
	WRE	Bsc.
	Disaster Management and Engineering	Msc.
Mechanical	Mechanical	Bsc. Msc. Phd
	PME	Bsc.
	MIE	Bsc.
Electrical & Computer	EEE	Bsc. Msc. Phd
	CSE	Bsc. Msc. Phd
	ETE	Bsc.
	Biomedical Engineering	Bsc.
Architecture and Planning	Arch	B Arch.
	URP	BURP, MURP
	Hum	No degree offered
Engineering	Physics	Msc. M Phil, Phd
	Chemistry	Msc. M Phil, Phd
	Math	Msc. M Phil, Phd
	Material Science and Engineering	BSc.
	Nuclear Engineering	Msc.
Center	Language Center	No degree offered
	Center of Environment Science and Engineering	No degree offered
Institute	IET	Msc.
	IEER	Msc.
	IICT	No degree offered

URP Department of

CHAPTER 2

Department of Urban & Regional Planning

2.1 Introduction

Very shortly, urban planning, or regional planning means designing an urban area, or region. In the traditional sense, design means an 'Art' of personal expression and creation employed in service to an individual. Most of the city plans and architectural designs of the past cultures were based on one client's desire, usually a monarch or other ruler. Plans and designs for the urban and neighboring regions were even provided by church Bishop, Priest of temple of the king, etc. Later designs were made more generally available to the wealthy classes, but the one to one interaction between designer / planner and the client was still the norm. This pattern persisted into the late nineteenth and early twentieth centuries, when industrialism became dominant and brought with it a pluralistic society. Indeed, one of the main reasons of the failure of those plans in the twentieth century was inability to deal with pluralism. And this was the beginning of urban and Regional planning profession to strive with the plants and design for the people with pluralistic ideology kept in mind. Now days- "Urban planning is used loosely to refer to intentional interventions in the urban development process. The term 'planning' thus subsumes a variety of mechanism that are in fact quite distinct: regulation, collective choice, organizational design, market correction, citizen participation, and public sector action" –Lewis D. Hopkins, Urban Development: The logic of making plans Urban and Regional Planning is a vital aspect of public, private and global issues. The problems faced by cities, counties and specific populations today demand innovative solutions from committed and thoughtful planners. Practitioners assist communities in planning for growth and change. They look at existing conditions and challenges, and also help develop a vision of what a community could look like in the future. Professional planners help to address issues such as, transportation, housing, social services economic development, environmental and natural resources, globalization and disaster management.

Department of Urban and Regional Planning Building

Today irrespective of whether a country is developed or not the need for planning is of prime importance. Well coordinated, organized and efficient planning is of prime importance. Well coordinated, organized and efficient planning of activities of different sectors are required in order to maintain the level of development a country has achieved or aspires to achieve. The importance of planning, therefore, can never be under emphasized. Stated, otherwise, there will always be a need for planners.

Developed countries have reached stages from which their approaches to planning and implementation of planning activities are more efficiently organized than those of underdeveloped countries. Even then developed countries have to constantly strive to maintain the level of development and deliver services and facilities of make towns, cities and countryside livable areas. We may ask, what efforts would then be required on the parts of underdeveloped countries to achieve such levels of development? Efforts of gigantic proportions would be required. And, relevant experts, in these case planners, can achieve this feat.

The need for planners for the overall development of this region has been felt prior to the liberation of Bangladesh. This need has, rather, been accentuated with the emergence of Bangladesh as a politically independent state. The country is currently striving to bring about rapid economic progress.

Increasing urbanization, degrading environmental qualities, inequalities between groups of people and regions and ever increasing poverty even after several decades of existence as an independent state has made the government realize that there should be shift in emphasis from previous planning process to more down to earth approach. It is thus expected that governmental and non-governmental organization will be more deeply involved in planning, administering and implementing projects aimed at overall physical, social and economic development of Urban and Regional Planning of the Chittagong University of Engineering and Technology (CUET) has been provided the responsibility of producing planners to undertake challenges confronting the country.

2.2 Department of URP

The importance of urban and regional planning for a country like Bangladesh can hardly be over emphasized. The Department of Urban and Regional Planning was established in 2009 under the Faculty of Architecture and Planning, for offering Bachelor Degree in URP. The academic program, however, began with the four teachers and three guest teachers as Adjunct Faculty.

The main objective of the BURP program is to equip students with the wide diversity of skill required for urban and regional planning.

2.2.1 Program Educational Objectives (PEOs) and Intended Program Learning Outcomes (PLOs)

The Bachelor in Urban and Regional Planning (BURP) Program Educational Objectives (PEOs) are given below:

After completing the BURP degree, graduates will be

- Able to practice in the planning profession through research, professional training and practical work.
- Enriched with knowledge and learning about contemporary planning issues facing by Bangladesh due to rapid urbanization through ethical planning practice.
- maximized with entry level skills as well as depth and flexibility needed for securing professional position and progress in the professional field of planning in Bangladesh.
- After obtaining the Bachelor in Urban and Regional Planning (BURP) degree, students should have ability to the following, which are

intended Program Learning Outcomes (PLOs):

- Ability to apply knowledge on Basic planning issue (urban, rural and regional development) such as land use, environment, infrastructure, transportation etc.
- Ability to apprehend the socio-economic and historical contexts and contemporary issues of planning from national, regional and global perspective.
- Ability to identify, formulate and solve planning problems to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- Knowledge through field works and trained to apply scientific methodologies to understand planning problems, issues and challenges.
- Ability to apply advanced tools and techniques for spatial analysis(both qualitative and quantitative)
- Ability to conduct field survey for data collection and processing as well as data analysis and interpretation through scientific methodologies for plan preparation, policy formulation, forecasting and modeling.
- Ability to develop communication and presentation skills effectively to interact with different stakeholders for planning and policy making.
- Ability to work individually as well as a team member with different professionals through effective leadership, networking, organizing and managerial skills.
- Understanding of professional and ethical responsibility.

2.2.2 Planner's concern

Urban and regional planning is a dynamic field that requires innovative solutions from committed and thoughtful individuals. Historically, it merged out of the convergence of two concerns:

1. The provision of urban infrastructure; and

2. The initiation of social reform

Today, the underlying focus on community well-being continues, Urban and regional planning has broadened to include the development, implementation, and evaluation of a wide range of policies. Specifically urban and regional planners, in both developed countries, are concerned with:

- The use of land in the city, in the suburbs, and in rural areas, and particularly with the transition from one use to another;
- Potential adverse impacts of human activities on a limited physical environment and the possible mitigation of those impacts;
- The design of the city and the surrounding region so as to facilitate the activities in which people need and desire to engage;
- Settlement systems and the location of human activities in urban and regional space;

- Identification of social needs and the design and provision of services and facilities to meet those needs;
- The distribution of resources, benefits costs among people;
- The anticipation of change and its impact on how people do and can live;
- Participation of citizens in planning processes which affect their future; and
- The way that choices are made, decisions implemented and actions evaluated, and the means by which those processes can be improved in urban and regional areas.

2.2.3 Our Identity

We view planning as a professional and intellectual endeavor. We are strongly committed not only to the education of the next generation of planning professionals and leaders, but also to augmenting the profession through significant research accomplishments that are disseminated widely to academic and professional audiences. The Department's faculty, students, and staff therefore engage in activities that simultaneously serve education, research, and public and professional engagement functions.

We emphasize the ecological, economic, social, and institutional aspects of urban and regional development and the theory and practice of planning processes. We teach and conduct research to improve understanding of human settlements and of planning situations and we focus on planning as the achievement of outcomes based on interrelated actions over time and space, not merely on individual policies or administrative decisions. Collaboration and close communication with a wide range of disciplines and professions is thus inherent in our approach. This collaboration is enhanced through faculty appointed in the department whose degrees are in architecture, economics, geography, history, law, political science, regional science, and zoology. We encourage faculty to pursue interdisciplinary research and to make scholarly contributions to both planning and fields closely allied with planning and we encourage and facilitate dual degree programs for students who wish professional qualifications in related fields.

We recognize planning for cities and regions as a process with a design component, in addition to ecological and human behavioral components. As a result, we seek to leverage our location in the College of Fine and Applied Arts to exploit innovative collaborative education, teaching and engagement opportunities with design-oriented disciplines, especially with the Department of Architecture.

We seek to understand human settlement and propose planning solutions at multiple spatial scales and locations—site, neighborhood, city, region, nation, and world. We therefore conduct research all over the world, and we seek a student body that is not just diverse in terms of gender, race and ethnicity, but also in terms of regional and national origin.

2.2.4 Our Aspirations

Our vision of our identity is based on a set of aspirations that guide our programs and influence the general direction of the Department.

- We are an intellectually exciting, creative, and productive community of students, scholars, and professionals. We engage in close interaction

with related units, including not only Architecture, but also Agriculture and Consumer Economics, Civil Engineering, Economics, Education, Natural Resources and Environmental Sciences, Finance, Geography, Government and Public Affairs, Human and Community Development, Law, Psychology, Social Work, and Sociology.

- We maintain an active program in neighborhood and community empowerment through community engagement and other professional activities that integrate teaching, research, and service.
- We have a diverse, representative, student body, faculty, and staff interacting with and enhancing each other as individuals.
- We involve the frequent participation of practicing professionals in activities on campus.
- We offer active continuing education opportunities for professional and citizen planners.
- We foster the international exchange of planning ideas and experience through teaching, research, public service, and active roles in international organizations.
- Our programs and research have a strong environmental component, bringing environmental science results to bear on specific planning situations.

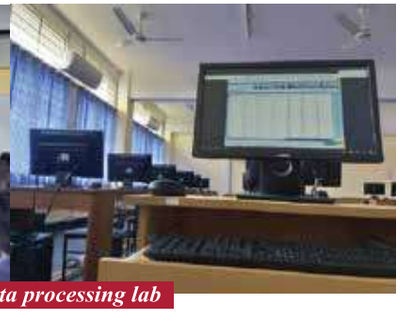
Bangladeshi graduated planners to make scope in the field of operations other than BIP, planning professionals are always encouraged to be affiliated by the societies in Earthquake Research, Disaster Management and Mitigation, Environment, Conservation, Rehabilitation, national and international professional bodies very closely related to Urban and Regional Planning.

2.2.5 Lab Facilities

In order to provide practical knowledge about Urban and Regional Planning, modern sophisticated facilities have been established for BURP students. Some of these facilities are:

URP Data processing lab (Capacity- 30 Students)

URP data processing lab serves substantial computing and data processing facilities for Postgraduate students and is used for teaching data management related courses of BURP program. Besides,



Students in data processing lab

URP data processing lab serves substantial computing and data processing facilities for Postgraduate students and is used for teaching data management related courses of BURP program. Besides, Postgraduate students can do their course related work/project at office time. It contains 30 high configured PCs with the full suite of software (SPSS, Microsoft office package, AutoCAD, Corel DRAW, and Adobe Master Collection etc.), Multimedia projector with electronic projector screen and internet facilities.

URP Studio Room (Capacity- 30 Students each)

There are two spacious studio rooms in the department. The size of the studio room is about 2,400 sq. ft. (80 ft. by 30 ft.) and designed such way that students get proper light for their sessional works. Each contains 30 drawing tables, 30 student cabinets and multimedia projector with automatic projector screen. This studio room is used for taking the Postgraduate courses like Graphics for planner, Basic Design, Cartography, Site and Area Planning, Presentation and communication techniques etc.

Studio Room

Students working in Studio Room

GIS & Remote Sensing Lab (Capacity- 30 Students)

There is a newly established GIS & Remote sensing Lab for teaching GIS, Remote sensing & photogrammetry based courses of BURP programs. Postgraduate students also can use it only for their course related work/project within office time. Main equipment of the Lab. is given below:

- High configured PCs (30 Nos.)
- Photogrammetry work station (2 Nos.)
- Multimedia projector with electronic projector screen
- Plotter
- Hand GPS

GIS & Remote Sensing Lab

Providing lecture in the GIS & RS Lab

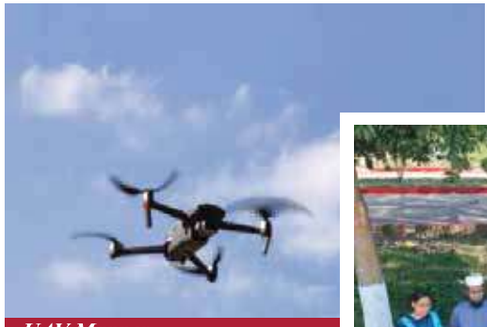
Surveying & Cartography Lab
A newly developed surveying and cartography lab is fully functioning in the department with proper facilities (digital theodolite, high precision total station, digital level machine, compass, instruments for chain survey, instruments for plain table survey etc.) to conduct survey related courses.


Conducting Physical Survey


Total Station

Transportation Lab
The lab is aimed to conduct research work related to simulation and modelling on sustainable transportation planning and management.

Urban Simulation Lab
Urban simulation lab is aimed to simulate visual representation of real time situations, emergency response and future projection of land use planning. We have UAV mapper to analyze and simulate real time urban environment.


UAV Mapper


Training on UAV operation

NAME OF FACULTY MEMBERS

Dr. Muhammad Rashidul Hasan
BURP (KU), MURP (BUET), PhD (JU)
Professor and Head
Department of URP
Chittagong University of Engineering and Technology
Email: mrhasan@cuet.ac.bd

Rokshana Binta Samad
BURP (JU), MURP (BUET)
MSc. (University of Stuttgart, Germany)
PhD (Ongoing, University of Leeds, UK)
Associate Professor, Department of URP
Chittagong University of Engineering and Technology
Email : rokshana_urp@cuet.ac.bd

Debasish Roy Raja
BURP (BUET), MURP (BUET)
Associate Professor
Department of URP
Chittagong University of Engineering and Technology
Email: debasishroy@cuet.ac.bd

Israt Jahan
BURP(BUET), MURP (BUET)
MSc. (University of Delaware, USA)
PhD (Ongoing, University of Delaware, USA)
Assistant Professor, Department of URP
Chittagong University of Engineering and Technology
Email: israt_jahan@cuet.ac.bd

Fowzia Gulshana Rashid Lopa
BURP (JU), MDS (EWU), MRRDP (AIT, Thailand)
PhD (Ongoing, University of Lethbridge, Canada)
Assistant Professor, Department of URP
Chittagong University of Engineering and Technology
Email: lopafowzia@cuet.ac.bd

Dr. Md. Sarfaraz Gani Adnan
BURP (BUET), M.Sc. (TU Darmstadt, Germany & UIC, Spain)
PhD (University of Oxford, UK)
Assistant Professor, Department of URP
Chittagong University of Engineering and Technology
Email: sarfarazadnan@cuet.ac.bd

A. T. M. Shahjahan
BURP (JU), MURP(JU), PhD (Ongoing, JU)
Assistant Professor
Department of URP
Chittagong University of Engineering and Technology
Email: shahjahan_urp@cuet.ac.bd

Sharmin Ara
BURP (BUET),
M.Sc. (ITC, University of Twente, The Netherlands)
PhD (Ongoing, Texas A & M University, USA)
Assistant Professor, Department of URP
Chittagong University of Engineering and Technology
Email: sharmin.ara14@cuet.ac.bd

Md. Rabiul Islam
BURP (BUET)
M.Sc. (ITC, University of Twente, The Netherlands)
PhD (Ongoing, University of California Irvine, USA)
Assistant Professor, Department of URP
Chittagong University of Engineering and Technology
Email: rabiul.urp@cuet.ac.bd

Khatun E Zannat
BURP (BUET)
MSc. (TU Darmstadt, Germany & University of Grenoble Alpes, France)
PhD (ongoing, University of Leeds, UK)
Assistant Professor, Department of URP
Chittagong University of Engineering and Technology
Email: khzannat@cuet.ac.bd

Sourav Das
BURP (CUET), MURP (Ongoing, CUET)
Assistant Professor
Department of URP
Chittagong University of Engineering and Technology
Email: souravurp09@cuet.ac.bd

Md. Shah Jalal Misuk
BURP (CUET), MURP (Ongoing, CUET)
Assistant Professor
Department of URP
Chittagong University of Engineering and Technology
Email: shahjalalmisuk@cuet.ac.bd

Tandra Das
BURP (CUET), MDS (DU)
Assistant Professor
Department of URP
Chittagong University of Engineering and Technology
Email: tandradas.urp@cuet.ac.bd

Md. Kamrul Islam
BURP (CUET), MURP (Ongoing, CUET)
Assistant Professor
Department of URP
Chittagong University of Engineering and Technology
Email: kamrul.islam.cuet10@cuet.ac.bd

K. M. Ashraful Islam
BURP (CUET)
Assistant Professor
Department of URP
Chittagong University of Engineering and Technology
Email: ashraful.urp@cuet.ac.bd

Md. Rakibul Hasan Kauser
BURP (CUET), MURP (Ongoing, BUET)
Assistant Professor, Department of URP
Chittagong University of Engineering and Technology
Email: mrhkauser@cuet.ac.bd

Md. Nazmul Huda Naim
BURP (CUET), MURP (Ongoing, CUET)
Lecturer, Department of URP
Chittagong University of Engineering and Technology
Email: naim.mmh@cuet.ac.bd

Jobyda Sultana
BURP (CUET), MURP (Ongoing, CUET)
Lecturer, Department of URP
Chittagong University of Engineering and Technology
Email: jobyda.urp@cuet.ac.bd

2.4 Professional Bodies

In every country, there are quite a handsome numbers of professional bodies in different field of professions. Bangladesh Institute of Planners (BIP) is representing the degree holder planning professionals in Bangladesh. In other countries the scenario is quite different. Any professional working in the sector of planning can be a part of Planning Professional Body. In this respect, BIP is representing solely our Bangladeshi graduated planners to make scope in the field of operations.

Other than BIP, planning professionals are always encouraged to be affiliated by the societies in Earthquake Research, Disaster Management and Mitigation, Environment, Conservation, Rehabilitation, national and international professional bodies very closely related to Urban and Regional Planning.

2.5 Migration to other profession

Very frequently, planners with their bachelor degree are undertaking Masters' Program in different field of Engineering and Development Planning. As the Bachelor of Urban and Regional Planning Degree program is designed with interdisciplinary attitude of acquiring knowledge in diverse field of learning and practicing, it is now planners' choice to migrate, or to be in the same field of operation according to the market demand of working professionals.

Doors are always open to make Masters' and Doctoral studies in Disaster and Environmental Engineering (CUET, BRAC), Disaster Management (Denmark, Norway, UK), Photogrammetry and Geoinformatics (Germany, USA), Geographical Information System (Sweden, the Netherlands, Portugal, Spain), Physical Geography (Canada, USA, Australia), Human Settlements (Belgium, China, UK, Chili), Urban Design (UK), Regional Planning (Germany), Business Administration (USA, Canada, Australia), etc.

2.6 Job hunting and Scholarships for higher studies

From the experiences of last two decades, it is evident that Planners are working in Development Authority (RAJUK, CDA, KDA, RDA, etc), City Corporations (DCC, KCC, CCC, RCC, etc), Municipalities, different United Nations organizations (prominently in UNDP, WHO, UNHABITAT, UNHCR, etc), Donor organizations (GTZ-GIZ, OXFAM, DFID, DANIDA, SIDA, AusAID, UKAID, USAID, etc), implementing organizations (CARE, Caritas, ActionAID, CDMP, etc) and in the main stream of government BCS, Planning Commission, Magistracy, Police Department, etc. Therefore, being a planner by profession and affiliation, it reduces chance to be unemployed. Besides, comparatively planning graduates achieve more scholarship opportunities in Asia, Europe and Australia than other professional fields. Higher studies are supported by ADB, DAAD, VLIR-OUS, MEXT, ERASMUS-MUNDUS, Commonwealth and many other organizations.

PHOTO GALLERY

Students working in Data Processing Sessional

GIS & RS Lab

Studio Room

Lecture by International Delegate Via Video Conference

UAV Mapper Urban Simulation Lab

Class project of the students

Presentation in sessional

Conducting survey sessional

CHAPTER 3

Academic Rules and Regulations for the Graduate Students

URP
Department of

ACADEMIC RULES & REGULATIONS FOR THE POST GRADUATE STUDIES
[Effective from Session 2014- 15 and onwards]

Approved by the Syndicate, Vide its Meeting No. 89, Date: 02.03.2015

Definitions:

In this Rules & Regulations, unless the context otherwise requires:

(a) "Academic Council" means the Academic Council of the University;
(b) "ACPGS" means Academic Committee for the Post-Graduate Studies of the respective departments;
(c) "ACRS" means Academic Committee for Research and Studies of the respective Institutes;
(d) "CHSR" means the Committee for Higher Studies and Research;
(e) "Controller" means the Controller of Examinations of the University;
(f) "Dean" means the Head of a Faculty of the University;
(g) "Department" means the Concerned Academic Department of the University;
(h) "Director" means the Director of the Institute;
(i) "Equivalence Committee" means the Equivalence Committee for determining the equivalence of undergraduate and postgraduate degrees;
(j) "Head" means the Head of the Academic Department;
(k) "Institute" means the Concerned Academic and Research Institute of the University
(l) "Registrar" means the Registrar of the University;
(m) "Rules & Regulations" means Academic Rules & Regulations for the Post-Graduate Studies;
(n) "Syndicate" means the Syndicate of the University;
(o) "Term/Semester" means program of study to be completed within a specific period of time, generally six months.
(p) "University" means the Chittagong University of Engineering & Technology, abbreviated as CUET;
(q) "Vice-Chancellor" means the Vice-Chancellor of the University;

1.0 Committees:

1.1 There shall be a Committee for Higher Studies and Research (CHSR), constituted as per provisions of the Section-10 of the First Statues of the University, consisting of the following members;

(i)	Vice-Chancellor or his/her nominated person	Chairman
(ii)	Deans of the Faculties	Members
(iii)	Director of the Institutes	Members
(iv)	Heads of the Departments	Members

(v)	One eminent Engineer to be nominated by the Vice-Chancellor	Member
(vi)	One Professor from any other University to be nominated by the Academic Council	Member
(vii)	Director (Research and Extension)	Member Secretary

Approval of the Academic Council is to be taken before the committee is made operative. The term of the nominated member shall be three years. The nominated member shall continue to act as a member till a substitute is nominated. In case of vacancy the Vice-Chancellor will take appropriate action. Presence of more than 50% of members will form quorum.

This Committee shall organize, co-ordinate, supervise and give directions to the Higher Studies and Research Programs to be conducted by the University through Academic Committee for Post-Graduate Studies (ACPGS) of various Departments and Academic Committee for Research and Studies (ACRS) of different Institutes.

1.2 There shall be another Committee named as the Academic Committee for the Post-Graduate Studies (ACPGS) in each Academic Department and as the Academic Committee for Research and Studies (ACRS) in each institute of the University as constituted under Art 3(2) of the First Statues of the University.

1.3 The composition of the Academic Committee for the Post-Graduate Studies (ACPGS) is as follows:

	The Head of the Department	Chairman
(ii)	All Teachers conducting the courses of M. Sc. Engg. / M. Engg. / M. Sc. / MURP by Course and Thesis / MURP by Course and Project /M. Phil / Ph. D.	Members
	All Professors and Associate Professors of the Department.	Members
	One Professor, to be nominated by the Vice-Chancellor, from amongst the Professors concerned associated with the subject from any other University.	Member
	One expert in the subject actively associated with an organization of Commerce and Industries or Research, to be nominated by the Academic Council.	Member

Approval of the Academic Council is to be taken before the committee is made operative. A teacher may be nominated by the Head of the Department as Course Coordinator, who will be acting as Member Secretary of the Committee. Presence of more than 50% of members will form quorum.

1.4 The Academic Committee for Post-Graduate Studies (ACPGS) shall have following functions:

(i) To formulate the courses and syllabuses to award M. Sc. Engg./M. Engg, M. Sc., MURP by Course and Thesis/MURP by Course and Project, M. Phil and Ph. D. degrees;

(ii) To propose the names of paper setters and examiners for different Post-Graduate examinations to the Academic Council; and

(iii) To perform such other functions as may be conferred on it by CHSR, Faculty and Academic Council according to the provisions of Statutes and Rules.

1.5 The composition of the Academic Committee for Research and Studies (ACRS) of Institutes shall be as follows:

(i)	The Director of the Institute	Chairman
(ii)	All Teachers conducting the courses of Postgraduate Degree	Members
(iii)	All Professors and Associate Professors of the Institute.	Members
(iv)	One Professor, to be nominated by the Vice-Chancellor, from amongst the Professors concerned associated with the subject from any other University.	Member
(v)	One expert in the Subject actively associated with an organization of Commerce and Industries or Research, to be nominated by the Academic Council.	Member

Approval of the Academic Council is to be taken before the committee is made operative. The postgraduate course coordinator will act as the Secretary of the Committee. Presence of more than 50% of members will form quorum.

1.6 The Academic Committee for Research and Studies shall have following functions:

(i) To formulate the courses and syllabuses to award M. Sc. Engg./M. Engg, M. Sc., MURP by Course and Thesis/MURP by Course and Project, M. Phil and Ph. D. degrees;

(ii) To propose the names of paper setters and examiners for different Post-Graduate examinations to the Academic Council and

(iii) To perform such other functions as may be conferred on it by CHSR, Faculty and Academic Council according to the provisions of Statutes and Rules.

1.7 There shall be an Equivalence Committee for determining the equivalence of undergraduate/post-graduate degree consisting of the following members:

(i)	Vice-Chancellor or his/her nominated person	Chairman
(ii)	All Deans of the Faculties	Members
(iii)	Director of the Institute concerned	Member
(iv)	Head of the Department concerned	Member
(v)	One Professor from any other University to be nominated by the Vice-Chancellor	Member
(vi)	Controller of Examinations	Member Secretary

Approval of the Academic Council is to be taken before the committee is made operative.

Quorum: Simple majority will form quorum.

A. ACADEMIC RULES & REGULATIONS FOR THE MASTER'S DEGREE PROGRAM
(M. Sc., M. Sc. Engg. and M. Engg.)

1.0 Degree Offered:

The post graduate degrees to be offered under this ordinance are as follows:

1.1 **Master of Science in**

Civil Engineering	abbreviated as	M. Sc. Engg. (Civil)
Computer Science and Engineering	abbreviated as	M. Sc. Engg. (CSE)
Electrical & Electronic Engineering	abbreviated as	M. Sc. Engg. (EEE)
Mechanical Engineering	abbreviated as	M. Sc. Engg. (Mech)
Disaster and Environmental Engineering	abbreviated as	M. Sc. Engg. (DEE)
Energy Technology	abbreviated as	M. Sc. Engg. (ET)
Earthquake Engineering	abbreviated as	M. Sc. Engg. (EQE)
Physics	abbreviated as	M. Sc. (Phy)
Chemistry	abbreviated as	M. Sc. (Chem)
Mathematics	abbreviated as	M. Sc. (Math)

Any other degree that may be awarded by a department/institute on the approval of the Syndicate upon the recommendation of the Academic Council.

1.2 **Master of Engineering in**

Civil Engineering	abbreviated as	M. Engg. (Civil)
Computer Science and Engineering	abbreviated as	M. Engg. (CSE)
Electrical & Electronic Engineering	abbreviated as	M. Engg. (EEE)
Mechanical Engineering	abbreviated as	M. Engg. (Mech)
Energy Technology	abbreviated as	M. Engg. (ET)
Earthquake Engineering	abbreviated as	M. Engg. (EQE)

Any other degree that may be awarded by a department/institute on the approval of the Syndicate upon the recommendation of the Academic Council.

1.3 Master of Urban and Regional Planning

Urban & Regional Planning	abbreviated as	MURP by Course and Thesis
Urban & Regional Planning	abbreviated as	MURP by Course and Project

2.0 Admission Requirements:

2.1 For admission to the courses leading to a Master's degree (M. Sc. Engg. / M. Engg.), MURP by Course and Thesis/MURP by Course and Project a candidate

a) must have at least one first class/first division or its equivalent in S. S. C. and H. S. C. examinations or its equivalent,

b) should have CGPA of a minimum of 2.50 out of 4.0 or its equivalent in B. Sc. Engg./BURP in the relevant branch,

c) must not have third division or a CGPA less than 2.0 out of 5.0 in any one of S. S. C. and H. S. C. or equivalent examinations.

d) should submit a written research proposal.

2.2 For admission to the courses leading to the award of the degree of M. Sc. Engg. / M. Engg, MURP by Course and Thesis/MURP by Course and Project. in any branch, a candidate must have obtained a B. Sc. Engg. ./BURP degree in the relevant branch or an equivalent degree from any recognized University/Institution. The Equivalence Committee shall examine the equivalence and suitability of a candidate for admission.

2.3 For admission to the courses leading to M. Sc. in Physics / Chemistry / Mathematics, an applicant

(a) must have at least 50% marks or a minimum CGPA of 2.5 out of 4.0 or its equivalent in four years B.S. / B. Sc. (Hons.)

(i) in Physics/ Applied Physics, Electronics and Communication Engineering, or B. Sc. Engg. in Electrical & Electronics / Materials & Metallurgical / Environmental Science / Environmental Science and Engineering or in a relevant discipline.

(ii) in Chemistry / Applied Chemistry / Biochemistry / Pharmacy or B. Sc. Engg. in Chemical / Environmental Chemistry / Environmental Science and Engineering or in a relevant discipline.

(iii) in Mathematics / Applied Mathematics / Physics / Statistics / Economics or B. Sc. Engineering in Civil / Electrical & Electronics / Mechanical / Computer Science and Engineering or in a relevant discipline,

Or

(b) must have at least second class or 50% marks or a minimum CGPA of 2.5 out of 4.0 or its equivalent in three years B. S. / B. Sc. (Hons.) or its equivalent and at least 50% marks or a minimum CGPA of 2.5 out of 4.0 or its equivalent in M.S. / M. Sc.

(i) in Physics / Applied Physics, Electronics and Communication Engineering, or in a relevant discipline.

(ii) in Chemistry / Applied Chemistry / Biochemistry / Pharmacy or in a relevant discipline.

(iii) in Mathematics / Applied Mathematics / Physics / Statistics / Economics or in a relevant discipline.

(c) must not have third division or a CGPA less than 2.0 out of 5.0 in any one of S. S. C. and H. S. C. or equivalent examinations.

d) should submit a written research proposal.

3.0 Admission Procedure:

3.1 Applications for admission to the above courses shall be invited through regular means of advertisement and shall be received by the Registrar office.

3.2 Before being finally selected for admission a candidate may be required to appear at an interview and / or admission test by an Admission Committee for the Postgraduate Studies as constituted by the CHSR. He/she will be required to take pre-requisite course as may be prescribed by the ACPGS/ACRS. Every selected candidate, unless he has already been registered, shall get himself/herself registered with the University.

3.3 After admission each student shall be assigned, by the respective ACPGS/ACRS of the department/institute, an Adviser/ Supervisor from among the teachers of the relevant Department/Institute not below the rank of an Assistant Professor having a post graduate degree. In advance of each enrolment and course registration for any Term/Semester the Adviser/Supervisor shall check and approve student's schedule for subjects, prerequisites as recommended by the ACPGS/ACRS and total credit hours. The student is expected to consult his/her adviser/supervisor on all academic problems but, it is the responsibility of the individual student to see that his/her schedule conforms to the academic rules & regulations.

3.4 Every registered candidate shall get himself/herself enrolled on payment of prescribed fees and other dues as fixed by the University before the commencement of each semester/term. Course registration must be completed within two weeks from the start of the Term/Semester; otherwise the student shall not be allowed to continue the course in the Term/Semester.

3.5 On the proposal of respective ACPGS of Departments/ ACRS of Institutes and upon the recommendation of the CHSR, the rules for admission into the University for postgraduate studies shall be framed/ reviewed time to time by the Academic Council.

4.0 Academic Requirements:

4.1 The minimum duration for full time students and part time students of the M. Sc. Engg. , M. Engg. MURP by Course and Thesis/MURP by Course and Project, and M. Sc. shall normally be three and four terms/ semesters, respectively. There are two Terms/ Semesters in each academic year. The duration of each Term/Semester is generally six months including thirteen weeks of classes and the Term/ Semester final examination. A candidate for the Master's degree must complete all requirements for the degree within five academic years from the date of his first admission in the respective program.

4.2 Academic progress shall be measured in terms of credit hours earned by a student. One credit hour of a theory subject shall normally require one hour of class attendance per week for one Term/Semester; while one credit hour for thesis/project/laboratory should normally required three hours of work per week for one Term/Semester. The number of credit hours for each subject shall be as specified in the syllabus of the respective departments/institute.

4.3 (a) For awarding the degree of M. Sc. Engg., MURP by Course and Thesis and M. Sc., a student must, in general, earn a minimum of 36 credit hours including a thesis for which 18 credit hours shall be assigned. However, for the department of Disaster and Environmental Engineering a student must earn a minimum of 48 credit hours including a thesis for which 21 credit hours shall be assigned.

(b) For awarding the degree of M. Engg., and MURP by Course and Project a student must earn a minimum of 36 credit hours including a project for which 6 credit hours shall be assigned.

4.4 There shall be two categories of students namely, full time students and part time students. Through the proper channel a student may apply to the respective Head/ Director to interchange his/her status between full time and part time studentship. Approval from the Academic Council is to be taken before the change is made operative. The status of studentship shall be reflected in his/her transcript.

4.5 Students, serving in organizations, including this University, may be admitted as part time students with a written consent of the employer. A part time student may be assigned a maximum of 9 credit hours of course work (theory course) in any Term/Semester. In case of Project/Thesis courses a maximum of 12 credit hours may be assigned for a part time student in any Term/Semester.

4.6 Full time students must register for a minimum of 12 credit hours and a maximum of 15 credit hours per Term/ Semester. A full time student shall not be allowed to be in the employment of any organization (even as part time employee). However, they may be employed as Teaching Assistant/Research Assistant/ Research Associate at this University.

4.7 The subject(s) of study in the Department/ Institutes shall be proposed by the respective ACPGS/ACRS. Upon recommendation of CHSR the Academic Council of the University shall give the final approval after due consideration.

4.8 The courses to be offered in any term/ semester shall be as determined by the relevant Department/ Institute. The Department/ Institute may review the curriculum and courses from time to time and propose any change, as may be considered necessary to the CHSR.

4.9 For awarding the degree of MURP by Course and Thesis or MURP by Course and Project the following credit hours should be earned by a student.

Course Type	Thesis Group		Project Group	
	No of course	Total Credit	No of course	Total Credit
Thesis/Project	-	18	-	06
Compulsory	02	06	02	06
Elective	01	03	04	12
Major stream courses	03	09	04	12
Total	**-**	**36**	**-**	**36**

5.0 Grading System:

5.1 Numerical marking may be made in answer scripts, tests etc., but all final grading to be reported to the Controller of Examinations shall be in the letter grade system as detailed below:

Mark Range				Letter Grade	Grade Point
90%	and	above		A+	4.0
85%	to	below	90%	A	3.75
80%	to	below	85%	A-	3.5
75%	to	below	80%	B+	3.25
70%	to	below	75%	B	3.0
65%	to	below	70%	B-	2.75
60%	to	below	65%	C+	2.5
55%	to	below	60%	C	2.25

50%	to below	below 50%	55%	D	2.0
				F	0.0
				I	Incomplete
				S	Satisfactory
				U	Unsatisfactory
				W	Withdrawn

5.2 Course(s) in which the student gets 'F' grade shall not be counted towards credit hour requirements and for the calculation of Grade Point Average (GPA).

5.3 'I' grade shall be given only when a student is unable to sit for the examination of a course at the end of the semester because of circumstances beyond his/her control. He/she must apply to the Head of the concerned Department within one week after examination to get an 'I' grade in that course. It must be completed within the next two terms/semesters, otherwise; the grade becomes an 'F' grade. He/she may, however, be allowed to register without further payment of tuition fees for that course.

5.4 Satisfactory or Unsatisfactory will be used only as final grades for thesis/project and non-credit courses. Grade for thesis / projects "In Progress" shall be so recorded, when it is to be continued. If however, thesis is discontinued, an 'I' Grade shall be recorded.

5.5 A student shall withdraw officially from a course within two working weeks of the commencement of the term / semester or else his/her grade in that course shall be recorded as 'F' unless he/she is eligible to get a grade of 'I'. A student may be permitted to withdraw and change his course within the specified period with the approval of his/her Adviser/ Supervisor and Head of the Department/Director of the Institute and the respective teacher(s) concerned.

6.0 Conduct of Examinations:

6.1 In addition to tests, assignments and/or examinations during the term/ semester as may be given by the teacher(s) concerned, there shall be a written final examination for each of the courses offered in a term/ semester at the end of that Term/ Semester. The dates of the final examination shall be announced by the Controller of Examinations, as advised by the Chairman of the Examination Committee at least two weeks before the commencement of the examination. The final grade in a subject shall be based on the performance in all tests, assignments and examinations.

6.2 The Controller of Examinations shall keep up to date record of all grades obtained by a student in individual Academic Record Card and also in the Tabulation Book. Grades shall be announced by the Controller of Examinations at the end of each Term/Semester. In addition, each student is entitled to get one official transcript of the University record without any fee at the completion of his/her academic program from the office of the Controller of Examinations on production of statement of clearance from all Departments/Institutes/Offices.

6.3 The Controller of Examinations shall prepare invigilation schedule and provide all logistic supports for holding the examinations. He shall receive examination answer scripts and distribute the same to the respective examiners with proper instructions.

6.4 The ACPGS/ACRS of the respective department/institute shall propose to the Academic Council for final approval of the names of the paper setters and examiners for the term/ semester final examinations of the courses at least two weeks before the date of commencement of the examination.

7.0 Qualifying Requirements:

7.1 The qualifying requirement for the degree of M. Sc. Engg./ M. Engg, MURP by Course and Thesis/MURP by Course and Project is that a student must earn a minimum grade point of 2.65 based on the weighted average in his/her course work.

7.2 The 'D' grades up to a maximum of one course may be ignored for calculation of Grade Point Average (GPA) at the written request of the student, provided the student has completed the total course credit hour requirement with a minimum weighted GPA of 2.65 in the remaining subjects. No course(s) shall be repeated unless it is a compulsory requirement for the degree as determined by the CHSR. Performance in all the subjects shall be reflected in the transcript.

7.3 In addition to successful completion of course works every student shall submit a thesis on his/her research work or report on his/ her project work, fulfilling the requirements as detailed below.

8.0 Thesis:

8.1 Research work for a thesis shall be carried out under the supervision of a full-time teacher not below the rank of Assistant Professor with postgraduate degree belonging to the relevant Department/ Institute. Co-supervisor(s) from within or outside the department/institute may be appointed, if necessary.

8.2 The thesis proposal (as per the prescribed format) shall be proposed by the respective ACPGS/ACRS of the relevant Department/ Institute for final approval of the Academic Council upon the recommendation of CHSR of the university. The thesis proposal shall preferably be approved before the end of the second Term/Semester of studies of the student concern. If any change is necessary in the approved thesis

proposal (title, content, cost, supervisor, co-supervisor etc.), it shall be submitted to the respective ACPGS/ ACRS of the Department/ Institute for final approval of the Academic Council upon the recommendation of the CHSR.

8.3 The research work shall be carried out in this University or at a place (s) approved by the Supervisor in consultation with the respective ACPGS/ ACRS of the Department/ Institute.

8.4 Every student through his/ her supervisor shall submit required number of computer composed copies of his/ her thesis in the approved format (As given in Appendix) to the Head of the Department or Director of the Institute. The Head of the Department/ Director of the Institute shall immediately send copies of the thesis to the Controller of Examinations. The Controller of Examinations shall send the same to all members of the Examination Board. Upon receipt of the written/ verbal consent, regarding the date of the oral examination, of all members of the Examination Board, the Controller of Examinations shall arrange the oral examination in consultation with the Chairman of the Examination Board.

8.5 The student shall certify that the research work has been done by him/her and that this work has not been submitted elsewhere for any other purpose, except for publication.

8.6 The thesis should demonstrate/reflect an evidence of satisfactory knowledge in the field of research undertaken by the student.

8.7 **Oral Examination**:

8.7.1 Every student, submitting a thesis in partial fulfilment of the requirements of a degree, shall be required to appear at an oral examination, on a date or dates fixed by the Controller of Examinations in consultation with the Chairman of the Examination Board.

8.7.2 Every student must satisfy the examiners that he/ she is capable of intelligently applying the results of this research to the solution of problems, of undertaking independent work, and also afford evidence of satisfactory knowledge related to the theory and technique used in his research work.

8.7.3 There shall be an Examination Board consisting of minimum four members for conducting oral examination for every M.Sc. Engg., MURP by Course and Thesis and M. Sc. student. The Supervisor shall act as the Chairman and the Head of the Department / Director of the Institute will be an ex-officio member of the Examination Board. The Examination Board shall be proposed by the respective ACPGS/ ACRS of the

relevant Department/ Institute for final approval of Academic Council followed by the recommendation of CHSR.

The composition of the Examination Board shall be as follows:

i. Supervisor
ii. Co-supervisor (s) (if any)
iii. Head of the Department/Director of the Institute (Ex-Officio)
iv. One or two teachers from within the Department/ Institute
v. One External member outside the student's Department/ Institute/University

Quorum: Presence of Supervisor, Head of the Department/ Director of the Institute and External Member shall form the quorum.

8.7.4 The Head of the Department/ Director of Institute will send the resolution taken by the Examination Board with his forwarding to the Controller of Examinations.

8.7.5 If any examiner is unable to accept the appointment or has to relinquish his appointment before the examination, the Vice-Chancellor shall appoint another examiner in his place, on suggestion from the Supervisor in consultation with the Head of the Department / Director of the Institute. This appointment will be reported to Academic Council.

8.8 Upon satisfactory completion of the oral examination, the student shall submit N+2, where N is the number of members of the Examination Board, hard copies of the corrected thesis as per the prescribed format and specification, duly certified by the Supervisor and Co- Supervisor (s) (if any) that all the corrections have been incorporated in the thesis as suggested by the Board of Examiners.

9.0 Project:

9.1 Project work shall be carried out under the supervision of a full-time teacher not below the rank of Assistant Professor with postgraduate degree belonging to the relevant Department/ Institute.

9.2 The project proposal (as per the prescribed format) shall be proposed by the respective ACPGS/ ACRS of the relevant Department/ Institute for final approval of Academic Council upon the recommendation of CHSR. The project proposal shall be preferably approved before the end of the second Term/ Semester of studies of the student concern. If any change is necessary in the approved project proposal (title, content, cost, supervisor, co-supervisor etc.), it shall be submitted to the respective ACPGS/ ACRS of the

department/institute for final approval of Academic Council upon the recommendation of CHSR.

9.3 The project work must be carried out in this University or at a place approved by the supervisor in consultation with the Head of the Department/ Director of the Institute.

9.4 Every student through his/ her supervisor shall submit required number of computer composed copies of his/her thesis in the approved format (As given in Appendix) to the Head of the Department or Director of the Institute. The Head of the Department/ Director of the Institute shall send immediately copies of the thesis to the Controller of Examinations. The Controller of Examinations shall send the same to all members of the Examination Board. Upon receipt of the written/ verbal consent, regarding the date of the oral examination, of all members of the Examination Board, the Controller of Examinations shall arrange the oral examination in consultation with the Chairman of the Examination Board.

9.5 The student shall certify that the project work was done by him/her and that this work has not been submitted elsewhere or any other degree or diploma.

9.6 **Oral Examination:**

9.6.1 Every student submitting a project report in partial fulfilment of the requirements of a degree, shall be required to appear at an oral examination, on a date or dates fixed by the Controller of Examinations in consultation with the Chairman of the Examination Board.

9.6.2 Every student must satisfy the examiners that he/ she is capable of intelligently applying the results of this project to the solution of problems, of undertaking independent work, and also afford evidence of satisfactory knowledge related to the theory and technique used in his project work.

9.6.3 There shall be an Examination Board consisting of following members for conducting oral examination for every M. Engg./MURP by Course and Project student. The Supervisor shall act as the Chairman and the Head of the Department will be an ex-officio member of the Examination Board. The Examination Board shall be proposed by the respective ACPGS/ ACRS of the relevant Department/ Institute for final approval of Academic Council followed by the recommendation of the CHSR.

The composition of the Examination Board shall be as follows:

i.	Supervisor	Chairman
ii.	Head of the Department/Director of the Institute (Ex-Officio)	Member
iii.	One Teacher from within the Department/ Institute	Member
iv.	One External member outside the student's Department/ Institute / University	Member (External)

Quorum: Presence of Supervisor, Head of the Department/ Director of the Institute and External Member shall form the quorum.

9.6.4 The Head of the Department/ Director of the Institute will send the resolution taken by the Examination Board with his forwarding to the Controller of Examinations.

9.6.5 If any examiner is unable to accept the appointment or has to relinquish his appointment before the examination, the Vice-Chancellor shall appoint another examiner in his place, on suggestion from the Supervisor in consultation with the Head of the Department/ Director of the Institute. This appointment shall be reported to the Academic Council.

9.7 Upon satisfactory completion of the oral examination, the student shall submit N+2, where N is the number members of the Examination Board, hard copies of the corrected thesis as per prescribed format and specification, duly certified by the Supervisor and Co- Supervisor (if any) that all the corrections have been incorporated in the thesis as suggested by the Board of Examiners.

10.0 Striking off and Removal of Names from the Rolls:

The name of the student be struck off and removed from the rolls of the University for the following grounds:

(i) Non-payment of dues within prescribed period. Post graduate students residing in the halls of residence shall be subject to the same conditions or rules as followed in the Ordinance regarding Student's Discipline Rules.

(ii) Failing to proceed with the program by the exercise of Articles 4.1 and/or 7.1 or 7.3 of this Rules & Regulations.

(iii) Failing to make satisfactory progress in his program as reported by the Adviser/Supervisor through the ACPGS/ACRS and approved by the CHSR

(iv) Forced to discontinue his studies under disciplinary rules.

(v) Withdrawn officially from all the courses including Thesis/Project.

11.0 Publication of Results:

11.1 A student who successfully completes the prescribed courses and all academic requirements for fulfilment of the postgraduate degree will have to apply to the Controller of Examinations through the Head of the Department for the award of degree.

11.2 The Controller of Examinations shall publish the result.

11.3 Provisional degree will be awarded, on completion of minimum credit and GPA requirements, by the Academic Council.

12.0 Academic Fees:

Academic fees shall be as per Appendix-I and shall be reviewed and determined from time to time by the appropriate authority of the University.

13.0 Return of Fees:

A student withdrawing officially from all courses registered in a term / Semester including project/thesis as per Art. 10 (v) is entitled to get a refund of 50% of the course registration fees of the term / semester provided he/she withdraws in writing through the respective Head of the Department before the expiry of two working weeks from the commencement of the classes; and in that case his/her grade in the courses registered shall be recorded as 'W'. If withdrawal is made after the expiry of two weeks from the commencement of classes no refund shall be allowed and the grade should be recorded as 'F' unless he is eligible to get a grade of 'I' as per Art. 5.3. Thesis/Project registration fees in any case are not refundable.

B. ACADEMIC RULES & REGULATIONS FOR THE M. PHIL. DEGREE COURSES

1.0 Degree Offered:

The Post graduate degrees to be offered under this Ordinance are as follows:

1.1 **Master of Philosophy in**

Physics	abbreviated as	M. Phil. (Phy)
Mathematics	abbreviated as	M. Phil. (Math)
Chemistry	abbreviated as	M. Phil. (Chem)
Energy Technology	abbreviated as	M. Phil. (ET)

Any other degree that may be awarded by a department on the approval of the Syndicate upon the recommendation of the Academic Council.

2.0 Admission Requirements:

2.1 **For admission to the courses leading to an M. Phil. degree a candidate:**

a) must have at least one first class/first division or its equivalent in S. S. C. and H. S. C. examinations,

b) should have as at least second class/ division or CGPA of a minimum of 2.50 out of 4.0 or its equivalent in four-years Bachelor's degree in the relevant field,

c) should have at least four years' bachelor degree or equivalent degree in the relevant branches,

d) must not have third division/class in S. S. C. and H. S. C. examinations, and

e) should submit a written research proposal.

2.2 **For admission to the courses leading to an M. Phil. in IET a candidate:**

a) must have at least one first class/first division or its equivalent in S. S. C. and H. S. C. examinations,

b) should have at least CGPA of a minimum of 2.50 out of 4.0 or its equivalent in four-years Bachelor's degree in the relevant field,

c) should have at least four years Bachelor degree in Engg. / Physical Science / Social Science / Business Administration with minimum GPA 2.50 out of 4.0,

d) must not have a third division/class in S. S. C. and H. S. C. examinations, and

e) should submit written research proposal.

3.0 Admission procedures:

3.1 Applications for admission to the above courses shall be invited through regular means of advertisement and shall be received by the Registrar.

3.2 Before being finally selected for admission a candidate may be required to appear at an oral and / or written test by an Admission Committee for the Postgraduate Studies as constituted by the CHSR. He/she shall be required to take prerequisite non-credit courses as may be prescribed by the Admission Committee. Every selected candidate, unless he has already been registered, shall get himself/herself registered with the University.

3.3 After admission each candidate (student) shall be assigned, by the respective ACPGS/ACRS of the department/institute, an Adviser/ Supervisor from among the teachers of the relevant Department/Institute not below the rank of an Assistant Professor having a post graduate degree. In advance of each enrolment and course registration for any term/ semester the Adviser/Supervisor shall check and approve student's schedule for subjects, prerequisites as recommended by the ACPGS/ACRS and total credit hours. The student is expected to consult his/ her adviser/ supervisor on all academic problems but, it is the responsibility of the individual student to see that his/her schedule conforms to the academic rules & regulations.

3.4 Every registered student shall get himself/ herself enrolled on payment of prescribed fees and other dues before the commencement of each term / semester. In any academic year there will be normally two terms / semesters. The duration of each term/ semester is generally six months including thirteen weeks of classes and Term/ Semester final examination. All course registration must be completed within two weeks from the start of a term / semester, otherwise, the student shall not be allowed to continue the course in that term / semester.

3.5 On the proposal of respective ACPGS/ACRS and upon the recommendation of the CHSR, the rules for admission into the University for Postgraduate Studies shall be framed from time to time by the Academic Council.

4.0 Academic Requirements and Regulations:

4.1 The minimum duration of the M. Phil. course shall normally be four terms / semesters. A candidate for the M. Phil. degree must complete all requirements for the degree within five academic years from the date of his/ her first admission in the respective program.

4.2 Academic progress shall be measured in terms of credit hours earned by a student. One credit hour course shall normally require one hour of class attendance per week for one term / semester; while one credit hour for thesis/laboratory work should normally require three hours of work per week for one term / semester. The number of credit hours for each subject shall be as specified in the syllabus of the respective Department/Institute.

4.3 For the degree of M. Phil. a student must earn a minimum of 48 credit hours including a thesis of 30 credit hours.

4.4 There shall be two categories of students namely, full-time students and part-time students. Through the proper channel a student may apply to the respective Head/ Director to interchange his/her status between full time and part time studentship. Approval from the Academic Council is to be taken before the change is made operative. The status of studentship shall be reflected in his/her transcript.

4.5 Students serving in different organizations may be admitted as part-time students with a written consent of the employer. A part time student may be assigned a maximum of 9 credit hours of theory course in any term / semester. In case of Thesis course a maximum of 12 credit hours may be assigned for a part time student in any Term/Semester.

4.6 Full-time student must register for a minimum of 12 credit hours and a maximum of 15 credit hours per term /semester. A full-time student shall not be allowed to be in the employment of any organization (even as part time employee). However, they may be employed as Teaching/Research Assistant or Research Associate at the University. If a full time student becomes an employee (full or part time) of any other organization in the middle of a term / semester, he may, with the approval of the Head of the Department and his Employer, be allowed to continue as a full time student for that semester.

4.7 The subjects of study in the Department/Institutes shall be proposed by the respective ACPGS/ACRS. Upon recommendation of CHSR the Academic Council of the University shall give the final approval after due consideration.

4.8 The courses to be offered in any term/ semester shall be as determined by the relevant department/institute. The Department/Institute may review the curriculum and courses from time to time and propose any change, as may be considered necessary to the CHSR.

5.0 Grading System:

5.1 Numerical marking may be made in answer scripts, tests etc., but all final grading to be reported to the Controller of Examinations shall be in the letter grade system as detailed below:

Mark Range				Letter Grade	Grade Point
90%	and	above		A+	4.0
85%	to	below	90%	A	3.75
80%	to	below	85%	A-	3.5
75%	to	below	80%	B+	3.25
70%	to	below	75%	B	3.0
65%	to	below	70%	B-	2.75
60%	to	below	65%	C+	2.5
55%	to	below	60%	C	2.25
50%	to	below	55%	D	2.0
below		50%		F	0.0
				I	Incomplete
				S	Satisfactory
				U	Unsatisfactory
				W	Withdrawn

5.2 Courses in which the student gets 'F' grades shall not be counted towards credit hour requirements and for the calculation of Grade Point Average (GPA).

5.3 'I' Grade shall be given only when a student is unable to sit for the examination of a course at the end of the term / semester because of circumstances beyond his control, he must apply to the Head of the concerned Department within one week after the examination to get an 'I' grade in that course. It must be completed within the next two terms / semesters, otherwise, the 'I' become an 'F' grade. He/she may, however, be allowed to register without further payment of tuition fees for that course.

5.4 Satisfactory or Unsatisfactory- grades shall be used only as final grades for thesis and non-credit courses. Grade for thesis "In Progress" shall be so recorded what it is to be continued. If, however, thesis is discontinued, an 'I' grade shall be recorded.

5.5 A student shall withdraw officially from a course within two working weeks of the commencement of the term / semester or else his/her grade in that course shall be recorded as 'F' unless he/she is eligible to get a grade of 'I'. A student may be permitted to withdraw and change his course within the specified period with the approval of his/her Adviser, Head of the Department/Director of the Institute and the respective teacher(s) concerned.

6.0 Conduct of Examinations:

6.1 In addition to tests, assignments and/or examinations during the terms /semester as may be given by the teacher(s) concerned, there shall be a written examination for each of the courses offered in a Term / Semester at the end of that term / semester. The dates of the final examination shall be announced by the Controller of Examinations as advised by the Chairman of the Examination Committee at least two weeks before the commencement of the examination. The final grade in a course shall be based on the performance in all tests, assignments and /or any other examinations.

6.2 The Controller of Examinations shall keep up to-date record of all the grades obtained by a student in individual Academic Record Card. Grades shall be announced by the Controller of Examinations at the end of each term / semester. In addition, each student is entitled to one official transcript of the University record without any fee at the completion of his academic program from the office of the Controller of Examinations on production of statement of clearance from all Departments/ Institutes/ Offices.

6.3 The Controller of Examinations shall prepare invigilation schedule and provide logistic support for holding the examinations. He shall receive examination answer scripts and distribute the same to the respective examiners with proper instructions.

6.4 The ACPGS/ACRS of the respective Department/ Institute shall propose and CHSR shall recommend the names of the paper setters and examiners for the term/ semester final examinations at least two weeks before the date of commencement of the examination to the Vice-Chancellor for approval.

7.0 Qualifying Requirements:

7.1 The qualifying requirement for graduation is that a student must earn the minimum grade point of 2.65 based on the weighted average in his/her course work.

7.2 The 'D' grades up to a maximum of two subjects may be ignored for calculation of Grade Point Average (GPA) at the written request of the student, provided the student has completed the total credit hour requirement with minimum weighted GPA of 2.65 in the remaining

subjects. No course shall be repeated unless it is compulsory requirement for the degree as determined by the CHSR. Performance in all the subjects shall be reflected in the Transcript.

7.3 In addition to successful completion of course works every student shall submit a thesis on his/her research work, fulfilling the requirements as detailed below.

8.0 Thesis:

8.1 Research work for a thesis shall be carried out under the supervision of a full-time teacher not below the rank of Assistant Professor with postgraduate degree belonging to the relevant Department/ Institute. Co-supervisor(s) from within or outside the department/institute may be appointed, if necessary.

8.2 The thesis proposal (as per the prescribed format) shall be proposed by the respective ACPGS/ ACRS of the relevant Department/ Institute for final approval of the Academic Council followed by the recommendation of CHSR. The thesis proposal shall be preferably approved before the end of the second term/ semester of studies of the student. If any change is necessary in the approved thesis proposal (title, content, cost, supervisor, co-supervisor etc.), it shall be submitted to the respective ACPGS/ACRS of the Department/ Institute for final approval of the Academic Council followed by the recommendation of CHSR.

8.3 The Research work must be carried out in this university or at place approved by the Supervisor in consultation with the ACPGS/ACRS.

8.4 Every student through his/ her supervisor shall submit required number of computer composed copies of his/ her thesis in the approved format (As given in Appendix) to the Head of the Department or Director of the Institute. The Head of the Department/ Director of the Institute shall immediately send copies of the thesis to the Controller of Examinations. The Controller of Examinations shall send the same to all members of the Examination Board. Upon receipt of the written/ verbal consent, regarding the date of the oral examination, of all members of the Examination Board, the Controller of Examinations shall arrange the oral examination in consultation with the Chairman of the Examination Board.

8.5 The student shall certify that the research work was done by him/her and that this work has not been submitted elsewhere for any other purpose (except for publication).

8.6 The thesis should demonstrate an evidence of satisfactory knowledge in the field of research undertaken by the student.

8.7 Oral Examination:

8.7.1 Every student, submitting a thesis in partial fulfilment of the requirements of M. Phil. degree, shall be required to appear at an oral examination, on a date or dates fixed by the Controller of Examinations in consultation with the Chairman of the Examination Board.

8.7.2 Every student must satisfy the examiners that he/ she is capable of intelligently applying the results of this research to the solution of problems, of undertaking independent work, and also afford evidence of satisfactory knowledge related to the theory and technique used in his research work.

8.7.3 There shall be an Examination Board consisting of minimum four members for conducting the oral examination for every M. Phil. student. The Supervisor shall act as the Chairman and the Head of the Department will be an ex-officio member of the Examination Board. The Examination Board shall be proposed by the respective ACPGS/ ACRS of the relevant Department/ Institute for final approval of Academic Council followed by the recommendation of CHSR.

The composition of the Examination Board shall be as follows:

i.	Supervisor	Chairman
ii.	Co-supervisor (s) (if any)	Member
iii.	Head of the Department/Director of Institute (Ex-Officio)	Member
iv.	One or two members from within the Department	Member
v.	One external member from outside the student's department/ University	Member (External)

Quorum: Presence of Supervisor, Head of the Department / Director of the Institute and External Member shall form the quorum

8.7.4 The Head of the Department/ Director of Institute will send the resolution taken by the Examination Board with his forwarding to the Controller of Examinations.

8.7.5 If any examiner is unable to accept the appointment or has to relinquish his appointment before the examination, the Vice-Chancellor shall appoint another examiner in his place, on suggestion from the Supervisor in consultation with the Head of the Department. This appointment will be reported to the CHSR.

8.8 Upon satisfactory completion of the oral examination, the student shall submit N+2, where N is the number members of the Examination Board, hard copies of the corrected thesis as per prescribed format and specification, duly certified by the Supervisor and Co- Supervisor (if any) that all the corrections have been incorporated in the thesis as suggested by the Board of Examiners.

9.0 Striking off and removal of names from the rolls:

The name of the student shall be struck off and removed from the rolls of the University on the following grounds:

(i) Non-payment of dues within the prescribed period. Post graduate students residing in the halls of residence shall be subject to the same conditions as followed in the Ordinance regarding student's Discipline.

(ii) Failing to proceed with the program by the exercise of Article 4.1 and or 7.1 and/or 7.3 this Rules & Regulations.

(iii) Failing to make satisfactory progress in his/her program as reported by the Adviser/Supervisor through the ACPGS/ACRS and approved by CHSR.

(iv) Forced to discontinue his studies under disciplinary rules.

(v) Withdrawn officially from all the courses including thesis.

10.0 Academic Fees:

Academic fees shall be as per Appendix-II It and shall be reviewed and determined from time to time by the appropriate authority of the University.

11.0 Publication of Results:

11.1 A student who successfully completes the prescribed courses and all academic requirements for fulfilment of the postgraduate degree will have to apply to the Controller of Examinations through the Head of the Department for the award of degree.

11.2 The Controller of Examinations shall publish the result.

11.3 Provisional degree will be awarded, on completion of minimum credit and CGPA requirements, by the Academic Council.

12.0 Return of Fees:

A student withdrawing officially from all courses registered in a term / semester (including project/thesis) as per Art. 9.0 (v) is entitled to get a refund of 50% of the course registration fees, provided he/she withdraws in writing through the respective Head of the Department before the expiry of two working weeks from the commencement of the classes; and in that case his/her grade in the courses registered shall be recorded as 'W'. If withdrawal is made after the expiry of two weeks from the commencement of classes no refund shall be allowed and the grade should be recorded as failure, unless he is eligible to get a grade of "Incomplete" as per Art. 5.3 Thesis/Project registration fees in any case are not refundable.

C. ACADEMIC RULES & REGULATIONS FOR DOCTOR OF PHILOSOPHY PROGRAM

1.0 Degrees Offered:

The degree of Doctor of Philosophy shall be offered by the University in the following Departments/Institutes:

Department of Civil Engineering;

Department of Computer Science and Engineering;

Department of Electrical & Electronic Engineering;

Department of Mechanical Engineering;

Department of Physics;

Department of Chemistry;

Department of Mathematics;

Institute of Earthquake Engineering Research;

Such other Department/ Institute as may be approved by the Academic Council and the Syndicate of the University.

The degree of Doctor of Philosophy shall be abbreviated as Ph. D.

2.0 Admission Requirements:

2.1 For admission to the courses leading to a Ph. D. degree a candidate

a) must have at least one first class/first division or its equivalent in S. S. C. and H. S. C. examinations or its equivalent,

b) must have at least second class/ division or CGPA of a minimum of 2.50 out of 4.0 or its equivalent in four years B. Sc. (Hons.) / B. Sc. Engg. / in the relevant branch,

c) must have an M. Sc. Engg. / M. Engg / M. Sc. with four-year bachelor degree / M. Phil. degree with minimum grades as stated in the following sub-sections,

d) must not have third division/class or GPA of minimum 2.0 out of scale of 5.0 in S. S. C. and H. S. C. examinations, and

e) must submit a written research proposal in a prescribed format.

2.2 For engineering, the minimum qualification for admission shall normally be an M. Sc. Engg. / M. Engg. degree with a minimum CGPA of 2.75 out of 4.0 in the relevant branch of engineering or its equivalent from any recognized Institution.

2. a) For Physics, the minimum qualification for admission shall normally be an M.Sc with four-year B. Sc. (Hons.)./ M. Phil. degree in Physics / Applied Physics/Environmental Science with a minimum GPA of 2.75 out of 4.0 or its equivalent from any recognized Institution.

Or

M. Sc. Engg. degree in Mechanical/Electrical & Electronic Engineering/ Electronics & Telecommunication Engineering/Electronics and Communication Engineering / Computer Science & Engineering/ Materials & Metallurgical Engineering /Environmental Science and Engineering or in a relevant discipline with a minimum GPA of 2.75 out of 4.0 or its equivalent from any recognized Institution.

(b) For Chemistry, the minimum qualification for admission shall normally be an M.Sc with four-year B. Sc. (Hons.)./M. Phil. degree in Chemistry/Applied Chemistry/Biochemistry/Molecular Biology/Food and Nutrition /Environmental Chemistry with a minimum GPA of 2.75 out of 4.0 or its equivalent from any recognized Institution.

Or

M. Sc. Engg. degree in Chemical Engineering/ Environmental Science and Engineering or in a relevant Discipline with a minimum GPA of 2.75 out of 4.0 or its equivalent from any recognized Institution.

(c) For Mathematics, the minimum qualification for admission shall normally be an M. Sc. / M. Phil. degree in Mathematics/Applied Mathematics / Physics / Statistics / Economics with a minimum GPA of 2.75 out of 4.0 or its equivalent from any recognized Institution.

Or

M. Sc. Engg. degree in Civil / Electrical & Electronics / Mechanical / Computer Science and Engineering with a minimum GPA of 2.75 out of 4.0 or its equivalent from any recognized Institution.

3.0 Admission Procedure:

3.1 Provisional Selection:

3.1.1 Applications for provisional admission to the Ph. D. program shall be received by the Registrar.

3.1.2 Before being provisionally selected for admission to the Ph. D. program a candidate may be required to appear at an oral and / or written test by an Admission Committee for the Postgraduate Studies as constituted by the CHSR.

3.1.3 A candidate provisionally selected by the Admission Committee may be required to pass the prerequisite non-credit courses as prescribed by the Admission Committee.

3.2 Final Selection:

A provisionally selected candidate shall be deemed to be eligible for final registration as a Ph. D. student with effect from the date of his provisional admission if and when he/ she qualifies the comprehensive examination (as per Art. 11.1.2).

4.0 Registration:

4.1 Every selected candidate, unless he/she has already been registered, shall get himself/herself registered with the University.

4.2 Every registered candidate (student) shall get himself/herself enrolled on payment of prescribed fees and other dues as per University rules before the commencement of each term/semester. Course registration must be completed within two weeks from the start of the term/semester; otherwise the student shall not be allowed to continue the course in that term/ semester.

5.0 Appointment of a Supervisor:

On provisional admission, the respective ACPGS/ACRS shall propose a name of Supervisor who shall be a full-time member not below the rank of Assistant Professor having doctoral degree of the relevant Department/Institute and name (s) of Co-Supervisor (s) from within or outside the Department/Institute, if necessary. Final approval from the Academic Council shall be taken upon the recommendation of CHSR. The Supervisor shall prescribe a plan of study to be undertaken by the student and supervise the progress of the student's work.

6.0 Academic Requirements and Regulations:

6.1 The minimum duration of the Ph. D. course shall be four terms / semesters from the date of provisional admission. A student must complete all requirements for the Ph. D. degree within six academic years (session) from the date of his provisional admission.

6.2 Academic progress shall be measured in terms of credit hours earned by a student. One credit hour of a theory course shall normally require one hour of class attendance per week for one Term/Semester; while one credit hour for thesis/project/laboratory should normally requires three hours of work per week for one Term/Semester. The number of credit hours for each subject shall be as specified in the syllabus of the respective Department/ Institute. The duration of each Term/ Semester is generally six months including thirteen weeks of classes and Term/ Semester final examination.

6.3 A student must complete a minimum of 54 credit hours of which a minimum of 45 credit hours shall be assigned for a thesis.

6.4 There shall be two categories of students namely, full-time students and part-time students. Through the proper channel a student may apply to the respective Head/Director to change his/ her status

between full time and part time. Approval from the Academic Council is to be taken before the change is made operative. The status of studentship shall be reflected in his/ her transcript.

6.4.1 Students, serving in organizations, including this University may be admitted as part-time students with a written consent of the employer. A part-time student may be assigned maximum 9 credit hours of course work in any term / semester. In case of thesis course a maximum of 12 credit hours may be assigned for a part time student in any term/ semester.

6.4.2 Full-time student must register for a minimum of 12 credit hours and maximum of 15 credit hours per term / semester. A full-time student shall not be allowed to be in the employment of any organization (even as part-time employee). However, they may be employed as Teaching/Research Assistant or Research Associate at this University.

6.5 The subjects of study in the Department/ Institute shall be proposed by the respective ACPGS/ACRS. Upon recommendation of the CHSR, the Academic Council of the University shall give the final approval after due consideration.

6.6 The courses to be offered in any term/ semester shall be as determined by the relevant department/institute. The Department/Institute may review the curriculum and courses from time to time and propose any change, as may be considered necessary to the CHSR.

7.0 Grading System:

7.1 Numerical marking may be made in answer scripts, tests etc., but all final grading to be reported to the Controller of Examinations shall be in the letter grade system as detailed below:

	Mark Range				Letter Grade	Grade Point
90%	and		above		A+	4.0
85%	to		below	90%	A	3.75
80%	to		below	85%	A-	3.5
75%	to		below	80%	B+	3.25
70%	to		below	75%	B	3.0
65%	to		below	70%	B-	2.75
60%	to		below	65%	C+	2.5
55%	to		below	60%	C	2.25
50%	to		below	55%	D	2.0

below		50%		F	0.0
				I	Incomplete
				S	Satisfactory
				U	Unsatisfactory
				W	Withdrawn

7.2 'I' is given only when a student is unable to complete the course because of circumstances beyond his control. If must be made up by the close of next two term / semester or the incomplete grade becomes a failure. He may however be allowed to register without further payment of tuition fees for that course.

7.3 Satisfactory or Unsatisfactory shall be used only as final grades for thesis and non-credit courses. Grade for thesis "In Progress" shall be so recorded what it is to be continued. If, however, thesis is discontinued an "Incomplete" grade shall be recorded.

7.4 A student shall withdraw officially from a course within two working weeks of the commencement of the term / semester or else his grade in that course shall be recorded as F unless he is eligible to get a grade of I. A student may be permitted to withdraw and change his course within the specified period with the approval of his Supervisor, Head of the Department/Director of the Institute and the respective teacher(s) concerned.

8.0 Doctoral Committee:

8.1 The Doctoral Committee for every student shall be proposed by the respective ACPGS/ ACRS, in consultation with the Supervisor. Upon recommendation of the CHSR the Academic Council of the University shall give the final approval after due consideration. The Doctoral Committee shall be formed within six months from the date of the student's provisional admission. The Doctoral Committee should meet from time to time at the request of the Supervisor to review the progress of the student's work. In special circumstances, the CHSR may approve any addition and/or alteration in the Doctoral Committee on the recommendation of the respective ACPGS/ ACRS of the Department/ Institute.

8.2 The composition of the Doctoral Committee shall be as follows:

(i)	Supervisor	Chairman
(ii)	Co-supervisor (s) (if any)	Member
(iii)	Head of the Department/ Director of Institute (Ex-officio)	Member
(iv)	Three teachers from within the University (at least one teacher from outside the student's	Members

Department/ Institute) who have Ph. D. degree & minimum Associate Professor

(v) One professor from outside the University — External Member

Quorum: Presence of five members will form quorum including supervisor, Head of the Department/ Director of the Institute and external members.

9.0 Thesis Proposal:

The student shall submit a thesis proposal to the Doctoral Committee, which shall examine the proposal and recommend it to the respective ACPGS/ ACRS of the Department/ Institute to take necessary steps for final approval from the Academic Council of the university. In special circumstances the Doctoral Committee may recommend through the respective ACPGS/ ACRS of the Department/Institute to CHSR for approval for any change of research topic/content, etc.

10.0 Conduct of Examinations for Course Work:

10.1 In addition to tests, assignments and /or examinations during the Term/Semester as may be given by the teacher(s) concerned, there shall be a written final examination for each of the course offered at the end of a Term/Semester. The dates of the Term/Semester final examinations shall be announced by the Controller of Examinations as advised by the Chairman of the Examination Committee at least two weeks before the commencement of the examination. The final grade in a course shall be based on the performance in all tests, assignments and/or examinations.

10.2 The Controller of Examinations shall keep up to date record of all the grades obtained by a student in individual Academic Record Card. Grades shall be announced by the Controller of Examinations at the end of each term / semester. In addition, each student is entitled to get one official transcript of the University record without any fee at the completion of the academic program from the office of the Controller of Examinations on production of statement of clearance from all Department/Institute Offices.

10.3 The ACPGS/ACRS of the respective department/institute shall propose to the Academic Council for final approval of the names of the paper setters and examiners for the term/ semester final examinations of the courses at least two weeks before the date of commencement of the examination.

11.0 Qualifying Requirements:

The following are qualifying requirements for the degree Ph. D.

11.1 Comprehensive Examination:

Every student shall pass the comprehensive examination before starting the thesis work. The comprehensive examination shall comprise a written examination and/ or an oral examination to test the knowledge of the student in his/ her field of study. The Doctoral Committee shall conduct the comprehensive examination. If a student fails to qualify in a comprehensive examination, he/she shall be given one more chance to appear at the examination as scheduled by the Doctoral Committee. The date and time of the comprehensive examination shall be fixed by the Doctoral Committee on the request of the Supervisor. Comprehensive Examination shall ordinarily be held after the completion of the course work by the student.

11.2 Course work:

To qualify for the degree a student must earn a minimum grade point of 2.75 based on the weighted average in his/her course work.

11.3 Thesis:

11.3.1 Research work for the thesis shall be carried out in the University or at a place(s) approved by the Doctoral Committee in consultation with the Supervisor.

11.3.2 The student shall certify that the research work was done by him/her and that this work has not been submitted elsewhere for any other purpose (except for publication).

11.3.3 At the end of the student's research work the student shall submit a thesis which must be an original contribution to engineering or physical science and worthy of publication. Every student through his/ her supervisor shall submit required number of computer composed copies of his/ her thesis in the approved format (as given in Appendix) to the Head of the Department or Director of the Institute. The Head of the Department/ Director of the Institute shall immediately send copies of the thesis to the Controller of Examinations. The Controller of Examinations shall send the same to all members of the Examination Board (as constituted in Art. 11.2.6). In addition, the thesis shall be referred to two experts (at least one member shall be from abroad) nominated by the Academic Council. The respective ACPGS/ ACRS shall propose a panel of experts to the Academic Council, in addition to the Examination Board (Art. 11.3.6).

11.3.4 The expert shall preferably send his/ her evaluation report in a prescribed format within two months from the date of receipt

of the thesis. The expert may include in his/ her report an overall assessment, preferably chapter-wise, placing the thesis in any one of the following categories:

11.3.4.1 Recommend the acceptance of the thesis in its present form and classify as HIGHLY RECOMMENDED/ RECOMMENDED.

11.3.4.2 Recommend the acceptance of the thesis with minor corrections. In this case, the student shall incorporate the corrections in the thesis and submit the corrected copy to the respective member (s), if required.

11.3.4.3 Defer the recommendation at this stage and the student shall incorporate the suggested modifications in the thesis and the corrected thesis along with the student's clarifications shall be sent to the respective examiner (s).

11.3.4.4 Reject the thesis for the reasons set out in the detailed report.

11.3.5 Upon receipt of the thesis evaluation reports from the experts in sealed envelopes, the Controller of Examinations shall fix a suitable date with prior consent of all members of the Examination Board for oral examination. The Controller of Examinations shall handover the thesis evaluation reports to the Chairman of the Examination Board just before the oral examination. The Controller of Examinations shall assist the Examination Board for conducting the oral examination as constituted in Art. 11.3.6. Any addition, revision, modification, etc., suggested by the experts and the examination board members shall be carried out by the student before submitting the corrected thesis to the office of the Controller of Examinations as per Art. 11. 4.

11.3.6 **Oral Examination:**

11.3.6.1 There shall be an Examination Board consisting of minimum six members for conducting the oral examination for every doctoral student. The Supervisor shall act as the Chairman and the Head of the Department will be an ex-officio member of the Examination Board. The Examination Board shall be proposed, in consultation with the Supervisor, by the respective ACPGS/ ACRS of the relevant Department/ Institute, for final approval of the Academic Council followed by the recommendation of the CHSR.

The Examination Board shall be constituted as follows:

(i) Supervisor

(ii) Co-supervisor (s) (if any)

(iii) Head of the Department/ Director of Institute (Ex-Officio)

(iv) Two or Three teachers from within the University who have Ph. D. degree & minimum Associate Professor

(v) Two members from outside the University

Quorum: Presence of five members will form quorum including supervisor, Head of the Department/ Director of the Institute and external members.

11.3.6.2 The Head of the Department/ Director of Institute will immediately send the resolution taken by the Examination Board with his forwarding to the Controller of Examinations.

11.3.7 If any examiner is unable to accept the appointment or has to relinquish his/her appointment before/during the examinations, the Vice-Chancellor shall appoint another examiner in his/her place, on suggestion from the Supervisor in consultation with the respective Head/ Director of the Department/ Institute. This appointment will be reported to the CHSR.

11.3.8 The student must satisfy the examiners (as constituted in Art. 11.3.6) that he/she is capable of intelligently applying the results of this research to the solution of problems, of undertaking independent work and afford evidence of satisfactory knowledge related to the theory and technique used in his/her research work.

11.4 Upon satisfactory completion of the oral examination, the student shall submit N+2, where N is the number of members of the Examination Board, hard copies of the corrected thesis as per prescribed format and specification, duly certified by the Supervisor and Co- Supervisor (if any) that all the corrections have been incorporated in the thesis as suggested by the Board of Examiners.

12.0 Striking off and Removal of Name from the Rolls:

The name of the student shall be struck off and removed from the rolls of the University on the following grounds:

(i) Non-payment of dues within prescribed period. Post-Graduate students residing in the Halls of Residence shall be subject to the same conditions and rules as provided in the ordinance relating to Student's Discipline Rule.

(ii) Failing to proceed with the program by the exercise of Art. 6.1 or 11.0 of this Rules & Regulations.

(iii) Failing to make satisfactory progress in his/her program as reported by the supervisor through the ACPGS/ACRS and approved by CHSR.

(iv) Forced to discontinue his/her studies under disciplinary rules.

(v) Withdrawn officially from all the courses including thesis.

13.0 Publication of Results:

(i) A student who successfully completes the prescribed courses and all academic requirements for fulfilment of the postgraduate degree will have to apply to the Controller of Examinations through the Head of the Department for the award of degree.

(ii) The Controller of Examinations shall publish the result.

(iii) Provisional degree will be awarded, on completion of minimum credit and CGPA requirements, by the Academic Council.

14.0 Academic Fees:

Academic fees shall be decided time to time by the University authority.

15.0 Return of Fees:

A student withdrawing officially from all courses including project/thesis as per Art.12 (v) is entitled to get a refund of 50% of the course registration fees, provided he/she withdraws in writing through the respective Head of the Department before the expiry of two working weeks from the commencement of the classes; and in that case his/her grade in the courses registered shall be recorded as "W". If withdrawal is made after the expiry of two weeks from the commencement of classes no refund shall be allowed and the grade should be recorded as failure, unless he is eligible to get a grade of "Incomplete" as per Art. 7.2. Thesis/Project registration fees in any case are not refundable.

APPENDIX-I

Academic Fees

University Registration Fee	Taka ……..
Admission / Enrolment Fee	Taka ……..
Course Registration Fee	Taka ……..per credit hour with a maximum of Taka……...…… per Semester, Payable in 2 instalments.
Project Registration Fee	Taka ……. (on 1st Project registration).
Fees for each additional copy of Transcript	Taka ……..
Medical Fees	Taka ……per semester
Caution Money at first enrolment	Taka ……..
Library Caution Money	Taka …….

* Caution money may be refunded if the student withdraws officially from all the courses including project or at the end of his academic program and the amount will be determined from the statement of clearance from all Departments/ Institutes/ Offices.

APPENDIX-II

Format for Thesis of Ph. D. Degree M. Phil., M. Sc. MURP by Course and Thesis and Project Report of M. Engg., MURP by Course and Project, PG. Dip.,

The following set of instructions may be followed as standard format for the thesis / project report.

1. **Size and Thickness of Paper:**

   Thesis / Project is to be printed on A4 size quality offset paper and minimum weight of paper should be 70 gm.

2. **Typing or Print:**

   The typeface should be consistent and the copy must be clean for both text and illustration. Dot matrix printers should not be used unless giving near letter quality. The general text of the thesis / project report should be spaced at one and a half with single spacing for footnotes or lengthy quotations. Triple or larger spacing may be used where necessary to set off headings, subheadings or illustrations. The thesis / project report must be in "letter quality" print and laser printing is recommended. And standard type (font) may be used but it must be consistent throughout. The print size should be at least 10 points (or equivalent) not exceeding 12 points.

3. **Margins and Layout of Text:**

   There must be a margin of 4 cm to allow for binding on the left hand side of the paper. Minimum margins of 3 cm are required at the top and the bottom. A 2.5 cm margins is required at the right hand side. This also applies to table and figures.

4. **Pagination:**

   The text is to be numbered consecutively in the top right hand corner of the page, beginning with the first page of the text. The page numbers are to be approximately 2.5 cm (1 inch) from the right hand edge of the page. The number does not appear on the first page of the text although is understood to be a numeral '1'. All figures, tables, appendices and similar materials are numbered as pages of the text through to the end of the thesis / project. Material preceding the first page of the text is to be numbered in small roman numerals centered at the bottom of each page. The title page is considered to be page but it is not so indicated.

5. **Word Spacing and Division:**

   Text should be set to ensure an even spacing between words for any particular line. Word division at the ends of lines (hyphenation) should be avoided if possible.

6. **Illustrations:**

   Tables, figures, photographs, and other illustrations must always be referred to in the text. They should be arranged neatly and effectively. They should be in black ink. or be high quality photocopies, photo-offset, or photographs. They should be presented on paper of similar weight to that used in the thesis / project report. Oversize maps charts or diagrams must be folded so that they can be bound with the pages or inserted in a pocket. Original photographs or photo-offset must be provided in all required copies of the thesis / project report. They should be properly pasted on paper with permanent non-wrinkle glue. Photographs printed on 21.5 cm X 28 cm (8 ½ in X 11 in) photographic paper or photo-offsets are preferred rather than being pasted on. High quality computer graphics (black and white or colour) and high-quality colour photocopies are acceptable. All required copies must be identical.

   The title of a table must be above the table and the title on the figure, below the figure. The student should consult with the thesis / project supervisor if any difficulty arises in the placing of illustrations.

7. **Computer Disks:**

   If a student wishes to include computer disks as a part of his data, he must submit a disk for each required copy of his thesis. These must be submitted loosely. If is not necessary to submit them at the time he schedule his defence. In this case there should be a pocket in the thesis / project report on the inside back cover. He should also indicate the presence of computer disks in his Table of Contents.

8. **Binding and Colour:**

   Sewn and bound in strong, waterproof cloth. Not more than 6.5 cm thick. Maroon colour for Ph. D., Black for M. Engg., M.Sc. Engg. **MURP by Course and Thesis/ MURP by Course and Project** or M.Phil. degree.

9. **Lettering:**

   In golden on spine only.

Top	:	Degree
Middle	:	Name of author (initials and surname)
Foot	:	Year of Presentation.
Cover Page	:	In golden on Cover.
Positioning	:	Centre Justified, Title, Name, Dept.

10. **Order of Items:**

    10.1 Title Page:

    The student should follow the following instruction for title page:

10.1.1 The title of the thesis should appear in 12-point boldface upper and lower case letters.

10.1.2 The word 'by' should in lower case letters.

10.1.3 The name of the author should be in upper and lower case letters, and should be identical to the one in the copyright page. The name used must be the student's legal name as it appears on the University records.

10.1.4 Write out the full name of the degree in uppercase letters for which the work is presented, e.g. DOCTOR OF PHILOSPHY, MASTER OF SCIENCE IN CIVIL ENGINEERING, MASTER OF SCIENCE IN COMPUTER SCIENCE & ENGINEERING MASTER OF URBAN & REGIONAL PLANNING BY COURSE AND THESIS/ MASTER OF URBAN & REGIONAL PLANNING BY COURSE AND PROJECT.

10.1.5 Under major subject, the student should write the name of the department in full e.g. Civil Engineering.

10.1.6 Type in CHITTAGONG UNIVERSITY OF ENGINEERING AND TECHNOLOGY in uppercase letters.

10.1.7 The date of the title page should indicate only the year of the defence.

10.2 **Certification page of Thesis / Project Report Approval:**

The certification page of Thesis / Project Report Approval should be as per the format of Annexure I of this Appendix-II

10.3 **Declaration Page:**

The Declaration page should be as per the format of Annexure II of this Appendix-II

10.4 **Dedication (optional)**

10.5 **Table of Contents:**

The decimal system is advised for mentioning the headings and sub headings of the chapter. Each headings and subheadings appearing in the Table of Contents must appear in the text of the thesis / project report.

10.6 **List of Tables and Figures:**

A List of Tables and Figures should follow the Table of Contents. Each should appear on separate page with the appropriate page numbers. However, if the lists are very short they may be combined on one page under the title "List of Tables and Figures". It is advised

that the decimal system (e.g. figure 3.2 is the second figure in chapter 3) be used for figures if this system is followed for headings.

10.7 **List of Abbreviations of Technical Symbols and Terms:**

Page of the list of Abbreviations of Technical Symbols and Terms should be incorporated following the page of list of Tables and Figures. In this respect the student is advised to consult information sources such as Abbreviations Published by the American Standards Association and other information sources available in the Central Library. These abbreviations are also frequently found listed at the back of standard texts on technical writing.

10.8 **Acknowledgements:**

These should be given on a page following the List of Abbreviations of Technical Symbols and Terms. The student should acknowledge advice, service encouragement, library and information service support and source of financial support.

10.9 **Abstract:**

The student is required to incorporate an abstract following the page of acknowledgement. The abstract must be no longer than can be accommodated in single space type on one side page only.

10.10 **Main Body of Text:**

10.10.1 **Heading and Sub-headings**

Headings and subheadings of the text must be consistent and correspond to the headings given in the Table of Contents. Each major chapter should begin on a new page.

10.11 **Reference/Bibliography:**

Notes and bibliography/references should be typed in single spacing. A consistent policy should be used, interesting the notes at the foot of page or at the end of each chapter or at the thesis/project report. References must be complete, clear and exact and must be given sufficient information to enable any person reading the thesis/project report to find the references quickly and easily. A reference to an article in a journal must include author's name and initials, the title of articles, the title of the journal, date/year, volume if applicable, issue number if applicable and inclusive pages. A reference to a book must include the name of the author with initials, title of the book, title of article in the book, volume if applicable, editor if applicable, place of publication if applicable, publishers if applicable, year of publication and Specific page

number. If titles of journals are abbreviated, they must follow a standard form as used in a reputed research journal. All references listed in the reference section must be cited in the text. References to conference proceedings must include the date and location of conference. The student is all allowed a certain freedom of choice, since methods of handing references in the text and listing them varies. However, the student is advised to use that employed in the most reputed journals in his field. Above all, they must be consistent in format. Alphabetical listing of references by author is preferable.

10.12 **Appendices:**

Appendices are included to provide detailed information that would otherwise detract the readability of the main body of the text. Computer programs, lengthy tables and detailed laboratory procedures etc. are a few examples of material to be included in the Appendix. Appendices must be paginated in accordance with the text. All tables and figures in the Appendices must be appropriately labelled and listed in the Lists of Tables and Figures.

ANNEXURE-III

The dissertation/thesis/project titled…….....
.....……..……
…….....…….....…….Submitte d by…….....
Roll No…….....Session…….....
has been accepted as satisfactory in partial fulfilment of the requirement for the degree of ….....…….....
.....……on…….....

BOARD OF EXAMINERS

1.	(Signature)	
	Name of the Supervisor Designation & Address	Chairman
2.	(Signature)	Member
	Name of the Co-Supervisor (if any) Designation & Address	
3.	(Signature)	
	Name of the Internal Member Designation & Address	Member
4.	(Signature)	
	Name of the Internal Member Designation & Address	Member
5.	(Signature)	
	Name of the Head of the Dept. Designation & Address	Member (Ex-Officio)
6.	(Signature)	
	Name of the External Member Designation & Address	Member (External)

ANNEXURE-IV

CANDIDATE'S DECLARATION

It is hereby declared that this thesis or any part of it has not been submitted elsewhere for the award of any degree or diploma.

Signature of the Candidate

_____

Name of the Candidate

URP Department of

সংশোধনী

একডেমিক কাউন্সিল সভা - ১০৩তম
তারিখঃ ১৯/০৩/২০১৭ খ্রিস্টাব্দ

সিদ্ধান্ত-১০৩/১১(গ) ঃ (iii) স্নাতকোত্তর পর্যায়ের শিক্ষার্থীরা 'I' Grade প্রাপ্ত হলে তা Academic Transcript এ প্রতিফলিত হবে না।

একডেমিক কাউন্সিল সভা - ১২০তম
তারিখঃ ২৩/০৮/২০২০ খ্রিস্টাব্দ

আলোচ্যসূচী-৮ঃ **অনলাইনভিত্তিক পোষ্টগ্র্যাজুয়েট Oral Examination গ্রহণের নিমিত্তে ডীনদের পত্র প্রসঙ্গে।**

সিদ্ধান্ত-১২০/৮ঃ অনলাইনভিত্তিক পোষ্টগ্র্যাজুয়েট Oral Examination গ্রহণের নিমিত্তে কমিটির সুপারিশের ক্রমিক (১) এর সংশোধনীসহ [(১) মাষ্টার্স/এম. ফিল এর Oral Examination এর পূর্বের এবং পরের যাবতীয় ধাপ (Thesis এর হার্ডকপি/সফ্টকপি পরীক্ষা কমিটির সকল সদস্যদের নিকট প্রেরণ, পরীক্ষার সময় ও ভেন্যু নির্ধারণ এবং তা পরীক্ষা শাখাকে অবহিতকরণ, পরীক্ষার ফল প্রকাশ ইত্যাদি) প্রচলিত পদ্ধতি অনুযায়ী সম্পন্ন করতে হবে।] একাডেমিক কাউন্সিল কর্তৃক অনুমোদিত হলো।

একডেমিক কাউন্সিল সভা - ১২৮তম
তারিখঃ ০২/০৩/২০২১ খ্রিস্টাব্দ

আলোচ্যসূচী-৪ঃ **Ph.D/M.Phil/M.Sc/M.Engg. এর ফলাফল প্রকাশের ক্ষেত্রে Transcript এ F/I গ্রেড এবং Tabulation Book এর জটিলতা নিরসন সংক্রান্ত সভার কার্যবিবরণী প্রসঙ্গে।**

সিদ্ধান্ত-১২৮/৪ঃ **(i)** Ph.D/M.Phil/M.Sc/M.Engg. এর ফলাফল প্রকাশের ক্ষেত্রে Transcript এ F/I গ্রেড উল্লেখ না করার নিমিত্তে সংশ্লিষ্ট কমিটি কর্তৃক উত্থাপিত রিপোর্টের সংশ্লিষ্ট ধারাসমূহ সংশোধনের সুপারিশ অনুমোদিত হল **(পরিশিষ্ট পৃঃ ০৪-০৫)**।

একডেমিক কাউন্সিল সভা - ১৩৮তম (জরুরী)
তারিখঃ ২১/০১/২০২২ খ্রিস্টাব্দ

সিদ্ধান্ত-১৩৮/১: (খ) পোস্ট গ্রাজুয়েট এর একাডেমিক কাউন্সিল এর ১২০তম সভার সিদ্ধান্ত ১২০/৮-এ উল্লেখিত -"Oral Examination এর সময় সংশ্লিষ্ট শিক্ষার্থী, সুপারভাইজার, কো-সুপারভাইজার, বিভাগীয় প্রধান এবং আভ্যন্তরীন সদস্য/সদস্যবৃন্দ সশরীরে উপস্থিত থাকবেন। শুধুমাত্র বহিঃপরীক্ষক প্রয়োজনে অনলাইন-এ উপস্থিত থেকে পরীক্ষা কার্যক্রমে অংশগ্রহণ করবেন।" -এর পরিবর্তে চলমান বৈশ্বিক করোনা মহামারীর বিষয়টি বিবেচনায় এনে "Oral Examination এর সময় সংশ্লিষ্ট শিক্ষার্থী, বহিঃপরীক্ষক, সুপারভাইজার, কো-সুপারভাইজার, বিভাগীয় প্রধান এবং আভ্যন্তরীন সদস্য/সদস্যবৃন্দ অনলাইন-এ উপস্থিত থেকে পরীক্ষা কার্যক্রমে অংশগ্রহণ করতে পারবেন।"-মর্মে অনুমোদিত হলো।

URP
Department of
URP
Department of

CHAPTER 4

Drugs Prevention Policies CUET -2016 (in Bengali)

মাদকদ্রব্য প্রতিরোধ নীতিমালা, চুয়েট-২০১৬
চট্টগ্রাম প্রকৌশল ও প্রযুক্তি বিশ্ববিদ্যালয় (চুয়েট) -এ মাদকদ্রব্য প্রতিরোধ-এ প্রনীত নীতিমালা

আজকের ছাত্র-ছাত্রীরা ভবিষ্যতের দেশ গড়ার কারিগর। প্রত্যেক ছাত্র-ছাত্রীকে একজন দক্ষ প্রকৌশলীর পাশাপাশি প্রকৃত মানুষ হয়ে সুনাগরিক হিসাবে গড়ে তোলার জন্য মাদকের গ্রহন, বহন, সেবন হতে বিরত রাখার উদ্দেশ্যে একটি নীতিমালা করা সমীচীন ও প্রয়োজনীয়। এ লক্ষ্যে নিম্নরুপ নীতিমালা প্রনয়ন করা হলঃ-

১। (ক) এই নীতিমালা **"মাদকদ্রব্য প্রতিরোধ নীতিমালা, চুয়েট-২০১৬"** নামে অভিহিত হবে।

(খ) এই নীতিমালা সিন্ডিকেট সভার অনুমোদনের তারিখ হতে কার্যকর হবে।

২। বিষয় বা প্রসঙ্গের পরিপন্থী কোন কিছু না থাকলে, এই নীতিমালায় -

(ক) "বিশ্ববিদ্যালয়" অর্থ চট্টগ্রাম প্রকৌশল ও প্রযুক্তি বিশ্ববিদ্যালয়

(খ) "কমিটি" অর্থ এই আইনের অধীনে প্রতিষ্ঠিত "মাদক প্রতিরোধ" কমিটি

(গ) "মাদকদ্রব্য" অর্থ এই নীতিমালায় উল্লেখিত দ্রব্য এবং সরকারী গেজেটে প্রজ্ঞাপন দ্বারা মাদকদ্রব্য বলে ঘোষিত অন্য কোন দ্রব্য

(ঘ) "এ্যালকোহল" অর্থ স্পিরিট এবং যে কোন ধরনের মদ, ওয়াইন, বিয়ার বা ০.৫% অর অধিক এ্যালকোহলযুক্ত যেকোন তরল পদার্থ এর অন্তর্ভূক্ত হবে

(ঙ) "ওয়াইন" অর্থ শর্করা কিংবা শ্বেতসার সম্বলিত যে কোন বস্তুকে পানি ও অন্যান্য উপকরন সহযোগে গাঁজানের মাধ্যমে উৎপন্ন এ্যালকোহলযুক্ত যেকোন তরল পদার্থ

(চ) "বিয়ার" অর্থ মল্ট, হপস সহযোগে কিংবা মল্ট বা হপস সহযোগে ব্রিউয়িং পদ্ধতিতে ব্রিউয়ারীতে প্রস্তুতকৃত অন্যুন ০.৫% এ্যালকোহলযুক্ত যে কোন পানীয়

(ছ) "চিকিৎসক" অর্থ Medical and Dental Council Act,1980-এ সঙ্গায়িত Registered Medical Practitioner ও Dentists.

(জ) " বাহন" অর্থ বাই-সাইকেল, রিক্সা, ভ্যান, মোটর সাইকেল, সিএনজি, স্কুটার, কার মাইক্রোবাস, ট্রাক, বাসসহ যে কোন ধরনের যানবাহন

(ঝ) "মাদকাসক্ত" অর্থ শারীরিক বা মানসিকভাবে মাদকদ্রব্যের উপর নির্ভরশীল ব্যক্তি বা অভ্যাসবশে মাদকদ্রব্য ব্যবহারকারী

(ঞ) "স্থান" বলতে বিশ্ববিদ্যালয়ের আবাসিক হল, একাডেমিক ভবন, প্রশাসনিক ভবন, আবাসিক ভবন, দোকান, যানবাহন, কেন্টিন সহ বিশ্ববিদ্যালয়ের যে কোন স্থান বুঝাবে ।

৩। আপাতত বলবৎ অন্য কোন নীতিমালায় যা কিছুই থাকুকনা কেন, এই নীতিমালায় প্রণীত নীতিসমূহ চট্টগ্রাম প্রকৌশল ও প্রযুক্তি বিশ্ববিদ্যালয় এ কার্যকর থাকবে।

৪। (১) এই নীতিমালার উদ্দেশ্য পূরনকল্পে **"মাদক প্রতিরোধ কমিটি"** নামে একটি কমিটি থাকবে।

(২) কমিটি নিম্নবর্নিত সদস্য সমন্বয়ে গঠিত হবে :

(ক) ছাত্রকল্যাণ পরিচালক যিনি কমিটির সভাপতি হবেন

(খ) উপাচার্য কর্তৃক মনোনীত ২(দুই) জন প্রভোষ্ট (মনোনীত সদস্যগণের মেয়াদকাল ২(দুই) বৎসর)।

(গ) চীফ মেডিক্যাল অফিসার

(ঘ) ডেপুটি রেজিস্ট্রার, আইন/এস্টেট, একাডেমিক এবং নিরাপত্তা

(ঙ) নিরাপত্তা কর্মকর্তা

(চ) ডেপুটি ছাত্রকল্যান পরিচালক, যিনি কমিটির সচিবও হবেন।

(৩) কমিটি-এর মোট সদস্যের অর্ধাংশের উপস্থিতিতে সভার কোরাম পূর্ন হবে।

(৪) সভাপতির অনুপস্থিতে সভাপতি কর্তৃক মনোনীত কমিটির অন্য কোন সদস্য সভায় সভাপতিত্ব করবেন।

৫। কমিটির দায়িত্ব ও কর্তব্য

(ক) মাদকদ্রব্য সৃষ্ট সম্ভাব্য ক্ষতিকর প্রতিক্রিয়া রোধকল্পে প্রয়োজনীয় ব্যবস্থা গ্রহন এবং উহা বাস্তবায়নের জন্য পদক্ষেপ গ্রহন।

(খ) মাদকদ্রব্য সংক্রান্ত যাবতীয় তথ্য সংগ্রহের জন্য যে কোন ধরনের কার্যক্রম পরিচালনা।

(গ) মাদকদ্রব্য সরবরাহ ও ব্যবহার রোধে প্রয়োজনীয় ব্যবস্থা গ্রহন।

(ঘ) মাদকাসক্তের চিকিৎসা ও পুনর্বাসন সংক্রান্ত বিষয়ে সংশ্লিষ্ট অভিভাবকের সাথে যোগাযোগ পূর্বক প্রয়োজনীয় ব্যবস্থা গ্রহন।

(ঙ) মাদকাসক্তির কুফল সম্পর্কে ছাত্র/ছাত্রীদেরকে সচেতন করার জন্য প্রয়োজনীয় শিক্ষা ও প্রচারনামূলক কার্যক্রম পরিচালন।

(চ) মাদকদ্রব্য সংক্রান্ত বিষয়ে মাদকদ্রব্য নিয়ন্ত্রন অধিদপ্তর ও সংশ্লিষ্ট সংস্থার সাথে যোগাযোগ স্থাপন এবং এতদসংক্রান্ত যাবতীয় কার্যক্রমের সমন্বয় সাধন।

(ছ) উপরি-উক্ত দায়িত্ব পালন ও কর্তব্য সম্পাদনের জন্য প্রয়োজনীয় যে কোন ব্যবস্থা গ্রহণ।

৬। বিশ্ববিদ্যালয়ের সাথে সংশ্লিষ্ট যে কেউ বিশ্ববিদ্যালয়ের কোন ছাত্র/ছাত্রী মাদকাসক্ত বলে সন্দেহ করেন, তাহলে তিনি তৎসম্পর্কে কমিটিকে অবহিত করবেন। এতদ্‌সংক্রান্ত তথ্য প্রদানকারীর পরিচয় গোপন রাখা হবে।

৭। বিশ্ববিদ্যালয় ক্যাম্পাসের-এর বাহিরের আশেপাশের কোন দোকান/হোটেল/বাড়িতে মাদকদ্রব্য ক্রয়/বিক্রয় সংক্রান্ত কোন তথ্য কমিটির নিকট থাকলে এ বিষয়ে প্রয়োজনীয় ব্যবস্থা গ্রহণের জন্য বিশ্ববিদ্যালয় প্রশাসন আইন শৃঙ্খলা রক্ষাকারী বাহিনীকে অবহিত করবেন।

৮। যদি কমিটির কোন সদস্য জানতে পারেন যে, কোন ছাত্র/ছাত্রী মাদকাসক্ত হওয়ার কারনে প্রায়শঃ অপ্রকৃতিস্থ থাকেন এবং তাকে স্বাভাবিক জীবনে ফিরিয়ে আনার জন্য অনতিবিলম্বে তার চিকিৎসা করা প্রয়োজন, তা হলে কমিটির সভাপতি সংশ্লিষ্ট ছাত্র/ছাত্রীর অভিভাবকের সাথে যোগযোগ করে পত্র মারফত উক্ত ছাত্র/ছাত্রীর চিকিৎসার্থে কোন উপযুক্ত চিকিৎসকের নিকট বা মাদকাসক্তি নিরাময় কেন্দ্রে প্রেরনের নির্দেশ প্রদান করবেন।

৯। মাদক নিয়ন্ত্রণ আইন ১৯৯০ এর ১৬(৮) ধারা মোতাবেক সরকার-এর নিকট হতে মাদকাসক্ত কোন ছাত্র/ছাত্রীর বাধ্যতামূলক চিকিৎসার ব্যয়ভার গ্রহনের জন্য কমিটির সুপারিশক্রমে সংশ্লিষ্ট ছাত্র/ছাত্রীর অভিভাবক প্রয়োজনীয় পদক্ষেপ গ্রহন করবেন।

১০। বিশ্ববিদ্যালয়ের কোন চিকিৎসক যদি এরূপ মনে করেন যে, তার চিকিৎসাধীন কোন ছাত্র/ছাত্রী মাদকাসক্ত এবং সেজন্য যথাযথ চিকিৎসা প্রয়োজন, তাহলে তিনি এই চিকিৎসার প্রয়োজনীয়তার কথা লিখিতভাবে কমিটিকে অবহিত করবেন।

১১। (ক) এই নীতিমালায় সুপারিশকৃত শাস্তি বিশ্ববিদ্যালয়ের Students Discipline Committee এর মাধমে প্রদান করা হবে।

(খ) কোন ছাত্র/ছাত্রী নিম্নের টেবিলে উল্লেখিত কোন মাদকদ্রব্য সেবন/ব্যবসায়িক/অন্য কোন উদ্দেশ্যে নিজ অধিকারে রাখলে নিম্নের ছকে উল্লেখিত পরিমান শাস্তি প্রাপ্ত হবে ঃ

ক্রমিন নং	মাদকদ্রব্যের নাম	শাস্তির পরিমা ন
(i)	ইয়াবা ট্যাবলেট	(ক) ইয়াবা ট্যাবলেটের পরিমান অনুর্ধ্ব ১০টি হলে ২ বৎসর একাডেমিক বহিষ্কার (খ) ইয়াবা ট্যাবলেটের পরিমান ১০টির বেশী হলে ৩ বৎসর একাডেমিক বহিষ্কার (গ) বিশ্ববিদ্যালয় আবাসিক হল হতে আজীবন বহিষ্কার
(ii)	ফেনসিডিল	(ক) ফেনসিডিলের পরিমান অনুর্ধ্ব ৫ বোতল হলে ২ বৎসর একাডেমিক বহিষ্কার (খ) ফেনসিডিলের পরিমান ৫ বোতলের বেশী হলে ৩ বৎসর একাডেমিক বহিষ্কার (গ) বিশ্ববিদ্যালয় আবাসিক হল হতে আজীবন বহিষ্কার
(iii)	এ্যালকোহল, ওয়াইন, বিয়ার	(ক) মাদকদ্রব্যের পরিমান অনুর্ধ্ব ৫ বোতল/ক্যান হলে ২ বৎসর একাডেমিক বহিষ্কার (খ) মাদকদ্রব্যের পরিমান ৫ বোতল/ক্যানের বেশী হলে ৩ বৎসর একাডেমিক বহিষ্কার (গ) বিশ্ববিদ্যালয় আবাসিক হল হতে আজীবন বহিষ্কার

(iv)	হেরোইন, কোকেন এবং কোকা উদ্ভুত মাদকদ্রব্য	(ক) মাদকদ্রব্যের পরিমান অনুর্ধ্ব ২৫ গ্রাম হলে ২ বৎসর একাডেমিক বহিষ্কার (খ) মাদকদ্রব্যের পরিমান ২৫ গ্রামের বেশী হলে ৩ বৎসর একাডেমিক বহিষ্কার (গ) বিশ্ববিদ্যালয় আবাসিক হল হতে আজীবন বহিষ্কার
(v)	পেথিডিন, মরফিন ও টেট্রাহাইড্রোক্যানাবিনল	(ক) মাদকদ্রব্যের পরিমান অনুর্ধ্ব ১০ গ্রাম হলে ২ বৎসর একাডেমিক বহিষ্কার (খ) মাদকদ্রব্যের পরিমান ১০ গ্রামের বেশী হলে ৩ বৎসর একাডেমিক বহিষ্কার (গ) বিশ্ববিদ্যালয় আবাসিক হল হতে আজীবন বহিষ্কার
(vi)	অপিয়াম, ক্যানাবিস, রেসিন	(ক) মাদকদ্রব্যের পরিমান অনুর্ধ্ব ২ কেজি হলে ২ বৎসর একাডেমিক বহিষ্কার (খ) মাদকদ্রব্যের পরিমান ২ কেজির বেশী হলে ৩ বৎসর একাডেমিক বহিষ্কার (গ) বিশ্ববিদ্যালয় আবাসিক হল হতে আজীবন বহিষ্কার
(vii)	মেথাডন	(ক) মাদকদ্রব্যের পরিমান অনুর্ধ্ব ৫০ গ্রাম হলে ২ বৎসর একাডেমিক বহিষ্কার (খ) মাদকদ্রব্যের পরিমান ৫০ গ্রামের বেশী হলে ৩ বৎসর একাডেমিক বহিষ্কার (গ) বিশ্ববিদ্যালয় আবাসিক হল হতে আজীবন বহিষ্কার
(viii)	গাঁজা বা যে কোন ভেষজ ক্যানাবিস	(ক) মাদকদ্রব্যের পরিমান অনুর্ধ্ব ২৫০ গ্রাম হলে ২ বৎসর একাডেমিক বহিষ্কার (খ) মাদকদ্রব্যের পরিমান ২৫০ গ্রামের বেশী ৩ বৎসর একাডেমিক বহিষ্কার (গ) বিশ্ববিদ্যালয় আবাসিক হল হতে আজীবন বহিষ্কার
(ix)	যে কোন প্রজাতির ক্যানাবিস গাছ	(ক) ক্যানাবিস গাছের সংখ্য অনুর্ধ্ব ২৫টি হলে ২ বৎসর একাডেমিক বহিষ্কার (খ) ক্যানাবিস গাছের সংখ্যা ২৫টির বেশী হলে ৩ বৎসর একাডেমিক বহিষ্কার (গ) বিশ্ববিদ্যালয় আবাসিক হল হতে আজীবন বহিষ্কার
(x)	ফেনসাইক্লিআইন, মেথাকোয়ালন, এল.এস.ডি, বারবিরেটস, এমফিটামিন	(ক) মাদকদ্রব্যের পরিমান অনুর্ধ্ব ৫ গ্রাম হলে ২ বৎসর একাডেমিক বহিষ্কার (খ) মাদকদ্রব্যের পরিমান ৫ গ্রামের বেশী হলে ৩ বৎসর একাডেমিক বহিষ্কার (গ) বিশ্ববিদ্যালয় আবাসিক হল হতে আজীবন বহিষ্কার

(গ) কোন ছাত্র/ছাত্রীকে মাদকাসক্ত অবস্থায় সনাক্ত করা গেলে তাকে ১ বৎসরের জন্য একাডেমিক বহিষ্কার এবং আজীবন আবাসিক হল হতে বহিষ্কার শাস্তি প্রদান করা হবে।

(ঘ) কোন ছাত্র/ছাত্রী মাদক সেবনরত অবস্থায় সনাক্ত করা গেলে তাকে ২ বৎসরের জন্য একাডেমিক বহিষ্কার এবং আজীবন আবাসিক হল হতে বহিষ্কার শাস্তি প্রদান করা হবে।

(ঙ) অত্র বিশ্ববিদ্যালয়ের ছাত্র/ছাত্রী ব্যতিরেকে বিশ্ববিদ্যালয়ের ক্যাম্পাসে যে কোন কাউকে যে কোন ধরনের মাদক বহন/সেবনরত অবস্থায় পাওয়া গেলে কমিটির সুপারিশ ক্রমে বিশ্ববিদ্যালয় কর্তৃপক্ষ যথাযথ শাস্তির ব্যবস্থা করবে। সে ক্ষেত্রে প্রয়োজনবোধে আইন শৃঙ্খলা রক্ষাকারী বাহিনীর সহায়তা গ্রহন করা হবে।

(চ) নীতিমালায় উল্লেখিত মাদকদ্রব্য সংক্রান্ত যে কোন অভিযোগের সংশ্লিষ্টতা থাকার প্রমাণ কমিটি কর্তৃক মেডিক্যাল টেস্টের মাধ্যমে নিশ্চিত করা হবে।

(ছ) এই নীতিমালায় উল্লেখিত মাদকদ্রব্য সমূহের ব্যবহার/সংরক্ষণ/অন্য কোন উদ্দেশ্যে কোন ছাত্র/ছাত্রী তার নিজ কক্ষ, যানবাহন, সরঞ্জামাদি ব্যবহার করে বা করতে দেয়, তা হলে উক্ত ছাত্র/ছাত্রীকে ৬ মাসের জন্য একাডেমিক বহিষ্কার এবং আজীবনের জন্য বিশ্ববিদ্যালয়ের আবাসিক হল হতে বহিষ্কার করা হবে।

(জ) হয়রানির উদ্দেশ্যে যদি কোন ছাত্র/ছাত্রী অসত্য বা বিভ্রান্তিমূলক তথ্য প্রদান করেন, তা হলে তাহার বিরুদ্ধে প্রয়োজনীয় শাস্তিমূলক ব্যবস্থা গ্রহন করা হবে।

(ঝ) এই নীতিমালায় উল্লেখিত মাদকদ্রব্য সমূহ গ্রহণে কোন ছাত্র/ছাত্রী কাউকে সাহায্য করলে/প্ররোচনা দিলে/ জোরপূর্বক বাধ্য করলে উক্ত ছাত্র/ছাত্রীকে ৬ মাসের জন্য একাডেমিক বহিষ্কার এবং আজীবনের জন্য বিশ্ববিদ্যালয়ের আবাসিক হল হতে বহিষ্কার করা হবে।

(ঞ) কোন ছাত্র/ছাত্রী যদি মাদকদ্রব্য সংক্রান্ত এমন কোন অপরাধের সাথে জড়িত হয়ে পড়ে যার জন্য এই নীতিমালায় স্বতন্ত্র কোন দন্ডের ব্যবস্থা নেই, তা হলে উক্ত ছাত্র/ছাত্রীকে এই অপরাধের জন্য কমিটি কর্তৃক সুপারিশকৃত শাস্তি প্রদান করা হবে।

(ট) কোন ছাত্র/ছাত্রীকে মাদক সেবনরত/মাদকদ্রব্য নিজ অধিকারে রাখা অবস্থায় সনাক্ত করা গেলে তাৎক্ষনিকভাবে সংশ্লিষ্ট আবাসিক হলের প্রভোস্ট কর্তৃক বিশ্ববিদ্যালয়ের আবাসিক হল হতে সাময়িকভাবে বহিষ্কার করা হবে।

(ঠ) এই নীতিমালার অধীনে প্রথমবার শাস্তিপ্রাপ্ত ছাত্র/ছাত্রী দ্বিতীয়বার শাস্তির আওতায় আসলে তাকে বিশ্ববিদ্যালয় হতে আজীবন একাডেমিক বহিষ্কারাদেশ প্রদান করা হবে।

১২। এই নীতিমালায় উল্লেখিত যে কোন মাদকদ্রব্য আটকের সঙ্গে সঙ্গে মাদকদ্রব্যগুলি কমিটির সভাপতির এখতিয়ারে রাখা হবে। কমিটির সভাপতি প্রয়োজন অনুযায়ী দ্রব্যটি হস্তান্তর/সংরক্ষন/ধ্বংসের প্রয়োজনীয় ব্যবস্থা গ্রহন করবেন।

১৩। কমিটির সদস্যবৃন্দ বিশ্ববিদ্যালয়ের যে কোন স্থানে (আবাসিক এলাকায় প্রবেশের ক্ষেত্রে উপাচার্য মহোদয়ের অনুমতি সাপেক্ষে) যে কোন সময়ে তল্লাশীর জন্য প্রবেশ করতে পারবেন। এক্ষেত্রে ঃ

(ক) উক্ত স্থানে প্রবেশ কালে বাধাগ্রস্থ হলে বাধা অপসারনের জন্য দরজা জানালা ভাঙ্গাসহ যেকোন প্রয়োজনীয় ব্যবস্থা গ্রহন করতে পারবেন।

(খ) উক্ত স্থানে তল্লাশীকালে প্রাপ্ত মাদকদ্রব্য এবং এই নীতিমালার অধীনে অপরাধ প্রমাণে সহায়ক কোন দস্তাবেজ বা জিনিসপত্র আটক করতে পারবেন।

(গ) উক্ত স্থানে উপস্থিত যে কোন ব্যক্তির দেহ তল্লাশী করতে পারবেন।

(ঘ) তল্লাশী পরিচালনা কালে কমিটির কোন সদস্যের যদি মনে হয়, কোন ব্যক্তি তার শরীরের কোন অংগ প্রতঙ্গে মাদকদ্রব্য লুকিয়ে রেখেছে, তা হলে উক্ত ব্যক্তির শরীরের এক্স-রে করা বা মূত্রসহ অন্য যে কোন প্রকার প্রয়োজনীয় পরীক্ষার নির্দেশ দিতে পারবেন।

১৪। অভিযুক্ত ছাত্র/ছাত্রী অপরাধ সংঘটনের সময়ে হাতে নাতে ধৃত হলে, তাহার ধৃত হবার তারিখ হতে পরবর্তী পনের কার্যদিবসের মধ্যে নির্ধারিত শাস্তির কার্যাদি সম্পন্ন করা হবে। অভিযুক্ত ব্যক্তি অপরাধ সংঘটনের সময় হাতে নাতে ধৃত না হলে, অপরাধ সংঘটন সংক্রান্ত প্রাথমিক তথ্য প্রাপ্তির তারিখ হতে পরবর্তী ত্রিশ কার্যদিবসের মধ্যে নির্ধারিত শাস্তির কার্যাদি সম্পন্ন করা হবে।

১৫। এই নীতিমালার অধীনে পরিচালিত কোন কার্যক্রমের কোন পর্যায়ে কোন বস্তুর রাসায়নিক পরীক্ষার প্রয়োজন দেখা দিলে তা, বিশ্ববিদ্যালয়ে স্থাপিত রাসায়নিক পরীক্ষাগারে অথবা কমিটি কর্তৃক নির্ধারিত যে কোন পরীক্ষাগারে সম্পাদন করা হবে।

১৬। রাসায়নিক পরীক্ষকের স্বাক্ষরযুক্ত রাসায়নিক পরীক্ষার রিপোর্ট এই নীতিমালার অধীনে কোন তদন্ত, বিচার বা অন্য কোন প্রকার কার্যক্রমের সাক্ষ্য হিসাবে ব্যবহার করা যাবে।

১৭। ছাত্র/ছাত্রীদেরকে মাদকাসক্তি থেকে মুক্ত রাখার জন্য মাঝে মাঝে ছাত্র/ছাত্রীদের দৈবচয়ন পদ্ধতিতে রক্ত পরীক্ষাকরন কর্মসূচী পরিচালনা করা হবে।

CHAPTER 5

Summary of courses offered for Masters of Urban & Regional Planning Students

Summary

Thesis / Project

Course ID	Courses Title	Credit
URP 6001	Thesis	18
URP 6002	Project	06

Compulsory Courses for All Categories Students

Course ID	Courses Title	Credit
URP 6003	Research methods and seminar	3
URP 6004	Planning theories, practice and ethics	3

Foundation courses:

Course ID	Courses Title	Credit
URP 6101	Urban planning techniques	3
URP 6102	Urban planning and development	3
URP 6103	Regional planning and development	3
URP 6104	Environmental planning and management	3
URP 6105	Rural planning techniques	3
URP 6106	Hilly region and coastal area planning	3
URP 6107	GIS applications in urban and regional lanning	3
URP 6108	Statistics for planners	3
URP 6109	Disaster management	3
URP 6110	Tourism planning and management	3
URP 6111	Transportation policy and planning	3
URP 6112	Housing and Real Estate Development	3

Elective Courses for all Categories of Students

Thesis group students need to complete 01 Elective Course (03 credits) and Project group students need to complete 04 Elective Courses (12 credits).

Course ID	Courses Title	Credit
URP 6201	Advanced GIS, Remote Sensing and Photogrammetry	3
URP 6202	Governance	3
URP 6203	Advanced qualitative research methods	3
URP 6204	Strategic planning	3
URP 6205	Project evaluation and management	3
URP 6206	Urban design and development	3

Major Courses

Students need to select one major stream. After the selection of a major stream, Thesis group students will need to undertake **03** courses (9 Credit) and Project group students need to undertake **04** courses (12 Credit) from selected major stream.

Major in Transportation Planning and Management

Course ID	Courses Title	Credit
URP 6301	Sustainable Land-Use and Transport Planning	3
URP 6302	Understanding Travel Behavior	3
URP 6303	Public Transport Planning and Management	3
URP 6304	Principles of Transport Modelling	3
URP 6305	Shaping Future Transport Systems	3
URP 6306	Transport Data Collection and Analysis	3
URP 6307	Choice Modelling and Stated Preference Survey Design	3
URP 6308	Transport logistics / Green logistics	3

Major in Environmental Planning and Disaster Management

Course ID	Courses Title	Credit
URP 6401	Critical Perspectives in Environment and Development	3
URP 6402	Environmental Policy and Governance	3
URP 6403	Climate Change: Physical Science Basis	3
URP 6404	Climate Change: Impacts and Adaptation	3
URP 6405	Climate Change Mitigation	3
URP 6406	Advanced Environmental Science Field and Research Skills	3
URP 6407	Risk Perception and Communication	3
URP 6408	Tools and Techniques in Ecological Economics	3

Major in Urban Management and Development

Course ID	Courses Title	Credit
URP 6501	Urban environment, sustainability and climate change	3
URP 6502	Urban Governance, Policy, Planning and Public Private Partnerships	3
URP 6503	Urban Quantitative Data Analytics	3
URP 6504	Urban Qualitative Data Analytics	3
URP 6505	GIS Methods for Urban Research	3
URP 6506	Urban Morphology	3
URP 6507	Sustainable Cities	3
URP 6508	Action Planning Workshop	3
URP 6509	Urban Infrastructures Planning and Management	3

Major in Regional and Rural Development

Course ID	Courses Title	Credit
URP 6601	Rural and Regional Development Theories and Practice	3
URP 6602	Gender and Development Studies	3
URP 6603	Rural Environment and Development	3
URP 6604	Rural housing and settlement	3
URP 6605	Rural Development Planning	3
URP 6606	Local Government Finance and Investments	3
URP 6607	Local level planning and development	3
URP 6608	Regional Development Policy Issues and Analysis	3
URP 6609	Regional Economic Development Theory and Policy	3

URP Department of

CHAPTER 6

Detail outline of Postgraduate Courses

1. Thesis

1.1. URP 6001: Thesis

All MURP candidates will submit a thesis individually on the selected research topic.

1.2. URP 6002: Project

All MURP candidates will undertake a Research Project on the selected research topic with an approval from her/his supervisor.

2. Compulsory courses for all categories of students

2.1. URP 6003: Research methods and seminar

2.1.1. Course Summary

The course aims to equip graduate students with the skills to develop research proposals, collect, process, and evaluate data, and carry out advanced qualitative and quantitative data analyses using the latest tools and techniques. Also, developing communication and presentation skills is one of the major focuses of this course.

2.1.2. Objectives:

The objectives of this course are to:

- Improve research skills among beginners and enhance the quality of research of the existing researchers.
- Introduce students to quantitative and qualitative methods for conducting meaningful inquiry and research.
- Enhance the students' ability to analyze and critically evaluate the issues of research in the realm of urban and regional planning.
- Enhance the knowledge and skills of students for designing and conducting academic research independently.
- Develop skills on communication and presentation techniques through research seminar.

2.1.3. Learning Outcomes:

At the end of the course the students will be able to:

- Address common issues in conducting and evaluating quantitative research.
- Understand the basic framework of the research process, various research designs, and techniques.

URP
Department of

- Improve understanding of the underlying principles of qualitative and quantitative research.
- Explore various sources of information for literature review and data collection.
- Familiarize with the ethical issues of conducting applied research.
- Develop research proposals and research articles.
- Students will be able to disseminate research outcomes to specialized and generalized audiences.

2.1.4. Course content

- Introduction to research methodology (Problem statement, research motivation, objectives, type, significance, issues)
- Defining a research problem (Research problem, selecting a problem, techniques involved in defining a problem)
- Research Design (concept, requirements, types, objective formulation)
- Developing a Research Plan (research problem, research question, hypothesis and assumptions)
- Literature review and testing of hypothesis (concept, sources, purposes, managing literature, importance, nature and function of hypothesis)
- Sampling Design (Census and Sample Survey, Sample Design, Types, stages, and purposes of sampling)
- Scope of quantitative research and components of dataset and level of measurement.
- Case studies related to qualitative and quantitative research.
- Methods of Data Collection (Data types, primary and secondary data collection methods)
- Processing of Data (Data processing, problems in processing, Elements/Types of Analysis, Statistics in Research).
- Analysis of Data (Measures of Central Tendency, Asymmetry (Skewness), Relationship, Simple Regression Analysis, Multiple Correlation and Regression).
- Data manipulation and perform calculations.
- Testing of Hypotheses-I (Parametric or Standard Tests of Hypotheses)
- Chi-square Test.
- Analysis of Variance and Covariance.

- Testing of Hypotheses-II (Nonparametric or Distribution-free Tests).
- Writing of research proposals and scientific articles.
- Presentation of proposal and approval of the proposal by the thesis committee.

2.1.5. Reading List

Campbell, W.G. (1954). Form and Style in Thesis Writing, Boston: Houghton Mifflinco.

Kothari, C.R. (1985). Research Methodology: Methods and Techniques. 5th ed. New Delhi: Wiley Eastern Ltd.

Lawrence Neuman, W. (2014). Social research methods: Qualitative and quantitative approaches.

Lester, J.D. (1990). Writing Research Papers: A Complete Guide. New York: Harper Collins.

Turabian, K.L. (1972). A Manual for Writer's of term Papers, Theses and Dissertations. 3rd ed. Chicago: The University of Chicago Press.

2.2. URP 6004: Planning theories, practice and ethics

2.2.1. Course summary

Unplanned and haphazard development cause chaos in city areas. Such issues include a lack of systematic development, loss of physical identity and harmony, lack of facilities, low social interaction, pollution, and congestions. Planned development of lands supports systematic arrangement of land uses, promotes accessibility of the people, ensures efficient use of limited resources, protects people and the environment from environmental degradation, maintains ecological balance, etc. To achieve sustainable development and uphold planned development, understanding the process and techniques of planning is essential. This course will help students to understand concepts, nature, functions, theories, methods, and techniques of planning in urban, rural, and regional contexts.

2.2.2. Objectives

This course aims to:

- Understand the importance and scopes of urban, rural, and regional planning.
- Conceptualize various aspects of planning to delineate the relationship among them.
- Understand the plan preparation process, policy formulation, and implementation.
- Appreciate the relationship between planning theories and practices.
- Understand legal issues and professional ethics in practicing planning.

2.2.3. Learning Outcomes

At the end of the course the students will be able to:

- Understand the concept, history, nature, functions, and techniques of urban, rural, and regional planning
- Identify different aspects of planning at the local and national levels and their influence on the overall development process.
- Understand concepts, methods, and techniques used in plan preparation, policy formulation, implementation, monitoring, and evaluation in development projects.
- Assess theoretical frameworks considering spatial, economic, and socio-political dimensions for understanding urban, rural, and regional development processes.
- Understand the manner of professional planning practices in private and public sectors, their conflicts, causes, and possible solutions for maintaining development pace.
- Understand available policies, strategies, legal procedures for plan preparation, and standard ethical code of conduct for professional planning practices.

2.2.4. Course content

- Introduction: Basic concepts of planning as a subject of study and professional activity; necessity and scopes of planning; overview of the history, nature, functions, and techniques of urban, rural, and regional planning.
- Aspects of planning: Various aspects of planning; the relationship between land use planning and overall development process; the role of physical planning for achieving desired objectives in development; the role of urban and regional planning and its relationship with general theory and process of planning; urban and regional planning at the local and strategic levels.
- Plan-making process: contemporary concepts, methods, and techniques in plan preparation, policy formulation, and implementation; plan-making process and decision theory; development control; plan implementation and

monitoring; interrelation between key urban and rural activities in the urban and rural planning process.

- Planning theories: Review theoretical frameworks for understanding urban, rural, and regional development processes; analyses of spatial, economic, and socio-political dimensions of urban, rural, and regional activities; relationships between capital accumulation and urban development; place marketing and rise of the creative cities.
- Planning practice: Understanding professional planning practice in Bangladesh and abroad, practical dimensions of planning in public and private sectors; Practical limitations in the application of planning theories; conflicts between theory and practice; typical practice dilemmas, their causes, consequences, and possible resolutions; gradual development of ideas and concepts towards a standard body of planning knowledge and doctrine.
- Laws and ethics: Review the history, policies, strategies, administrative and legal procedures of planning; the role of the state and public policy; standard ethical codes in professional practice.

2.2.5. Reading List

Chakrabarti, Dilip K. (1992). Ancient Bangladesh – A Study of the Archaeological Source.

Chapin, Stuart F., (1965). Urban Landuse Planning.

Davis, Kingsley. (1965). "The Urbanization of Human Population", America.

Gallion, Arthur and Eisner, Simon. (1986). The Urban Pattern. New York: Van Nostrand Reinhold.

International City Managers' Association: Principles and Practice of Urban Planning.

Mcgregor, Brian and McField, B.: Forecasting Techniques in Urban and Regional Planning.

Mumford, Lewis. (1961). The City in History: Its Origin, Its Transformation and Its Prospects. New York: Harcourt, Brace and World.

Ramachandran, R. (1989). Urbanization and Urban Systems in India. Calcutta: Oxford University Press.

Ratcliffe, John.: Introduction to Town and Country Planning.

Roberts, Margaret: Town Planning Techniques.

Whittick, Arnold. (ed.) (1973). Encyclopaedia of Urban Planning New York: McGraw-Hill Inc.

3. Foundation courses:

3.1. URP 6101: Urban Planning Techniques

3.1.1. Course summary

This course will cover the basic concepts and techniques of urban planning and design. It also deals with understanding the dynamic urban processes and developing effective interventions. The course introduces the students to various techniques for land development, conservation plan, planning standards for different urban functions, and their importance which can contribute to the development of competitive, compact and sustainable cities. Overall, the course provides an overview of the relationship between the various urban and regional planning techniques. This course is important for the students to understand the facts and implement the planning concepts practically.

3.1.2. Objectives

- The student will understand the basic concepts of the land use plan-making process and land development.
- The student will recognize and summarize the special area planning elements, criteria, and their difference.
- The student will comprehend the models of urban structures and their implementation.
- The student will learn how to develop strategies of sustainable city planning to ensure livable and self-sustaining communities.

3.1.3. Learning outcomes

- The student will be able to explain the fundamental concepts of different land use plan-making processes while maintaining planning standards such as FAR, Zoning, Density estimation for a different types of land uses.
- The student will be able to describe the concept of development plans and techniques such as Urban Renewal, Land Readjustment, Land Banking.

- The student will be able to analyze the sustainable development plan and its importance for the future generation.

3.1.4. Course content

Fundamental concept on zoning and FAR: Techniques for regulating land use, calculate floor areas and building height; **Use zoning practice in Bangladesh**: Zoning ordinances enactment and amendment, meeting obligation of municipalities; Height zoning, Density zoning: Practice in worldwide; **Introductory concept on land use and land classification process**: Perspectives of land use analysis; Information required for land use planning and land classification plan: process of analysis, components of land classification plan, sequence of land use plan making process; **Land use classification system in Bangladesh**: procedure, hierarchy and categories; **Urban Renewal**: Basic concepts, methods, cause and consequent approaches; **Development of management plan**: identifying components, function and process; Structure plan, Local plan, Action plan, Subject plan, Master plan: Form, process, analysis, interpretation and preparing; **Urban growth, smart growth and urban sprawl**: Types, reasons, advantage and disadvantage **Smart City**: Concept, components, necessity, path to smart city; Models of urban structure: Concentric zone theory, sector theory, multiple nuclei theory, garden city, vertical city etc.; **Urban development**: Challenges, procedure to choose urban pattern, projection of urban land requirements, address informality, integrating informal settlements within city, urban development plan of CDA; Urban spatial structure: Preferences, promoting mix land use; **Residential Area Plan Making Process:** Functions, design concepts: neo-traditional concepts, Clarence Perry, Redburn. TOD concept, Suburban neighborhood model, locational requirement, suitability analysis, space requirements, holding capacity, local support facilities, synthesizing residential area design, **Commercial Area Plan Making Process**: Land use associated with commercial and employment center, commercial area plan making process, prerequisite for selecting site, computing future space; **Special area planning**: Industrial parks, Airport, Metro, Heritage site etc.: concept, conservation and preservation prerequisites, decision support tools, commonly experienced problems, political, institutional framework; **Land Development**: Concept, process, examples, pros and cons of site and services scheme, slum, squatter upgrading, incremental development, guided land development, land sharing, land readjustment, land banking, land ceiling, excess condemnation; Compact development: form, structure, relationships. **Sustainable city planning techniques**: UNDP goal, path to achieve goal, concept on resilience of cities, climate change adaptation for cities, planning techniques for combating extreme events.

3.1.5. Reading list

Cardon, Carol 1972, Planned cities, London: Sage Publication.

Catanese, J. Anthony and Synder C. Jans (1979), Introduction to Urban Planning, New York: Mc-Grew Hill.

Cherry and Gordon (1974), Urban Planning Problems. London: Leonard Hill.

Disner, Simon and Gallion, Aurthur B. 1986, The Urban Pattern: City Planning & Design Van Nostrand Reinhold.

GOB, 1977. Pourashava Ordinance 1977, Bangladesh Government Press, Dhaka.

Ramchandran, R. Urbanization and Urban systems in India, 1989, Delhi: Oxford University Press.

Task Forces on Bangladesh Development Strategies for the 1990's Report on Developing the Infrastructure (vol.3), University Press Limited, Dhaka.

3.2. URP 6102: Urban planning and development

3.2.1. Course summary

This course will cover the basic concept and techniques of urban planning and design. It also deals with understanding the dynamic urban processes and developing effective interventions. The course introduces the students to various techniques for land development, conservation plan, planning standards for different urban functions, and their importance which can contribute to the development of competitive, compact, and sustainable cities. Overall, the course provides an overview of the relationship between the various urban and regional planning techniques. This course is important for the

students to understand the facts and implement the planning concepts practically.

3.2.2. *Objectives*

- The student will understand the basic concepts of the land use plan-making process and land development.
- The student will recognize and summarize the special area planning elements, criteria, and their difference.
- The student will comprehend the models of urban structures and their implementation.
- The student will learn how to develop strategies of sustainable city planning to ensure livable and self-sustaining communities.

3.2.3. *Learning outcomes*

- The student will be able to explain the fundamental concepts of different land use plan-making processes with maintaining planning standards such as FAR, Zoning, Density estimation for a different types of land uses.
- The student will be able to describe the concept of development plans and techniques such as urban renewal, Land Readjustment, Land Banking.
- The student will be able to clarify the concept of a city as a living organism and at what stage urban renewal is to come in.
- The student will be able to analyze the sustainable development plan and its importance for the future generation.

3.2.4. *Course content*

Fundamental concept on zoning and FAR: Techniques for regulating land use, calculate floor areas and building height; **Use zoning practice in Bangladesh**: Zoning ordinances enactment and amendment, meeting obligation of municipalities; Height zoning, Density zoning: Practice in worldwide; **Introductory concept on land use and land classification process**: Perspectives of land use analysis; Information required for land use planning and land classification plan: process of analysis, components of land classification plan, sequence of land use plan-making process; **Land use classification system in Bangladesh**: procedure, hierarchy and categories; **Urban Renewal**: Basic concepts, methods, cause and consequent approaches; **Development of management plan**: identifying components, function and process; Structure plan, Local plan, Action plan, Subject plan, Master plan: Form, process, analysis, interpretation and preparing; **Urban growth, smart growth and urban sprawl**: Types, reasons, advantage and disadvantage **Smart City**: Concept, components, necessity, the path to the smart city; Models of urban structure: Concentric zone theory, sector theory, multiple nuclei theory, garden city, vertical city, etc.; **Urban development**: Challenges, the procedure to choose an urban pattern, projection of urban land requirements, address informality, integrating informal settlements within the city, the urban development plan of CDA; Urban spatial structure: Preferences, promoting mix land use; **Residential Area Plan Making Process:** Functions, design concepts: neo-traditional concepts, Clarence Perry, Radburn. TOD concept, Suburban neighborhood model, locational requirement, suitability analysis, space requirements, holding capacity, local support facilities, synthesizing residential area design, **Commercial Area Plan Making Process**: Land use associated with commercial and employment center, commercial area plan-making process, the prerequisite for selecting a site, computing future space; **Special area planning**: Industrial parks, Airport, Metro, Heritage site, etc.: concept, conservation and preservation prerequisites, decision support tools, commonly experienced problems, political, institutional framework; **Land Development**: Concept, process, examples, pros, and cons of site and services scheme, slum, squatter upgrading, incremental development, guided land development, land sharing, land readjustment, land banking, land ceiling, excess condemnation; Compact development: form, structure, relationships. **Sustainable city planning techniques**: UNDP goal, the path to achieve a goal, concept on the resilience of cities, climate change adaptation for cities, planning techniques for combating extreme events.

3.2.5. *Reading list*

Cardon, Carol 1972, Planned cities, London: Sage Publication.

Catanese, J. Anthony and Synder C. Jans (1979), Introduction to Urban Planning, New York: Mc-Grew Hill.

Cherry and Gordon (1974), Urban Planning Problems. London: Leonard Hill.

Disner, Simon and Gallion, Aurthur B. 1986, The Urban Pattern: City Planning & Design Van Nostrand Reinhold.

GOB, 1977. Pourashava Ordinance 1977, Bangladesh Government Press, Dhaka.

Ramchandran, R. Urbanization and Urban systems in India, 1989, Delhi: Oxford University Press.

Task Forces on Bangladesh Development Strategies for the 1990's Report on Developing the Infrastructure (vol.3), University Press Limited, Dhaka.

3.3. URP 6103: Regional planning and development

3.3.1. *Course summary*

This course examines regional planning in advanced economies and the relationship between regional planning and more conventional planning. The course considers the origin and development of regional planning as a discipline, as well as its contemporary applications. Regional planning has a long history within advanced economies and over recent decades has been advanced as a key strategy for ensuring the economic competitiveness of major urban centers. The need for regional planning has also been boosted by the increasing connectedness of regions, both locally and across territorial borders. Finally, this course draws upon examples from Bangladesh and other nations and considers in some detail the interaction between economic development processes and regional planning.

3.3.2. *Objectives*

- The student will understand the fundamental concepts of region and regional planning.
- The student will learn how to analyze regions in the short run and long run with several techniques.
- The student will learn the process and techniques associated with preparing a regional plan.

3.3.3. *Learning outcomes*

- The student will be able to learn the basic concepts of regional planning and macro-level planning from a regional perspective.
- The student will be able to provide sufficient depth into regional analysis and practice necessary for a meaningful understanding of the subject area.
- The student will be able to interpret the associated techniques for preparing a regional plan.

3.3.4. *Course content*

Definition and types of regions; Need, principles and scope of regional planning. Levels of planning- National, Regional, Sub-regional and Local. Regionalization and the delineation of planning regions. Regional analysis: Regional data base, income measures and regional social accounting, input-output analysis, industrial structure analysis, Inter regional trade multiplier analysis. Theories and models of regional growth: Economic Base Theory, Aggregate Growth Models. Industrial Location Theory, Central Place Theory, Growth Pole Theory, Regional development policies at home and abroad. Policy Issues: Place prosperity Vs people prosperity; Economic development Vs regional growth. Regional distribution of public investment: Dispersal Vs Concentration; Balance Vs imbalance; Growth Vs Welfare; Efficiency Vs equity. Policy Instruments.

3.3.5. *Reading list*

Chuadhuri, J. R. (2001), An introduction to development and regional Planning, Orient Longman Ltd., Kolkata.

Glasson, J. (1975), An Introduction to regional Planning, Hutchinson & Co (Publishers) Ltd., London.

Lind, D. A., Marchal, W. G., & Wathen, S. A. (2012). Statistical techniques in business & economics (15th ed.), New York, USA: McGraw-Hill/Irwin.

Mohapatra, A. C. and Routry, J. K (1998) Regional and Development Planning, Rawat Publications, Delhi.

3.4. URP 6104: Environmental planning and management

3.4.1. Course summary

The course explicitly aims to make students aware of the need for, and understand the complexities of environmental management. It offers the theory and methods required to support decision making and strategic development in complex environments, helping solve various environmental issues based on a sound understanding of environmental science. The course bridges the gap between environmental sustainability and sound socio-economic growth. It provides knowledge on the role of different pollutants in environmental degradation; environmental hazards and site vulnerability assessment; investigation of the environmental impact of development decisions; computer-aided environmental management techniques; and management practices in Bangladesh and globally.

3.4.2. Objectives

- To enable students to take their place in society with a good understanding of some of the world's major contemporary environmental problems, and how such problems are being (or perhaps should be) dealt with by governments and other public bodies.
- Enabling students to integrate social and natural science approaches of environmental problem solving, and in the acquisition of field, laboratory, and computing (GIS) skills.
- Equip students with skills to analyze air and water pollution analysis as an input to environmental impact assessments for development-oriented but environmentally critical projects.
- Support the implementation, monitoring and evaluation of water policies, plans, programs, and projects.
- Equip students with an understanding of the institutional, legal, and decision-making processes involved in environmental planning and management.

3.4.3. Learning Outcomes

- The course will enable students to understand the fundamental concept of natural environmental systems, identify environmental issues and associated causes and effects
- The course will enable students to incorporate social and natural science approaches in environmental problem solving, and develop skills in assessing environmental quality, their measuring methods, standards, and applications.
- Students will be able to analyze air and water pollution analysis as an input to environmental impact assessments for development-oriented but environmentally critical projects.
- The course will help students develop skills in preparing Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) reports.
- The course will help students acquire knowledge on the institutional, legal, and decision-making processes involved in environmental planning and management in Bangladesh and globally.

3.4.4. Course content

Basic concepts related to environmental planning and management: Environment, resource, renewable and non-renewable resources, carrying capacity, externalities, ecological footprint, common-pool resources, understanding the commons, Tragedy of the commons, Prisoner's dilemma, free riding, **The environmental problems and causes:** Air quality (physical, chemical) and pollution, water quality (physical, biological, chemical) and pollution; impacts. **The environmental planning procedures**: Defining planning area; inventory of environmental resources; environmental impact assessment (EIA) - impact identification, impact measurement and impact evaluation. Mitigation of environmental impacts: impact prevention measures; impact management measures. Case studies in environmental management. **Concept of Strategic Environment Assessment (SEA):** Concept and relationship with EIA; Process of SEA and examples of SEA from different countries.

Basic concepts of Natural Resource Management: Conceptual issues of institutions. Fundamentals of Community Based Natural Resource Management, Community based natural resource management and rural livelihoods and Lessons learnt from different developing countries. **Concept of Ecosystem Services:**

Conceptual issues of ecosystem services and their Implications for ecosystem services to global change, Ecosystem services in urban planning, Ecosystem-based adaptation in urban areas. **Conservation of Biodiversity:** Biodiversity- from concepts to crises, The Economic case for valuing biodiversity, evolving concepts for biodiversity conservation, the legislative framework, Protected areas and conservation areas. **Integrated Water Resource Management in Practice:** A watershed in watershed management; Role of public institutions in wetland management and community-based resource planning in wetland management.

3.4.5. Reading list

Bridgeman, H. (1992). *Global Air Pollution*, CBS Publishers, New Delhi, India.

Caldwell, L. K. (1992), *International Environmental policy, Emergence and Dimensions.* Duke Press Policy Studies

Katyal, T., Satake, M., and Kumar, R. (eds). (1996), *Environmental Pollution*, Anmol Publishers.

Mohan, I., (1989), *Environmental Pollution and Management*, Ashish Publishing House, New Delhi.

Rahman, A. A., Huq, S., & Conway, G. R. (1990). *Environmental aspects of surface water systems of Bangladesh: an introduction*. University Press Ltd. Dhaka, Bangladesh.

Trivedi, P. R. (Ed.). (1992). *Environmental Problems: Impact Assessment*. Akashdeep Pub., House.

3.5. URP 6105: Rural Planning Techniques

3.5.1. Course summary

This course will cover the basic concepts and theories of rural planning and development from a national and international perspective. It will also discuss the history and government strategy for rural development of Bangladesh along with its impacts on the national economy. This course is essential because it will help the student understand the significance of rural planning and its sustainability for the future generation. Students will need to work on contemporary rural planning strategies under different topics. In addition, they will be able to understand the application of theory and methods to rural development issues and problems that require detailed analysis to improve rural infrastructure and the living environment.

3.5.2. Objectives

- The student will understand the theoretical background related to rural planning and development.
- The student will learn how to apply different concepts of rural planning in the case of rural development.
- The student will learn how to implement the development strategies in rural areas.

3.5.3. Learning outcomes

- The student will be able to understand the basic concept of rural planning and its linkage with urban planning
- The student will be able to demonstrate the theoretical aspects of rural development
- The student will be able to examine the theories of development and apply the theories to analyze rural development challenges in developing countries.
- The student will be able to select the issues in rural planning in Bangladesh.
- The student will be able to identify the spatial dimension of development

3.5.4. Course content

Introduction to Rural Planning: Defining Rural Planning, Rural, Rural Development, Rural Development; Characteristics of rural people, Basic goal of rural development, why rural planning, Macro or general planning. **Major Approaches during Pakistan and Bangladesh:** Village Aid Programme, Comilla Model, Integrated Rural Development Programme, Swanirvar (Self-reliance) Bangladesh and Ideal Village Project and Present Government and Non-Government Organisations' Approaches of Rural Development. **Rural Growth Centre Planning:** Rural planning norms and standards, Concept of rural growth centre, Systems of rural centres, Thresholds, Development process of rural growth centre, Hierarchy of rural growth centre, Role and influence of rural growth centre. **Institutions for Rural Development:** Meaning of rural development, Evolution of Rural Development policy in Bangladesh, Current administrative

patterns and rural development bodies, Allocation of resources of rural local govt., Institutional issues that affect UP governance, Government agencies in rural development, NGO intervention and rural development, Weakness of government in rural development, Planning control cycle. **Introduction to rural economy:** Activities, size, characteristics, constraints, challenges etc. **Determinants of rural development:** Types of determinants, role of determinants for rural development. **Measures of development:** Need for quantitative measures of development, types of different quantitative measures-concepts, advantages and limitations, physical quality life index, human development index. **Measures of poverty:** Concept, Calculation, Procedure, Advantage and limitations of Head Count Index (HCI), Poverty Gap Index (PGI) and Housing Index, Calculation of Head Count Index (HCI), Poverty Gap Index (PGI) etc. **Planning for Rural Development:** Basic steps in rural planning, Functions of planning at different levels (Micro, Meso and Macro), Integration of planning among different levels. **Sustainable rural development:** Key elements of sustainability, indicators of non-sustainable development, Element of new strategy for sustainable development etc.

3.5.5. Reading list

Abdullah Dr.Mohammad Mohiuddin (1979) Rural development in BD, Jahom Publication. Dhaka

Jahangir Alam(2008) Studies on Agriculture and rural development, Palok Publishers, Dhaka

Misra and Achyntha, Micro level rural planning.

Oueleks Md. Abul (1996) Rural development in Bangladesh, Bangladesh Academy for rural development Comilla

Tofail Ahmed, Decentralization and peoples participation in Bangladesh

3.6. URP 6106: Hilly region and coastal area planning

3.6.1. Course summary

The earth happens to have simultaneously the global composite and segmented geography. The composite geography of the earth reflects the wholeness of the features of the elements composing the physical and cultural landscapes. Each region inherits and develops distinct geography of its own. Due to the geographical and physiological contexts, hilly regions and coastal areas are at risk of multiple types of hazards.

Hilly regions are the most difficult yet most exciting and challenging features to carry out any development work. Physical development in hilly regions is constrained by their difficult terrain, steep gradients, complex geological structure, climatic conditions, and rich flora. However, the hills, valleys, and canyons that define much of the terrain are considered by many to be a vital ingredient in the quality of life. Natural hillsides are perceived to be far prettier than those that are graded. Therefore, virtually every proposal for the development of steep terrain is greeted by a major public uproar. To plan and manage such special areas, a discourse on the distinct geography, ecosystems, multiple hazards, physiology, as well as economic and socio-cultural elements of these areas is essential.

On the other hand, over half of the world's population resides in growing coastal areas. These areas are major economic engines, supporting port and shipping, tourism, fisheries, aquaculture, and oil and gas mining activities. The coastal zone — comprised of nearshore waters and lands — represents some of the most fragile habitats on the planet. Balancing economic activities with sensitive habitats and high population density is a major challenge that resource managers face in the 21st Century. Similarly, adaptation to climate change, sea-level rise, coastal erosion, and hurricanes pose additional challenges for coastal managers.

If the hilly regions and coastal ecosystems are managed through the guiding principles of sustainability, the livelihoods of millions will be protected and their survival guaranteed. The "Hilly Region and Coastal Area Planning" course aims to create knowledge to balance between development needs and protection of natural resources in hilly regions and coastal zones, focusing particularly on Bangladesh.

Objectives

The course aims to provide general knowledge about hilly region planning and development: vulnerability, design

considerations and rules, regulation, and management organizations. The objectives of this course are to:

- Develop knowledge about the physiography of hilly regions of Bangladesh focusing on the flora, fauna, and geological scenario.
- Develop knowledge on hilly area land use and vulnerability focusing on the causes of landslide/erosion and its effect on nature and human life.
- Develop knowledge on types and patterns of hilly settlement, and associated problems and prospects on amenities, utility services, and facilities.
- Develop design skills of specific elements of hilly planning such as road alignment, surface drainage, slope design, plantation strategies, waste management system, and biodiversity.
- Develop knowledge on legal framework regarding hilly cutting issues and hilly area development guidelines.
- Develop an understanding of the responsibility of management organizations regarding hilly area management.

3.6.2. *Learning outcomes*

- The course will improve understanding of the context of hilly and coastal areas, the pattern of land use, and risk.
- The course will enable students to identify the existing planning issues in hilly areas, as well as elicit planning prospects.
- Students will be able to apply technical skills for planning a hilly area settlement and managing coastal regions.
- The course will improve students' ability to review critically rules, regulations, and evaluate the legal procedure for managing coastal and hilly regions.
- Students will be able to participate in the planning decision-making process for developing hilly and coastal areas.

3.6.3. *Course content*

Hilly Zones of Bangladesh: Definition, Historical perspective of Hilly zones of Bangladesh; Current Physical scenario of Hilly Zones of Bangladesh: Flora (Type/Location), Fauna (Type/Location), and geological (Soil and minerals – Types and Location). **Human Settlements and Infrastructure scenario of Hilly zone**: silting, logging of drainage system; slums settlement in the hills; communication (road, water network, Telephone network) health/education, **Hilly zone Planning and Management Organization:** Objectives, Structure, Functions, working process, accomplishment, and constraints, emerging issues of Hilly zones of Bangladesh: Characteristics and impact of Hilly area's community clash. **Coastal Zone Planning:** Definitions/concepts of the coastal zone, characteristics of the coastal zone (location, climate, geomorphology, hydro-morphology, ecology, vulnerability, natural disasters, people and livelihood, infrastructure, resources, etc.). **Issues addressed by CZ Planning and Management:** Principles/approaches, resource use conflict, population growth and poverty, illegal activities, climate change, pollution, biodiversity conservation, policy, and institutional gaps and conflicts. **Planning tools of Coastal Zone Management:** Tools and techniques of coastal zone management, Existing planning initiatives.

3.6.4. *Reading list*

Beatley, T., Brower, D., & Schwab, A. K. (2002). *An introduction to coastal zone management*. Island Press.

Brahtz, J. F. P. (1972). *Coastal Zone Management*. UN Department of International Economic & Social Affairs, New York.

Cairns, J. (1994). *Implementing Integrated Environmental Management.* Virginia Tech. University.

Clark, J. R. (1992). *Integrated Management of Coastal Zones*. FAO Fisheries Tech. Paper No. 327, Rome.

Clark, J. R. (1997). Coastal zone management for the new century. *Ocean & Coastal Management*, *37*(2), 191-216.

Dahal, R. K., & Pathak, D. (2011). SAARC Training Program on Landslide Risk Management in South Asia. *Kathmandu, Nepal SAARC Disaster Management Center*.

Hodder, R. (2005). *Development geography*. Routledge.

Kumar, A. (2013). Building regulations for environmental protection in Indian hill towns. *International Journal of Sustainable Built Environment*, *2*(2), 224-231.

Kumar, A. (2013). Building regulations for environmental protection in Indian hill towns. *International Journal of Sustainable Built Environment*, *2*(2), 224-231.
Kumar, A. (2015). Approach to formulate setback regulations for Indian hill towns. *International Journal of Sustainable Built Environment*, *4*(1), 91-99.
Kumar, A. (2016). Impact of building regulations on Indian hill towns. *Hbrc Journal*, *12*(3), 316-326.
Kumar, A. (2018). Review of building regulations for safety against hazards in Indian hill towns. *Journal of Urban Management*, *7*(2), 97-110.
Lee, E. M., & Jones, D. K. (2004). *Landslide risk assessment* (Vol. 10). London: Thomas Telford.
Post, J. C., & Lundin, C. G. (1996). Guidelines for integrated coastal zone management.
Singh, R. Y. (2002). *Geography of settlements*. Rawat publication

3.7. URP 6107: GIS applications in urban and regional planning

3.7.1. Course summary

This course will cover the basic concept of Geographic Information System (GIS), its data model and geographic transformation, spatial data input, editing and management, raster and vector data analysis, terrain, viewsheds, and watersheds analysis, spatial interpolation, geocoding, and dynamic segmentation, path, and network analysis and GIS model and modeling. This course is important for the students to apply GIS knowledge as a tool for solving contemporary planning problems. Students will need to work on different contemporary planning problems/ issues under different sessional courses where they will need to design, prepare maps, analyze and visualize spatial data. GIS knowledge will be an essential tool for these sorts of works. So, this course is a major course for this curriculum.

3.7.2. Objectives

- The student will understand the theoretical background of Geographical information systems (GIS), GIS data structure, and its transformation.
- The student will learn how to apply GIS knowledge such as different spatial methods and techniques for solving spatial problems.

3.7.3. Learning outcomes

- The student will be able to explain the theoretical knowledge of Geographic information systems, GIS data structure, a different method of data analysis, and GIS model.
- The student will be able to describe and apply different spatial statistical methods for solving spatial problems.
- The student will be able to apply the GIS knowledge in terrain, viewshed, watershed, geocoding, and networking analysis.

3.7.4. Course content

Introduction to Geographic Information System: Definition, Application, component of GIS, Brief History, Geospatial data, GIS operation, GIS data sources and applications in Bangladesh**. Geo-relational vector data model:** Geo-relational data model, representation of simple features, topology and non-topology vector data, data model for composite features and its application. **Object based vector data model:** Object based data model and geo database data model, interface, topology rules in geo database data model **Raster data model:** Elements, types and structure of raster data model, data comparison and conversion, integration of raster and vector data. **Data input:** Sources of existing GIS data, metadata, conversion of existing data and creating new data **Geometric transformation:** Concept of geometric transformation and its methods, root mean square error, interpretation of RMS errors on digitized map, resampling of pixel values **Spatial data editing:** Locational errors, spatial data accuracy standards, topological errors, topological and non-topological editing and other editing operation **Attribute data input and management:** Types of attribute data, database management, relational model, attribute data entry and manipulation of the field **Data display and cartography:** Cartographic symbolization, types of map, map design and production **Data exploration:** Data exploration, attribute data query, spatial data query, raster data query and map based data

manipulation **Raster data analysis:** Data analysis environment, local operations, zonal operation, neighborhood operation, physical distance measurement operations and other raster data operation, comparison of vector and raster base data analysis
Projection and Coordinate System: Geographic Coordinate system, Map projection, Projected Coordinate system, working with coordinate system in GIS, Coordinate system in Arc GIS **Vector Data Analysis:** Buffering , Overlay, Distance Measurement, Pattern Analysis, Application of Pattern Analysis, Map Manipulation **Terrain Mapping and Analysis:** data for Terrain Mapping and analysis, DEM, TIN, Terrain Mapping, Slop and Aspect, Surface Curvature, Raster Versus TIN) **Viewsheds and watersheds:** (viewshade analysis, Parameters , Application, Water shade analysis, factor influencing watershade analysis, Applications of watershade analysis, Exercise **Spatial Interpolation:** Elements of spatial interpolation, Global Methods- Trend surface method, regression method, Local Methods- Thiessen polygons, Density estimation, inverse distance weighted interpolation(IDW),Thin plate splines Kriging- Semivariogram, Models, Ordinary Kriging, Universal Kriging, other Kriging methods, Comparison of spatial interpolation methods **Geocoding and Dynamic segmentation:** Concept and its application **Path and network analysis:** Concept and its application **GIS Model and Modeling:** Basic elements of GIS Modeling, concept of different model (Binary Model, Index Models, Regression Models, Process Models).

3.7.5. Reading list

Chang, K.-T. (2004). Introduction to geographic information systems. Boston: McGraw-Hill Higher Education.
Heywood, D. I., Cornelius, S., & Carver, S. (1998). An introduction to geographical information systems. New York: Addison Wesley Longman.

3.8. URP 6108: Statistics for planners

3.8.1. Course summary

This course provides postgraduate students an introduction to the basic statistical tools, means to carry out statistical analyses, and evaluate them. Students will learn the statistical techniques that are used by practicing planners throughout the profession.

3.8.2. Objectives

- The student will understand the meaning of statistics, data, variables, and information.
- The student will learn how to calculate and interpret measures of central tendency and dispersion, including mean, median, standard deviation, quartiles, sample, and random variables
- The student will learn how to explain the relevance of statistics in different kinds of planning activities.

3.8.3. Learning outcomes

- The student will be able to organize and present statistical data effectively and accurately
- The student will be able to summarize and analyze statistical data to solve practical problems.
- The student will be able to interpret the relevance of statistical findings for problem-solving and decision-making.

3.8.4. Course content

- Summarizing Data: Frequency distribution and graphical presentations, statistical descriptions - samples and populations.
- Measures of central tendency- mean, median, mode. Measures of dispersion - range, mean deviation, variance, and standard deviation, moments, skewness, and kurtosis.
- Basic probability distributions: discrete and continuous probability distributions- Binomial, Poisson, and Normal distributions.
- Sampling and sampling distributions.
- Decision analysis: statistical inference – estimation, point, and interval estimation. Aggregation and index numbers: construction of scale, index of prioritization, index of satisfaction or dissatisfaction, index of agreement or disagreement, index of performance, etc.

3.8.5. *Reading list*

Gupta, S. P. and Gupta, M. P. (2006) Business Statistics, New Delhi: Sultan Chand & Sons

Levin R. I., and Rubin D. S. (1998). Statistics for Management (Seventh Edition) Prentice Hall of India, New Delhi.

Lind, D. A., Marchal, W. G., & Wathen, S. A. (2012). Statistical techniques in business & economics (15th ed.), New York, USA: McGraw-Hill/Irwin.

Mian, Md. and Miyan, M. Alimullah (1984): An Introduction to Statistic: Ideal Library.

3.9. URP 6109: Disaster management

3.9.1. *Course summary*

Natural and technological hazards affect everyday life as well as long-term development plans. For many decades the prevailing approach in dealing with disasters was focused on response and recovery, however lately pre-disaster actions to minimize the disaster risks are encouraged. Due to the deltaic geographical setting and high population density, Bangladesh is well-known as being vulnerable to various natural hazards. The frequency and intensity of extreme events are like to increase in the face of climate change. To ensure an effective and coordinated response to various natural hazards, extensive knowledge of disaster risk management is of the greatest importance.

The course introduces disaster management, focusing on the natural hazard. The problem is addressed in a holistic cross-sectoral and cross-disciplinary manner, including all stages of the disaster management cycle: mitigation, preparation, response, and recovery. Starting with theory, main definitions, and concepts, the course considers other aspects of the disaster management cycle, such as International Agreements, impact of climate change and urbanization on severity and extent of disasters, case studies of disaster management on national and local levels, some disaster risk reduction (DRR) technologies. Special attention will be paid to information and communication technologies aimed at collecting, processing, and analyzing spatial data for better decision-making in disaster risk management.

3.9.2. *Objectives*

The course aims to improve students' critical understanding of the following.

- Key issues and debates related to the theory and application of disaster risk reduction. Students will demonstrate familiarity with different theoretical approaches, practical problems, and the diversity of policies at international and national levels, including the Sendai Framework for Disaster Risk Reduction and the Sustainable Development Goals.
- The range of environmental, health, and social science topics which influence disaster risk reduction and management (including geographical, political, historical, anthropological understandings). Students will be familiar with the methodological and normative underpinnings of these disciplines.
- An understanding of common approaches to disaster risk reduction, including an awareness of the problems and critiques associated with disaster prevention, mitigation, preparedness, response, and recovery in both developed and developing countries.
- The analytical and policy literature concerning the related issues of disaster risk reduction includes environmental/geological studies, emergency management structures and institutions, the role and perspectives of the state, multilateral and bilateral agencies, international and domestic NGOs, and other civil institutions.

3.9.3. *Learning outcomes*

- The course will enable students to understand the foundations of hazards, disasters, and associated natural/social phenomena. Familiarity with disaster management theory (cycle, phases).
- The course will help students acquire knowledge about existing global frameworks and existing agreements (e.g., Sendai, SDG)
- Students will develop skills in methods of community involvement as an essential part of successful DRR.
- The course will improve understanding of Humanitarian Assistance before and after a disaster.
- Students will improve skills in technological innovations in Disaster Risk Reduction: Advantages and problems.

3.9.4. *Course content*

Basic concepts: Hazard, Vulnerability, Risk, Disaster; Classification of Hazards, Basic characteristics of common disasters, Natural Disasters versus Man-made Disasters, Impact of disaster on national development. **Types and nature of hazard and disaster:** Flood, cyclone, earthquake, landslide, drought, riverbank erosion (types, impacts and mitigation measures). **Assessment of Hazard, vulnerability, and risk of different hazard:** Flood, earthquake, cyclone, drought, riverbank erosion, salinity etc. **Disaster Management Cycle and model:** Concept of Disaster Management, Disaster Management Cycle, Prevention, Mitigation, Preparedness, Response, and Recovery and Rehabilitation, Disaster resilience. **Disaster Risk Management (DRM) and Disaster Risk Reduction (DRR):** Conceptual issues of DRR, Approaches and methods of DRR, DRR strategies in different developing countries, National and International drivers for Disaster Risk Reduction and Management and Mainstreaming disaster risk reduction. **CBDRM/CBDM:** Conceptual issues of CBDRM, Approaches and methods of CBDRM/CBDM, Case studies on CBDRM and Process of developing CBDRM. **Integrated Development and Disaster Risk Reduction:** Conceptual issues, importance of integration, approaches and methods and process of integration.

Climate Change: Basic concepts related to climate change, climate variability and climate extremes, causes of climate change, Climate change models, and Climate change and climate variability in context of Bangladesh, example of climate change adaptation and mitigation; **IPCC/ Climatic Governance/ Green Development Fund Disaster Management Act and Rules/Framework (Global/ Bangladesh perspective):** Global framework (Hyogo framework for action; Sendai framework etc.),National disaster management Act, National Disaster Management Policy, Standing Orders on Disaster (SOD).**Links between development planning and disaster management planning:** Counter disaster plans, general considerations, format of a plan, aspects for consideration, National Plan for Disaster management in Bangladesh, Contingency plans **Institutional Framework for Disaster Management in Bangladesh:** National frame work for disaster management, Disaster management institutions; roles and responsibilities of different stakeholders in disaster management.

3.9.5. *Reading list*

ADB (1992). *Disaster Mitigation in Asia and the Pacific*. Manila, ADB.

ADPC (2006). *Disaster Risk Management Primer for Asia and the Pacific*. Bangkok, Asian Disaster Preparedness Center (ADPC).

Auf der Heide, E. (1990). *Disaster Response: Principles of Preparation and Co-ordination.* St. Louis, CV Mosby.

Collins, A. E. (2009). *Disaster and development*. Routledge.

Dixit, A. M. (2003). Community Based Initiatives in Earthquake Risk Management Process in Nepal. *National Society for Earthquake Technology-Nepal (NSET)*.

Hall, G. and Snedden, R. (1996). *Natural Disasters: Factfinders*. Bristol, Parragon.

Hossain, H., Dodge, C. P., & Abed, F. H. (Eds.). (1992). *From crisis to development: coping with disasters in Bangladesh*. University Press.

Maskrey, A. (1989). *Disaster mitigation: a community based approach*. Oxfam International.

Palm, R. (1990). *Natural hazards: An integrative framework for research and planning*. Maryland John Hopkins University Press.

Pelling, M. (2003). Disaster risk and development planning: the case for integration. *International Development Planning Review*, *25*(4), 1.

Pelling, M., Maskrey, A., Ruiz, P., Hall, P., Peduzzi, P., Dao, Q., Mouton, F., Herold, C., and Kluser, S. (2004). *Reducing disaster risk: a challenge for development.*

Schreider, T. (1998). *Encyclopedia of Disaster Recovery, Security and Risk Management.* New York, Crucible. Shah,

Theis, J., & Grady, H. M. (1991). *Participatory rapid appraisal for community development: a training manual based on experiences in the Middle East and North Africa*. London: International Institute for Environment and Development.

UNDRO (1991). *Mitigating Natural Disasters – Phenomenon, Effects and Options*

Wilderspin, I., Expert, D. R. R., Barham, J., & Expert, H. (2008). Evaluation of disaster risk reduction mainstreaming in DG ECHO's humanitarian actions. *Aguaconsult, Wivenhoe*.
Wisner, B., Blaikie, P., Cannon, T., & Davis, I. (2014). *At risk: natural hazards, people's vulnerability and disasters*. Routledge.
Withers, J. (1988). *Major industrial hazards: their appraisal and control*. Gower Technical Press.

3.10. URP 6110: Tourism planning and management

3.10.1. Course summary

This course will cover the basic concept of tourism planning and management from a national and international perspective. It will also discuss the impacts of tourism and the exploitation of natural resources in specific environmentally critical regions in Bangladesh. This course is essential because it will help the student understand the significance of tourism, the economic valuation of tourism sites, and its sustainability for the future generation. Students will need to work on contemporary environmental and natural resource-related issues under different topics. In addition, they will be able to understand the application of economic theory and methods to environmental issues and problems that require detailed analysis to improve management strategies.

3.10.2. Objectives

- The student will understand the theoretical background related to environmental and natural resource economics
- The student will learn how to apply different concepts of economics in the case of natural resource conservation and preservation.
- The student will learn how to implement the knowledge in environmental planning & management.

3.10.3. Learning outcomes

- The student will be able to explain the theoretical aspects of tourism such as the definition of tourism, leisure, tourist, visitor, excursionist, etc.
- The student will be capable to interpret different theories, methods, and models to forecast tourism demand and supply.

- The student will be able to compare and contrast different effects of tourism activity.
- The student will be able to understand different policies to make sustainable tourism.

3.10.4. Course content

Basic concepts of leisure, tourism, and recreation; introduction of the economics of tourism; the importance of the economics of tourism for the economic development of Bangladesh; classification of recreation, leisure, and tourism organizations; **tourism demand and supply management**; issues related to tourism demand and supply management; tourism market structure and pricing strategies; **models** to promote tourism industries of Bangladesh at local, national, and international level.
Tourism planning and management: concepts, issues, and players; **impacts of tourism**: economic impacts, socio-cultural impacts, and environmental impacts of tourism; **theories within the context of tourism planning and management**; **major players in tourism planning and management:** visitors, hosts, communities, tourism industry and government; the **role of partnership and collaboration** in tourism planning and management; **Sustainable tourism and ecotourism.**

3.10.5. Reading list

Mason, Peter (2003). Tourism impacts, planning & management, Oxford, UK: Butterworth-Heinemann

3.11. URP 6111: Transportation policy and planning

3.11.1. Course summary

This course will cover the basic concept of transportation systems and guidelines of advanced transportation policy. This course is important for the students to understand the steps in the transportation planning process and traffic safety. Students will need to work on various transportation planning problems/ issues to formulate a planning framework, collect data from the field level and analyze the data. In the end, students will prepare a formal report where the transportation planning relevant analysis result and policy findings are interpreted.

3.11.2. Objectives

- The student will understand the theoretical background related to transportation systems, different steps of the

planning process and key issues in urban-national transport policy, implementation of transport plans/programs.

- The student will learn how to collect transportation relevant data from field surveys, how to process and analyze the data considering different transportation and pedestrian safety issues.
- The student will learn how to ensure sustainable urban transport: idea and issues, transport and environment, congestion management and policy options for sustainable transport, social sustainability.

3.11.3. Learning outcomes

- The student will be able to explain different steps in the planning process and the existing transportation system in Bangladesh.
- The student will be able to illustrate key issues in urban and national transport policy, features and principles of major transportation planning, and implementation of transport plans/programs.
- The student will be able to review sustainable transport: idea and issues, transportation safety measurements, and applications of intelligent transport systems.

3.11.4. Course content

Transportation systems in Bangladesh: different sectors and agencies: role and functions, issues and problems, policy and strategy, travel pattern and characteristics, the role of PT and NMT, conflict of MT and NMT, cost structure. **Transportation planning process**: national, regional, and urban levels, local area transportation planning (LATP) system modeling and strategy development (Four stage models); **Fundamentals of transportation economics**: the value of travel time savings, economic evaluation of transport projects, planning of transport infrastructure. **Transport policy**: key issues in urban and national transport policy and implementation of transport plans/programs. Policy options in urban transportation, features and principles of major transportation planning (i.e. STP, DUTP) in Bangladesh; Policy in other sectors or countries, in the short-run and long-run; sustainable transport: idea and issues, transport and environment, congestion management, policy options for sustainable transport, social sustainability; **Mass transit**: MRT, BRT, attributes of a well-organized MTS, main features and policies of STP for Dhaka, BRT planning (success stories in Bogota and Curitiba), bus franchising, contracting, regulation. **NMT planning and management**: Role of NMT and IMT, the scenario in other (developed) cities, major issues-concerns, planning for walking and cycling (problems, how to promote, issues and problems, and designing, planning and developing network); **Traffic Safety (accident)**: accident cost, accidents as an epidemic, crash information and engineering treatments of haphazard locations, road accident data analysis, 'zero' vision, pedestrian-friendly city. **Pedestrian safety**: the road and its influence on the pedestrian accidents; Pedestrian crossing design, safe system countermeasures for pedestrian safety traffic and environment: detrimental effect of traffic on the environment, noise propagation and mitigation strategies, steps taken by the government to improve air quality in Bangladesh; **ITS (intelligent transport systems):** GIS, GPS, mobile positioning systems and SCAT systems application for data collection, route network planning, and traffic management. Other topics or issues: rural transport, water transport, rail, air transport.

3.11.5. Reading list

Banister, D., & Berechman, Y. (2001). Transport investment and the promotion of economic growth. *Journal of transport geography*, *9*(3), 209-218.

Beimborn, E., & Kennedy, R. (1996). Inside the Blackbox: Making transportation models work for livable communities.

Duranton, G., & Turner, M. A. (2011). The fundamental law of road congestion: Evidence from US cities. *American Economic Review*, *101*(6), 2616-52.

Ewing, R., & Cervero, R. (2010). Travel and the built environment: A meta-analysis. *Journal of the American planning association*, *76*(3), 265-294.

Ewing, R., & Dumbaugh, E. (2009). The built environment and traffic safety: a review of empirical evidence. *Journal of Planning Literature*, *23*(4), 347-367.

Kenworthy, J. R., & Laube, F. B. (1999). Patterns of automobile dependence in cities: an international overview of key physical and economic dimensions with

some implications for urban policy. *Transportation Research Part A: Policy and Practice*, *33*(7-8), 691-723.
King, D., Manville, M., & Shoup, D. (2007). The political calculus of congestion pricing. *Transport Policy*, *14*(2), 111-123.
Lynch, K. (1984). *Good city form*. MIT press.
Meyer, M. D., & Miller, E. J. (1984). Urban transportation planning: A decision-oriented approach.
Roess, R. P., Vandehey, M. A., & Kittelson, W. (2010). Level of service: 2010 and beyond. *Transportation research record*, *2173*(1), 20-27.
Taylor, B. D. (2004). The geography of urban transportation finance. *The geography of urban transportation*, *3*, 294-331.
Vuchic, V. R. (2017). *Transportation for livable cities*. Routledge.
Wachs, M. (2001). Forecasting versus envisioning: A new window on the future. *Journal of the American Planning Association*, *67*(4), 367-372.

3.12.URP 6112: Housing and Real Estate Development

3.12.1. Course summary

This course will cover the basic understanding of real estate and housing situation in Bangladesh. The course will also provide the explanation of the basic terms and concepts relevant to the course as well as the role of both public and private sector for the development of housing and real estate and relevant policies and their implications in the country.

3.12.2. Objectives

- The student will understand the the basic concept, first objective of this course is to develop a better understanding about the contemporary housing types, demand and supply of housing and real estate markets in Bangladesh.
- The student will learn how to decide regarding housing issue and real estate development projects of both micro and macro scale.

3.12.3. Learning outcomes

- To Understand the basic concept of housing and real estate
- To Explain the contemporary situation of housing and real estate in Bangladesh
- To Conceptualize the demand, supply and the factors affecting the demand and supply of housing and real estate in Bangladesh
- Computation of Real Estate rent, price and their growth at different periods
- Evaluation of different strategies and policies for the development of housing situation in Bangladesh

3.12.4. Course content

Introductory: Concepts, Definitions, Types / Classification, Components and Importance of housing. Design and Standard: Design of Residential Areas, Requirements of Residential Building, Unit Design, Infrastructure and Facilities, Form and Structure, Socio-Economic and Other Physical Parameters. Housing Production and Housing Finance: Producers; Production Requirements; Delivery Systems; Financing Systems; Roles of Private Sector, Civil Society, and Government. Housing Strategy Design Process: Analyzing Housing Stress, Analyzing Economics of Housing, Analyzing Housing Demand, Strategy Formulation Theoretical Assumptions of Housing Approaches: Modernization, Keynesian Housing Policy, Self-Help Housing Approach Housing and Livelihood: Impact of Housing in Urbanization Process and Livelihood Housing Delivery System: Different Type of Housing Delivery System, Components of Delivery System, Determinants of Housing Delivery System Land, Housing and Markets: Housing Demand and Supply, Ownership and Rental, Market Segmentation, Formal and Informal Markets, Purchase Cost Affordability, Infrastructure Provision and Affordability Housing for the Urban Poor: Designing and Financing Slum and Settlement Upgrading, Land Allocation, Sharing, Readjustment, Servicing and Banking Housing Policy and Programmes in Bangladesh: Review of National Housing Policy, Housing Finance,

Housing Situation in Bangladesh (challenges and organizational involvement).

Definition of real estate, real estate development principles. Real estate economics: characteristics of supply and demand. Real estate trade cycle (both long run and short term). Real estate instruments: contract, deed, lease, mortgage, broker and brokerage. Planning considerations for real estate development. Evaluation of real estate projects- cost estimation, feasibility, study, environmental impact statement, implementation, monitoring and management. Regulatory measures to guide and monitor housing development and the developers (REDMA, 2010) etc.

3.12.5. Reading list

- An introduction to Housing in Bangladesh, Dr. Mahmudul Hasan
- Real estate finance and investments Baeggeman, William B & Fisher, Jeffreg D.(1997), , Trwin mdrraw will, Boston
- Real Estate Development and Management Act, 2010, Government of the people's Republic of Bangladesh.
- Ministry of Housing and public works (1993), "National Housing Policy", Government of the people's Republic of Bangladesh.
- Planning commission (1998), "The Fifth Five Year Plan (1997-2002)", Ministry of Planning, Government of the Peoples Republic of Bangladesh.

4. Elective courses for all categories of students

4.1. URP 6201: Advanced GIS, Remote Sensing and Photogrammetry

4.1.1. Course summary

This course familiarizes students with advanced topics of spatial analysis, spatial database, accuracy assessment, spatial modeling, Spatial Decision Methods related to Geographic Information Systems, Remote Sensing, and Photogrammetry.

4.1.2. Objectives

This course aims to:

- Understand the basic concept and issues related to Geographic Information Systems, Remote Sensing, and Photogrammetry.
- Orient with the different types of geospatial geo-processing analytical tools and functions.
- Conceptualize the geospatial modeling techniques for spatial planning and implementation issues.
- Appreciate the importance of geospatial applications in urban and regional planning and related fields.
- Understand contemporary exemplary geospatial applications related to urban and regional planning and related fields.

4.1.3. Learning outcomes

At the end of the course the students will be able to:

- Appreciate an overall idea about the fundamental concept of Geographic Information Systems, Remote Sensing, and Photogrammetry.
- Apply geospatial geo-processing analytical tools and functions to solve spatial problems.
- Apply the knowledge and skill to solve the spatial problem through modeling techniques of the real-world situation related to planning and implementation issues.
- Understand contemporary geospatial innovations to solve spatial problems.
- Process and classify satellite imageries along with features extractions for spatial database building leading to solving the spatial problems.
- Model stereo image and extract features with 2D and 3D information.

4.1.4. Course content

- Review of GIS Basics: GIS fundamentals; nature and models of spatial data; quality of spatial data, error propagation in GIS; Coordinate systems, Map projection, and transformation. Rectification and Registration, Digitizing; data reduction and generalization, Topology creation and map correction,
- GIS Analysis Functions: Overlay techniques, interpolation, and aerial manipulation of spatial data linking topological database with attribute tables making the query with different items. Overlay techniques,

- GIS Modeling: Modeling of geographical data for supporting spatial planning decisions. GIS implementation issues.
- Case Studies: Case studies of GIS applications in urban planning, environmental and resource management, AM/FM, and disaster management.
- Remote Sensing: The Remote Sensing Analytical Process, Preprocessing of Remotely Sensed Data, Image Enhancement, and Interpretation, Feature Extraction from Remotely Sensed Imagery, Classification Accuracy Assessment & Evaluation, Remote Sensing Applications
- Photogrammetry Basic: Basics and principles of digital aerial photogrammetry, Modern aerial cameras and photography, platforms and options,
- Tools of Digital Photogrammetry: Image adjustment, image correlation, image operators, Relative orientation of the images, epipolar geometry,
- Aerotriangulation: Analogue, analytical and digital, method of independent models, bundle block adjustment, accuracy, practical examples, Photogrammetric mapping on the digital workstation - process, outcomes, accuracy,
- Orthophoto Systems: Orthophoto creation, orthophoto mosaics, and orthophoto maps, Airborne laser scanning, Unmanned Aerial Vehicles (UAV) Photogrammetry.

4.2. URP 6202: Governance

4.2.1. Course summary

The orthodoxy of neo-liberalism brought many fold changes in the traditional concept of government and gave rise to governance. While governance has relaxed the public authorities from many of the previous mundane tasks, it has brought new roles and responsibilities. The dynamic changes in technology, social structure, socio-economic development, and mass media have put the public administration under constant scrutiny. This course explores the new dynamic of public administration in the 21st century.

4.2.2. Objectives:

This course aims to:

- Understand the changing nature of Bangladesh and world politics and the new roles that the public sector, society, and business currently play in the realm of governance.
- Explore and identify the major forces that are redefining how we think about state-society-business relationships.
- Understand and analyze the changing patterns of governance in Bangladesh.

4.2.3. Learning Outcomes:

At the end of the course the students will be able to:

- Understand the shift from government to governance.
- Understand the role of CBOs, NGOs, Civil Society, and voluntary associations.
- Business hegemony and the new dynamics of public administration, urbanization, and infrastructure development.
- Explore the governance issues in Bangladesh and the rising complexities.
- The influence of emerging economies on the type of governance.

4.2.4. Course content

- Governance structure and Washington institutions: Concept of Governance (World Bank, UN, and EU definitions), changing concept of governance (Washington institutions), the historical platform for understanding the concept of governance.
- Public, private and NGOs/Civil society: Role back of state & rise of NGOs and civil society, good governance and the role of NGOs and civil society, the consequence of NGOs and Civil Society in the governance system.
- Business Hegemony and Neo-liberalism: Public administration and private interest nexus (corporations, EPZs), the role of the public administration in the crony capitalism, the power balance between the private sector, NGOs, and Civil Society, questions of resettlement, environmental disaster, and other issues during neoliberal age.
- Government and Governance in Bangladesh: Bangladesh's political history, Bangladesh's entry into the

neo-liberalism, NGOs and civil society in Bangladesh, success, and Failure of NGOs.

- Influence of the emerging economies: Rise of China and India as an economic power, East Asian Miracle, emerging donor funding strategy, security, and shifting global power.
- Nexus between development and democracy: The influence of the emerging donors on domestic democracy in Bangladesh, the tension between democracy and corporate freedom, the influence of and tension between India and China on Bangladesh, how does it shape South-Asian economy and geopolitics?
- Development projects and governance: Jamuna Bridge, Bashkhali coal extraction, Padma Multi-purpose bridge, Ruppur nuclear power plant, Rampal thermal power plant.
- Mass Media and the Shaping of Ruling Ideas: How does the media can intervene, interfere, or influence shaping democracy? ruling ideas and values (an ideology) in Bangladesh, corporate concentration in the media industry, and troubling civil society.
- Changing global power structure: Mega-infrastructure projects and emerging economies, extra-economic process, and foreign investment. democracy and emerging economies, the contest of geopolitical influence between West and South/East.
- Future governance issues and Bangladesh: Local, regional, and urban governance, NGOs, Civil Society, democracy and development in Bangladesh. Contemporary governance issues.

4.3. URP 6203: Advanced qualitative research methods

4.3.1. Course summary

Social scientists use ethnographic and qualitative methods to make sense of and analyze the social world. This course is designed to familiarize doctoral and advanced master's students with the epistemological and methodological foundations of qualitative research methods. We will examine the craft of qualitative research including participant observation, ethnographic field research, in-depth interviews, comparative case studies, and read exemplars of each method. Students will also evaluate the epistemological foundations of different approaches and consider both ethical concerns of research positionality and calls on qualitative researchers for greater data transparency and reproducibility. Since students have had some initial exposure to some or all these methods, this course will prepare students to use these methods in their own research and develop a facility by which to evaluate the qualitative work others have done. The goal is for students to become purposeful (and prolific) producers as well as a critical consumer of qualitative methods in their academic careers.

4.3.2. Objectives

This course will provide students with the knowledge, insights, and techniques relating to the more advanced aspects of qualitative research. This will include providing students with a comprehensive understanding of the theoretical perspectives within qualitative research designs, specific qualitative methodologies and analyses, advanced data collection methods, and complex issues in qualitative research (e.g., critical appraisal). Students will be taught the knowledge and skills needed to critically engage with complex concepts relevant to the more advanced aspects of qualitative research.

4.3.3. Learning outcomes

By the end of this course, students will be able to understand and deal with complex issues associated with qualitative research. They will demonstrate critical engagement with theoretical concepts, methodological approaches, and critical challenges in conducting and appraising qualitative research, and be able to apply this knowledge within their research or practice. They will be able to:

- Appraise a range of different methodological approaches in qualitative research to evaluate the quality and to aid in the design of a qualitative research study
- Discriminate between and compare a range of different methodological approaches to choose an approach most suited to a qualitative research question
- Understand the challenges and complexities associated with qualitative research and recognize their implications for conducting qualitative research
- Describe epistemological stances and how these inform the design of a qualitative research study

- Understand how theory informs the analysis in a qualitative research study
- Describe and apply advanced methods of qualitative data collection
- Determine the different types of bias in qualitative research and how they impact the findings
- Understand the challenges associated with reflexivity and how it impacts qualitative research
- Develop the critical skills required to publish written reports of qualitative research.

Students will need to have basic prior knowledge of:

- Sampling and recruitment in qualitative research
- Data collection methods (interviews, focus groups, ethnography)
- Thematic analysis or another methodological approach
- The ethical issues raised in undertaking qualitative research

4.3.4. Course content

- Theory and Research Design
- Interviewing
- Elite interviews
- Oral history narratives
- Ethnography and Field Research
- Grounded Theory
- Extended Case Method
- Case Study Method and Comparative Research
- Ethical Considerations and Field Research Challenges in Qualitative Research

4.3.5. Reading list

Atkinson, R. (1998). The life story interview. A Sage University Paper. Thousand Oaks, Sage.

Berg, B.L., & Lune, H. (2012). Qualitative research methods for the social sciences (8th ed.). Boston: Pearson.

Brown, K. L. (2018). Gone Home: Race and Roots through Appalachia. UNC Press Books.

Charmaz, K. (2006). Constructing grounded theory. Thousand Oaks, CA: Sage.

Creswell, J. (2012). Qualitative inquiry and research design: Choosing among five approaches (3rd ed.). Thousand Oaks, CA: Sage

Creswell, J. W., & Clark, V. L. P. (2007). Designing and conducting mixed methods research. Thousand Oaks, CA: Sage.

Creswell, J. W., Klassen, A. C., Plano Clark, V. L., & Smith, K. C. (2011). Best practices for mixed methods research in the health

Daly, K. J. (2007). Qualitative methods for family studies and human development. Thousand Oaks, CA: Sage.

Denzin, N. K., & Lincoln, Y. S. (Eds.). (2008). Strategies of qualitative inquiry (Vol. 2). Thousand Oaks, CA: Sage.

Denzin, N.K. and Lincoln, Y.S. eds., 2011. The SAGE handbook of qualitative research. Sage

Ellingson, L. L. (Ed.). (2009). Engaging crystallization in qualitative research: An introduction. Thousand Oaks, CA: Sage.

Emerson, Robert M., Rachel I. Fretz, and Linda L. Shaw. 2011. Writing Ethnographic

Feldman, M. S. (1995). Strategies for interpreting qualitative data. Thousand Oaks, Sage.

Fieldnotes. University of Chicago Press.

Glaser, B., & Strauss, A. (1967). The discovery of grounded theory. London: Weidenfield & Nicolson.

Goodall, B. (2008). Writing qualitative inquiry: Self, stories, and academic life. Walnut Creek, CA: Left Coast Press.

Green, J., & Thorogood, N. (2013). Qualitative methods for health research. Thousand Oaks, CA: Sage.

Gubrium, J. F., & Holstein, J. A. (2001). Handbook of interview research: Context and method. Thousand Oaks, CA: Sage.

Gubrium, J. F., & Holstein, J. A. (2009). Analyzing narrative reality. Thousand Oaks, CA: Sage.

Holstein, J. A., & Gubrium, J. F. (1995). The active interview. Thousand Oaks, CA: Sage.

https://tigger.uic.edu/jaddams/college/business_office/Research/Best_Practices_for_Mixed_Methods_Research.pdf

Johnson, L. R. (2017). Community-based qualitative research: Approaches for education and the social sciences. Thousand

Langellier, K. M, & Peterson, E. E. (2004). Storytelling in daily life: Performing narrative. Philadelphia: Temple.
Maxwell, J. A. (2012). Qualitative research design: An interactive approach. Thousand Oaks, CA: Sage.
McIntyre, A. (2007). Participatory action research (Vol. 52). Sage Publications.
Morgan, D. L. (1998). The focus group guidebook. Thousand Oaks, Sage.
Morse, J.M. and Field, P.A., 1995. Qualitative research methods for health professionals
Oaks, CA: Sage.
Padgett, D. K. (2011). Qualitative and mixed methods in public health. Thousand Oaks, CA: Sage.
Riessman, C. K. (Ed.). (1993). Narrative analysis (Vol. 30). Thousand Oaks, Sage.
Rowles, G. D., & Schoenberg, N. E. (2002). Qualitative gerontology: A contemporary perspective. Springer.
Saldana, J. (2016). The coding manual for qualitative researchers, 3rd edition. Thousand Oaks, CA: Sage.
sciences. Bethesda, MD: National Institutes of Health (NIH). Available Free:
Small, M. L. (2017). Someone to Talk to. Oxford University Press.
Studies. Free Press.
Tracy, S. J. (2013). Qualitative research methods: Collecting evidence, crafting analysis, communicating impact. Wiley.
Van Manen, M. (1990). Researching lived experience: Human science for an action sensitive pedagogy. New York: SUNY
Weiss, Robert. 1995. Learning from Strangers: The Art and Method of Qualitative Interview
Whaley, B. B. (Ed.). (2014). Research methods in health communication: Principles and application. Routledge.
Yin, R. K. (2014). Case study research: Design and methods. Thousand Oaks, CA: Sage.

4.4. URP 6204: Strategic planning

4.4.1. Course overview and objectives

The course will focus on advanced treatment of theoretical and practical knowledge on planning and development. Important aspects to be covered are:

4.4.2. Course content

Meaning of strategic planning, goals, and objectives, need and context for strategic planning; Distinction between conventional planning and strategic planning; strategic measures of solving emerging planning problems in spatial and social contexts; Infrastructure planning and growth management strategies; strategic planning and community welfare; strategic planning in the context of Bangladesh, case studies on strategic planning.

4.5. URP 6205: Project evaluation and management

4.5.1. Course summary

This course attempts to equip the students with project planning, management, monitoring and evaluation concepts, theories, methods, tools, and techniques for solving project management, monitoring and evaluation related issues at multiple levels and scales.

4.5.2. Objectives

The course aims to:

- Conceptualize the different project planning methods, tools, and techniques.
- Orient with the various performance criteria, techniques, and rules for project selection.
- Understand the risk and uncertainty issues related to project planning, management, monitoring and evaluation.
- Appreciate the problems, issues, techniques related to project cost and benefit analysis
- Understand the issues, concept, analysis, and management related to project monitoring and evaluation.
- Understand the contemporary exemplary project with its planning, monitoring and evaluation issues.

4.5.3. Learning Outcomes

At the end of the course the students will be able to:

- Understand project planning methods, tools, and techniques.
- Apply various performance criteria, techniques, and rules to select a project.
- Understand and apply project risk and uncertainty assessment and management framework.
- Monitor projects based on concept, analysis, and management techniques.

- Evaluate projects based on evaluation tools and techniques.
- Gain the experiences from the contemporary project with its planning, monitoring and evaluation issues.

4.5.4. Course content

- Project Planning: The Critical Path Method (CPM), The Precedence Diagramming Method (PDM), The Program Evaluation and Review Technique (PERT), The Graphical Evaluation and Review Technique (GERT), Queue - Graphical Evaluation and Review Technique (GERT), Simulation Language for Alternative Modelling (SLAM), Dynamic Planning and Control Methodology (DPM), Critical Chain Planning, Resource Loading
- Basis of Project Selection: Financial criteria, Discounter Cash Flow Techniques. Choice of discount rate and social time preference; Selection criteria; Ranking rules; Deferment criteria,
- Risk and Uncertainty: Dealing with risk and uncertainty; Treatment of income distribution and inequalities; Cost estimation methodology, cost engineering, and cost control applicable in project management.
- Cost-benefit Analysis: Concept of Cost-benefit Analysis, problems of identification, categorization, qualification, and evaluation of costs and benefits; private versus social costs and benefits.
- Project Monitoring: Earned value analysis, Risk and uncertainty, Quality Assurance, Conflict Management, Change management.
- Project Evaluation: Preparation and implementation of projects; Purpose of project evaluation; Economic versus financial evaluation,
- Case Studies: Case studies related to project planning, management, monitoring, and evaluation in urban and regional planning and related issues.

4.6. URP 6206: Urban design and development

4.6.1. Course summary

Urban design is the profession and discipline concerned with the shaping of cities. Traditionally concerned with the spatial and material layers of the city, urban design today also encompasses the "content" of urban spaces - their social, performative, and experiential dimensions.

Through a combination of historical survey, theoretical framings, case studies, and contemporary questions, this course critically maps the variety of approaches to shaping urban spaces and places, in pursuit of their animating principles and ideologies.

4.6.2. Objectives and learning outcomes

Knowledge and Understanding

- To expose students to a range of historical precedents, theoretical ideas, case studies, and field experiences relevant to the study and practice of urban design and planning.
- To situate urban design within its social, cultural, political, technological, and aesthetic context.
- To facilitate the development of a rigorous intellectual framework for design and research on cities, and an awareness of the student's emerging personal theoretical position and approach to urban design.

Skills

- To develop skills in the representation, analysis, and interpretation of urban places and spaces, in both textual and graphic modes, using both analogue and digital techniques.
- To develop critical and analytical thinking along with the ability to communicate this thinking (writing, oral and graphic presentation, other media).
- To foster capacities to generate, coordinate, share, and debate ideas and proposals in collaboration with others.

4.6.3. Course content

This is a class about how cities, suburbs, and metropolitan areas change. It examines both the evolving structure of the major cities of world and the ways that it can be designed and developed. We will survey the ideas of a wide range of people who have addressed urban problems and acted to alter cities, suburbs, and regions through urban design and development. We will analyze the values implicit in each of their proposals, stressing the connections between ideas and design. We will look at designs for new towns and examine the ways that existing cities have spread and been redeveloped. Attempts to control growth and suburban sprawl will also be covered. Topics range from grand ideas proposed by single individuals to smaller more incremental processes carried

out through collaboration by a variety of contending parties. You will see how cities and suburbs have been changed in the past and how you and others may help change them in the future.

4.6.4. Reading list

Lynch, Kevin. *The Image of the City*. Cambridge, MA: MIT Press, 1960, pp. 4-5. ISBN: 0262620014.

5. Major in Transportation Planning and Management

5.1. URP 6301: Sustainable Land-Use and Transport Planning

5.1.1. Course summary

This course will make students aware of the key aspects of integrated transport and land-use planning which contribute to more sustainable outcomes. Transport is an inherently spatial phenomenon, which cannot be divorced from considerations of urban form, spatial planning, social processes, and people. The course delivers this understanding by developing beyond the basic GIS skills and applying cutting edge techniques in GIS (Geographical Information Systems) and spatial analysis which can be deployed to explore contemporary planning problems, alongside theoretical considerations. Students will develop their skills to access, analyze and display spatial data to facilitate advanced policy analysis informed by the theoretical underpinnings of sustainable land use and transport planning taught in the course.

5.1.2. Objectives

The objectives of the course are to explore, through research-led teaching, the key relationships between land-use and transport planning which can lead to more sustainable planning outcomes. In taking the course, students will apply this knowledge to a range of real-world contexts in the developed and developing world through the development and application of skills in GIS and spatial analysis so that they can independently approach spatial planning problems and understand how best to inform the advancement of sustainability goals.

5.1.3. Learning outcomes

- To understand and be able to analyze the relationship between urban form, social structures, and travel patterns in the context of sustainability
- Demonstrate and apply GIS and spatial analysis concepts and techniques to real-world transport problems

- Implement GIS tools and spatial analysis techniques to be able to evaluate real-world policy-relevant questions in the field of sustainable planning.
- Students will develop their GIS skills using an appropriate GIS package (most likely free and open-source software) which can be installed on student computers, and which is also available in central teaching space.
- Appropriate visualization of analyses in maps and graphics.

. ***Course content***

Sustainable Land-Use and Transport; GIS concepts for spatial planning; Data set processing; Accessibility concepts and Accessibility Mapping (Case Study 1); Layering data sets and using geoprocessing tools to perform analysis and derive indicators; social sustainability and equity analysis (Case Study 2 – (developed vs. developing); constructing environmental indicators exploring open data (case study 3 examples from different locations 3); Further analysis techniques which aid developing indices of sustainability.

5.1.4. Reading list

Banister, D. (2012) Assessing the reality—Transport and land use planning to achieve sustainability, Journal of Land Use and Transport, 5(3), 2012, 1-14, doi: 10.5198/jtlu.v5i3.388

Banister, David. 2008. "The Sustainable Mobility Paradigm." *Transport policy.* 15 (2): 73–80. doi: 10.1016/j.tranpol.2007.10.005.

Cervero, R. (2013) Linking Urban Transport and Land Use in Developing Countries, Journal of Land-Use and Transport, 6(1), 7 24 https://conservancy.umn.edu/bitstream/handle/11299/171183/JTLU_vol6_no1_pp7-24.pdf?sequence=1&isAllowed=y

Cervero, R., Sarmiento, O.L., Jacoby, E., Gomez, L.F., Neiman, A., 2009. Influences of Built Environments on Walking and Cycling: Lessons from Bogota. Int. J. Sustain. Transp. 3, 203–226. https://doi.org/10.1080/15568310802178314

Geurs, K.T., van Wee, B., 2004. Accessibility evaluation of land-use and transport strategies: review and research directions. *Journal of transport geography*. 12, 127–140. doi:10.1016/j.jtrangeo.2003.10.005

Hickman, R., Seaborn, C., Headicar, P. and Banister, D. (2010) In Eds. Givoni, M. and Banister, D. (2010) *Integrated transport [electronic resource] : from policy to practice*, Routledge, Oxon, ISBN 0-415-54893-4

McIntosh, J., Trubka, R., Kenworthy, J. and Newman, P. (2014) The role of urban form and transit in city car dependence: Analysis of 26 global cities from 1960 to 2000, *Transportation research. Part D, Transport and environment.*, **33**, 95-110, http://dx.doi.org/10.1016/j.trd.2014.08.013

Akse, R., Thomas, T., Geurs, K., 2021. Mobility and accessibility paradigms in Dutch policies: An empirical analysis. J. Transp. Land Use 14, 1317–1340. https://doi.org/10.5198/jtlu.2021.2097

Seminar readings

Cervero, R., Arrington, G., 2008. Vehicle Trip Reduction Impacts of Transit-Oriented Housing. J. *Public Transp*. 11. https://doi.org/10.5038/2375-0901.11.3.1

Christiansen, P., Engebretsen, Ø., Fearnley, N., Usterud Hanssen, J., 2017. Parking facilities and the built environment: Impacts on travel behaviour. *Transp. Res. Part Policy Pract.* 95, 198–206. https://doi.org/10.1016/j.tra.2016.10.025

Guzman, L., Oviedo, D., Cardona, R., 2018. Accessibility Changes: Analysis of the Integrated Public Transport System of Bogotá. *Sustainability* 10, 3958. https://doi.org/10.3390/su10113958

Romanillos, G., Gutiérrez, J., 2020. Cyclists do better. Analyzing urban cycling operating speeds and accessibility. *Int. J. Sustain. Transp.* 14, 448–464. https://doi.org/10.1080/15568318.2019.1575493

GIS textbooks

Ballas, D., Clarke, G., Franklin, R.S., Newing, A., 2018. GIS and the social sciences: theory and applications. Routledge Taylor & Francis Group, London; New York. [University of Leeds Library https://www.vlebooks.com/Product/Index/972243?page=0]

QGIS Development Team, 2021. QGIS User Guide. https://docs.qgis.org/3.16/en/docs/user_manual/index.html

Menke, K., 2019. *Discover QGIS 3.x: a workbook for the classroom or independent study*. Locate Press, Chugiak, Arkansas. [University of Leeds Library: https://leeds.primo.exlibrisgroup.com/discovery/fulldisplay?docid=alma991019717449505181&context=L&vid=44LEE_INST:VU1&lang=en&search_scope=My_Inst_CI_not_ebsco&adaptor=Local%20Search%20Engine&tab=AlmostEverything&query=title,contains,discover%20QGIs,AND&query=creator,contains,Menke,AND&sortby=rank&mode=advanced&offset=0]

5.2. URP 6302: Understanding Travel Behavior

5.2.1. Course summary

Understanding Travel Behavior offers the opportunity to analyze and explore traditional and emergent thinking on travel behavior and understanding why people travel. This course aims to equip postgraduate students with the analytical skills necessary for the development and evaluation of policy and practice in the transport sector in both professional environments and higher academic studies.

5.2.2. Objectives

This course aims to provide students with a critical appreciation of the different disciplinary perspectives currently dominant in the study of transport, including:

- Social psychological models of attitude and behavior
- The 'new mobilities paradigm' - corporeal travel, flows and communicative practices
- Economic theories of behavior - derived demand, utility, and the value of time
- Time and space geographies and activities.

The study of each of these strands will be used to understand why people travel and to inform the development of more effective transport policy and practice.

5.2.3. Learning outcomes

- On completion of the course students should have knowledge and comprehension of the dominant theoretical perspectives on travel behavior.
- The course will develop skills and understanding to enable students to describe, analyze, synthesize, and evaluate relationships and links between theories and concepts and demonstrate a critical and nuanced appreciation of the differences, similarities, links, and complementarities between the various key theoretical standpoints to understanding travel and to be able to apply that knowledge to the study of transport policy.
- Upon completion of the course students will have a comprehensive understanding of theories of why people travel which and will have been given the opportunity to apply that understanding to the context of the development of transport policy using examples.
- The course aims to develop skills associated with critical reasoning, problem solving, hypothesize building, creativity, and evaluation.

5.2.4. Course contents

- Introduction to studying transport and travel
- Introduction to analytical skills and comparative analysis
- Understanding travel from the mobilities perspective
- Understanding travel from the economics perspective
- Understanding travel from the social-psychologist perspective and understanding travel from the time/space perspective
- Comparative analysis to explore complementarities and synergies from each perspective and to explore the impact on, and usefulness of these understandings in the development of policy.

5.2.5. Reading list

Ajzen, Icek, (2005, 2nd Edition) Ajzen, Icek, Attitudes, personality, and behavior. pp.112-145. Milton Keynes: Open University Press.

Aytur A S., Rodriguez D.A., Evenson K.R., Catellier D.J., Rosamund W.D. 2008. The sociodemographics of land use planning: Relationships to physical activity, accessibility and equity. Health & place. 14, 3 (2008), pp.367-385.

Boden D and Molotch HL (1994) 'The Compulsion of Proximity', in Friedland R and Boden D (Eds) NowHere space, time, and modernity, University of California Press:London.

Button KJ (1993) Transport Economics (3rd Edition), Edward Elgar:Cheltenham.

Clifton K. J., (2004) Mobility Strategies and Food Shopping for Low-Income Families A Case Study, Journal of Planning Education and Research. 23(4) 402-413. doi: 10.1177/0739456X04264919.
Dijst M, Farga S and Schwanen T (2008) A comparative study of attitude theory and other theoretical models for understanding travel behaviour, Environment and planning. A: environment and planning., Vol 40, pp 831-847.25.
Giddens A, 1984, The constitution of society: outline of the theory of structuration, Chapter 3 'Time, space and regionalization' p.110-119. Polity:Cambridge.
Grieco M., (1995) 'Time Pressures and Low Income Families: The Implications for 'Social' Transport Policy in Europe', The community development journal., 30(4). 347-363.
Hägerstrand T, 1970, 'What about people in regional science? ', Papers of the Regional Science Association., vol. 24, 1970, P8. - Available online: http://courses.washington.edu/cee500/What%20about%20people%20in%20regional%20science.pdf Core
Jain, J; Lyons, G, 2008, 'The gift of travel time', Journal of transport geography., vol. 16, 81-89.
Jones P et al, 1983, Understanding travel behaviour, Gower: Aldershot.
Kahneman, D, 2012, Thinking Fast and Slow, London: Penguin Core
Larsen J, Urry J and Axhausen KW (2006) Mobilities, networks, geographies, Ashgate: Aldershot. Core
Lovejoy K., and S. Handy (2011); Social networks as a source of private-vehicle transportation: The practice of getting rides and borrowing vehicles among Mexican immigrants in California, Transportation research. Part A, Policy and practice. 45 (2011) 248–257.
Mackie P, 2008 'Who Knows Where The Time Goes? A Response to David Metz', Transport reviews., 28:6, 692-694.
Mokhtarian PL, Salomon I, and Redmond LS, 2001 'Understanding the Demand for Travel: It's not Purely Derived', Innovation: the European Journal of Social Sciences, vol. 14(4), 2001, 355-380.

Neutens T, Schwanen T and Witlox F (2010) The prism of everyday life: towards a new research agenda for time geography, Transport reviews., vol 31, iss 1, pp 25/47.
Steg, L 2005 Car use: lust and must. Instrumental, symbolic and affective motives for car use, Transportation research. Part A, Policy and practice. , vol. 39(2-3), pp 147-162.
Wardman, M. & Lyons, G. (2016) The digital revolution and worthwhile use of travel time: implications for appraisal and forecasting, Transportation., 43: 507. doi:10.1007/s11116-015-9587-0.
Urry John, 2007, Mobilities. Polity Cambridge

5.3. URP 6303: Public Transport Planning and Management

5.3.1. Course summary

To ensure that students have a sound understanding of the key issues affecting the planning, management, and financing of public transport in developed and developing countries.

5.3.2. Objectives

- To ensure that students are able to apply the underlying operating and economic principles in order to develop solutions to various PT problems such as forecasting, scheduling, network design and project evaluation.
- To ensure that students understand the multi-dimensional role of public transport within a multi-modal transport planning system.

5.3.3. Learning outcomes

- Understanding of the key issues affecting the demand, cost, planning and management of public transport
- Demonstration of practical public transport economic and operational modeling skills to develop solutions to various real-world problems
- Discussion of the multi-dimensional role of public transport within a mixed-mode transport planning system.

5.3.4. Skills outcomes

Planning the scheduling of public transport operations, demand forecasting, cost modelling, pricing policies and principles behind regulation and privatization.

5.3.5. Course content

- Introduction to public transport, technology; predicting demand for PT

- Public transport pricing and fare systems
- Costing of public transport
- Public Transport Investment
- Procurement of Public Transport
- Public transport network design and operation
- Designing and Operating Rail Systems
- BRT Systems
- Revision lecture/class

5.4. URP 6304: Principles of Transport Modelling

5.4.1. Course summary

The course starts by introducing the general concept of transport modelling, including key objectives, terms, and definitions in transport modelling, and briefly the basic four-stage models. It then introduces each of the four stages of transport modelling in turn: trip generation, trip distribution. modal split, and traffic assignment. The key mathematical modelling techniques are introduced for each stage, and examples are made to illustrate the workings of these models. The second part of the course introduces more advanced transport modelling techniques, which provide improvements to the traditional four-stage modelling.

5.4.2. Objectives

To ensure that students understand the role and purpose of transport models, that they are familiar with the advantages and disadvantages of each of a range of modelling techniques available and are able to select an appropriate model for a given task. Also, to ensure that they are able to use a modelling package to analyze real-world problems.

5.4.3. Learning outcomes

On completion of this course, students should:

- be able to understand the role and purpose of the main types of transport models.
- become familiar with the advantages and disadvantages of each of a range of modelling techniques available.
- be able to select an appropriate model for a given task.
- be able to use a basic modelling package to analyze a realistic 'real life' problem.

5.4.4. Course contents

- Introduction to transport modelling
- The four-stage models: Trip generation, Trip distribution, Modal split, and Traffic assignment
- Critiques of the four-stage modelling
- Microsimulation models
- Disaggregate models
- Departure time choice
- Car ownership forecasting

5.4.5. Reading list

Ortuzar, J.D., and Willumsen, L.G. (2011). *Modelling Transport*, 4th edition, Wiley.

Hensher, David A. and Button, Kenneth, J. (2008) *Handbook of Transport Modelling*, 2nd edition, Pergamon. Chapters 2 and 3.

O'Flaherty, C.A. (2001) *Transport Planning and Engineering*, Chapter 5, Oxford: Elsevier Butterworth – Heinemann.

Mannering, F. and Washburn, S. (2020) *Highways Engineering and Traffic Analysis*, 7th edition, Wiley. Chapter 8

5.5. URP 6305: Shaping Future Transport Systems

5.5.1. Course summary

The Shaping Transport Futures course will provide students with an understanding of the fundamental relationships involved in transport systems, their interactions with other sectors, and future opportunities and challenges. It will provide understanding of the case for interventions in managing transport systems. Students will be able to understand and contrast international approaches to transport planning and management and develop appreciation of the contribution of different roles in the delivery of transport sector implementations. Finally, students will be equipped with the fundamental techniques necessary to work in inter-disciplinary teams.

5.5.2. Objectives

The Shaping Transport Futures course will provide students with an understanding of the fundamental relationships involved in transport systems, their interactions with other sectors, and future opportunities and challenges. It will provide understanding of the case for interventions in managing transport systems. Students will be able to understand and contrast international approaches to

transport planning and management and develop appreciation of the contribution of different roles in the delivery of transport sector implementations. Finally, students will be equipped with the fundamental techniques necessary to work in inter-disciplinary teams, which will prepare them for the Transport Integrated Project course delivered in the following semester

5.5.3. Learning outcomes

- Gain understanding of the fundamental relationships involved in transport systems, their interactions with other sectors, and future opportunities and challenges
- Gain understanding of the case for interventions in managing transport systems.
- Gain understanding and contrast international approaches to transport planning and management.
- Develop appreciation of the contribution of different roles in the delivery of transport sector (implementations).
- Gain fundamental techniques necessary to work in inter-disciplinary teams.

5.5.4. Course content

Delivery will consist of a Common Element plus streamed material appropriate to the needs of each program cohort.

- Course introduction
- Introduction to Transport Systems
  Aim: provide an understanding of the principal aspects of transport systems
- Drivers of transport demand
  Aim: provide an understanding of how people are significant in transport
- Opportunities and Challenges - the future
  Aim: provide a context for planning transport provision
- Space, land and planning for sustainable development
  Aim: provide understanding of significance of spatial analysis in transport
- Time
  Aim: to provide understanding of the ways time is used and the significance of time in understanding transport provision and travel
- Transport policy context (generic and international)
- Transport Policy Measures and Measure selection
- Governance: (Where do different disciplines fit into open-governance and multiple stakeholder planning)

Aim: understand transport as an industry with multiple stakeholders

- Freight transport
- Objective-led transport planning

Aim: Understand team working for intervention planning

5.5.5. Reading list

Governance

Chen, Z. (2011) 'Is the policy window open for high speed rail in the United States: A Perspective from the multiple streams model for policymaking', Transportation Law Journal, 38 (2), 115-144.

Cobbs, R. and Coughlin, J. (1998) Are Elderly Drivers a Road Hazrd? Problem Definition and Political Impact, Journal of aging studies., 12 (4), 411-427

Dodds, A. (2013) Comparative public policy, London: Palgrave Macmillan. Chapter 7 'Ideas and Public Policy'

Dudley, G (2013) 'Why do ideas succeed and fail over time? The role of Narratives in Policy Windows and the Case of the London Congestion Charge', Journal of European public policy., 20, pp. 1139-1156

Dudley, G. and Richardson, J. (2000) Why does policy change? : lessons from British transport policy, 1945-99. London: Routledge

Hall, P. (1993) 'Policy Paradigms, Social Learning, and the State: The Case of Economic Policymaking in Britain', Comparative politics., 25 (3), 275-96.

Kingdon (1995) Agendas, Alternatives, and Public Policies: Second Edition, London: Harper Collins (any edition fine to use)

Transport policy context

Marsden G; Mullen C; Bache I; Bartle I; Flinders M (2014) Carbon reduction and travel behaviour: Discourses, disputes and contradictions in governance, Transport policy., 35, pp.71-78. doi: 10.1016/j.tranpol.2014.05.012

Mullen C; Marsden G (2015) Transport, economic competitiveness and competition: A city perspective , Journal of transport geography., 49, pp.1-8. doi: 10.1016/j.jtrangeo.2015.09.009

World Health Organisation (WHO) (2015) Global Status Report on Road Safety. WHO, Geneva – Available

online: http://www.who.int/violence_injury_prevention/road_safety_status/2015/en/
World Health Organization (WHO) (2016) Air pollution levels rising in many of the world's poorest cities; News release, Geneva. - Available online: http://www.who.int/mediacentre/news/releases/2016/air-pollution-rising/en/

Transport Measures

Kodukula, S. (2011) Reviving the Soul in Seoul: Seoul's experience in demolishing road infrastructure and improving public transport, Federal Ministry for Economic Cooperation and Development - Available online: http://www.sutp.org/files/contents/documents/resources/C_Case-Studies/GIZ_SUTP_CS_Reviving-the-Soul-in-Seoul_EN.pdf
Konsult - is a knowledge database on transport measures and also provides a tool to aid thinking about measure selection (a measure option generator). Information on different types of measures can be found via the links at: http://www.konsult.leeds.ac.uk/pg/ The 'measure option generator' is at http://www.konsult.leeds.ac.uk/mog/intro/
Orvañanos Murguía R., (2015) Share the Road: Design Guidelines for non-motorised transport in Africa UNEP and FIA Foundation - Available online: https://www.unenvironment.org/resources/toolkits-manuals-and-guides/share-road-design-guidelines-non-motorized-transport-africa
Pucher, J. and Buehler, R. (2008) Making Cycling Irresistible: Lessons from the Netherlands, Denmark and Germany. Transport reviews., 28, 4, 495-528.

Transport planning

Banister, D. (2002) ' Transport planning '. Second edition. E&FN Spon.
Bonsall, P., Beale, J., Paulley, N., & Pedler, A. (2005) The differing perspectives of road users and service providers, Transport policy., 12 (4), 334-344
Ison, S. and Wall, S. (2003) Market- and non-market-based approaches to traffic related pollution: the perception of key stakeholders, International journal of transport management., 1, 133-143.
ITF (2015) ITF Transport Outlook, http://www.keepeek.com/Digital-Asset-Management/oecd/transport/itf-transport-outlook-2015_9789282107782-en#.V9vX5jZwZS4
Jeon, C.M., and Amekudzi, A. (2005) Addressing Sustainability in Transportation Systems: Definitions, Indicators, and Metrics, Journal of infrastructure systems., March, 31-50, 2005, ASCE
Meyer, M.D. and Miller, E.J. (2001) Urban transportation planning : a decision-oriented approach, 2nd Edition, McGraw-Hill, Singapore,

Land use

D. Hunt, D. S.Krigerand E. J. Miller (2005) Current operational urban land-use-transport modelling frameworks: A review, Transport reviews., Vol. 25, No. 3, 329–376, May 2005
Michael Iacono, David Levinson and Ahmed El-Geneidy Models of Transportation and Land Use Change: A Guide to the Territory, Journal of Planning Literature , Vol. 22, No. 4 (May 2008), DOI: 10.1177/0885412207314010
M Wegener, (1994) Urban/regional models and planning cultures: lessons from cross-national modelling projects, Environment and planning. B: planning and design. 1994, volume 21, pages 629-641.
Wegener, Michael, (1994) Operational urban models: State of the art, American Planning Association. Journal of the American Planning Association.; Winter 1994; 60, 1; ABI/INFORM Global. pg. 17.

Economics

Button, K.J. (2010) Transport economics (3rd edition). Edward Elgar: London.
Cowie, J. (2010) The economics of transport : a theoretical and applied perspective. Routledge: London
Mallard, G., Glaister, S. (2008) Transport economics : theory, application and policy. Palgrave Macmillan: Basingstoke
Environment - Air Quality
Greater London Authority (GLA). 2010. London Clearing the air - The Mayor's Air Quality Strategy. December 2010. https://www.london.gov.uk/sites/default/files/air_quality_strategy_v3.pdf
Franco, V., Sánchez, F., P., German, J., Mock, P. 2014. Real-world exhaust emissions from modern diesel cars. White Paper – October

2014. http://www.theicct.org/sites/default/files/publications/ICCT_PEMS-study_diesel-cars_20141013.pdf
DEFRA. 2018. Air quality: draft Clean Air Strategy. https://consult.defra.gov.uk/environmental-quality/clean-air-strategy-consultation/
ICCT. 2018. Topics in Vehicle emissions testing. https://www.theicct.org/spotlight/vehicle-emissions-testing

Modelling

Ortuzar JD, Willumsen LG (2011). Modelling Transport. 4th Edition, Wiley.
Atkins, ST (1987). The crisis for transportation planning modelling, Transport reviews., 7:4, 307-325, DOI: 10.1080/01441648708716664

Modelling: Economics

Flyvbjerg B,Skamris Holm SK & Buhl SL (2006) Inaccuracy in Traffic Forecasts, Transport reviews., 26:1, 1-24.

5.6. URP 6306: Transport Data Collection and Analysis

5.6.1. Course summary

This course provides fundamentals of data collection and analysis in the context of transport. It addresses the loop covering research questions, data requirements, data collection/generation, data analysis, and interpretation.

5.6.2. Objectives

- To ensure that students understand the quality of different data and data collection techniques and can discuss their strengths and weaknesses.
- To develop student's ability to design transport data collection activities.
- To ensure that students understand the needs for data generation and approaches to collecting a range of transport data and are able to justify techniques appropriate for given research requirements.
- To ensure that students understand the principles underlying the statistical analysis of transport data and are equipped to select appropriate statistical techniques and associated interpretation of results.
- To develop students' ability to interpret the result of statistical analyses and draw meaningful conclusions.

5.6.3. Learning outcomes

- Evaluate the link between research needs and data requirements and collection
- Discuss the principles underlying statistical analysis, apply these on data, and interpret their results
- Discuss and recommend data collection techniques relevant to transport issues
- Apply data acquisition skills
- Apply data handling, statistical and analytical skills
- Apply data presentation and reporting skills

5.6.4. Course content

Indicative data collection methods:

- Characteristics of (transport) data
- Data and Research design
- Primary and secondary data
- Automatic data collection/Technology aided data collection
- Qualitative data
- Questionnaire design
- Big data
- Air quality data sources
- Rail and public transport data

Indicative statistical techniques:

- Definition of variables and summary measures
- Measures of dispersion
- Normal distribution
- Distribution of sample mean
- Hypothesis testing
- Contingency tables
- Regression analysis
- Poisson distribution

5.7. URP 6307: Choice Modelling and Stated Preference Survey Design

5.7.1. Course summary

Choice modelling techniques are used widely to produce insights into choice behavior, often with a view to providing guidance to policy makers, e.g., as an input to cost-benefit analyses. The models can be estimated either on data containing real observed choices, or data collected in hypothetical choice scenarios. The latter approach, known as stated preference data, is

widespread and an appealing solution in cases where data on real choices are difficult to obtain, for example when looking at behavior in the presence of a new transport mode. This course covers the essential principles involved in the specification, estimation, and interpretation of choice models, covering topics from basic structures right through to state-of-the-art techniques. Similarly, the course covers different available techniques for generating designs for stated preference surveys, and also addresses the topics of data collection. The course involves a mix of lectures and practical, providing extensive hands-on experience with model estimation as well as survey design.

5.7.2. Objectives

To provide a thorough grounding in choice modelling and stated preference survey design.

5.7.3. Learning outcomes

- Understand the basics of experimental design
- Understand the theory behind the development and application of choice models
- Be able to create experimental designs using NGene
- Be able to analyze choice modelling data using Apollo
- Be able to justify the decisions made in survey design and model specification
- Be able to interpret model outputs

5.7.4. Course content

Modelling:

Random utility theory; multinomial logit model; nested logit; cross-nested logit; mixed logit; model specification; model estimation; interpretation of results; joint RP-SP estimation; model application; forecasting

Survey design:

Orthogonal design; design testing; efficient design; dealing with respondent issues including strategic bias and non-trading

5.8. URP 6308: Transport logistics / Green logistics

5.8.1. Course summary

The course re-appraises supply chain logistics using the latest thinking and endeavors to offer possibilities to reduce the environmental impact.

5.8.2. Objectives

The course is designed to help students who aspire to work in planning, policymaking, and consultancy roles in which they will need up-to-date knowledge of best practice in reducing the environmental problems associated with freight and logistics activities.

5.8.3. Learning outcomes

Students will have a good understanding of how supply chains currently work, and how they might be improved for the benefit of the environment and society, now and in the future.

5.8.4. Course content

The course will consider relevant aspects of logistics and supply chain management, including: vehicle utilization; vehicle routing; fuel efficiency and use of alternative fuels; moving to greener modes; reverse logistics ('returns' and waste management); the 'food miles' debate, reducing the environmental impact of warehousing; greener city logistics; the role of e-logistics; methods of carbon auditing; the role of the government in green logistics.

5.8.5. Reading list

A C McKinnon, M Browne, M Piecyk and A E Whiteing (eds.), (2015), *Green logistics : improving the environmental sustainability of logistics*, (3rd edition). London, Kogan Page. Previous editions are also suitable.

M. Christopher, *Logistics and Supply Chain Management*, Financial Times/Pitman Publishing

A. Harrison and R. van Hoek, *Logistics Management and Strategy*, Financial Times/Prentice Hall

D.J. Bowersox, D.J. Closs and M. Bixby Cooper, *Supply Chain Logistics Management*, McGraw-Hill, Boston, Mass.

J J Coyle, E J Bardi and J Langley, *The management of business logistics : a supply chain perspective ,* Mason, Ohio : South-Western/Thomson Learning

A rather more analytic approach to logistics and supply chain management can be found in;

S. Chopra and P. Meindl (2013), *Supply Chain Management: Strategy, Planning, and Operation*, Fifth edition, Pearson Education International, Boston.

A more operational view of logistics can be found in

A. Rushton, P. Croucher, P. Baker, (2010), Handbook of Logistics and Distribution Management, 4th edition, Kogan Page, London.

C.D. Waters (ed.), (2010), Global logistics : new directions in supply chain management , 6th Ed, Kogan Page, London.

P. B. Schary and T. Skjott-Larsen (1995), Managing the global supply chain , Copenhagen Business School.

D. F. Wood, A. Barone, P. Murphy and D. L.Wardlow (1995), International logistics , Chapman and Hall.

6. Major in Environmental Planning and Disaster Management

6.1. URP 6401: Critical Perspectives in Environment and Development

6.1.1. Course summary

The purpose of this course is for students to obtain a well-grounded understanding of the key theoretical, conceptual, and practical debates and issues within the environment-development field. Theoretically, political ecology is used as a starting point of the course to push critical and reflective thinking about mainstream ideas of environmental change and development. Then key concepts and topical issues in the environment-development field are explored. Conceptual focus is given to the issues of biodiversity, land degradation and desertification, with practical examples drawn from a variety of fields including conservation, agriculture, forestry, and water management.

6.1.2. Objectives

The specific objectives are:

- To familiarize students with key theoretical approaches and concepts used in Environment and Development studies.
- To introduce students to political ecology as an analytical approach in Environment and Development studies and to critically analyses its relevance to understanding environment-development linkages.
- To encourage students to think critically and reflectively about policy and practical developments in the environment-development field.
- To encourage students to think critically and reflectively about environmental change and natural resource management
- For students to develop knowledge of a range of research papers and projects in the environment-development field that support their studies.
- For students to develop creative and critical verbal and written skills in the environment-development field.

6.1.3. Learning outcomes

At the end of this course students should:

- Be familiar with theoretical approaches and concepts used in Environment and Development studies including political ecology and be able to critically evaluate them.
- Be better able to think and express yourself critically and creatively in the environment-development field, both verbally and in writing.
- Have developed knowledge of and an ability to critically evaluate a range of case study material from the environment-development field.

The course places considerable emphasis on:

- Reading and understanding theoretical concepts.
- Critical evaluation of complex environment-development issues and associated research.
- Understanding the balance between theory and practice.
- Written and oral communication.
- Reflective thinking and writing.
- Individual study and group discussion/debate.

6.1.4. Course content

- Introduction to theories and concepts in environment-development studies
- Political ecology – the what, where and why?
- Scientific myths, laws, and generalizations
- Desertification debates
- Land degradation and policy developments
- Social construction of knowledge and nature
- The idea of biodiversity
- Contested resources, knowledges, and meanings
- Critical exploration of key topics informed by research expertise in the Sustainability Research Institute, e.g.

- Ecosystem services, poverty alleviation and human wellbeing
- Natural resource management and participatory development
- Livelihood dynamics and resilience - Food security and agricultural development
- Climate compatible development

6.1.5. Reading list

Adams, W. Green Development. Routledge

Robbins, P. (2019). Political ecology: A critical introduction (3rd Edition) John Wiley & Sons.

6.2. URP 6402: Environmental Policy and Governance

6.2.1. Course summary

Within this course, we examine the multiple pathways through which human-environment interaction is governed. We recognize how both structural forces and multiple actors at and between multiple scales and levels may shape and constrain environmental governance processes and outcomes. A central focus of the course is how the alleged limitations of conventional state-led environmental protection have given way to a proliferation of 'new' environmental policy instruments where state-market-civil society distinctions blur. We explore changing modes of climate and environmental policy and governance within and between the international, regional, national, and local levels of analysis. The course illustrates these ongoing processes using practical examples from both developed and developing countries.

6.2.2. Objectives and learning outcomes

On completion of this course, students should:

- Understand the nature, influence and limits of different environmental policy instruments.
- Be familiar with the changing ways in which environmental governance processes and outcomes are shaped and constrained in different contexts.
- Understand the significance of scale in environmental governance.

Department of URP

- Understand the different roles that governments, markets and civil society actors can play in influencing environmental policy and governance.
- Understand the changing role of government and the significance of institutional capacities in shaping the abilities of governments to exert influence.
- Be familiar with cross-cutting issues such as community governance and conservation, social justice, climate change and decarbonization, and the politics of the Anthropocene.
- Have improved written, group and public communication skills.

6.2.3. Course content

Introduction to environmental policy instruments

- Introduction and Policy instruments 1: Environmental regulations
- Policy instruments 2: Market-based instruments
- Policy instruments 3: Information-based instruments
- Policy instruments 4: Voluntary instruments

Theory and conceptual debates

- Global environmental governance
- Theories of the policy process
- Non-governmental and community governance

Cross-Cutting Issues and Future Directions

- Multi-scale environmental governance
- Social justice and decarbonization
- Environmental policy and governance in the Anthropocene

6.2.4. Reading list

Bulkeley, H. and Newell, P. 2010. *Governing climate change.* Routledge.

Carter, N. (2007 and 2018) (2nd and 3rd ed) *The Politics of the Environment*, Cambridge University Press, London.

Chasek, P.S., Downie, D.L. and Brown, J.W. (2017) *Global Environmental Politics*, Westview Press: Boulder, CO, USA.

Clapp, J. and Dauvergne, P. (2005) *Paths to a green world : the political economy of the global environment*, MIT Press, London.

Death, C. (ed) (2014) *Critical environmental politics.* Routledge: Abingdon.

Dryzek, J.S. (2013) *The politics of the earth: environmental discourses.* Oxford University Press: Oxford.
Durant, R.F., Fiorino, D.J. and O'Leary, R. (Eds) (2004) *Environmental governance reconsidered : challenges, choices, and opportunities*, MIT Press: Cambridge, MA.
Fiorino, D. J. (2006) *The new environmental regulation*, MIT Press, Cambridge, Mass.
Gouldson, A. a nd Murphy, J. (1998) *Regulatory realities : the implementation and impact of industrial environmental regulation*, *Earthscan*, London.
Gunningham, N. and Sinclair, D. (2002) *Leaders & laggards : next-generation environmental regulation*, Greenleaf, Sheffield.
Gupta, A. and Mason, M. (2014) *Transparency in global environmental governance : critical perspectives*, MIT Press: Cambridge, MA.
Hill, M.J. and Hupe, P.L. 2002. *Implementing public policy: governance in theory and practice.* Wiley Online Library.
Jasanoff, Sheila (2004), *Earthly politics : local and global in environmental governance* (Politics, Science and the Environment Series), MIT Press: Cambridge, MA.
Jordan, A. (ed.) (2005) *Environmental Policy in the European Union: Actors, Institutions and Processes*, Earthscan, London.
Kütting, Gabriela and Lipschutz, Ronnie (Eds) (2009) *Environmental governance : power and knowledge in a local-global world* Routledge: London.
Park, J., Conca, K., Finger, M. (2008) *The crisis of global environmental governance: towards a new political economy of sustainability*, Routledge: New York.
Roberts, J. (2011) *Environmental Policy*. Routledge: Abingdon.
Vatn, A. (2015) *Environmental governance : institutions, policies and actions.* Edward Elgar: Cheltenham.
Weale, A. (1992) *The new politics of pollution* Manchester University Press.
Young, O.R. 2002. *The institutional dimensions of environmental change: fit, interplay, and scale.* Cambridge, Massachusetts, USA: MIT press.

URP Department of

Introduction and Policy instruments 1: Environmental Regulations

Introduction and overview:

Carter, N. (2007 or 2018) *The Politics of the Environment*, Cambridge University Press. (Chapter 7)
Jordan, A. (2008) 'The governance of sustainable development: taking stock and looking forwards', *Environment and planning. C, Government and policy.*, 26: 17-33.
Lemos, C. and Agrawal, A. (2006) 'Environmental Governance', *Annual review of environment and resources.,* 31: 297-325.

Policy Instruments 1: Environmental Regulations:

Carter, N. (2007 or 2018) *The Politics of the Environment*, Cambridge University Press. (Chapter 12)
Holling, C., Meffe, G. (1996) Command and Control and the Pathology of Natural Resource Management. *Conservation biology.*. 10: 2. pp. 328-337.

Policy instruments 2: Market-based instruments

Jordan, A., Wurzel, R. K. W. and Zito, A. (2005). 'The Rise of 'New' Policy Instruments in Comparative Perspective: Has Governance Eclipsed Government?' *Political studies.*, 53: 477-496.
Castree, Noel. (2008): "Neoliberalising nature: the logics of deregulation and reregulation." *Environment and planning A* 40.1 131-152.

Policy instruments 3: Information-based instruments

Gunningham, N. and Sinclair, D. (1999) Regulatory Pluralism: Designing Policy Mixes for Environmental Protection. *Law & Policy,* Vol 21, No 1, pp. 49-76.*
Mol, A. (2009) Environmental Governance through Information, *Singapore Journal of Tropical Geography*, 30: 114-129.
Stephan, M. (2002). 'Environmental information disclosure programs: They work, but why?', *Social science quarterly.*, 83 (1): 190-205.

Policy instruments 4: Voluntary instruments

Blackman, A. and Sisto, N. (2005). Muddling through While Environmental Regulatory Capacity Evolves: What Role for Voluntary Agreements?, RFF Discussion Paper 05-16, Resources for the Future, Washigton, D.C. [Available at: http://www.rff.org/rff/Documents/RFF-DP-05-16.pdf]

Borck, J. and Coglianese, C. (2009) 'Voluntary Environmental Programs: Assessing Their Effectiveness', *Annual review of environment and resources.*, 34: 305-329.

Global environmental governance

Biermann, F. and Pattberg, P. (2008) 'Global Environmental Governance: Taking Stock, Moving Forward', *Annual review of environment and resources.,* 33: 277-294.

Falkner, R. (2003), 'Private Environmental Governance and International Relations: Exploring the Links', *Global environmental politics,* 3(2): 72 – 87.

Theories of the policy process

Keeley, J. and Scoones, I. (2000) "Knowledge, Power and Politics: The Environmental Policy-Making Process in Ethiopia", *Journal of modern African studies.*. Vol. 38, No. 1, pp. 89-120.

Cairney, P. Bog posts on policy processes: https://paulcairney.wordpress.com/2013/11/11/policy-concepts-in-1000-words-the-policy-cycle-and-its-stages/

Ostrom (2011) "Background on the Institutional Analysis and Development Framework." *Policy studies journal.* 39 (1): 7–27

Non-governmental and community governance

Dressler, W., et al (2010). From hope to crisis and back again? A critical history of the global CBNRM narrative. *Environmental conservation*, 5-15.

Agrawal, A., Chhatre, A., & Hardin, R. (2008). Changing governance of the world's forests. *science*, 320(5882), 1460-1462.

Multi-level environmental governance

Cash, D. W., W. N. Adger, F. Berkes, P. Garden, L. Lebel, P. Olsson, L. Pritchard, and O. Young. (2006). 'Scale and cross-scale dynamics: governance and information in a multilevel world.' *Ecology and society [electronic resource].* 11(2):8.

Di Gregorio M, Fatorelli L, Paavola J, Locatelli B, Pramova E, Nurrochmat DR, May PH, Brockhaus M, Sari IM, Kusumadewi SD. 2019. Multi-level Governance and Power in Climate Change Policy Networks. *Global Environmental Change*. 54, pp. 64-77.

Termeer et al (2010) 'Disentangling Scale Approaches in Governance Research: Comparing Monocentric, Multilevel, and Adaptive Governance', *Ecology and society [electronic resource].,* 15(4): 29.

Social justice and decarbonization

Delina, L.L. and Sovacool, B.K. 2018. Of temporality and plurality: an epistemic and governance agenda for accelerating just transitions for energy access and sustainable development. *Current Opinion in Environmental Sustainability*. 34, pp.1–6.

Hu, Z 2020. When energy justice encounters authoritarian environmentalism: The case of clean heating energy transitions in rural China. *Energy Research & Social Science.* 10.

Sovacool, Benjamin K, Turnheim, Bruno, Hook, Andrew, Brock, Andrea and Martiskainen, Mari (2020) Dispossessed by decarbonisation: reducing vulnerability, injustice, and inequality in the lived experience of low-carbon pathways. *World Development*: https://www.sciencedirect.com/science/article/pii/S0305750X20302436*

Environmental policy and governance in the Anthropocene

Griggs, D. et al (2013) 'Policy: Sustainable development goals for people and planet', *Nature.*, 495: 305-307.

Raworth, K. (2012) 'A safe and just space for humanity: can we live within the doughnut?' Oxfam discussion paper, February. Available from: https://www.oxfam.org/sites/www.oxfam.org/files/dp-a-safe-and-just-space-for-humanity-130212-en.pdf

Steffen, W. et al (2015) 'Planetary boundaries: Guiding human development on a changing planet', *Science.*, 347(6223).

6.3. URP 6403: Climate Change: Physical Science Basis

6.3.1. Course summary

This course introduces the students to the physical science base on climate change. The course includes sessions on the global climate system, carbon cycle, radiative forcing, past climates, climate modelling, climate predictions, and the handling of uncertainty in climate change research. The course lays down the foundation for literacy in the physical science base on climate change,

which is important for understanding climate mitigation and adaptation. It is useful for professionals, policy makers and academics alike. It also strengthens the students' ability to engage in further climate change related studies for example in the writing of a thesis.

6.3.2. *Objectives*

- On completion of this course, students should be familiar with and understand the key issues in the physical science base on climate change.
- The course provides a critical analysis and strengthens the students' ability to interpret and analyse environmental issues that they will encounter as part of their studies or professional or academic career.
- The course in particular encourages students to critically assess the state of climate change science for themselves, developing their understanding from first principals. It brings in and discusses topical research ensuring that it is based in a wider background understanding of the science. It develops a scientific evaluation of the research that is free from value-judgments.
- The course lays down the foundation for literacy in climate change science, which is essential for academics as well as practitioners, policy makers at all levels of policy making. The course also strengthens the students' ability to engage in further climate change related work in the writing of a thesis, for example.

6.3.3. *Learning outcomes*

The students should develop knowledge of the background physical basis of global climate change. Key understanding of:

- The greenhouse effects
- The causes of climate change
- How the Earth responds to these causes
- The components involved in Earth System modelling
- The causes of past changes in climate and the role of human emissions.
- Students should be able to assess popular articles in the press and online for their scientific merits.
- Disseminate and critique literature on the science of climate change.
- Assessing potential causes of climate change and the degree of risk for various outcomes.
- Framing credible climate change arguments using physics and literature sources.
- Communication of climate research to different stakeholders, including policymakers and academia

6.3.4. *Course content*

- Course introduction and history of climate change
- Observations of climate change
- Radiative forcing and the greenhouse effect
- Climate sensitivity and feedbacks
- Climate models
- Detection, attribution and uncertainty
- Paleoclimate
- The global carbon cycles
- Socio-economic scenarios and climate projections
- Geoengineering and carbon dioxide removal
- Climate policy and climate metrics

6.3.5. *Recommended course text*

"Climate models for the layman": Judith Curry, 2017. https://www.thegwpf.org/content/uploads/2017/02/Curry-2017.pdf *Note: the climate change sceptic's view!*

"Constructing a climate model". In *Climate Change and Climate Modeling*, J. David Neelin, Cambridge University Press 2011, ISBN 9781139491372, Section 5.1-5.1.5 (pp. 145-155).

"Is the climate changing?". In: *Introduction to Modern Climate Change*, Second edition, Andrew Dessler, Cambridge University Press 2016, ISBN 9781107480674, Chapter 2 (pp. 17-37).

"The Discovery of Global Warming": Spencer Weart, 2017 https://history.aip.org/climate/summary.htm. *This website is a more complete climate change resource in addition: feel free to explore the other chapters of this website for more general climate background.*

Chapters 2 and 9 of the IPCC AR6 report

Chapters 2, 6 and 7 of the IPCC AR6 report

Chapters 5 and 7 IPCC AR6 report

Climate Change 2021: The physical science basis.

Eric Wolff guest post on climate feedbacks: https://www.carbonbrief.org/guest-post-understanding-climate-feedbacks
Global Warming: The Hard Science, L.D. Danny Harvey, Prentice Hall 2000, ISBN 9780582381674. *This is a rather old textbook in the context of a rapidly evolving field, but much is still relevant.*
Hansen, J., D. Johnson, A. Lacis, S. Lebedeff, P. Lee, D. Rind, and G. Russell, 1981: Climate impact of increasing atmospheric carbon dioxide. *Science*, 213, 957-966, doi:10.1126/science.213.4511.957.
Introduction to Modern Climate Change, Second edition, Andrew Dessler, Cambridge University Press 2016, ISBN 9781107480674.
IPCC AR6: Summary for Policymakers https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf
Minx, J. et al. (2018), Negative emissions—Part 1: Research landscape and synthesis, *Env. Res. Lett.,* 13, 063001, doi: https://doi.org/10.1088/1748-9326/aabf9b
Robock, A., Marquardt, A., Kravitz, B., and Stenchikov, G. (2009), Benefits, risks, and costs of stratospheric geoengineering, Geophys. Res. Lett., 36, L19703, doi:10.1029/2009GL039209.
Technical summary of IPCC AR6 report
Wolff EW, Shepherd JG, Shuckburgh E, Watson AJ. 2015 Feedbacks on climate in the Earth system: introduction.*Phil. Trans. R. Soc. A* 373: 20140428. http://dx.doi.org/10.1098/rsta.2014.0428

6.4. URP 6404: Climate Change: Impacts and Adaptation

6.4.1. Course summary

This course gives an overview of climate change impact assessment and predictions, and key concerns and strategies of adaptation to climate change. It covers climate impact causation, impact assessment methods, sectoral and regional climate change impact predictions, environmental risks and hazards, adaptation strategies, governance and policy for adaptation, and economics and delivery of adaptation. The course lays down the foundation for literacy in scholarship on climate change impacts and adaptation, which is essential for academics as well as practitioners, policy makers at all levels. The course also strengthens the students' ability to: engage in further climate change related work such as the writing of a thesis; disseminate and critique literature on impacts of and adaptation to climate change; develop and judge measures to adapt to climate change; evaluate and assess arguments on impacts and adaptation using relevant scholarly sources and methods; as well as the student's familiarity with impact assessment and vulnerability assessment methods.

6.4.2. Objectives

- On completion of this course, students should be familiar with and understand the key issues and challenges related to the impacts of, and adaptation to, climate change. The course provides an overview of methods to assess climate change impacts, key concepts and results, and strategies related to adaptation to climate change.
- The course lays down the foundation for literacy in scholarship on climate change impacts and adaptation, which is essential for academics as well as practitioners and policy makers at all levels. The course also strengthens the students' ability to engage in further climate change related work such as the writing of a thesis.

6.4.3. Learning outcomes

- The students should develop knowledge of climate change impacts, their assessment and determinants and strategies of adaptation.
- Key understanding of:
  - climate change impact causation;
  - impact assessment methods;
  - regional and sectorial climate change impacts, adaptation strategies, adaptation policy, and implementation of adaptation.
- They should be able to assess popular articles in the press and online for their scientific merits.

Skills outcomes

- An ability to disseminate and critique literature on impacts of and adaptation to climate change.
- Familiarity with impact assessment and vulnerability assessment methods.

- Ability to develop and judge climate change adaptation strategies.
- An ability to evaluate and assess arguments on impacts and adaptation using relevant scholarly sources and methods.
- An ability to work as part of a team to synthesize and apply knowledge on climate impacts and adaptation.

6.4.4. *Course content*

- Introduction to impacts and adaptation
- Assessing impacts and risk
- Climate impacts models
- Methods of integrated assessment
- Critiquing impacts studies
- Conducting assessments
- Approaches to adaptation
- Policy and governance for adaptation
- Decision-making and planning for adaptation
- Delivering adaptation actions and measures
- The future of adaptation: research and careers

6.4.5. *Reading list*

IPCC (2014) Climate change 2014 : impacts, adaptation, and vulnerability: Volume 1 (Part A) and Volume 2 (Part B), Global and Sectoral Aspects. Cambridge: Cambridge University Press. Available at http://ipcc.ch/report/ar5/wg2

Wilby. R.L,(2017) Climate change in practice : topics for discussion with group exercises

Pelling, M. 2011. Adaptation to climate change: from resilience to transformation, Routledge

UK Climate Change Risk Assessment 2017 Evidence - starting with the chapter summaries at the bottom of the "Technical chapter" pages

Houghton (2009) Global warming: the complete briefing. Third (2004) or Fourth (2009, ISBN: 9780521709163) edition.

W. Steffen et al (2004) Global change and the earth system : a planet under pressure Berlin ; London : Springer.

Cowie, Johanthan. Climate change: biological and human aspects. Cambridge University Press 2008. ISBN-13: 9780521696197

Eckart Ehlers and Thomas Krafft (eds.) (2006) Earth system science in the anthropocene : [emerging issues and problems] Berlin : Springer.

Broad reading on climate change impacts assessments

IPCC. 2014. Summary for Policymakers. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. *Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Available at https://www.ipcc.ch/report/ar5/wg2/

UK Climate Change Risk Assessment 2021

Understanding Causation

Wilby. R.L,(2017) Climate change in practice : topics for discussion with group exercises, Chapter 18

Challinor AJ; Simelton ES; Fraser EDG; Hemming D; Collins M (2010) Increased crop failure due to climate change: assessing adaptation options using models and socio-economic data for wheat in China, Environmental research letters, 5, doi: 10.1088/1748-9326/5/3/034012

Climate Impacts Modelling

Griffiths, E. C. (2010) What is a model? https://plato.stanford.edu/archives/sum2009/entries/models-science/

Impacts modelling for adaptation

Challinor, AJ, Koehler, AK, Ramirez-Villegas, J, Whitfield, S, Das, D. (2016) Current warming will reduce yields unless maize breeding and seed systems adapt immediately. Nature climate change . 6, pp 954-958.

The emergence of climate vulnerability research

Barnett, J. (2020). Global environmental change II: Political economies of vulnerability to climate change. Progress in Human Geography, 44(6), 1172-1184. doi:10.1177/0309132519898254

Hewitt K. (1983). The idea of calamity in a technocratic age. In Hewitt K (ed) (1983) Interpretations of calamity : from the viewpoint of human ecology, Allen & Unwin, pg1-30

Naylor, A., Ford, J. D., Pearce, T., & VanAlstine, J. (2020). Conceptualizing climate vulnerability in complex adaptive systems. One Earth, 2(5), 444-454.

O'Brien K, Eriksen S, Nygaard LP, Schjolden A (2007) Why different interpretations of vulnerability matter in climate change discourses. Climate policy. 7:73-88
Smit B, Wandel J (2006) Adaptation, adaptive capacity, and vulnerability. Global environmental change : human and policy dimensions. 16:282-292
Thomas, K., Hardy, R.D., Lazrus, H., Mendez, M., Orlove, B., Rivera-Collazo, I., Roberts, J.T., Rockman, M., Warner, B.P. and Winthrop, R., (2019). Explaining differential vulnerability to climate change: A social science review. Wiley Interdisciplinary Reviews: Climate Change, 10(2), p.e565. –
Tschakert, P. (2007). Views from the vulnerable: Understanding climatic and other stressors in the Sahel. Global Environmental Change-Human and Policy Dimensions, 17, 381-396. doi:10.1016/j.gloenvcha.2006.11.008
Watts MJ, Bohle HG (1993) The space of vulnerability: The causal structure of hunger and famine. Progress in human geography. 17:43-67

Doing vulnerability research

Ford JD et al (2010) Case study and analogue methodologies in climate change vulnerability research. Wiley interdisciplinary reviews. Climate change..
Hill, R., Walsh, F. J., Davies, J., Sparrow, A., Mooney, M., Council, C. L., . . . Tengo, M. (2020). Knowledge co-production for Indigenous adaptation pathways: Transform post-colonial articulation complexes to empower local decision-making. Global Environmental Change-Human and Policy Dimensions, 65. doi:10.1016/j.gloenvcha.2020.102161
Latulippe, N., & Klenk, N. (2020). Making room and moving over: knowledge co-production, Indigenous knowledge sovereignty and the politics of global environmental change decision-making. Current Opinion in Environmental Sustainability, 42, 7-14. doi:10.1016/j.cosust.2019.10.010
Mach, K. J., Lemos, M. C., Meadow, A. M., Wyborn, C., Klenk, N., Arnott, J. C., . . . Wong-Parodi, G. (2020). Actionable knowledge and the art of engagement. Current Opinion in Environmental Sustainability, 42, 30-37. doi:10.1016/j.cosust.2020.01.002

McCubbin, S., Smit, B. & Pearce, T. (2015). Where does climate fit? Vulnerability to climate change in the context of multiple stressors in Funafuti, Tuvalu. Global environmental change : human and policy dimensions. 30, 43-55
Owusu, M., Nursey-Bray, M. & Rudd, D. (2019). Gendered perception and vulnerability to climate change in urban slum communities in Accra, Ghana. Reg Environ Change (2019) 19: 13.
Rahman, H. M. T., & Hickey, G. M. (2020). An Analytical Framework for Assessing Context-Specific Rural Livelihood Vulnerability. Sustainability, 12(14). doi:10.3390/su12145654
Singh, C., Tebboth, M., Spear, D., Ansah, P., & Mensah, A. (2019). Exploring methodological approaches to assess climate change vulnerability and adaptation: reflections from using life history approaches. Regional Environmental Change, 19(8), 2667-2682. doi:10.1007/s10113-019-01562-z

Adaptation: bottom up and top-down approaches

Eakin, H. C. and A. Patt (2011). "Are adaptation studies effective, and what can enhance their practical impact?" Wiley interdisciplinary reviews. Climate change. 2(2): 141-153.

Adaptation: Decision-making under uncertainty

Walker, W., M. Haasnoot and J. Kwakkel (2013). "Adapt or Perish: A Review of Planning Approaches for Adaptation under Deep Uncertainty." Sustainability 5(3): 955-979.

Adaptation policy and governance

Adger, W. N., Arnell, N. W. & Tompkins, E.L., 2005. Successful adaptation to climate change across scales. Global environmental change : human and policy dimensions.. 15 (2), pp. 77-86.
Cots, F., J. D. Tabara, D. McEvoy, S. Werners and E. Roca (2009). "Cross-border organisations as an adaptive water management response to climate change: the case of the Guadiana river basin." Environment and planning. C, Government and policy. 27(5): 876-893.
Waters, E. and J. Barnett (2018). "Spatial imaginaries of adaptation governance: A public perspective." Environment and Planning. C, Politics and space. 36(4): 708-725.

Tracking adaptation
Arnott, J. C., S. C. Moser and K. A. Goodrich (2016). "Evaluation that counts: A review of climate change adaptation indicators & metrics using lessons from effective evaluation and science-practice interaction." Environmental Science & Policy 66: 383-392.
Berrang-Ford, L., Biesbroek, R., Ford, J. et al. (2019). Tracking global climate change adaptation among government. Nature Climate Change, 9(6), 440-449.
Dupuis J, Biesbroek R (2013) Comparing apples and oranges: The dependent variable problem in comparing and evaluating climate change adaptation policies. Global environmental change: human and policy dimensions. 23:1476-1487.
Ford, J. D., Berrang-Ford, L., Lesnikowski, A., Barrera, M. & Heymann, S. J. (2013). How to Track Adaptation to Climate Change: A Typology of Approaches for National-Level Application. Ecology and society [electronic resource]. 18, doi:10.5751/es-05732-180340 (2013).
Lesnikowski, A., Belfer, E., Rodman, E., Smith, J., Biesbroek, R., Wilkerson, J.D., Ford, J.D. and Berrang-Ford, L. 2019. Frontiers in data analytics for adaptation research: Topic modeling. Wiley Interdisciplinary Reviews: Climate Change. 10(3), p.e576.
Lesnikowski, A., Ford, J., Biesbroek, R., Berrang-Ford, L. & Heymann, S. J. (2016). National-level progress on adaptation. Nature climate change 6, 261-+, doi:10.1038/nclimate2863
McDowell, G., Huggel, C., Frey, H., Wang, F.M., Cramer, K. and Ricciardi, V. 2019. Adaptation action and research in glaciated mountain systems: Are they enough to meet the challenge of climate change? Global Environmental Change. 54, pp.19–30.
Olazabal, M., de Gopegui, M.R., Tompkins, E.L., Venner, K. and Smith, R., 2019. A cross-scale worldwide analysis of coastal adaptation planning. Environmental Research Letters, 14(12), p.124056

6.5. URP 6405: Climate Change Mitigation

6.5.1. Course summary

This course outlines the relative significance of main sources of greenhouse gases and the potential technologies and strategies for reducing them. Students will gain an understanding of the key challenges for controlling the emissions of greenhouse gases from different sources. The course is divided into two overarching themes. The first theme provides an understanding of the mitigation options in different sectors including the energy, transport, housing and the agricultural sector. The second theme explores how the transition to a low carbon economy could happen through the use of different scenarios and pathways and policy options.

6.5.2. Objectives

On completion of this course students should have:

- An appreciation of the scale of change needed to achieve specific outcomes
- To understand options available for specific topics (housing, transport, energy production)
- Confidence in critically assessing a country's mitigation strategy
- Knowledge of potential pathways towards a low carbon economy
- An appreciation of the available policy options
- Be able to talk confidently about climate change mitigation to a policy expert
- An understanding of the complexity of negotiations and self interest in the climate change debate.

6.5.3. Learning outcomes

The student should develop knowledge of different sources of greenhouse gases, their relative significance, and ways to reduce them. In addition, they will develop an understanding of the key challenges for controlling the emissions of greenhouse gases from different sources. The students should be able to assess popular articles in the press and online for their scholarly merits.

6.5.4. Course content

- Introduction & governance and politics of mitigation
- Energy supply & industry
- Transport, infrastructure & buildings
- Agriculture and land use change and emissions - The role of REDD+
- Mitigation scenarios and macroeconomic costs

- Transitions management
- Managing responses to policies and stimulating innovation
- The EU Emission Trading Scheme and valuing carbon
- Climate Change negotiation

6.5.5. Reading list

CCC (2020) The Sixth Carbon Budget - The UK's path to Net Zero Executive Summary. Available at: https://www.theccc.org.uk/wp-content/uploads/2020/12/The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf

CREDS (2019) Shifting the focus: energy demand in a net-zero carbon UK - Report Highlights. available at https://www.creds.ac.uk/wp-content/uploads/CREDS-STF-summary.pdf

CREDS (2021) The role of energy demand reduction in achieving net-zero in the UK. Available at: https://low-energy.creds.ac.uk/wp-content/uploads/CREDS-Role-of-energy-demand-report-2021.pdf

Department for Transport. 2021. Decarbonising Transport. A Better, Greener Britain. Available at: https://www.gov.uk/government/publications/transport-decarbonisation-plan

IEA (2021) Net Zero by 2050 A Roadmap for the Global Energy Sector, International Energy Agency. Available at: https://iea.blob.core.windows.net/assets/deebef5d-0c34-4539-9d0c-10b13d840027/NetZeroby2050-ARoadmapfortheGlobalEnergySector_CORR.pdf

IPCC (2014): Summary for Policymakers. In: Climate Change 2014: Mitigation of Climate Change. Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. et al. (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

IRENA (2021) World Energy Transitions Outlook. 1.5° C Pathway, International Renewable Energy Agency https://www.irena.org/publications/2021/Jun/-/media/E39E2962B96D489BBBB65DB5112DA1F2.ashx

Peñasco, C., Anadón, L., & Verdolini, E. (2021). Systematic review of the outcomes and trade-offs of ten types of decarbonization policy instruments. Nature Climate Change, 11 (3), 257-265. Available at https://doi.org/10.1038/s41558-020-00971-x . Author accepted manuscript at: https://www.repository.cam.ac.uk/handle/1810/316164

Rosenow, J. and Eyre, N., 2013. The green deal and the energy company obligation. Proceedings of the Institution of Civil Engineers-Energy, 166(3), pp.127-136. Available at: https://doi.org/10.1680/ener.13.00001

Smith P., et al., Agriculture, Forestry and Other Land Use (AFOLU). Chapter 11. (Read especially 11.2.3, 11.3, 11.5.2 and 11.6) In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., et al. (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. Available at: https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter11.pdf

Turnhout, E., Gupta, A., Weatherley-Singh, J., Vijge, M.J., de Koning, J., Visseren-Hamakers, I.J., Herold, M., Lederer, M. (2017) Envisioning REDD+ in a post-Paris era: between evolving expectations and current practice. *WIREs Climate Change* 8, e425. Available at: https://doi.org/10.1002/wcc.425

UK Government (2021) Net Zero Strategy – Build Back Greener. Executive Summary Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1033990/net-zero-strategy-beis.pdf

UKERC (2019) UKERC Technology and Policy Assessment Modelling Demand-side Energy Policies for Climate Change Mitigation in the UK: A Rapid Evidence Assessment - Working Paper. Available at: https://ukerc.ac.uk/publications/modelling-demand-side-policies/

Ward JD, Sutton PC, Werner AD, Costanza R, Mohr SH, Simmons CT. Is Decoupling GDP Growth from Environmental Impact Possible? PLoS One. 2016;1–14. Available at: https://doi.org/10.1371/journal.pone.0164733

WRAP. 2021. Net Zero: why resource efficiency holds the answers. Available at: https://wrap.org.uk/resources/report/net-zero-why-resource-efficiency-holds-answers

6.6. URP 6406: Advanced Environmental Science Field and Research Skills

6.6.1. Course summary

This course will train students in advanced practical environmental field skills and their expert application in research and industry. It involves both a field course and a component of independent research that allows the students to examine the observations made in the field in further depth, integrate their findings with current state of the art knowledge, and produce verbal and written reports on their work. The field course will take place over several days and will conclude with a capstone team research project. Out of the field, students will attend a series of tutorials to support the design of their independent research projects on a topic of their choice, combining their primary data (collected during the field trip) with published literature in order to test scientific hypothesis and draw original conclusions.

6.6.2. Objectives

On completion of this course, students will be familiar with research techniques used in meteorology, atmospheric physics, chemistry, biodiversity, and ecology. Measurement techniques will have been practiced extensively in the field. A wide variety of in situ and remote sensing approaches will have been used to gather physical, chemical, and ecological data. Data collected in the field will have been analyzed using a variety of computer-based and analogue methods. Data will have been interpreted in order to draw conclusions concerning the natural structure of the atmosphere, both chemically and physically, and ecological diversity. The expert, in-field training will culminate in one group and one independent research project. Existing literature will be interrogated to integrate project findings with current state of the art knowledge.

6.6.3. Learning outcomes

On completion of this course, students will be able to:

- Independently research, synthesize and critically analyze existing literature.
- Apply expert practical skills and knowledge to measure environmental variables using research and industry-standard instrumentation, and evaluate implicit error/uncertainty within those measurements.
- Interrogate primary data to draw robust conclusions and integrate findings with existing state of the art knowledge.
- Create clear oral and written presentations, including bespoke graphics, to communicate research findings.

6.6.4. Course content

- Practical weather forecasting using synoptic charts and other data.
- Investigation of atmospheric stability, flow profiles, energy profiles, energy balance and turbulence in the surface layer.
- Profiling of the atmosphere using radiosondes and surface measurements.
- Examining energy balance processes and the carbon cycle.
- Profiling local ecology and links to environmental stressors.

6.7. URP 6407: Risk Perception and Communication

6.7.1. Course summary

Throughout their personal and professional lives, people face risks that may potentially affect their finances, health, safety, and environmental impacts. This course will help future executives, policy makers, financial advisors, health professionals, and other practitioners to gain a critical understanding of how non-experts perceive risks, as well as how to effectively communicate risk information to diverse audiences. We will cover the main findings of the risk perception and communication literature and discuss applications in the contexts of finance, behavioral economics, public health, emerging technologies, and sustainability.

6.7.2. Objectives

This course aims to provide a critical understanding of how non-expert audiences perceive risks. It will also explore how to effectively communicate risk information to different audiences.

6.7.3. Learning outcomes

On completion of the course, students should be able to critically evaluate:

- how non-experts perceive risks, how their risk perceptions deviate from those of experts, and how non-expert risk perceptions vary by individual characteristics
- communications of quantitative risk information to diverse non-expert audiences
- survey design for assessing non-expert audiences' perceptions of risks
- the main principles of risk communication design
- the effectiveness of communications
- the main findings in the academic field of risk perception and communication, its most important methods, results, and controversies
- the methodological standards used within the field for determining the trustworthiness of results
- scientific articles in risk perception and communication

Skills outcomes

On completion of this course students should be able to:

- communicate to an advanced standard to a variety of audiences
- undertake research and report on findings
- think critically
- make effective decisions
- apply social and decision sciences to solve real-world problems

6.7.4. Course content

- The Course content covers reviews of:
- Non-expert perceptions of risk, deviations from expert perceptions of risk, variations by individual characteristics
- Interview and survey methods for assessing non-expert audiences' perceptions of risks
- Strategies for communicating quantitative risk information to diverse non-expert audiences
- The main principles of effective risk communication design
- Methods for evaluating the effectiveness of communications
- Applications to a variety of domains, including finance, behavioral economics, public health, emerging technologies, and sustainability.

6.8. URP 6408: Tools and Techniques in Ecological Economics

6.8.1. Course summary

This course aims to develop research skills to enable students to carry out quantitative research projects, which integrate environmental, social and economic aspects of sustainability. Through lectures, seminars and computer exercises, the course will familiarize students with some of the most extensively used methods and research frameworks for the analysis of coupled socio-economic and environmental systems. The content of this course is relevant to some of the most innovative and cutting-edge research in ecological economics, effectively paving the way towards a systematic understanding of sustainability. This course will cover both top-down macro-economic approaches and bottom-up social and technical approaches, providing students with a broad foundation for their future work and research. Applications include topics such as: The dynamics of coupled economic, environmental and social systems (econometrics, panel analysis) or analyzing emergent behavior from the bottom-up simulation of socio-ecological systems (agent-based modelling). Environmentally-Extended Input-Output analysis for the study of climate change mitigation in production or consumption, and System dynamic modelling.

6.8.2. Objectives

- This course aims to give students hand-on experience of analytical tools that can be applied to understand and research ways in which socioeconomic activity impacts the environment, and how this understanding can be used for projections and scenario building.
- On successful completion of the course, students will have demonstrated the ability to apply and critically discuss a number of the most widely used tools in ecological and environmental economics to analyze interdependencies between environmental and economic systems.

6.8.3. Learning outcomes

Understanding of some of the most widely used economic and modelling frameworks for analysis of environmental impacts.

Specifically:

- understanding of the most important macro-economic methods to analyze the coupled dynamics of economic, environmental, and social systems or understanding the basic concepts of agent-based modelling of socio-ecological systems
- understanding of the basis of models for assessment of economy wide environmental impacts of changes in patters of production and consumption
- understanding the basis of system dynamic modelling

Skills outcomes

- Improved quantitative research, data analysis and interpretation skills
- Ability to formulate hypotheses based on the main theories of environment-economy linkages
- Practical skills in applying different tools and techniques
- Familiarity with appropriate programming and modelling software
- Improved written communication.

6.8.4. Course content

Presentations, discussions, and applications of the following frameworks for analysis:

- Environment-economy-society linkages: how to measure and model them or Agent-based modelling
- Input-Output analysis
- System Dynamic Modelling

7. Major in Urban Management and Development

7.1. URP 6501: Urban environment, sustainability and climate change

7.1.1. Course summary

The course focuses on some of the most relevant issues and challenges facing cities world-wide: how cities can achieve sustainability from a social, economic and environmental perspective, what are the most innovative initiatives being undertaken to foster smart cities, how to implement effective and efficient climate change adaptation and mitigation actions, and how can cities achieve a higher level of resilience. All these issues are at the forefront of the global political and decision-making agenda. In recent decades, the emergence of the challenges related to climate change has only reinforced the relevance and importance of this field of study.

7.1.2. Course objectives

At the end of the master track, participants should be able:

- To critically discuss the key concepts, theories, and frameworks behind urban environment, climate change, and sustainability based on state-of-the art review.
- To systematically compare how NBS, climate change adaptation and mitigation, and ICT-based solutions can contribute to sustainable, smart, and resilient cities after analyzing global case study examples.
- To evaluate the conditions, benefits, challenges, and limitations in planning for sustainable, smart, and resilient cities through the results of interactions with key actors and exposure to projects related to NBS, climate change adaptation and mitigation, and ICT-based solutions.
- To investigate key methodologies, techniques, and tools used by urban practitioners to plan for NBS, climate change adaptation and mitigation, and ICT-based solutions in order to achieve sustainable, smart, and resilient cities.
- To develop strategies for building sustainable, smart and resilient cities based on analysis of a selected case study and with the application of key methodologies, techniques, and tools.

7.1.3. Course content

Key concepts, theories, and frameworks

- Theoretical approaches to governing global environmental challenges
- Urban environment
- Natural environment: Ecosystems and ecosystem services
- Built environment: Infrastructure, Energy, Transport, Buildings. Etc.
- Climate change
- Impacts
- Risks
- Policies (optional)
- Sustainability concepts
- Sustainability
- Smart

- Resilience

Key actions and solutions

- Climate change adaptation and mitigation
- Barriers to implementation of climate change actions (optional)
- Guiding principles for city climate action planning (optional)
- Nature-based solutions
- ICT-based solutions

Key methodologies, tools, and techniques

- Cross-cutting
- GIS and ICT, including citizen science and environmental and earth observations
- Analysis and assessment
- Ecosystem service mapping and assessment
- GHG emissions assessment
- Energy sector analysis
- Climate change hazards and risk assessment
- Governance to reduce urban risk (optional)
- Key actors in reducing urban risk (optional)
- Vulnerability assessment
- Social Vulnerability (optional)
- Practical examples of calculating social vulnerability (optional)
- Air quality and heat island assessment
- Planning and implementation
- Ecosystem based strategies for financing climate action projects
- Serious gaming with Tygron (scenario planning)
- Climact prio (optional)
- Monitoring and evaluation
- Programming, big data, and statistical forecasting

7.2. URP 6502: Urban Governance, Policy, Planning and Public Private Partnerships

7.2.1. Course summary

Cities are growing quickly and are extremely dynamic. (Local) governments must try to steer and guide the development process in many ways. Their motivation for doing this and the way they do this lie at the heart of the fields of study of urban governance, policy, and planning. This course will discuss the efforts of governments, often undertaken in partnership with other stakeholders, to deliberately intervene in and influence, steer and guide the development process of cities. The role and responsibility of both public and private actors are central in the academic debate of urban governance, policy, and planning. This course will introduce the current academic debates in Urban Governance, Policy, Planning and Public and Private Partnerships and it will identify the linkages between these.

7.2.2. Course objectives

After the course participants should be able to:

- Discuss and describe the key characteristics of complex decision making and the problems associated with complexity; distinguish and compare network governance theory, new public management perspective and traditional public administration and discuss the implications of these differences for decision-making processes; discuss and analyze the key characteristics of network governance theory; and apply the concept to practice using a case study.
- Understand the meaning, dimensions, and objectives of urban policy, understand the importance of the policy process and tools for implementation, discuss and deliberate on the nature of public interest and who determines it; understand the nature of policy analysis, and analyze policy documents using a set of guidelines.
- Reflect on what planning is and why it is useful; assess different planning approaches and explain what strategic planning is; analyze the implications of these different planning approaches for the role of the planner and other stakeholders in the planning process.
- Distinguish and discuss the different theories that underpin Public Private Partnerships (PPPs), in particular the value of neo-liberal economic theory as a framework for PPPs; discuss and identify the key characteristics of and the rationale for PPPs; identify, discuss and analyze the potential pros and cons of partnerships, as well as the issues faced in setting up PPPs in different sectors; distinguish various forms of PPPs and their characteristics.

- Understand the interconnections between the different course components and analyze what these linkages mean in practice.
- Within a multicultural team, jointly discuss and come to decisions that are mutually agreed upon.

7.2.3. Course content

- **Urban Policy**
  Policies for urban development: This course introduces the meaning of 'policy' and highlights various approaches towards urban policy. We will look at what makes a policy "urban" as opposed to sectoral, the impact of changing concepts (for example, integration, decentralization, participation, neo-liberal approaches), the influence of major actors and what makes a good policy document.
- **Urban Governance**
  Decision making in situations of complexity: In this course, we look at theories underpinning urban governance and focus on trends to networked forms of governance. Network governance is seen as an alternative to markets and rational choice, in a situation of increasing complexity and uncertainty. Government is no longer the lead actor in development, but one amongst many. This implies a new role for government, a role in steering and managing horizontal relations.
- **Urban Planning**
  This course introduces the different meanings and interpretations of 'urban planning' and the urban planner. It highlights trends in planning approaches and zooms into the shift from traditional land use planning towards more strategic forms of planning.
- **Public Private Partnerships**
  A mechanism of governance: Since the 1990's PPP's have become an important approach to streamlining cooperation and risk sharing between the public and private sectors, and achieving value for money in service provisions. This course introduces participants to different rationale, objectives and forms of PPP's. Participants discuss and deliberate on the conditions under which PPP's can be successful instruments for urban development.

7.3. URP 6503: Urban Quantitative Data Analytics

7.3.1. Course introduction

This course will teach students how to harness the power of quantitative urban data by mastering the way they are prepared, visualized, and analyzed. The course begins with introducing students to quantitative data analysis (compared to qualitative data analysis), and continues with lectures on descriptive statistics and data visualization. The focus is, besides understanding, on working with real data and practicing how to conduct data analyses, which students learn in workshops and with exercises. Students will also learn how to present descriptive statistics and data visualization in academic studies.

7.3.2. Course objectives

The aim of this course is to equip participants with a basic tool set that will capacitate them to work with data and interpret results for testing and refining theory as well as supporting evidence-based policy making.

7.3.3. Learning outcomes

- Understand what quantitative data analysis entails and how it differs from qualitative data analysis.
- Identify situations in which quantitative data analysis provides useful information in an urban context.
- Be able to use and explain the main tools of descriptive data analysis and visualization and apply these in practice using statistical software.
- Comprehend the power of random sampling and how to use that information for hypothesis testing.
- Understand the basics of regression analysis using the ordinary-least-squares method and apply the knowledge in practice using statistical software.
- Understand how quantitative data analysis output is interpreted, find meaning in the data, and learn how findings can be translated into policy recommendations and/or reflection on theory.

7.3.4. Course content

- Introduction to quantitative data analysis
- Descriptive statistics (measures of central tendency, measures of spread, correlation)
- Data visualization
- Probability and estimation

- Hypothesis testing
- Simple regression analysis
- Multiple regression analysis
- The statistical software that will be used in this course is SPSS and R.

7.4. URP 6504: Urban Qualitative Data Analytics

7.4.1. Course introduction

For the first time in history, more than half of the world's population lives in urban areas. This does not only mean that a majority of people worldwide live in cities, but also that cities are increasingly becoming larger and more complex. In this context, collecting and making sense of in-depth qualitative data on complex urban issues is crucial for urban managers to understand and respond to how urban complexity is constructed, maintained, experienced, and contested.

7.4.2. Course objectives

The objective of the course is to help students gain methodological skills to design and conduct qualitative research.

7.4.3. Learning outcomes

At the end of the course, the students will be able to

- Understand theoretical and practical aspects of conducting qualitative urban research.
- Apply methodological skills on building qualitative research design, data collection and analysis of qualitative data.
- Critically reflect on qualitative research findings.
- Apply ethical concerns, as well as concerns for validity and reliability in qualitative research.

7.4.4. Course content

Urban Qualitative Data Analytics course introduces urban qualitative research and focuses on qualitative data collection and analysis. Covering both theoretical and practical dimensions of conducting qualitative research, it helps the students to gain methodological skills to design and conduct qualitative research in urban settings. The course is structured around the following themes:

- Introduction to Qualitative Urban Research (Qualitative vs. Quantitative Research, Sampling).
- Qualitative Data Collection Tools (Interviews, Focus Groups, Observations, Online and Offline Qualitative Data Collection).
- Qualitative Data Analysis (Types, Data Preparation and Coding, Presentation of Findings, Using Atlas TI).
- Together with UDA Quantitative and Research Design courses, this course provides students a practical guide for the design and implementation of their thesis research.

7.5. URP 6505: GIS Methods for Urban Research

7.5.1. Course introduction

Have you ever wanted to carry out a spatial analysis for research purposes? Or do you intend to do so for your thesis? GIS can be a powerful tool for spatial data analysis as it can link spatial and non-spatial data. Furthermore, visualizing data spatially, for example through maps, can reveal spatial relations which otherwise would not have become apparent. In this course, we will introduce and apply fundamental methods for analyzing data in GIS which will be helpful in answering research questions with a spatial component. These skills will be an added value in social sciences research and will be highly valued in various professions.

This course is different from a GIS course in that it focuses specifically on manipulating and processing data for spatial analysis. Examples are basic geoprocessing tools such as buffer, clip, intersect; query; clustering analysis; or basic modelling.

7.5.2. Course objectives and learning outcomes

By the end of the course, all participants will be able to "create a geospatial database for a topic relevant to social sciences research and will be able draw inferences from correctly applied spatial analysis".
Specifically, students should be able to:

- Conceptualize and create geospatial databases for a topic relevant to social sciences research.
- Create scientifically appropriate spatial visualizations of data.
- Analyze spatial data using geoprocessing tools and interpret the results.
- Synthesize and compare findings from different analyses.

7.5.3. Course content

- GIS for urban research is a hands-on course in which participants apply GIS tools for spatial analysis.
- The course starts with an elementary introduction of GIS, followed by a general overview of spatial analysis tools.
- Students will be able to choose from a selection of spatial research problems to work on as their individual assignment.
- The major portion of the course will be on creating GIS databases and getting basic skills in geoprocessing data.

7.6. URP 6506: Urban Morphology

7.6.1. Course Objectives

- Introduce quantitative urban form and accessibility analysis techniques.
- Explain how volumetric and spatial features of urban environment can be used in urban planning.

7.6.2. Learning Outcomes

- Identifies elements of urban form and explains the relationship between them.
- Can calculate volumetric and spatial features of an urban environment using relevant software or programming language.
- Can visualize interpret the results of quantitative urban morphological analysis.
- Can perform Space Syntax analysis using relevant software.
- Can visualize and interpret the results of Space Syntax analysis.
- Can evaluate spatial autocorrelation of volumetric and spatial features of the urban environment.
- Can train spatial regression models to evaluate and explain the relationship between urban morphological, vitality, and accessibility measures.
- Can perform graph-based accessibility calculations of an urban environment.
- Can list, explain and argue the importance of urban morphological approaches and measures that are appropriate to practical urban planning tasks.

7.6.3. Course Contents

- **Introduction and the elements of urban form:** The elements of urban form: the urban tissue, the natural context, the streets system, the plots system, the building's system.
- **Urban morphology and planning:** Application of urban morphological analysis in urban planning.
- **Introduction to Computational Urban Morphology:** Evolution and comparative analysis of computational morphology methods. Case studies using various methods.
- **Space Syntax:** Spatial morphology and Space Syntax. Practical applications of spatial morphology. Evolution space syntax. Choosing indicators for spatial analysis.
- **Assessing Complexity of Urban Spatial Networks:** Spatial Graphs of Urban Environments. Accessibility analysis.
- **Spatial Statistics for Urban Morphological Analysis:** Use of spatial autocorrelation and spatial regression models in quantitative urban morphology.

7.6.4. Reading list

Arbia, G. (2006). Spatial Econometrics : Statistical Foundations and Applications to Regional Convergence. Berlin: Springer. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&site=eds-live&db=edsebk&AN=163308

Arbia, G. (2014). A Primer for Spatial Econometrics : With Applications in R. Basingstoke: Palgrave Macmillan. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&site=eds-live&db=edsebk&AN=998543

D'Acci, L. (Ed.), 2019. The Mathematics of Urban Morphology, Modeling and Simulation in Science, Engineering and Technology. Springer International Publishing, Cham. https://doi.org/10.1007/978-3-030-12381-9

Hillier, B. (2007). Space is the machine: a configurational theory of architecture. United Kingdom, Europe: Space Syntax. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&site=eds-live&db=edsbas&AN=edsbas.F31464B2

Kropf, K. (2017). The Handbook of Urban Morphology. Chichester, West Sussex, UK: Wiley. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&site=eds-live&db=edsebk&AN=1611815

Luc Anselin, Ibnu Syabri, & Youngihn Kho. (2006). GeoDa: an introduction to spatial data analysis. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&site=eds-live&db=edsbas&AN=edsbas.13C715BA

Oliveira, V. (2016). Urban Morphology : An Introduction to the Study of the Physical Form of Cities. Cham: Springer. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&site=eds-live&db=edsebk&AN=1203600

On Urban Morphology and Mathematics. (2019). Netherlands, Europe. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&site=eds-live&db=edsbas&AN=edsbas.E87CBE0A

Recommended Additional Bibliography

Bin Jiang, & Xiaobai Yao. (2010). Geospatial Analysis and Modelling of Urban Structure and Dynamics. Springer.

Sun, X. (2013). Comparative Analysis of Urban Morphology: Evaluating Space Syntax and Traditional Morphological Methods. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&site=eds-live&db=edsndl&AN=edsndl.oai.union.ndltd.org.UPSALLA1.oai.DiVA.org.hig-15492

7.7. URP 6507: Sustainable Cities

7.7.1. Course Overview

For the first time in history over half the world's population lives in urban areas. Today there are over 400 cities with more than a million residents compared to 12 cities in 1900. By 2050 the share of the world's urban population is expected to reach 70 percent, and most growth will occur in the developing world. As urban population growth continues, urban centers face the problems of aging infrastructure, economic growth, changing climate, congestion, pollution, and demands of inhabitants to enhance their quality of life.

Cities consume 75 percent of the world's energy and produce almost 80 percent of global GHG emissions. In response, many cities are striving to be low carbon cities while sustaining healthy economic and social life. But addressing the new urban agenda requires a new model of cooperation across sectors and all tiers of government to redirect the urban economic development into paths that are restorative. The purpose of this course is to prepare its students to understand, analyze, and develop policies and procedures to address the sustainability issues being faced by urban centers of developed and developing world, their decision-makers, and inhabitants.

7.7.2. 2. Course Objectives

Students in the course are assumed to have had no previous in-depth exposure to sustainable urban development and urban planning. By the end of the course, students will have learned to develop strategies and related actions to enhance the sustainability of cities covering the following areas:

- Sustainability enhancing practices in urban development and planning.
- Emerging policies, practices, and technologies that promote efficient and low carbon delivery of urban services including transportation, energy, waste, water, and sanitation.
- Approach to manage climate change risks and related adaptation actions.
- Practices of sustainability planning adopted by global cities.

7.7.3. Course Content

- **Couse Overview and Introduction to Urban Sustainability**
  - ✓ Course Overview
  - ✓ Why adopt sustainability principals for cities?
- **Urban Development and Economics**
  - ✓ Why cities take different forms of development?
  - ✓ What are key determinants of land uses and their distribution within a city?
- **Urban Growth Management and Sustainability Indicators**
  - ✓ How land development and transport interactions shape urban economy, inclusiveness and environment?
  - ✓ What should be measured and monitored to nurture sustainability?
- **Urban Travel Management**
  - ✓ What major factors influence travel behavior and demand?

- ✓ How to reduce transport linked GHG emissions?
- ✓ What are emerging technologies, practices and policies that affect choice of modal options and reduce use and ownership of vehicles?

Urban Spatial Structure

- ✓ Cities are primarily labor markets; if the pandemic changes the nature of these labor markets, will it drastically alter the structure of current cities?
- ✓ The world of cities in the 21 century: expanding megacities in developing economies vs. shrinking cities in the prosperous world.
- ✓ What major factors are influencing urban footprint expansion of the city?
- ✓ How transport supply is affecting travel pattern and mode choices?
- ✓ How the Metro city is performing in meeting current mobility needs of its residents compared to other cities?
- ✓ What measures would you consider to improve quality of environment and access to opportunities for city residents?

Inclusive Urban Development

- ✓ How cities define, measure and address social sustainability?
- ✓ Can environmental sustainability address social sustainability in cities?
- ✓ How land development policies and non-government actors enhance affordable living and inclusiveness of cities?

Solid Waste & Circular Economy

- ✓ What factors influence urban waste generation?
- ✓ What are effective practices and technologies of waste management?
- ✓ How the paradigm of circular economy may help cities in reusing and reducing waste?

Urban Energy Planning & Solutions

- ✓ What are key attributes of urban energy systems in meeting fluctuations in demand?
- ✓ How to manage urban energy systems by land development policies?
- ✓ How a city should leverage drivers and technological solutions to promote sustainable urban energy systems?

- ✓ What are efficiency capturing options in the private sector (e.g., buildings, site planning and distributed generations)?

Urban Water & Sanitation

- ✓ How to balance supply, demand and quality of urban water?
- ✓ What are effective practices, technologies and policies for urban water management?
- ✓ What are re-use and eco-friendly strategies in urban settings?

Analysis of GHG Emissions and Energy Efficiency

- ✓ What is the internationally accepted protocol for measuring GHG emissions in cities?
- ✓ How a municipality could develop an energy efficiency and related emission reduction plan for services provided to city residents?

Climate Change & Cities

- ✓ How to identify and manage climate risks?
- ✓ What are emerging approaches to adaptation planning and financing?

7.7.4. Reading list

A framework for incremental development and low income house building. Acceptability, SpringerLink, 2010

Arthur O'Sullivan, "Urban Economics", Seventh Edition, Chapters 1, 6 &7, McGraw Hill,

Arup, C40 and University of Leeds, The Future of Urban Consumption in a 1.5 C world, Methodology Report, June 2019. https://c40-production-images.s3.amazonaws.com/other_uploads/images/2257_2Method_Report_Final_2019-06-13.original.pdf?1560879858

Bajpai, J.N., Halusan B. and Murray S., Building Affordable Neighborhood in Kigali (Rwanda):

Bajpai, Jitendra N., "Building a foundation for smart Indian cities", published in "Insight", a Journal of Indian School of Business, Hyderabad, April 2015.

Bajpai, Jitendra N., "Emerging Vehicle Technologies and the Search for Urban Mobility Solutions", Journal of Urban, Planning & Transport Research, Vol. 4, 2016, Issue 1 http://www.tandfonline.com/eprint/rmWFcyHMerxiadEquKhA/full

Bertaud Alain, “Affordability: Household’s income, regulations and Land supply”, Part I, Working Paper #38, Dec. 2016.
Bertaud Alain: “Cities as labor markets”, Working Paper #2, NYU, Feb. 19, 2014 http://marroninstitute.nyu.edu/content/working-papers/cities-as-labor-markets
between energy, ICT and the city”, and Chapter 10: “Solar energy in urban retrofit”, Earthscan from Routledge, London, NY, 2014
Bret Clark, “Ebenezer Howard and Marriage of Town & Country: An Introduction to Howard’s Garden Cities of Tomorrow”, Organization & Environment, Sage, 2003 http://oae.sagepub.com/content/16/1/87.full.pdf+html
C40, ICLEI, WRI, “Global Protocol for Community Scale GHG Emissions”, Executive Summary, June 2012.
California Water Action Plan, Draft Action Plan for Public Review, 2014 http://resources.ca.gov/docs/Final_Water_Action_Plan.pdf
Campbell Scott, “Green Cities, Growing Cities & Just Cities: Urban Planning & the
City, Pages 214-251, 2015
Clarisa Diaz, July 7, 2020, The push to turn NYC’s polluting peaker plants into publicly-owned solar power
Contradictions of Sustainable Development”, Journal of American Planning Association
Dixon Tim, Enmes M, Hunt M & Lannoa S, “Urban Retrofitting for Sustainability:
Dixon Tim, Enmes M, Hunt M & Lannoa S, “Urban Retrofitting for Sustainability: Mapping the Transition to 2050, Part III Chapter 13: “Retrofitting sustainable integrated water management at household, building & urban scales”.
Earthscan from Routledge, London, NY, 2014
EMAIL_CAMPAIGN_2018_03_02_COPY_01&utm_medium=email&utm_term=0_230210005944067cb972-178196157
Environment, and Quality of Life in American Cities”, Cambridge, “Chapter 1: The Conceptual Foundations of Sustainable Cities: Sustainability, Sustainable Economic Development, and Sustainable Communities”, MIT Press, 2013.
Environment, and Quality of Life in American Cities”, Cambridge, Chapter 6: Is Sustainable City a More Egalitarian Place? Sustainable Communities, Environmental Equity, and Social Justice, MIT Press, 2003.
ESMAP, Bogota, Columbia, Bus Rapid Transit for Urban Transport, Nov. 2009 https://www.esmap.org/node/660
ESMAP, Cairo - Arab Republic of Egypt, Taxi Scraping & Recycling Project, 2010
Ewing Reid, Cervero R., “Travel and the Built Environment”, Journal of American
Fix NYC: Advisory Panel Report (Page 1 to 25), January 2018. https://cdn.shopify.com/s/files/1/0703/6475/files/Fix-NYC-Panel-Report-_Transmittal_Appendix_B.pdf
Hahn N., Martin S. & Zils M., “Remaking the Industrial Economy”, McKinsey Quarterly, Feb 2014. https://www.mckinsey.com/business-functions/sustainability/our-insights/remaking-the-industrial-economy
Homi Kharas and Wolfgang Fengler, Brookings, October 9, 2019, “Double tipping points in 2019: When the world became mostly rich and largely old”
IDB. (2019), The Future of Water, Chapter 1: One Water and Resource Recovery: Emerging water and sanitation paradigm (Pages 1-13).
IEA (2013), Transition to Sustainable Buildings, Strategies and Opportunities for 2050, Chapters 3, 4, 5, and 6.
IFC, Green Buildings, A finance and policy blue print for emerging markets, Washington DC., 2019, Executive Summary.
Jenks Mike, Jones Colin, “Dimensions of the Sustainable City”, Chapter 5: Social
Kaza S., Yao L., Bhada-Tata P. & Woerden F. V., What a Waste 2.0, Chapter 5: Financing and cost recovery for waste management system, and Chapter 6: Waste and Society, World Bank, 2018
Lam, S.H. and Toan T.D., “Land Transport Policy and Public Transit in Singapore”,

Luis M.A. Bettencourt, “The kind of problem a city is”. Santa Fe Institute, 2013 https://www.santafe.edu/research/results/working-papers/the-kind-of-problem-a-cityis
Mapping the Transition to 2050, Part II Chapter 7: Urban design & the retrofit agenda”,
Mapping the transition to 2050, Part II Chapter 9: “The smart grid & the interface
Mathias Wendt, “The Importance of Death and Life of American Cities by Jane Jacobs to Profession of Urban Planning”, New Visions for Urban Affairs, Volume 1, Spring 2009 https://cpb-us-w2.wpmucdn.com/sites.udel.edu/dist/a/7158/files/2018/01/theimportance-of-death-and-life-of-great-american-cities-1961-by-jane-jacobs-to-theprofession-of-urban-planning-t7jm1p.pdf
McCormick Kathleen. Grow with the flow: How planners in two western cities are integrating water and land use, Lincoln Institute, Nov. 27, 2018. https://www.lincolninst.edu/publications/articles/grow-flow
Mckinsey & Co. (July, 2019). The Global relevance of New York State’s clean power targets.
New York City Govt., 1.5^{0} C Aligning New York City with the Paris Climate Agreement, Appendix III: Inventory of New York GHG in 2016. https://assets.locomotive.works/sites/5ab410c8a2f42204838f797e/content_entry5ab410faa2f42204838f7990/5ab4117274c4833febe6c8a1/files/NYC_CAP.pdf?1525685151
New York City Govt., One NY: The plan for a strong and just city, Pages 168-170 & 174-
New York City Govt., One NY: The plan for a strong and just city, Vision 4: Our Resilient
NYC, Mayor’s Office of Recovery and Resiliency, Climate Resiliency Design Guidelines, 2019. https://www1.nyc.gov/assets/orr/pdf/NYC_Climate_Resiliency_Design_Guidelines_v3-0.pdf
ODI, Community driven development in the slums: Thailand’s Experience
Part 2, page 51 onward “Fostering growth and inclusion in Asia’s cities” in
Planning Association, May 11, 2010

Portney, Kent E., “Taking Sustainable Cities Seriously: Economic Development, the Environment, and Quality of Life in American Cities”, Cambridge, “Chapter 2: Measuring the Seriousness of Sustainable Cities”, MIT Press, 2013
Project for Public Spaces, A playbook for inclusive place making – Community Process, May 31, 2019
SEWA: Self-employed woman association. https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_policy/documents/publication/wcms_234890.pdf

Suzuki H, Cervero R., Luchi K., “Transforming Cities with Transit”, Pages 1-21, World Bank, 2012. http://documents.worldbank.org/curated/en/947211468162273111/pdf/Main-report.pdf
The Urban Institute, Keeping the neighborhood affordable: A handbook of housing strategy for gentrifying areas. https://www.urban.org/sites/default/files/publication/50796/411295-Keeping-the-Neighborhood-Affordable.PDF
UN Habitat: Guiding Principles for City Climate Action Planning
UNFCC, “CDM Methodology Booklet”, Nov. 2010
Urban Land Institute, A Guide to Assessing Climate Change Risks. http://uli.org/wp-content/uploads/ULI-Documents/ULI-A-Guide-for-AssessesingClimate-Change-Risk-final.pdf
Vision 2020: New York City Comprehensive Waterfront Plan, Chapter 3: “Goal 4- Improve Water Quality”. https://www1.nyc.gov/site/planning/plans/vision-2020-cwp/vision-2020-cwp.page
Waldman-Brown A. & Flatter G. C., Scaling Sanergy: Growing a Promising Sanitation Startup, MIT Management and Legatum, Boston, May 2018. https://legatum.mit.edu/wp-content/uploads/2018/07/Sanergy-Case-Study_6.29.2018.docx.pdf
William E. Rees, “Achieving Sustainability: Reform or Transformation?” Journal of Planning Literature, Vol. 9, No.4, May 1995, pp-343-361. http://jpl.sagepub.com/content/9/4/343.full.pdf+html
World Bank, “The Low Carbon City Development Program (LCCDP) Guidebook, A Systems Approach to

Low Carbon Development in Cities", Executive Summary (Pg. 8 -15) and Emission Inventory (Pg. 46-48), 2014
World Bank, 2018, Municipal Waste Management, European Union Case Study, Pages 85-108
World Bank, 2018, Municipal Waste Management, Japan Case Study, Pages 109-132

7.8. URP 6508: Action Planning Workshop

7.8.1. Course introduction

The Action planning Workshop incorporates the concepts learned during the Urban Governance, Policy, Planning and Public Private Partnerships (UGPPP) course in a practical, one-week exercise.

7.8.2. Course objectives and learning outcomes

After the course students should be able to:

- Describe the Action Planning process and provide practical examples of each of its steps
- Work with and apply key tools for decision making, as part of the Action Planning process
- Develop an integrated Action Plan, working in a multidisciplinary group
- Simulate the organization and implementation of a participatory planning process
- Present and communicate the Action Plan to an audience of professionals and the community.

7.8.3. Course content

- Practical exercise that simulates the reality of a using a multi-stakeholder, integrated approach to developing a strategy and action plan for a neighborhood.
- Structured in steps and students use specific planning tools, applying these to a case study.
- Planning cycle, starting with problem identification, and concluding with the development of a strategy and implementation plan, forms the basis for Action Planning.
- Students work with a case study that highlights a series of complex issues in different urban sectors.
- Each case is different, but sectors may include: space and place, land and housing, economy and well-being, environment and climate change, large scale /social infrastructure and basic services
- Final strategy must also balance the different needs and interests of various actors and stakeholders.

7.9. URP 6509: Urban Infrastructures Planning and Management

7.9.1. Course Summary

This course attempts to introduce students to 'real world' risks and challenges in managing infrastructure. It will also help Students to learn about the development, the characteristics and functions of urban infrastructure systems, how they shape the development of cities and urban regions and reflect on the resulting challenges in the governance of cities and infrastructures.

7.9.2. Course Objectives

- to understand the historical, institutional, and socio-spatial factors shaping existing infrastructural dilemmas and how they shape urban futures, and
- to explore the role of politics and strategic actions involving actors and institutions across levels government as well as sectors, organizations, and groups beyond it in advancing and sustaining policy changes in urban infrastructure

7.9.3. Learning outcomes

After completing this course students are able to:

- Explain the basic concepts and functions of urban infrastructure. Understand the main challenges that urban infrastructure systems are confronted with and its connections to the modern societies.
- Become knowledgeable about the interpretation of the principles of urban infrastructure management and analyses challenges and opportunities of urban infrastructure management.
- Learn about the main concepts and thought in the management of urban infrastructure systems; and apply such concepts and tools to the cases of urban energy and urban transportation systems.

7.9.4. Course content

Introduction to urban infrastructures: Networked infrastructures such as energy, water, wastewater, telecommunication, and transport systems guide and facilitate urban functioning and urban life in a multitude of ways. Introduction to principles of urban infrastructure management: Rural and Urban Infrastructure Sectors, Players and Phases in an Infrastructure Project. Project Finance and Public Private Partnerships, Socio-Economic Analysis and Good Governance for Infrastructure. Financing and management of urban energy, urban transport urban water etc. The future of urban infrastructures. The role of public management in urban development.

7.9.5. Reading list

- 'Infrastructure Planning Handbook' by Prof Makarand Hastak, ASCE Press
- 'Strategic Management of Large Engineering Projects' by Miller and Lessard
- Urban Infrastructure: Finance and Management, edited by Kath Wellman, Marcus Spiller
- Publisher: John Wiley & Sons, Ltd.

8. Major in Regional and Rural Development

8.1. URP 6601: Rural and Regional Development Theories and Practice

8.1.1. Course Summary

The course aims to equip graduate students with the knowledge about the concepts, strategies and theories of rural and regional development. It will also provide knowledge on the development experiences at rural and regional level through evaluating different development projects of Bangladesh and South Asian Countries.

8.1.2. Course Objectives

The objectives of this course are to:

- Introduce the concepts and theories of rural and regional development
- Learn about the development experiences at rural and regional level in Bangladesh and South Asian Countries
- Identify the obstacles that are responsible for successful implementation of rural and regional level development strategies undertaken in Bangladesh and South Asian Countries

8.1.3. Learning outcomes

At the end of the course the students will be able to:

- Understand the basic theories of rural and regional development
- Explore development experiences at rural and regional level in Bangladesh and South Asian Countries
- Describe the benefits and limitations of rural and regional level development strategies undertaken in Bangladesh and South Asian Countries

8.1.4. Course content

- Rural and Regional Development concept, Objectives and Indicators of Rural and regional Development, Rural and regional Dynamics; Rural Development Strategies: Types of Rural Development Strategies; Rural and regional Development: Major Initiatives
- Theories of Rural and regional Development Rostow's Stages of Growth; Lewis Theory of Development; Theory of Big Push; Marxian Concept of Development; Schultz's Transformation of Traditional Agriculture
- Infrastructural Development: An Overview Roads & Transport: All weather rural roads; Challenges of Power and Electricity Facilities; Safe Drinking Water & Sanitation for All; Status of Rural Housing: Challenges in Building Permanent Housing
- Rural and regional Development Experiences in Bangladesh and south Asian countries

8.1.5. Reading list

- Banerjee, Abhijit V & DUFLO Esther, 2011, Poor Economic – rethinking poverty & the ways to end it, Random Houses India Chamber, Robert, 2005, Ideas for Development, Earthscan from Routledge
- Glasson, J. (1992). An introduction to regional planning: Concepts, theory and practice. London: UCL Press.
- Glasson, J., & Marshall, T. (2007). Regional planning. London: Routledge.
- Higgins, Benjamin & Savoie, Donald. (2017). Regional Development Theories & Their Application. 10.4324/9781315128269.

- J. Emmanuel, 2006, World Development Report 2007: Development and the Next Generation, World Bank, World Bank
- JICA. (2012). Data Collection Study on Regional Development in South eastern Bangladesh. People's Republic of Bangladesh.
- K Jalihal, M. Shivamurthy, 2003, Pragmatic Rural Development for Poverty Alleviation: A Pioneering paradigm, Concept
- K. Hoggart, H. Buller, 1987, Rural Development: A Geographical Perspective, Rutledge K. Sahu, 2003, Rural Development in India, Anmol Publications
- K. Singh, 2009, Rural Development: Principles, Policies and Management, Sage Publications
- M.J. Moseley, 2003, Rural Development: Principles and Practice, Sage Publications
- National Council of Applied Economic Research, 2007: India Rural Infrastructure Report, SAGE Publication
- Obaidullah, A. (1995). Rural Development in Bangladesh: Views and Reviews. BARD and JICA.
- Paul Cloke, Terry Marsden and Patrick Mooney, 2006, Hand Book of Rural Studies, Sage Publications, London

8.2. URP 6602: Gender and Development Studies

8.2.1. Course Summary

Gender studies and development studies are both interdisciplinary in orientation, and touch on issues as diverse as work and family life, health and population, labor and international economic change. It is now widely recognized that pervasive pre-existing gender inequalities mean that development processes have differential effects on women and men. Early feminist critiques emphasized the "marginal" position of women in development and advocated their "integration". More recently, critiques have argued that women's "marginality" reflects the systematic gender bias in official statistics and development planning in general, and that women are already affected by and involved in development, although in locally variable and class specific ways.

8.2.2. Course Objectives

The objectives of this course are to:

- Deepen student understanding of the fruitfulness of studying diverse issues affecting the lives of poor people in relation to one another, rather than being limited by disciplinary boundaries
- Know the main theoretical approaches used in gender analysis of development issues, awareness of the significance of locally-specific contexts
- Understand differential impacts of development interventions on women and men.

8.2.3. Learning outcomes

At the end of the course the students will be able to:

- show a working knowledge of the main theoretical approaches used in gender analysis of development issues and their links to wider social and political change
- show an awareness of the interplay between regional cultures, social change and development intervention in terms of differential impact on women and men
- show competence in assessing gender issues in international development research and practice from a sociological perspective
- show an understanding of the value of comparative analysis
- utilize acquired skills in analysis, planning and reporting on current development issues

8.2.4. Course content

- Conceptualizing and theorizing gender and development: This session introduces the course by outlining Women in Development (WID), Women and Development (WAD) and Gender and Development (GAD) approaches.
- Logics of empowerment: from radical origins to de-politicized practice? Do 'empowerment' projects enable women to gain (greater) control over their lives, rather than being passive recipients of 'development'? The session traces empowerment from its feminist origins to its recent neo-liberal avatar.
- Mainstreaming gender or streaming gender away? Feminists have been concerned to ensure that gender and gender equality are on the policy agenda and brought

center stage in development practice. This session critically examines 'gender mainstreaming'. Dangers of ethnocentrism - feminism, rights discourse and development practice: Who defines and makes judgements about gender issues? In the context of rights-based approaches in international development, can we legitimately universalize and generalize?

- Coercion, consent, choice: Gender politics of population policies and reproductive & sexual health and rights. The links between gender, population and reproductive and sexual health are complex and crucial to the development enterprise. This session addresses this contested aspect of development.
- Towards sustainable futures? Ecofeminism and development: This session asks what contribution ecofeminism can make to current debates in gender and development in relation to environmental and sustainability concerns.
- Educate a woman, educate a nation? Gender, education and development: Girls' education is widely regarded as important in development circles and this session reflects critically on some of the distinctive approaches to the issue.
- Victims, perpetrators or actors? Gender, violence and development: Feminists draw our attention to both gender-based violence and the gendered implications of political violence. This session explores some of the contentious and complex discursive shifts in understandings of violence and development.
- Sweatshop warriors? Women and paid work in the global economy: Women's employment and independent income is widely considered essential for women's emancipation.
- Reflecting on nearly 40 years of 'gender and development': The final session wraps up the course and reflects on the broad shifts that have occurred in global understandings of key issues in gender and development in the last four decades.

8.2.5. Reading list

- Andrea Cornwall et al (eds): Feminisms in Development: Contradictions, Contestations and Challenges (Zed 2007)

- Cecile Jackson & Ruth Pearson (eds.): Feminist Visions of Development: Gender Analysis and Policy (Routledge, 1998)
- Naila Kabeer: Reversed Realities: Gender Hierarchies in Development Thought (Verso, 1994)
- Caroline Moser: Gender Planning and Development: theory, practice and training (Routledge, 1993)
- Nalini Visvanathan et al. (eds.): Women, Gender and Development Reader (Zed Books, 1997)

8.3. URP 6603: Rural Environment and Development

8.3.1. Course Summary

The world community now-a-days is striving to achieving the Sustainable Development Goals (SDGs). Students of this stream are mainly concerned with rural and regional development. In order to have a developed Bangladesh, eradication of poverty from rural areas is a must. On the hand, environment and development are interdependent. Competencies for achieving SDGs in order to achieving a developed rural Bangladesh will be achieved by the students by pursuing this very course. The course covers a range of topics including models of development, environmental concerns in development, integrated conservation and development projects, community-based resource management, global and ecological economics perspectives.

8.3.2. Course Objectives

The objectives of this course are to:

- Introduce models of development and environmental concerns in development
- Discuss environmental issues in developing countries
- Explore households and community perspectives on natural resource management (NRM)
- Learn economics of environment and development projects

8.3.3. Learning outcomes

At the end of the course the students will be able to:

- Explore the relation between economic development and environmental problems

- Identify property rights and household decision making issues in NRM
- Describe the problems and prospects of community based NRM

8.3.4. Course content

- Introduction to Economic Development and the Environment: what is development and what makes a 'developing' country ; basic development theory: poverty, inequality and population
- Environmental Issues in Developing Countries, An Overview: market and policy failures, poverty-environment trap and cumulative causation; cross-cutting themes & more complex arguments: population & poverty ; political ecology & ecological distribution conflicts
- Rural Households and Natural Resource Management (NRM): household decision-making and NRM; property rights and NRM; traditional natural resource management systems
- Agricultural Change and the Environment: Green Revolutions and agricultural transformation; agro-ecosystems and sustainable agriculture; opportunistic management in pastoral systems
- Community-based Resource Management, Social Capital and the Environment: prospects for community-based resource management; social capital and the environment; decentralization and NRM
- Protected Areas & Parks-People Conflicts: developing country perspectives on conservation; integrated conservation and development projects (ICDPs) vs. direct payments; protected area policies and local communities: parks-people conflicts
- Economics of Environment and Development Projects: valuation of environmental resources in developing countries; economic analysis of development projects with environmental impacts; Case Study
- Environment and the Economy: natural resource endowments and development; the Environmental Kuznets Curve; linking development and tropical deforestation

- International Trade & Policy Perspectives: the environment and agricultural trade liberalization; the "pollution haven" hypothesis; biodiversity conservation and debt-for-nature swaps; multilateral institutions and environmental learning

8.3.5. Reading list

- Barbier, E.B., "The role of natural resources in economic development", Australian Economic Papers 42(2): 253-72, 2003.
- Brandon, K.E. and Wells, M., "Planning for people and parks: design dilemmas", World Development, 20(4): 557-570, 1992.
- Conway, G.R., "Sustainable agriculture: the tradeoffs with productivity, stability and equitability", Economics and Ecology – New Frontiers and Sustainable Development, E.B. Barbier (ed.), Chapman & Hall: London, 1993.
- Dasgupta, S., Laplante, B., Wang, H., and Wheeler, D., "Confronting the Environmental Kuznets Curve", Journal of Economic Perspectives 16 (1): 147- 168, 2002
- Deacon, R.T. and Murphy, P., "The structure of an environmental transaction: the dept-for-nature swap", Land Economics 73(1): 1-24, 1997.
- Dedina, S. Saving the Gray Whale – People, Politics and Conservation in Baja, California, Tucson: University of Arizona Press, 2000.
- Dixon, J.A., Fallon Scura, L., Carpenter, R.A. and Sherman, P.B., Economic Analysis of Environmental Impacts, Earthscan: London, 1994; Chapters 3 & 4.
- Ellis, F., "The risk-averse peasant". Peasant Economics, Cambridge University Press: Cambridge, 1993.
- Escobar, A., "Whose knowledge, whose nature? Biodiversity, conservation, and the political ecology of social movements", Journal of Political Ecology 5: 55-82 , 1998.
- Ferraro, P.J. and Kiss, A., "Direct payments to conserve biodiversity", Science (29 November) 298: 1718 – 1719, 2002.
- Guha, R., "Radical American environmentalism and wilderness preservation: a third world critique"" Environmental Ethics. 11(1): 71-83, 1989.
- Gutman, G., "Agriculture and the environment in developing countries: the challenge of trade liberalisation",

The Environment and International Trade Negotiations – Developing Country Stakes, D. Tussie (ed.), IDRC: Ottawa, 2000.

- Mansuri, G. and Rao, V., "Community-based and –driven development: a critical review", The World Bank Research Observer 19 (1): 1-39, 2004.
- Migot-Adholla, S., Hazell, P., Blarel, B.and Place, F., "Indigenous land rights in SubSaharan Africa: a constraint on productivity?" The World Bank Economic Review. 5 (1): 155-175, 1991.
- Millennium Development Goals, United Nations website; available online at: http://www.un.org/millenniumgoals/
- Pretty, J. and Ward, H., "Social capital and the environment", World Development, 29(2): 209-227, 2001.
- Roy, A. The Cost of Living, Vintage Canada, 1999
- Scherr, S.J., "A downward spiral? Research evidence on the relationship between poverty and natural resource degradation", Food Policy 25: 479- 498, 2000.
- Tiffen, M., "Productivity and environmental conservation under rapid population growth: a case study of Machakos District", Journal of International Development 5(2): 207-223, 1993.

8.4. URP 6604: Rural housing and settlement

8.4.1. Course Summary

Rural housing and settlement is one of the most important indicators of rural development. The course aims to describe the characteristics and patterns of rural housing and settlement. Rural housing policies, programs and involvement of different organizations on rural housing provision and control of rural housing will also be discussed here.

8.4.2. Course Objectives

The objectives of this course are to:

- Knowledge on characteristics, nature and formation, the pattern of growth, living conditions, Classification of rural housing and settlement, Structure and building materials of rural housing
- Application of rural housing policies and programs in rural areas on Bangladesh
- Historical evolution of rural settlements

- Problems of rural housing and settlements and role of relevant organizations

8.4.3. Learning outcomes

At the end of the course the students will be able to:

- Explore the characteristics, growth pattern, structure and materials of rural housing in Bangladesh and South Asian countries
- Identify the linkage between rural settlement and employment opportunities
- Classify rural housing and settlements based on different criteria
- Critically analyze the role of authority involved with the control of rural housing and settlement of Bangladesh

8.4.4. Course content

- Definition, characteristics, nature and formation, the pattern of growth of rural housing and settlements
- Classification of rural housing and settlement
- Structure and building materials of rural housing
- Rural housing policies and programs
- Rural settlement and employment opportunities
- Rural housing and settlement of developed and developing countries.
- Rural housing and settlement of Bangladesh: historical evolution, types, pattern, use of materials, temporary and permanent settlement
- Residential, commercial, and farming settlements in rural areas
- Peasant family and their behavior
- Authority involved with the control of rural housing and settlement of Bangladesh
- Rules and regulations related to the control and development of rural housing and settlement of Bangladesh.

8.4.5. Reading list

- Ali, S. M., Rahman, M. S., & Das, K. M. (1983). Decentralization and people's participation in Bangladesh. Dhaka: National Institute of Public Administration.
- Asaduzzaman, M., & Westergaard, K. (1993). Growth and development in rural Bangladesh: A critical review. Dhaka: University Press.

- Clark, C., & Roy, K. C. (1995). Technological change and rural development in poor countries: Neglected Issues. Calcutta: Oxford University Press.
- CIRDAP, (2006). Current Status and Future Directions of Rural Development: CIRDAP Perspectives, Bangladesh
- Misra, R. P., & In Achyutha, R. N. (2016). Micro-level rural planning: Principles, methods and case studies
- Todaro, M. P. (1992). Economic development in the Third World. London: Longman

8.5. URP 6605: Rural Development Planning

8.5.1. Course Summary

The course focuses on Definition and Identification of rural settlements; Concept of Rural Development, the theories of rural land use and the economies of land use decision in agriculture and its classification system in rural areas. It also covers Institutions for the Provision of public goods and infrastructures in the rural areas; Community Development and self help projects; Relevance of millennium development goals (MGDs) to rural development planning. Concept of rural poverty; programs for the alleviation of rural poverty; public-private partnership (PPP) initiatives in the provision of rural infrastructure

8.5.2. Course Objectives

The objectives of this course are to:

- know the definitions of Rural Development Planning
- understand the characteristics of rural settlements
- historical account of population census in Bangladesh
- know the theories of Rural land use
- concept of rural poverty
- initiatives in the provision of rural infrastructure

8.5.3. Learning outcomes

At the end of the course the students will be able to:

- Conceptualize Rural Development planning as a field of study
- Explore the characteristics and features of rural settlement
- Von Thunnen agricultural land use model and its relevance to contemporary agricultural practice
- Conceptualize of rural poverty and its alienation approaches

8.5.4. Course content

- Introduction to Rural development planning: Definition of rural settlements, Concept of Rural Development
- History of population census in Bangladesh and Settlement Classification: Definition of Population Census, Urban settlement Classification, Settlement classification
- Concept of rural planning and rural development: Goals of rural development planning, Obstacles to Effective Rural Planning, Rural Planning Perspectives
- Rural Area: Characteristics and Problems
- Theories of Agriculture land use: Von Thunnen Agriculture Land Use Model
- Economies of land use decision in rural areas
- Agriculture and its classification system in rural area
- General Factors Controlling Agriculture production
- Conversion of agricultural land to other uses (e.g. Housing, Road Development, Industrial Establishment, Mineral Development, Institutional)
- Typologies of land Uses in Rural areas: Institutions for the provision of Public Goods and
- Infrastructure in Rural Areas, LG councils, CBOs, NGOs etc., Self-help project, community Development approach, Adaptation of the PPP approach in the provision of Rural Infrastructure

8.5.5. Reading list

- Asaduzzaman, M. (2007). Institutional analysis of rural development: A study of Bangladesh Rural Development Board (BRDB). Dhaka: Osder Publications.
- Bangladesh. (2002). LGED in development, 1996-97--2000-01. Dhaka: Local Govt. Engineering Dept., Local Govt. Division, Ministry of Local Govt., Rural Development & Cooperatives, Govt. of the People's Republic of Bangladesh.
- Chowdhury, R. H. (1980). Urbanization in Bangladesh. Dacca: Centre for Urban Studies.
- Fisher, J. H. (1993). Rural development and migration in Bangladesh.
- In Islam, T., & In Paul, A. (2019). Geography in Bangladesh: Concepts, methods and applications.
- Jashimuddin, M. (2011). Drivers of land use change and policy analysis in Bangladesh: Theory and policy

recommendations. Saarbrucken: Lambert Academic Publishing.

- Khan, A. A., & Bangladesh Public Administration Training Centre. (1988). Sustainability of rural development projects: A case study of Rural Development 1 Project, Bangladesh. Dhaka: Bangladesh Public Administration Training Centre.
- Khan, Z. R. (January 01, 1999). Decentralized planning and financing of rural development in Bangladesh. Regional Development Dialogue - 20(2) - 1999 - 43-57 : Tables.
- Murdrick, R. (1973) Nature of Planning and Plan in L, Kelvin and R, Murphy (eds) Concepts in Organisation Guidance, Little Brown, Boston PP 224-233
- Oyesiku, O.K. (2010) New Cities in Urban and Regional Development Planning. Longman,
- Lagos
- Palash, M. S., & Margraf Publishers und Morra Musik Verlagsges. mbH. (2015). Land use change from crop to fish farming in Bangladesh: Determinants and impacts on farm profitability.

8.6. URP 6606: Local Government Finance and Investments

8.6.1. Course summary

Local government finance is about the revenue and expenditure decisions of local governments. It covers the sources of revenue that are used by local governments such as taxes (e.g., property, income, sales), user fees, and intergovernmental transfers. It also includes ways of financing infrastructure using operating revenues and borrowing as well as charges on developers and public-private partnerships. Furthermore, local government finance also addresses issues around expenditures at the local level and the accountability for expenditure and revenue decisions, including the municipal budgetary process and capital investment planning. These issues will all be looked at within the context of the ongoing COVID-19 pandemic which has already had a significant impact on local government finances, the effects of which will continue through the current period of lockdown and beyond.

8.6.2. Course objectives

The course presents and discusses the key principles underlying effective local government finance as well as a range of analytical approaches for the economic and financial analysis of investment projects implemented by local governments under conditions of uncertainty.

8.6.3. Learning outcomes

By the end of this course, students should be able to:

- Understand the key principles and elements of local government finance including fiscal decentralization, revenue management, and capital investment planning.
- Understand and apply economic and financial analysis to investment projects relevant to local governments and incorporate uncertainty and probability in decision analysis.

8.6.4. Course content

- First, the course will present the key principles underlying effective local government finance frameworks within the context of intergovernmental fiscal relations and fiscal decentralization. It will review the main revenue sources available to local governments, the issues typically associated with such sources, and the key challenges associated with revenue management. The sources of revenue for local governments discussed include taxes, user fees, and intergovernmental transfers, as well as investment income, property sales, and licenses and permits. The course will also analyze the issues associated with the development of capital investments plans and the corresponding sources of funding. It will cover established and innovative instruments and mechanisms utilized by municipalities to leverage additional resources for financing capital investments through borrowing and accessing capital markets. It will look closely at debt management, creditworthiness, intergenerational equity, and the impact of funding from development partners.
- Second, the course will review some of the key decision analysis theories and approaches related to investment projects, with a focus on economic and financial analysis. The conceptual foundations of economic and financial Cost-Benefit Analysis will be addressed by reviewing the key microeconomic concepts that can be applied to the measurement of costs and benefits. The discounted cash

flow analysis principle will be applied to concrete examples of investment projects. Among other cash flow modeling, project lifetime period, net present value, discount rate, and risk will be reviewed. Excel spreadsheets will be used to build an investment decision-making framework related to a hypothetical toll road project and risk and sensitivity analysis will be carried out to incorporate uncertainty and probability in decision analysis.

8.7. URP 6607: Local level planning and development

8.7.1. Course Summary

Students of this course are expected to identify the theoretical concepts in the local level planning practices in Bangladesh. This course emphasizes on the concepts of Policy and strategic issues of growth pole, growth center, and rural center planning together to address the multidimensional issues of rural people through union/upazila planning. It introduces different methods of making locational decisions like spare capacity approach, threshold analysis approach, cost-benefit approach, imposed pattern approach. It will explain the role of Strategies for participatory planning for rural areas. It also familiarizes students with Rural infrastructure and associated technical considerations and level of services and policy options.

8.7.2. Course Objectives

It is expected that from the course, student will know the conceptual issues of local level planning & development. This course aims to introduce the challenges associated with local area development in planning perspective. Equipping students with tools and techniques for preparing union/upazila plan will be the major emphases of this course.

8.7.3. Learning Outcomes

After completing the course students are expected to be able to:

- Explore local problems and economic, social, cultural and political dynamics in village area;
- Design/Develop village level plan or union/upazila plan (including planning of services and facilities;

- Select the issues in local level planning in Bangladesh and Identify the spatial dimension of development

8.7.4. Course content

- Local-level planning: concepts and practices regarding Bangladesh. The starting point for village planning: village and region, analysis of village form and character, issues to be considered, demand and need, local service centers. Methods of making locational decisions: spare capacity approach, threshold analysis approach, cost-benefit approach, imposed pattern approach. Conservation and improvement. The design of new development. Social planning and issues: social capital, social mobilization, and empowerment of rural people, civil society, and pressure group. Planning villages: comprehensive village development program (CVDP), village resources book. Union plan book. Thana/Upazila plan book.
- Policy and strategic issues of growth pole, growth center, and rural center planning. Strategies for participatory planning for rural areas. Guidelines for local-level plans: divisional plan, district plan, thana plan, union plan, and village plan. Dissemination of information/monitoring and evaluation, and coordination of government programs at Thana/Upazila, union, and village level. Rural infrastructure: supply, demand, and impact of rural infrastructure; maintenance output and prevailing standards; technical considerations and level of services; authorities and legal aspects; resources mobilization issues and policy options. Rural infrastructure strategy: lessons and future directions.

8.7.5. Reading list

- Setty, Rural development: problems and prospects, Inter-India publications
- ESCAP & CIRDAP, Guidelines for rural centre planning,
- Assaduzzaman & westergat, Growth and development in rural Bangladesh, UPL
- R. I. Rahaman, Daridra o unayyan (poverty and development), BIDS
- H. A. Hye, Below the line, UPL
- Mahbub Ullah, Land livelihood and changes in rural Bangladesh, UPL

- LGED, Bangladesh: rural infrastructure strategy study, UPL
- H. A. Hye, Agrarian reform for Bangladesh
- M. Hossain, Agriculture in Bangladesh, UPL
- CIRDAP, Guidelines on IRD
- DFID, Sustainable rural livelihoods
- World Bank, Bangladesh: A proposed rural development strategy, UPL.

8.8. URP 6608: Regional Development Policy Issues and Analysis

8.8.1. Course summary

This course introduces students to a variety of theoretical concepts, analytical techniques and relevant policy issues useful for analyzing regions and their economies.

8.8.2. Course objectives

- Students will understand the theoretical justifications for the role of government in regional development and be able to apply these to the analysis of specific programs.
- Students will achieve a basic understanding of the theories of regional growth and development.
- Students will be able to use the basic tools of local economic analysis.
- Students will have a basic understanding of more advanced tools of economic analysis and be able to interpret the results of such analysis.
- Students will be able to evaluate the use of incentives for regional development.
- Students will be able to analyze a region and recommend specific strategies to address regional dev development issues.

8.8.3. Learning outcomes

Upon completion of this second class in the Regional Development Policy specialization, it is expected that students will have achieved a level of proficiency in the basic techniques of regional analysis that are essential to developing informed and rigorous regional policy.

The outcomes are 1) decision making of a regional economy and 2) policy evaluation and recommendations.

8.8.4. Reading list

(Costs of doing business when government does not work)

Artz, Georgeanne. 2003. “Rural Area Brain Drain: Is It a Reality?” Choices.4 th Quarter. Pp. 11- 16. http://www.choicesmagazine.org/2003-4/2003-4-03.pdf

Bartik, T. J. (1990). The market failure approach to regional economic development policy. *Economic development quarterly*, *4*(4), 361-370. db=aph&AN=22286167&site=ehost-live&scope=site Development Quarterly. 4(4):361-370. 1990.

Drabenstott, Mark. Rethinking Federal Policy for Regional Economic Development. Economic http://proxy.mul.missouri.edu:2048/login?url=http://search.ebscohost.com/login.aspx?direct=true& http://www.kc.frb.org/publications/research/er/er-2006.cfm

Malizia, E., Feser, E., Renski, H., & Drucker, J. (2020). *Understanding local economic development*. Routledge.

Partridge, Mark D and M. Rose Olfert. “Winners’ Choice: Sustainable Economic Strategies for Successful 21st Century Regions. Applied Economic Perspectives and Policy. 33(2): 143-178. 2011. http://proxy.mul.missouri.edu/login?url=http://dx.doi.org/10.1093/aepp/ppr006

Johnson, Thomas G. “Where is the Place in Space.” Review of Regional Studies. 32(1), 9-17. 2002.

Review. Federal Reserve Bank of Kansas City. 91(1): p115-142. 2006.

Shaffer, Hustedde and Pulver http://ncrcrd.msu.edu/uploads/files/133/ncrcrd-rrd186-print.pdf 3. P. Portney. 2004. "Obligations of a Policy Economist." Agricultural and Resource Economics Review 33(2):159-161. http://ageconsearch.umn.edu/bitstream/31271/1/33020159.pdf

Shaffer, R., Deller, S., & Marcouiller, D. (2006). Rethinking community economic development. *Economic development quarterly*, *20*(1), 59-74.

The Economist. “The Flicker of a Brighter Future.” The Economist. Sept. 9, 2006. Pp. 60-62.

8.9. URP 6609: Regional Economic Development Theory and Policy

8.9.1. Course objectives and learning outcomes

By completing this course, the student should be knowledgeable in the following areas:

1. Economic theories explaining the location of economic activities and the growth or decline of regional economies (multi-state regions, states, counties, communities).
2. Consequences of regional economic growth and development in terms of the distribution of benefits and costs across space and among local interest groups.
3. Public policies proposed to encourage local economic development and influence the distribution of benefits and costs resulting from development.
4. Shortcomings or trade-offs inherent with alternative public policies for local economic development.
5. "Hands on" experience with data and theory in a "real world" case study for an actual client relevant to the course.
6. Enhanced understanding and use of computer-based software.

7. Enhanced presentation skills.

8.9.2. Reading list

Meaning of development and some definitions

Edward L. Glaeser, David Laibson and Bruce Sacerdote. 2002 "An Economic Approach to Social Capital. The Economic Journal 112(483): F437 - F458

Fabio Sabatini. Social Capital and the Quality of Economic Development. KYKLOS, 61(3):466-499. 2008.

http://edq.sagepub.com/cgi/content/abstract/20/1/59

http://www.ers.usda.gov/Amberwaves/Feb03/Features/ruralamerica.htm

John Quigley. 2002. "Rural Policy and the New Regional Economics: Implications for Rural Areas." The New Power of Regions: A Policy Focus for Rural America. Federal Reserve Bank of Kansas City. May. www.KC.frb.org/PUBLICAT/PowerofRegions/RC02_Quigley.pdf

Leslie Whitener and David McGranahan. 2003. "Rural America: Opportunities and Challenges." Amber Waves, February 2003,

Putnam, Robert. 2002. "The Prosperous Community: Social Capital and Public Life." The American Prospect. Vol. 4, Issue 13, March 1993. http://www.prospect.org/web/page.ww?section=root&name=ViewPrint&articleId=5175

Ron Shaffer, Steve Deller and Dave Marcouiller. 2006. Rethinking Community Economic Development. Economic Development Quarterly. 20; 59-74

William Grunkemeyer and Myra Moss Key Concepts in Sustainable Development http://www.rri.wvu.edu/WebBook/Grunkemeyer-Moss/sustainable.htm#intro

The Regional Economic Development Landscape and Export Base

Bill Schaffer. "Regional Models of Income Determination: Simple Economic-Base Theory." Regional Research Institute, University of West Virginia, Chapter 2; pp.1-8. http://www.rri.wvu.edu/WebBook/Schaffer/chap02.htm

Edgar Hoover and Frank Giarratani. An Introduction to Regional Economics, Chapter 11, "How Regions Develop." http://www.rri.wvu.edu/WebBook/Giarratani/chaptereleven.htm

Edward Glaeser and Janet Kohlhase. "Cities, Regions and the Decline of Transport Costs". Papers in Regional Science, 83: 197–228. 2004.

Hughes, David W. "Policy Uses of Economic Multiplier and Impact Analysis." Choices. 2nd Quarter:25-30, 2003. http://www.choicesmagazine.org

Location decisions

David Barkley and Mark Henry. "Advantages and Disadvantages of Targeting Industry Clusters." REDRL Research Report 09-2001-01, Clemson University, 2001. (http://cherokee.agecon.clemson.edu/redrl_rpt3.pdf)

Edgar Hoover and Fran Giarratani. An Introduction to Regional Economics, Chapter 8, "The Location of Urban Places," http://www.rri.wvu.edu/WebBook/Giarratani/chaptereight.htm

Hoover, E. M., & Giarratani, F. (2020). An introduction to regional economics.

Theories of regional development

David Barkley, Mark Henry, and Shuming Bao, "Metropolitan Growth: Boon or Bane to Nearby Rural Areas," Choices, 1995

http://www.newyorkfed.org/research/conference/2009/jrs/presentations/Redding.pdf

Paul Krugman. Appendix in Development, Geography, and Economic Theory.

Paul Krugman. Page 39-65. In Development, Geography, and Economic Theory. 1995.

Regional and urban economics. Edwards, Mary E.: 2007, Core-periphery models

Stephen J. Redding. “The Empirics of New Economic Geography.” Centre for Economic Performance, London School of Economics. May 2009.

Note

Note

URP
Department of

Note