UNDERGRADUATE CURRICULUM (2023)

Department of Urban and Regional Planning (DURP)
Bangladesh University of Engineering and Technology (BUET)

TABLE OF CONTENTS

1. OUTLINES OF UNDERGRADUATE COURSES

Level: 01, Term: 01				
Course	**Title**	**Theo.**	**Ses.**	**Credit**
Hum 159	English	2	0	2.0
Hum 171	Microeconomics	3	0	3.0
Math 105	Mathematics-I	3	0	3.0
Plan 111	Human Settlements Development	3	0	3.0
Plan 163	Engineering Survey and Cartography	3	0	3.0
Plan 164	Engineering Survey Fieldwork	0	3	1.5
Plan 196	Introduction to Computer Application	0	3	1.5
Arch 108	Basic Design	0	3	1.5
Arch 118	Graphics for Planners	0	3	1.5
Total		**14**	**12**	**20.0**

Level: 01, Term: 02				
Course	**Title**	**Theo.**	**Ses.**	**Credit**
Chem 129	Basic Environmental Chemistry	2	0	2.0
Hum 173	Macroeconomics	3	0	3.0
Math 107	Mathematics-II	3	0	3.0
Plan 113	Fundamentals of Planning	2	0	2.0
Plan 193	Statistics I	2	0	2.0
Plan 106	Communication and Presentation Skills	0	6	3.0
Plan 166	Cartography Studio	0	3	1.5
CSE 170	Introduction to Programming	0	4	2.0
Total		**12**	**13**	**18.5**

Level: 02, Term: 01				
Course	**Title**	**Theo.**	**Ses.**	**Credit**
Hum 233	Sociology (Optional)	3	0	3.0
Hum 271	Social Psychology (Optional)	3	0	3.0
Plan 211	Urban Planning Principles	3	0	3.0
Plan 213	Site Planning and Design	3	0	3.0
Plan 293	Statistics II	3	0	3.0
Plan 295	Introduction to Operations Research	3	0	3.0
Plan 204	Social and Physical Surveys	0	6	3.0
Plan 298	Data Analytics	0	6	3.0
Total		**15**	**12**	**21**
(One optional course to be taken in this term)				

Level: 02, Term: 02				
Course	**Title**	**Theo.**	**Ses.**	**Credit**
Hum 223	Public Finance (Optional)	2	0	2.0
Hum 227	Accounting (Optional)	2	0	2.0
Hum 263	Political Science and Local Government	3	0	3.0
Plan 215	Urban Planning Techniques	3	0	3.0
Plan 263	Geographic Information System (GIS)	2	0	2.0
WRE 215	Introduction to Water Resources Planning	3	0	3.0
Plan 214	Site Planning and Design Studio	0	6	3.0
Plan 282	Participatory Planning Studio	0	6	3.0
CSE 272	Database Management Sessional	0	3	1.5
Total		**13**	**15**	**20.5**
(One optional course to be taken in this term)				

Level: 03, Term: 01				
Course	**Title**	**Theo.**	**Ses.**	**Credit**
Arch 333	Landscape Planning and Design	2	0	2.0
CE 369	Civil Engineering Materials and Structural Forms	3	0	3.0
Plan 323	Housing and Affordability	3	0	3.0
Plan 343	Traffic and Transportation Study	3	0	3.0
Plan 365	Remote Sensing and Photogrammetry	2	0	2.0
Plan 312	Urban Planning Studio	0	6	3.0
Plan 324	Housing and Community Development Studio	0	3	1.5
Plan 364	GIS Studio	0	6	3.0
Total		**13**	**15**	**20.5**

Level: 03, Term: 02				
Course	**Title**	**Theo.**	**Ses.**	**Credit**
CSE 371	Machine Learning and Data Science	2	0	2.0
Plan 331	Rural Development Planning	3	0	3.0
Plan 333	Regional Development Planning	3	0	3.0
Plan 345	Transportation Policy and Planning	3	0	3.0
Plan 351	Environmental Planning and Management	3	0	3.0
Plan 304	Workshop on Legal Basis of Planning	0	3	1.5
Plan 366	Remote Sensing and Photogrammetry Studio	0	3	1.5
Arch 326	Landscape Planning Studio	0	3	1.5
CSE 372	Machine Learning and Data Science Sessional	0	3	1.5
Total		**14**	**12**	**20.0**

Level: 04, Term: 01				
Course	**Title**	**Theo.**	**Ses.**	**Credit**
Arch 445	Urban Design	3	0	3.0
CE 471	Basic Environmental Engineering (Optional)	3	0	3.0
Plan 400	Thesis	2	0	2.0
Plan 405	Project Planning and Management	3	0	3.0
Plan 423	Real Estate Development and Management (Optional)	3	0	3.0
Plan 443	Regional Transport Planning (Optional)	3	0	3.0
Plan 455	Hazards and Disaster Management	3	0	3.0
Plan 404	Leadership and Negotiation Skills	0	3	1.5
Plan 432	Rural Planning Studio	0	3	1.5
Plan 446	Transportation Planning Studio	0	6	3.0
Plan 470	Internship (Non-Credit)	-	-	-
Total		**14**	**12**	**20.0**
(One optional course to be taken in this term)				

Level: 04, Term: 02				
Course	**Title**	**Theo.**	**Ses.**	**Credit**
CE 409	Engineering Geology and Geomorphology (Optional)	3	0	3.0
CE 459	Transportation Engineering for Planners (Optional)	3	0	3.0
Plan 400	Thesis	4	0	4.0
Plan 407	Planning Practices in a Globalizing World	2	0	2.0
Plan 415	Planning of Utility and Municipal Services (Optional)	3	0	3.0
Plan 417	Tourism Planning and Management (Optional)	3	0	3.0
Plan 457	Climate Resilient Development (Optional)	3	0	3.0
Plan 477	Sustainability and Development (Optional)	3	0	3.0
Plan 402	Project Planning Studio	0	6	3.0
Plan 434	Regional Planning Studio	0	6	3.0
Total		**12**	**12**	**18.0**
(Two optional courses to be taken in this term of which, one must be from the Planning Department)				

2. DETAIL DESCRIPTION OF THE COURSES

2.1 COURSES FROM URP DEPARTMENT

Plan 106: Communication and Presentation Skills

3.0 credits; 6 hours/week sessional

Protocols, skills and techniques of communication and presentation: oral and audio-visual. Report preparation: writing and organizing the contents, citation and referencing. Etiquettes and protocols for professional communication: written and verbal. Professional portfolio development.

Plan 111: Human Settlements Development

3.0 credits; 3 hours/week theory

The origin and evolution of human settlements. Cities and civilizations of pre-industrial period (ancient, classical, medieval and neoclassical). Pre-industrial settlement planning in Islamic towns, Chinese towns. The emergence of post-industrial cities and their planning concepts.
Cities and civilizations in Bengal. Historic development and growth of settlements in Bangladesh. Growth of Dhaka from pre-Mughal period to independence.
Concept of urbanization, urban growth and urban area. Terminologies- mega city, primate city, metropolis, urban agglomeration, conurbation, suburb, fringe area etc.

Plan 113: Fundamentals of Planning

2.0 credits; 2 hours/week theory

Concepts of planning- definition and purpose. Domains of planning- spatial and sectoral planning. Purposes and objectives of spatial planning. The stages of planning process. Roles of planners. Stakeholders in the planning process. Ethics in planning profession.

Approaches of planning: traditional/comprehensive approach, structure/strategic approach, systems approach, advocacy planning, participatory planning. Planning process and role of relevant institutions in Bangladesh.

Plan 163: Engineering Survey and Cartography

3.0 credits; 3 hours/week theory

Purposes and aspects of engineering survey. Area and volume calculations. Reconnaissance survey. Traditional survey methods. Traverse survey. Levelling and contouring. Global Positioning Systems (GPS) and RTK survey. Introduction to photogrammetry. Drone survey and survey preparation.

Introduction to cartography. Types of maps based on scale and purpose; Types of maps commonly used in Bangladesh and its history. Component of maps. Map composition. Qualitative and quantitative data visualization techniques. Geodesy and map projection: Model of earth's shape, datum, map projections techniques, coordinate system. Web mapping and interactive map. Mobile mapping. Map analysis and map interpretation.

Plan 164: Engineering Survey Fieldwork

1.5 credits; 3 hours/week sessional

Introduction to field survey, reconnaissance surveying, chain surveying, plane table surveying, level and levelling, contouring, traverse surveying, and modern survey techniques.

Plan 166: Cartography Studio

1.5 credits; 3 hours/week sessional

Studio works related to cartography: map making and composition, spatial data visualization, and map interpretation.

Plan 193: Statistics I

2.0 credits; 2 hours/week theory

Basic concepts of statistics: Descriptive and inferential statistics, population, sample, variable, data, parameter, statistic, and levels of measurement. Organizing and graphing qualitative and quantitative data: frequency distribution and graphical presentations. Measures of central tendency: Mean, median, mode. Measures of dispersion: Range, 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.

Plan 196: Introduction to Computer Application

1.5 credits; 3 hours/week sessional

Document preparation in word processor. Preparing visual presentations in PowerPoint and/or relevant software. Basic spreadsheet operations and functions; creating, editing, and updating a spreadsheet; query and retrieval of data; visualizing and summarizing data.

Plan 204: Social and Physical Surveys

3.0 credits; 6 hours/week sessional

Introduction to social and physical surveys: Definition, purposes and applications. Relationship between hypothesis and survey objectives, and preparation of coordination schema. Social survey: questionnaire preparation, sampling, piloting, and data collection. Physical survey: Preparation of checklist, and data collection. Secondary data collection. Ethical and legal considerations in survey works. Data processing and analysis.

Plan 211: Urban Planning Principles

3.0 credits; 3 hours/week theory

Definition, scope and objectives of urban planning. Urban planning and sustainable development. Urban land use values and components. Principles of land use analysis: functional space, activity system (land use-transport interaction), developability and imageability. Spatial structure of cities with emphasis on that of South Asian cities. Forms of urban areas.

Land use planning principles for- City centre, residential area, commercial area, industrial area, public space, open/green space, urban water bodies, historic site and healthy city.

Plan 213: Site Planning and Design

3.0 credits; 3 hours/week theory

Introduction to site planning: site planning process, types of site development, site selection and analysis, natural, cultural and aesthetic factors. Site microclimate: air movement, shadow, heat exchange, sun angle. Noise in site. Site drainage and rainwater harvesting, grading and earthwork. Solid waste and sanitation. Landscape components: plant material and sensed landscape. Subdivision planning: zoning, block and plot design, FAR and setback, street and parking design. Utilities: water supply, energy and power, internet. Design principles for residential neighbourhood, commercial and industrial sites.

Plan 214: Site Planning and Design Studio

3.0 credits; 6 hours/week sessional

Applications of site planning and design principles for residential, commercial and/or other types of sites. Application of drawing and visualization software for site planning and design.

Plan 215: Urban Planning Techniques

3.0 credits; 3 hours/week theory

Importance of land classification and the land classification system. Land use plan-making process. Data and information needed for land use planning. Land development techniques: site and services scheme, settlement upgradation, urban renewal, land readjustment, land sharing. Satellite town and new town. Land development control and management. Patterns of urban development from sustainability perspectives: sprawl vs. compact development. Smart growth principles. Global trend of urbanization. Nature and trend of urbanization in Bangladesh. Sustainable development goals in the urban context of Bangladesh.

Plan 263: Geographic Information System (GIS)

2.0 credits; 2 hours/week theory

Introduction to Geographic Information System (GIS) and its application in planning. Geo-data models: Vector and raster data structures. Geo-referencing and projection. Geodatabase: Topological relationship and errors in GIS data. Spatial Data Analysis: Characteristics of spatial objects. Measurement: Measuring shape and distance. Reclassification and filters. Surface Analysis: Interpolation techniques. Spatial arrangement: Pattern analysis. Network Analysis. Buffer and overlay.

Plan 282: Participatory Planning Studio

3.0 credits; 6 hours/week sessional

Introduction to participatory planning: Importance and approaches. Participatory Rural Appraisal (PRA): Key concepts and types. Methods of data collection and analysis: Space related PRA methods, time related PRA methods, PRA relation methods, and others. Role of facilitators in FGD and KII.

Demonstration and application of different types of PRA methods through field works by students in groups.

Plan 293: Statistics II

3.0 credits; 3 hours/week theory``

Introduction to hypothesis testing. Statistical inferences about means, standard deviations and proportions. Analysis of variance. Chi-Square test. Nonparametric tests for two and more than two samples.

Pearson correlation. Simple linear regression: least-squares equation, goodness-of-fit criteria, standard errors, significance tests for coefficients, simple curvilinear regression by variable transformation.

Forecasting methods: Time Series Analysis (secular trend, cyclical variation, seasonal variation, irregular changes). Population projection methods: Aggregate approaches (trend line methods, comparative method, ratio method, multiple regression method) and composite approaches (population composition, cohort survival method, residual method of migration forecasting).

Plan 295: Introduction to Operations Research

3.0 credits; 3 hours/week theory

Introduction to Operations Research. Operations Research Modelling Approach: linear programming models, graphical method, simplex method, theory of simplex method, duality theory and sensitivity analysis. Graph theory. Network optimization models. Analytical Hierarchy Process (AHP). Game theory. Fundamentals of simulation techniques. Queuing theory. Decision analysis and assignment problems.

Plan 298: Data Analytics

3.0 credits; 6 hours/week sessional

Introduction to the data analytics software. Data preparation: data input, screening, storage, etc. Application of statistical techniques for analysing planning issues: descriptive statistics, data visualization, parametric and nonparametric hypothesis testing, regression modelling, and time series data analysis.

Plan 304: Workshop on Legal Basis of Planning

1.5 credits; 3 hours/week sessional

Introduction to the legal aspects of planning and its importance. Concepts of Law, Act, and Rules. Concepts of Justice. Need for legislation in plan making process. Development control, planning permission and approval process, and enforcement of planning controls. Legal tools to guide and regulate development: betterment fees, and green tax, Transfer of Development Rights, legal aspect of urban renewal, regeneration, and TOD development. Land management in Bangladesh: land surveys and records, transfer, and taxation. Land acquisition and compensation rules and regulations. Application of planning and relevant laws (e. g., TI Act, Water bodies Act, BNBC etc.) in Bangladesh and in different countries through review of documents and court cases.

Plan 312: Urban Planning Studio

3.0 credits; 6 hours/week sessional

Studio works related to the courses Plan 113: Fundamentals of Planning, Plan 211: Urban Planning Principles, and Plan 215: Urban Planning Techniques. Group projects and field works on urban planning will be conducted.

Plan 323: Housing and Affordability

3.0 credits; 3 hours/week theory

Introduction and concept of housing. Housing and Development: Social, physical, economic, health and cultural aspects of housing. Role of various stakeholders. Housing as a process vs housing as a product. Housing typology in rural and urban context. Life cycle Model of Housing; Types and nature of occupancy. Type of ownership and delivery system. Typology of residential built forms. Housing demand estimation. Challenges of housing in Bangladesh. Nature of housing problems in Bangladesh and scopes for housing development (including real estate development). Housing Policy, sectoral strategies and plans. Housing as a right: national and international commitments for housing.

Accessibility to housing by different income groups. Housing Affordability: Concepts, approaches and case studies at home and abroad. Tenure Security. Low Income Housing: Slums and squatters, role of stakeholders, Rehabilitation and Resettlement. Homelessness and floating population. Housing finance and resource mobilization. Social programme and policies for low-income housing at home and abroad. Social Housing**.**

Plan 324: Housing and Community Development Studio

1.5 credits; 3 hours/week sessional

Concepts of community, community development and stakeholders. Relationship of housing with neighbourhood planning and community development: physical, spatial, social, economic, political and cultural aspects. Neighbourhood functions, service facilities and their standards.

Studio works related to the courses Plan 323: Housing. Group projects and field works on Housing and Community Development will be conducted.

Plan 331: Rural Development Planning

3.0 credits; 3 hours/week theory

Concepts of community, community development and stakeholders. Relationship of housing with neighbourhood planning and community development: physical, spatial, social,

economic, political and cultural aspects. Neighbourhood functions, service facilities and their standards.

Studio works related to the courses Plan 323: Housing. Group projects and field works on Housing and Community Development will be conducted.

Plan 333: Regional Development Planning

3.0 credits; 3 hours/week theory

Need and scope of regional planning. Inter- and intra-regional planning. The region in regional planning: Concept of region, regionalization and the delineation of planning regions. Regional economic structure analysis: regional accounts, economic base theory, inter regional trade multiplier, input-output model, aggregate and disaggregated models of regional growth. Regional spatial structure analysis: Industrial location theories, Central Place Theory, Growth Pole Theory. Spatial interaction model. Migration and regional productivity.

Regional disparity analysis. Regional competitiveness and regional resilience. 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, etc. Economic and Spatial Policy instruments. Regional planning practice: case studies at home and abroad.

Plan 343: Traffic and Transportation Study

3.0 credits; 3 hours/week theory

Elements of transportation system. Characteristics of different modes (public transport, paratransit, private transport, active transport, etc.). Parking. Hierarchy of roads. Concepts of roadway capacity. Traffic characteristics. Fundamental parameters of traffic flow and their interrelationships. Traffic management. Roadway geometric design: Road design factors, Cross-sectional elements of roadway and their design standards, and intersections. Basic railway geometric features.

Transportation and land use: Impact of urban form on transportation and travel pattern. Relationship between land use and transportation. Integrated transportation and land use planning practices (e.g., smart growth, compact development, TOD, etc.). Case studies on transportation-land use interrelationships. Traffic and transportation surveys: traffic count survey, O-D survey, parking survey, public transport survey, speed survey, household interview survey, inventory of physical infrastructure, etc.

Plan 345: Transportation Policy and Planning

3.0 credits; 3 hours/week theory

Transportation policy: History and evolution of transportation system in Bangladesh. Institutional structure for transportation planning, decision-making, implementation, and management in Bangladesh. Transportation policy formulation process. Issues and debates in urban, regional, and national transport policy. Transport related policies and acts in Bangladesh. Global and national policies for public transportation, NMT, micro-mobility, mobility and accessibility, transportation equity, sustainable mobility, public engagement, Mobility as a Service (MAAS), etc.

Urban transportation planning: Transportation planning process in urban area. Fundamentals of transport demand and supply analysis. Travel demand modelling (trip generation, trip distribution, modal split, and trip assignment). Travel demand management. Performance evaluation of transportation projects and evaluation of alternatives. NMT planning and management. Planning of public transportation (e.g., bus, MRT, rail, etc.) systems, their operation, fare policy, and management.

Plan 351: Environmental Planning and Management

3.0 credits; 3 hours/week theory

Introduction to environmental planning and management. Concepts of environmental planning: ecoplanning, green infrastructure, environmental footprint etc. Tools and techniques for environmental planning: bio-top area factor, green factor, green space factor etc. Initial Environmental Examination (IEE), Environmental Impact Assessment: definition, process, importance in planning, Environmental Management System (EMS), Strategic Environmental Assessment (SEA). Planning and managing Environmentally Critical issues: watershed management, environmental pollution, urban forest and urban agriculture, planning hazardous service and industry, faecal sludge management. Environmental policies and sustainability. Environmental policy instruments (Regulatory, market based, voluntary and information based instruments). Institutional framework of environmental planning and management in Bangladesh: policy, act, plan and rules.

Plan 364: GIS Studio

3.0 credits; 6 hours/week sessional

GIS database preparation; Processing and management of vector and raster data models; Spatial analysis tools: Extraction, Overlay, Spatial analyst, Spatial statistics; Network analysis,

Geocoding, Map layout preparation in GIS software, 3D GIS, Web GIS, Case studies on GIS application.

Plan 365: Remote Sensing and Photogrammetry

2.0 credits; 2 hours/week theory

Concept of remote sensing and its application; Image acquisition: typology of remotely sensed image, data collection platforms, characteristics of image and its application. Principles and techniques of photogrammetry: geometric characteristics, measurement and correction of remotely sensed image; Image processing: geometric correction and radiometric correction; Image classification (supervised, unsupervised and others), interpretation and accuracy assessment.

Plan 366: Remote Sensing and Photogrammetry Studio

1.5 credits; 3 hours/week sessional

Remote Sensing (RS) image acquisition: data source and data collection process. RS data correction and processing: geometric correction and radiometric correction, georeferencing, map preparation, shapefile creation, spatial filtering techniques. RS image classification: supervised, unsupervised, and other types of classification methods. RS image Analysis: land cover analysis, analysis using different types of indexes (e.g., NDVI, NDBI, NDWI, etc.), water resource management (e.g., surface water management, watershed analysis, etc.), disaster and hazard analysis, Digital Elevation Model (DEM) (e.g., slope, aspect, hillshade, curvature, contour, etc.).

Processing and mapping of Unmanned Aerial Vehicle (UAV) survey data: point cloud, Orthophoto/Orthomosaic, Digital Surface Model (DMS), Digital Terrain Model (DTM), 3D Model.

Plan 400: Thesis

6.0 credits; 6 (2+4) hours/week/term (for 2 terms)

Studies on topics related to urban and regional planning, development, or policy issues. Individual and/or group studies on a chosen topic.

Plan 402: Project Planning Studio

3.0 credits; 6 hours/week sessional

Preparation of concept note, Terms of Reference (ToR), Development Project Proposal (DPP), Technical Proposal and Financial Proposal considering the content of PLAN 405.

Plan 404: Leadership and Negotiation Skills

1.5 credits; 3 hours/week sessional

Concepts, types and theories of negotiation. Problems in negotiation process. Negotiation approaches. Stages of negotiation. Styles of negotiation and style selection. Tools for negotiation: SWOT and Best alternative to a negotiated agreement (BATNA).

Concepts and theories of leadership. Leadership as a form of social influence - negotiation, dispute resolution and policy design. Leadership styles and skills. Leadership Ethics. Stakeholder engagement and team leadership for decision making and policy design and delivery.

Demonstration and application of different types, approach, styles of negotiation and leadership, in individual and group projects/assignments.

Plan 405: Project Planning and Management

3.0 credits; 3 hours/week theory

Definition, scope and typologies of Policy, Plan, Program, and Project, Policy and Project Cycle, Tools for policy implementation; Definition, functions and steps project management; Project Planning: Logical Framework Analysis, Risk Management, Scheduling, Estimating. Project Monitoring, Evaluation, Review; Project Appraisal; Project Planning in Bangladesh, Procurement Management.

Introduction to project evaluation, The Time Value of Money: Future and present value of a single amount, Annuity, Compounding and Discounting; Investment Criteria: NPV, BCR, IRR, Urgency, Payback period; Project Risk Analysis: Sources, measures and perspectives on risk, Sensitivity analysis, Social Cost-Benefit Analysis: Rationale and approaches for SCBA; Network Techniques for Project Management: Development of project network, Time estimation, Determination of the critical path, PERT model, CPM model.

Plan 407: Planning Practices in a Globalizing World

2.0 credits; 2 hours/week theory

Globalization and its principle characteristics. History of globalization. Globalization and its impacts. Global network of cities. Nexus between global forces and local contexts: economic, technological, cultural and political perspectives. Global challenges at local contexts in different sectors (housing, transport, water and sanitation, public spaces, energy etc.).

Planning practice in Bangladesh: Institutional framework, planning approaches, plan implementation, plan monitoring. Political culture of planning in Bangladesh. Review of

development plans (prepared by development authorities, city corporations, paurashava) in the face of global and local forces.

Plan 415: Planning of Utility and Municipal Services

3.0 credits; 3 hours/week theory

Planning of utility services: importance, characteristics, steps, issues, and challenges, including asset management and cost recovery. Operation of utility systems: drainage, electricity. Planning and management of utility services: water, sanitation, drainage, electricity, gas, telecommunication, and internet. Sustainability aspects of utility systems. Utility service scenario in Bangladesh. Case studies in utility services.

Types of municipal services: street lighting, solid waste management, parks and open spaces, graveyards, slaughter house, public toilet, public health, local market, disaster management. Economic Concepts of Infrastructure, Financing of Infrastructure.

Plan 417: Tourism Planning and Management

3.0 credits; 3 hours/week theory

Fundamental concepts of Tourism; Components of Tourism and Tourism Management: Type of Tourist, Natural Resources and Built Environment, Transportation, DMO, tourism services, Safety and Security, Information Technology etc, Theory of Tourism (Boullón's Theory of Touristic Space, Leiper's tourism system); Hard and soft dimensions of tourism, Types of tourism: – Ecotourism, Nature-based tourism, Wildlife tourism, Agri-tourism, Urban tourism; Impacts of tourism development: Economic, Socio-Cultural, Environmental. Factors influencing demand of tourism.

Approaches to Tourism Planning: Boosterism, Economic/ industry-oriented approach, physical/spatial approach, community-oriented approach, sustainable tourism approach; Management strategies of Urban, Coastal, Nature-Based and Heritage of tourism; Institutional aspects of Tourism Management in Bangladesh.

Plan 423: Real Estate Development and Management

3.0 credits; 3 hours/week theory

Concepts of Real Estate. Nature and History of real estate development in Bangladesh. Stakeholders and real estate market. Planning considerations for real estate development: Factors affecting location and land value capture, land-use plans/policies. Regulatory and institutional aspects for commercial real estate development and the developers. Real Estate

and Property Laws in Practice: nature of law and law of contract. Real estate instruments: contract, deed, lease, mortgage, broker and brokerage.

Property law – land tenure, third party rights, Issues like boundary, neighbour, conflict avoidance. Real Estate Development and Climate Change. Real Estate and Affordable housing. Professional regulation and ethics.

Real estate economics: relationships between macroeconomics and property cycles, characteristics of supply and demand. Real estate trade cycle (both long term and short term). Financial issues and risks involved in development corporate real estate project. Evaluation of real estate projects- cost estimation, feasibility study, environmental impact statement, implementation, monitoring and management. Real estate entrepreneurship – construction, use, development and property consultancy. Real Estate Investment, finance and mortgage market.

Plan 432: Rural Planning Studio

1.5 credits; 3 hours/week sessional

Challenges and opportunities of development in rural areas. Individual or group projects related to the course Plan 331: Rural Development Planning, involving application of planning techniques.

Plan 434: Regional Planning Studio

3.0 credits; 6 hours/week sessional

Exploring the scope of regional planning in Bangladesh. Delineating planning regions. Short-term and long-term regional analysis. Individual or group projects involving the application of regional planning techniques.

Plan 443: Regional Transport Planning

3.0 credits; 3 hours/week theory

Planning and operation of inter-regional travel modes and terminals, including road, rail, water, and air transport. Regional transportation planning process. Corridor planning. Rural transport planning. Traffic Impact Assessment (TIA). Intelligent Transportation System (ITS). Transportation finance and funding. Feasibility study of transportation projects. Key issues and challenges of Bangladesh transport sub-sectors: road, railway, IWT, and air.

Freight transportation: Key concepts and terms. Impact of freight flows on the community, freight sector, and transportation system. Role of freight transportation in supply chain and logistics. Institutional arrangement for freight transportation. Freight transportation systems

planning. Types of freight. Characteristics of freight transportation modes and terminals. Sustainable freight transportation. Warehouse and ICD planning and management. Port planning and management. Transborder and cross-border freight transportation. Key issues and challenges in freight transportation in Bangladesh.

Plan 446: Transportation Planning Studio

3.0 credits; 6 hours/week sessional

Traffic simulation and modelling: Evaluation of alternatives, travel demand modelling, etc. using state-of-the-art traffic simulation and modelling software.

Case studies and policy reviews related to transportation studies and planning. Individual/group projects on transportation planning that involve designing and conducting traffic and transportation surveys, analysing data, and preparing policies and plans.

Plan 455: Hazards and Disaster Management

3.0 credits; 3 hours/week theory

Introduction to the concepts of hazard and disaster; Types of natural and man-made hazards; Integration of development and disaster management; Disaster Management Models: Traditional, Expand-Contract model, Pressure and Release Model (PAR); Nature, impact, mitigation and adaptation strategies for different hazards: Cyclone, Tornado, Flood, Earthquake, Riverbank erosion, Drought; Climate change impacts at global and local context; Climate change adaptation/mitigation strategies and plans; Risk Reduction Strategies; Risk Sensitive Land Use Planning (RSLUP); Institutional framework for disaster management in Bangladesh.

Plan 457: Climate Resilient Development

3.0 credits; 3 hours/week theory

Climate change and development; Climate change impacts on different sectors of Bangladesh. Concepts of vulnerability, mitigation, adaptation, resilience; Framework of climate resilient development; Climate and gender; Climate and pro-poor development; Climate migrant; Approaches for climate adaptation: Nature-based solution, ecosystem services, community based solution. Climate resilient built environment; Climate proofing tools; Case studies on climate resilient development in different sectors.

Global context of climate change: Scenarios of climate change impacts, strategies for action, platforms for interaction, treaties. Institutional and legislative framework for climate change in Bangladesh. Policy, plans; strategies and tools for mitigation adaptation in Bangladesh:

NAP, Delta plan, BCCSAP, CCGap, Mujib Prosperity Plan, NDC, NCVA). Climate adaptation mitigation projects in Bangladesh. Climate finance in Bangladesh context.

Plan 470: Internship

Non-credit; 4 weeks

Four weeks of internship in planning related organizations to gain practical knowledge in the field of planning.

Plan 477: Sustainability and Development

3.0 credits; 3 hours/week theory

Concept of sustainability and its evolution; relevant international treaty and conventions; Key terminologies relevant to sustainability (ecosystem services, carrying capacity, ecological footprint, biodiversity, circular economy, nature based solutions); Tools for sustainability assessment: Carrying capacity assessment, Resource assessment, Sustainability appraisal (SA);

Concepts of development and associated aspects; Sustainable development goals (SDG) 2016-2030; Integration of SDGs in national and local level plans of Bangladesh; Sustainability and development sectors (e.g. housing, transportation, manufacturing, water and sanitation, Gender equality, Health, Food security, Education); Localization of SDGs: process and case studies.

2.2 COURSES FROM ARCHITECTURE DEPARTMENT

Arch 108: Basic Design

1.5 credits; 3 hours/week sessional

Understanding the relationship of form and space; Evolution of forms and their nature; Exercise on composition, i.e., points, straight lines and curves, and geometric shapes; Use of principles of design i.e., Contrast, Balance, Emphasis, Proportion, Hierarchy, Repetition, Rhythm, Pattern, White space, Movement, Variety, Unity.

Arch 118: Graphics for Planners

1.5 credits; 3 hours/week sessional

Lettering, mechanical and freehand drawings; Use of scale and instruments; Sectional and isometric views of solid geometric figures, plan, elevation, and section; One and Two-point perspectives.

Arch 326: Landscape Planning Studio

1.5 credits; 3 hours/week sessional

Study and analysis of landscape systems and attributes of terrain on a local and regional scale. Landscape systems, culture and economy informed landscape planning strategies. Application of appropriate planning strategies to attain aspired and resilient local and regional landscape planning schemes.

Arch 333: Landscape Planning and Design

2.0 credits; 2 hours/week theory

Introduction to landscape planning and its scope; Historical references of landscape planning and design; Contemporary landscape planning theories; Landscape systems within terrain; Ecological awareness; Landscape planning and climate change; Landscape systems responsive renewable energy; green-blue terrain conservation and restoration; Built infrastructure and human settlement within the dynamic terrain.

Arch 455: Urban Design

3.0 credits; 3 hours/week theory

Historical overview of Urban Design- from tree dwelling to renaissance; Definition of Urban Design, its aims and objectives; Elements of Urban Design: Space, Mass, Activities; Design Principles: Unity, Scale Proportion etc. and their application in urban design; Urban aesthetics; Urban spaces and their types and perception; City planning and design according to artistic principles, approaches, and level of analysis.

2.3 COURSES FROM HUMANITIES DEPARTMENT

Hum 159: English

2.0 credits: 2 hours/week theory

Various approaches to learning English. Grammar and usages. English speech sounds, stress and intonation. Reading skills: discussing readability, scan and skim reading, generating ideas through purposive reading. Writing skills: principles of effective writing, organization in writing, planning and development, composition, Précis, expansion of ideas. Writing process: generating ideas, identifying audiences and purposes, constructing arguments, stating problems, drafting and finalizing. Writing styles: descriptive, narrative, comparison and contrast, and cause and effect. Approaches to oral communication with special emphasis on dialogue and oral presentation. Business correspondence: tenders and quotations,

promotional letters, claim and adjustment letters. Short Stories written by some well-known classic writers.

Hum 171: Microeconomics

3.0 credits; 3 hours/week theory

Introduction to microeconomics; fundamental economic problems; utility analysis; demand and supply analysis; market equilibrium; elasticity of demand and supply; price effect and consumer surplus. Indifference curve analysis: marginal rate of substitution, price line, and optimal consumption point. Theory of production: laws of returns to scale, marginal analysis, optimization, and profit maximization. Costs of production: short run and long run, types of costs, and cost curves. Market structure: classification of the market; price and output under different market structures. Theory of distribution: marginal productivity theory, equity in income distribution.

Hum 173: Macroeconomics

3.0 credits; 3 hours/week theory

The concept of macroeconomics. National income accounting. Types of unemployment. Classical and modern theories of employment. Inflation: Concept of inflation, measures for controlling inflation. Consumption and investment functions. Goods market equilibrium, the IS curve. Keynesian Multiplier and Accelerator. Money and interest: the demand for money, supply of money, alternative theories of demand for money. Interest rate determination through money market equilibrium, the LM curve. A general equilibrium model such as IS/LM and three-equation. Different aspects of an open economy. Fiscal policy and monetary policy.

Hum 233: Sociology

3.0 credits; 3 hours/week theory

Nature and scope of Sociology. Sociology and urban planning. Social evolution, culture and civilization. Family and socialization. Social stratification. Population and resources. 4th Industrial Revolution, human interaction and Urban Sociology. Crime and deviance. Environment and urban ecology. Sociology of development and underdevelopment. Globalization and social change.

Hum 271: Social Psychology

3.0 credits; 3 hours/week theory

Introduction to Social Psychology. The Nature of Social Psychology. Social factors in perceptual cognitive processes: Social perception; person perception. Social attitudes: The nature of

attitude; the formation of attitude; the change of attitude. Process of social learning; Socialisation and family structure. Emerging norms and conformity. Leadership.

Youths and drugs: youths in Bangladesh; Sources of frustration among youths, drugs as a menace to the society and individuals.

Hum 223: Public Finance

2.0 credit; 2 hours/week theory

Meaning and scope of public finance. Public Goods. Externalities. Public expenditure. Taxation: types and effects. Public debt. Deficit financing. Public finance in Bangladesh: nature and structure of taxation, national budget and fiscal policies, local government finance.

Hum 227: Accounting

2.0 credits; 2 hours/week theory

Objectives and importance of accounting; Accounting as information systems. Accounting Equation. Accounting procedure and double entry system: Journal-ledger-trial balance. Preparation of Financial Statements considering adjustments. Analysis and interpretation of Financial Statements.

Cost and Management Accounting.

Cost Concepts & Classification; Cost-Volume-Profit Analysis; Break-Even-Point & Sensitivity Analysis, Capital Budgeting: Long-Run Planning and Control. Concept of Public Procurement. Objective and Process of Public Procurement. Types of Procurement Methods.

Hum 263: Governance and Local Government

3.0 Credits; 3 hours/week theory

Government and governance: institutional framework, legitimacy and authority, democracy, political leadership, bureaucracy, understanding good governance, corporate governance, environmental governance, global governance, E-governance, e-government system development, public-private partnership for e-government system, legal and ethical issues in e-governance, ICT policy and e-governance in Bangladesh.

Local Government: Definition, theories of decentralization and local government; comparative local government: UK, USA, France, China; structure and functions of urban and rural local government in Bangladesh; local government finance; personnel system; women in local government; relations between national and local government; local governance and NGOs; major challenges of local government in Bangladesh.

2.4 COURSES FROM CIVIL ENGINEERING DEPARTMENT

CE 369: Civil Engineering Materials and Structural Forms

3.0 credits; 3 hours/week theory

Types, Engineering properties and uses of different construction materials – aggregates, brick, cement, sand, lime, mortars, concrete and steel; wood structures and properties; shrinkage and seasoning; treatment and durability; mechanical properties of wood products; fiber reinforced polymer (FRP) composites and its application to civil engineering; basic properties of FRP composites and available FRP composite products; ferro-cement: advantages and uses; corrosion of steel in RC structures and its prevention.

Loads on buildings and structures; uses of steel, concrete and other materials in buildings and structures; types of foundations and their applications; concept of bearing capacity and settlement; evaluation of approximate costs.

Structural forms and systems for buildings, bridges, communication and transmission structures, flyovers and intersections, road embankments, irrigation, flood control and drainage structures- their types and functions.

CE 409: Engineering Geology and Geomorphology

3.0 credits; 3 hours/week theory

Minerals; identification of minerals, common rock forming minerals; physical properties of minerals; mineraloids rocks; types of rocks, cycle of rock change; earthquake and seismic map of Bangladesh.

Structural geology; faults; types of faults; fold and fold type; domes; basins; erosional process; quantitative analysis of erosional land forms. Channel development; channel widening; valley shape; stream terraces; alluvial flood plains; deltas and alluvial fans; channel morphology; channel patterns and the river basin; geology and geomorphology of Bangladesh.

CE 459: Transportation Engineering for Planners

3.0 credits; 3 hours/week theory

Introduction to transportation planning: concepts and theories; Road network planning: Country, Regional and Urban area perspectives; Multi-modal issues in transport planning; Urban transport problems and trends; Characteristics of different transit and para-transit modes, Planning transit network; Transit users' attitude; Policies and strategies for transit development in metropolitan cities.

Introduction to concepts of Transportation Engineering: Traffic Flow Characteristics, Types of Roadway Intersection Control, Grade Separation and Interchanges. Freight Transportation, NMT issues, Road Safety issues, Environmental issues and Sustainable transport concepts.

CE 471: Basic Environmental Engineering

3.0 credits; 3 hours/week

Water Supply: objectives and basic elements of water supply system; water requirements; water requirements; population prediction and water demand assessment; fire demand; planning of water supply systems - sources, abstraction, transmission, treatment and distribution.

Sanitation: urban and rural sanitation; low-cost sanitation technologies; elements of a conventional water borne system - collection, transportation, treatment and disposal; planning of sanitation systems.

Solid waste management: sources and classification; on-site storage and handling; collection, transportation, and disposal; sanitary landfilling method; waste recycling and reuse.

Environmental pollution - air, water and soil, and noise pollution.

2.5 COURSES FROM COMPUTER SCIENCE AND ENGINEERING DEPARTMENT

CSE 170: Introduction to Programming

2.0 Credits; 4 hours/week sessional

Introduction to programming; Basic I/O; Variables, data types, and operators; Type conversion and type casting; Conditional statements; Loops; Basic data structures: list, dictionary, set, tuple, and string; Immutability; Functions; Exception handling; Classes and objects; Advanced data structures: linked list, tree, and graph; Scientific libraries; Solving planning problems.

Recommended Language: Python.

CSE 272: Database Management Sessional

1.5 Credits; 3 hours/week sessional

Introduction to database systems and relational models; Database design using the entity-relationship model; SQL: Querying and manipulating database; PL/SQL: Constraints, functions, procedures, and triggers; Report generation and visualization.

CSE 371: Machine Learning and Data Science

2.0 credits, 2 hours/ week theory

Introduction to machine learning and data science; Supervised, unsupervised, semi-supervised and reinforcement learning; Data analytics life-cycle: data discovery, data preparation, model planning, model building, communicating results, and operationalize; Exploratory data analysis: data visualization; Classification and regression models: decision trees, linear regression, and logistic regression; Clustering: k-means clustering; Deep learning: convolutional neural network (CNN), recurrent neural network (RNN), long short-term memory (LSTM), and object detection; Time series analysis: ARIMA; Text analysis: topic modelling; Deep learning based methods for time series forecasting and natural language processing (NLP); Causal inference; Big data analytics; Applications in urban and regional planning.

CSE 372: Machine Learning and Data Science Sessional

1.5 credits, 3 hours/ week sessional

Sessional based on Machine Learning and Data Science for Planning with focus on point cloud classification, land use classification, geospatial analysis, remote sensing, drone survey, travel demand, employment, population, climate change, pollution, land use change forecasting, social network and multimodal data analysis, sentiment analysis, traffic flow analysis from videos, speed estimation, trajectory analysis, population profile analysis.

2.6 COURSE FROM WATER RESOURCES ENGINEERING DEPARTMENT

WRE 215: Introduction to Water Resources Planning

3.0 Credits; 3 hours/week theory

Hydrologic cycle, precipitation, stream flow, evaporation and transpiration, rainfall-runoff relationship, hydrograph analysis, storm water drainage, groundwater occurrence and wells; behaviour of alluvial rivers, navigation and dredging, river training and bank protection works; irrigation planning and methods of irrigation; flood mitigation approaches; integrated water resources management—economic, social, environmental and institutional aspects.

2.7 COURSES FROM MATHEMATICS DEPARTMENT

Math 105: Mathematics – I

3.0 credits; 3 hours/week

Functions: Families of functions. Properties and graphs of functions. Composite functions. Inverse functions. Polynomial and rational functions. Hyperbolic functions. Trigonometric functions. Exponential and Logarithmic functions. Applications.

Matrices: Algebra of matrices. Determinants. Gaussian elimination. Inverse of a matrix. Solutions of linear systems of equations. Rank and elementary transformation of matrices. Matrix polynomials. Eigenvalues and eigenvectors.

Solid Geometry: System of coordinates. Direction cosines. Equations of planes and straight lines. Shortest distance between two given straight lines. Standard equations of sphere and ellipsoid. Tangent planes.

Math 107: Mathematics – II

3.0 credits; 3 hours/week theory

Differential Calculus: Limits, continuity and differentiability. Successive differentiation. Maxima and minima of functions of single variable. Applications.

Integral Calculus: Integration by substitution and by parts. Standard integrals. Definite integrals. Area under plane curves. Applications.

Ordinary Differential Equations: Solution of first order differential equations by various methods. Solution of general linear equations of second and higher order with constant coefficients. Solution of homogeneous linear equations. Applications.

Fourier Analysis: Real and complex form of Fourier series. Finite Fourier transform. Fourier integrals. Fourier transforms and their uses in solving boundary value problems. Fourier transform of Gaussian function.

2.8 COURSE FROM CHEMISTRY DEPARTMENT

Chem 129: Basic Environmental Chemistry

2.0 Credits; 2 hours/week theory

Introduction to environmental science and its scope; Radioactivity and radioactive particles; Concentration of solutions and estimation of pollutants; Acids, bases, and environmental impact of pH; Stratospheric chemistry: the ozone layer and the ozone holes; Greenhouse gases and its effect, science of climate change, effect of climate change in Bangladesh; Air,

water and soil pollution, source and types of pollutants, effect of pollution, quality indices; Hazardous chemicals: types, characteristics, management; Chemical cycles.

UNDERGRADUATE CURRICULUM (2006)

Department of Urban and Regional Planning (DURP)
Bangladesh University of Engineering and Technology (BUET)

TABLE OF CONTENTS

1. OUTLINES OF UNDERGRADUATE COURSES

Level: 01, Term: 01				
Course	**Title**	**Theo.**	**Ses.**	**Credit**
Hum 171	Micro-Economics	3	0	3.0
Hum 125	English	2	0	2.0
Chem 123	Basic Environmental Chemistry	3	0	3.0
Math 101	Mathematics 1	2	0	2.0
Plan 111	Human Settlements Development	3	0	3.0
Arch 106	Basic Design	0	6	3.0
Arch 116	Graphics for Planners	0	6	3.0
Total		**13**	**12**	**19.0**

Level: 01, Term: 02				
Course	**Title**	**Theo.**	**Ses.**	**Credit**
Arch 145	Elements of Architecture	2	0	2.0
Math 103	Mathematics 11	2	0	2.0
Hum 177	Macro- Economics	3	0	3.0
Plan 113	Fundamentals of Planning	2	0	2.0
Plan 161	Surveying and Cartography	3	0	3.0
Plan 162	Surveying and Cartography workshop	0	6	3.0
Plan 196	Introduction to Computer Application	0	3	1.5
Plan 108	Communication & Presentation Techniques Studio	0	6	3.0
Total		**12**	**15**	**19.5**

Level: 02, Term: 01				
Course	**Title**	**Theo.**	**Ses.**	**Credit**
CE 209	Construction Materials	2	0	2.0
Plan 211	Urban Planning Principles	3	0	3.0
Plan 217	Site and Area Planning	3	0	3.0
Plan 291	Statistics for Planners 1	3	0	3.0
Hum 179	Sociology	3	0	3.0
Plan 204	Social and Physical Surveys	0	6	3.0
Plan 218	Site and Area Planning Studio	0	6	3.0
Hum 272	Developing English Skills	0	3	1.5
Total		**14**	**15**	**21.5**

Level: 02, Term: 02				
Course	**Title**	**Theo.**	**Ses.**	**Credit**
Arch 233	Landscape planning and Design	2	0	2.0
Plan 215	Urban Planning Techniques	3	0	3.0
Plan 261	GIS and Remote Sensing	3	0	3.0
Plan 293	Statistics for Planners II (Prerequisite Plan 291)	3	0	3.0
Hum 281	Political Science and Local Government (Optional)	3	0	3.0
Hum 221	Public Finance (Optional)	3	0	3.0
Plan 296	Computer Application in Planning	0	6	3.0
Arch 226	Landscape Planning Studio	0	6	3.0
	Total	**14**	**12**	**20.0**
(One optional course to be taken in this term)				

Level: 03, Term: 01				
Course	**Title**	**Theo.**	**Ses.**	**Credit**
CE 361	Elements of Solid Mechanics	3	0	3.0
WRE 309	Introduction to Water Resources Planning	3	0	3.0
Plan 321	Housing and Real Estate Development	3	0	3.0
Plan 343	Traffic and Transportation Study	3	0	3.0
Hum 225	Accounting (Optional)	2	0	2.0
Hum 271	Social Psychology (Optional)	2	0	2.0
Plan 313	Land Economics (Optional)	2	0	2.0
Plan 312	Urban Planning Studio	0	6	3.0
Plan 362	GIS and Remote Sensing Studio	0	6	3.0
Total		**14**	**12**	**20**
(One optional course to be taken in this term)				

Level: 03, Term: 02				
Course	**Title**	**Theo.**	**Ses.**	**Credit**
CE 363	Elements of Civil Engineering Structures (Prerequisite CE 361)	3	0	3.0
Plan 331	Rural Development Planning I	3	0	3.0
Plan345	Transportation Policy and Planning	3	0	3.0
Plan 333	Regional Development Planning	3	0	3.0
Arch 355	Urban Design (Optional)	3	0	3.0
Plan 323	Neigh. Plan. And Community Development (Optional)	3	0	3.0
Plan 393	Operations Research and System Analysis (Optional)	3	0	3.0
Plan 396	Programming Techniques	0	4	2.0
Plan 332	Rural Planning Studio	0	6	3.0
	Total	**14**	**10**	**20.0**
(One optional course to be taken in this term)				

Level: 04, Term: 01				
Course	**Title**	**Theo.**	**Ses.**	**Credit**
Plan 400	Project/Thesis	2	0	2.0
Plan 401	Project Evaluation and Management	3	0	3.0
Plan 403	Legal Basis of Planning	3	0	3.0
Plan 451	Environmental Planning and Management	3	0	3.0
CE 471	Basic Environmental Engineering (Optional)	3	0	3.0
Plan 417	Planning of Tourism & Recreational Facilities (Optional)	3	0	3.0
Plan 431	Rural Development Planning II (Optional), Prerequisite Plan 331	3	0	3.0
Plan 446	Transportation Planning Studio	0	6	3.0
Plan 434	Regional Planning Studio	0	6	3.0
Plan 470	Internship (Non-Credit)	-	-	-
Total		**14**	**12**	**20**
(One optional course to be taken in this term)				

Level: 04, Term: 02				
Course	**Title**	**Theo.**	**Ses.**	**Credit**
Plan 400	Project/Thesis	4	0	4.0
Plan 413	Urban Management and Governance	3	0	3.0
Plan 405	Development Planning (Optional)	3	0	3.0
Plan 407	Urban and Regional Economics (Optional)	3	0	3.0
Plan 415	Planning of Utility and Municipal Services (Optional)	3	0	3.0
Plan 419	Land Development and Management (Optional)	3	0	3.0
Plan 453	Environmental and Resource Economics (Optional)	3	0	3.0
Plan 471	Natural Hazards and Disaster Management (Optional)	3	0	3.0
Plan 402	Project Planning Studio	0	4	2.0
Plan 412	Participatory Planning Workshop	3	6	3.0
Total		**13**	**10**	**18**
(Two optional courses to be taken in this term)				

2. DETAIL DESCRIPTION OF THE COURSES

2.1 COURSES FROM URP DEPARTMENT

Plan 108: Communication and Presentation Techniques Studio

3.0 credits; 6 hours/week sessional

Techniques for communicating via different media—oral presentations, reports, posters, broadcasting, film, multimedia, Websites; techniques of visual presentation—figures, diagrams, charts, maps, cartograms, photographic compositions, etc. Students will be required to prepare several presentations on different planning problems.

Plan 111: Human Settlements Development

3.0 credits; 3 hours/week theory

The origin and evolution of ancient human settlements and cities, their relation to resources, trade routes, and transportation; city planning in the ancient and medieval and pre-industrial revolution periods; the origins of modern urban planning, the emergence of modern cities and their planning concepts (Garden City, Vertical City, Linear City, Neighbourhood concept, Radburn concept). Spatial structure of urban growth (concentric zone theory, sector theory, multiple nuclei theory).

The concept of urbanization and the nature of urbanization with special emphasis on Bangladesh. Physical, social, political, economic, and technological factors of urban growth and development. Models of rural-urban migration. The effects of urbanization and their policy implications. The growth and development of towns and cities in Bangladesh.

Plan 113: Fundamentals of Planning

2 credits; 2 hours/week theory

The basic generic concepts of planning: definition of planning, dimensions of planning, spatial versus sectoral planning, the variants of spatial and physical planning. The planning process—the different stages in the continuous and cyclical process. Roles of planners, decision makers and stakeholders in the planning process. Concepts of planning: rational approach, advocacy planning, adaptive planning, systems approach. Planning process in Bangladesh: sectoral and perspective planning at the national level, integrated area development planning at regional level and spatial planning at the local level.

Plan 161: Surveying and Cartography

3 credits; 3 hours/week theory

Reconnaissance survey; traverse survey; levelling and contouring; land surveying; cartographic surveying; introductions to photogrammetry, remote sensing and global positioning system.

Types of maps; types of maps commonly used in Bangladesh. Measurement scales. Mapping techniques: physical models, photomaps, sketch maps, cartograms. Map analysis and map interpretation. Relative and absolute position methods: Local grids, Geographical grids, Lambert's methods; Universal Transverse Mercator Grid. Land partitioning systems. Map projection techniques: planar, cylindrical, conical, etc.

Plan 162: Surveying and Cartography Workshop

3.0 credits; 6 hours/week sessional

3 weeks of field and studio works related to course Plan 161.

Plan 196: Introduction to Computer Applications

1.5 credits; 3 hours/week sessional

Overview of PC operating systems (Windows and DOS), creating formatted text documents in word processor, basic spreadsheet operations and functions, creating, editing, updating a database, query and retrieval of data and generation of reports.

Plan 204: Social and Physical Surveys

3 credits; 6 hours/week sessional

Meaning of survey, types of surveys, purpose of surveys and their applications in planning. Element of social survey- units, subjects and spatial coverage. Social survey methods. Household survey and questionnaire preparation. Social survey data analysis methods. Students will be required to work on a topic which would involve elements of social survey, i.e., questionnaire design and preparation, coding, data collection and analysis as part of their studio work.

Physical survey: secondary survey on topography, land level, natural drainage and slope. Primary survey of land uses, transportation network, access ways, utilities and services network, types of structures, age of structures, land values, population density distribution etc.

Plan 211: Urban Planning Principles

3 credits; 3 hours/week theory

Definition, objective and scope of urban planning. Urban functions, activities and land use components. Modern principles of planning—town centre, residential area, recreational area, industrial area, commercial area, transportation network, metropolitan region, satellite town, new town, special areas like airport, seaport, railway station, bus terminal.

Plan 215: Urban Planning Techniques

3 credit; 3 hours/week theory

Functions, forms and contents of urban development plan, strategy plan, structure plan, master plan, local area plan, action plan, subject plan. Data and information need for planning, planning techniques applied in different stages of the urban planning process, techniques for urban renewal and upgrading (conservation, improvement and redevelopment), techniques for land development (land readjustment, guided land development). Planning standards for different urban functions, types of planning standards and their importance. Urban planning studies and techniques of analysis of population, employment, economic functions, shopping, housing, leisure and recreation. Implementation tools and development control.

Plan 217: Site and Area Planning

3.0 credits; 3 hours/week theory

Introduction to site and area planning; types of site development. Site selection and analysis: natural factors, cultural factors, and aesthetic factors; land use and circulation; site drainage, grading and earthwork; alignment of horizontal and vertical curves. Site layout and development for residential, institutional, industrial, shopping, and other types of development. Subdivision planning. Landscape and planting.

Plan 218: Site and Area Planning Studio

3.0 credits; 6 hours/week sessional

Studio works related to course Plan 217. Practical and field works relating to site, area and land subdivision planning.

Plan 261: GIS and Remote Sensing

3.0 credits; 3 hours/week theory

Meaning of GIS and its application in planning. Essential elements of GIS. Data structures-raster data structures, vector data structures. Data acquisition-existing data sets, developing new data sets. Data management. Data manipulation and analysis. Remote sensing and image analysis - processing of remotely sensed digital data. Integration of remote sensing with GIS. Applications of GIS in planning.

Plan 291: Statistics for Planners – I

3 credits; 3 hours/week theory

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.

Plan 293: Statistics for Planners – II

3 credits; 3 hours/week theory

Decision Making: Statistical inference: hypothesis testing, inference about means, standard deviations and proportions; analysis of variance: Chi-Square test. Measurement scales. Nonparametric tests. Simple correlation and linear regression: Least-squares equation, goodness-of-fit criteria, standard errors, significance tests for coefficients. Simple curvilinear regression by variable transformation. Forecasting methods—time series analysis, causal and probabilistic methods. Population forecasting methods: arithmetic, geometric, decreasing rate of increase, logistic, ratio and correlation, trend projection and cohort survival.

Plan 296: Computer Applications in Planning

3.0 credits; 6 hours/week sessional

Prerequisite Plan 196

Application of statistical techniques and techniques of urban and regional analysis through the use of application software such as SPSS, Excel etc. Important planning techniques to be covered include Population Projection, Economic Base Analysis, Industrial Structure Analysis,

Input-Output Analysis etc. while statistical techniques include Frequency Distribution including Cross Tabulation, Graphical Presentation, Test of Independence, Analysis of Variance, Correlation and Regression Analysis etc.

Plan 312: Urban Planning Studio

3.0 credits; 6 hours/week sessional

Case studies in urban studies and planning. Studio works related to course Plan 211 - practical and field works on urban planning.

Plan 313: Land Economics

2 credits; 2 hours/week theory

Basic concepts of land economics. Land market. The demand for and supply of land resources. Population pressure and the demand for land. Determination of the requirements of land resources. Economic returns to land resources. The land development process. Locational and institutional factors affecting land use. The value of land and the methods of land valuation.

Plan 321: Housing and Real Estate Development

3 credit; 3 hours/week theory

Social, physical, economic and cultural aspects of housing. Typology of housing. Nature of housing problems in Bangladesh and scopes for housing development (including real estate development). Types and forms of ownership (single, multiple, tenancy in common, joint tenancy, general and limited partnership, syndicate, investment trust, condominiums, cooperatives etc.). Accessibility to housing by different income groups. Process of housing development. Housing finance and resource mobilization, housing package, credit facilities. Housing development and management in both public and private sectors. Role of various professional groups in housing sector development. Housing policies in Bangladesh and other developing countries. Social programme and public policy for low income housing. Role of private formal sector in the housing sector of Bangladesh.

Real estate economics: characteristics of supply and demand. Real estate trade cycle (both long term 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.

Plan 323: Neighbourhood Planning and Community Development

3.0 credits; 3 hours/week theory

Concept of neighbourhood; the physical, spatial, social, economic, political and cultural aspects of neighbourhood planning; neighbourhood functions, service facilities and their standards; upgrading of service facilities; functional and environmental improvement; spatial organisation.

The issues in community development; problems in urban communities of Bangladesh; community based organisations (CBOs); public participation in community development, community revitalization, service management and economic development in low-income urban communities especially in the slums and squatter settlements.

Plan 331: Rural Development Planning I

3.0 credits; 3 hours/week theory

Distinction between urban and rural areas. Analysis of rural settlement patterns. Social and cultural characteristics of rural communities. Meaning of rural development. The concept, nature and scope of integrated rural development. Integration of functional and spatial aspects in the context of rural development. Planning procedures for integrated rural development.

Resources for rural development - land, water, human, forest, livestock etc. Policies for rural resources development. Rural industrialization and rural centre planning. Rural development programmes in Bangladesh - past and present. Governmental and non-governmental organizations involved in rural development activities. Problems and issues in local level rural planning in Bangladesh.

Plan 332: Rural Planning Studio

3.0 credits; 6 hours/week sessional

Individual or group projects involving application of planning techniques for analyzing problems related to rural development planning.

Plan 333: Regional Development Planning

3.0 credits; 3 hours/week sessional

Definition and types of regions. Regionalization and the delineation of planning regions. Levels of planning - national, regional, sub-regional and local. Need and scope of regional planning. Regional analysis: regional data base; income measures and regional social accounting; input-output analysis; industrial structure analysis; interregional trade multiplier analysis. Theories

and models of regional growth: Aggregate growth models; industrial location theory; central place theory; growth pole theory; agropolitan growth. Regional growth - convergence or divergence. 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.

Plan 343: Traffic and Transportation Study

3.0 credits; 3 hours/week theory

Elements of transportation system. The land use and transport interaction. Fundamentals of landuse-transport planning. Fundamentals of transport demand and supply analysis. Urban transportation study: defining the study area and the network, volume study, O-D survey, parking survey, public transport survey, goods traffic survey, employment survey, inventory of physical infrastructure. Characteristics of different modes. Concepts of roadway capacity. Hierarchy of roads. Concept of environmental area; pedestrian traffic. Cross-sectional elements of roadway. Parking. Planning standards for physical facilities. Traffic management.

Plan 345: Transportation Policy and Planning

3.0 credits; 3 hours/week theory

Transportation system in Bangladesh. The key issues in urban and national transport policy and implementation of transport plans and programmes. Policy options in urban transportation; the role of different modes; cost structure. The transportation planning process at national, regional and urban levels. Fundamentals of transportation economics. Transportation and environment. Local area transportation planning. System modeling and strategy development. Planning of transport infrastructure. Planning for urban public transportation. NMT planning and management. Demand management.

Plan 362: GIS and Remote Sensing Studio

3 credits; 6 hours/week sessional

Individual or group projects to analyze planning problems using GIS and RS techniques.

Plan 393: Operations Research and Systems Analysis

3.0 credits; 3 hours/week theory

Introduction to operations research. Techniques for analyzing interconnected policy decision areas. Optimization techniques in the decision making process; elements of mathematical

programming: linear programming, graph theory, network analysis; fundamentals of simulation techniques, queuing theory. Systems approach in planning.

Plan 396: Programming Techniques

2 credits; 4 hours/week sessional

Exercises for developing algorithms for simple computer programmes for data analysis and solving planning problems; programming exercises in a high-level language like C/C++ involving, inter alia, reading data from files, using different data types, iterative and conditional processing and producing formatted outputs.

Plan 400: Project/Thesis

6.0 credits; 6 hours/week/term (for 2 terms)

Major individual studies on real world topics related to planning, development, implementation or policy issues. The objective is to develop initiative, self reliance, creative ability and some planning experience for the students. The outcomes of the study must be submitted in a comprehensive report following a standard format of presentation acceptable to the Department along with appropriate drawings, maps, charts, etc.

Plan 401: Project Evaluation and Management

3.0 credits; 3 hours/week theory

Project cycle. Concepts of evaluation: the efficiency versus equity criteria, economic versus financial evaluation; methods of evaluation; the welfare basis of social evaluation: consumers surplus, producers surplus, Pareto optimality, transfer payments, intangible items, shadow pricing, externalities, equity problem; concept of social cost benefit analysis; time value of money; discounting technique; choice of discount rate and social time preference; investment criteria; basic concepts of financial accounting; dealing with risk and uncertainty. Introduction to other techniques of evaluation. Appraisal requirements by national and international financing agencies. Concept of project management, introduction to different management techniques.

Plan 402: Project Planning Studio

2.0 credits; 4 hours/week sessional

Case studies in project evaluation. Project formulation practices and approval procedure in Bangladesh. Preparation of project documents: PPs and TAPPs; workshops related to course Plan 401.

Plan 403: Legal Basis of Planning

3.0 credits; 3 hours/week theory

Legal aspects of planning and its importance. Enabling legislation process. Planning laws in different countries. The Development Plan (structure and local) process and need for legislation. Development control-planning permission, development orders, special forms of control. New town development laws. Compensation and betterment problems. Urban renewal practice. Planning laws in Bangladesh. Pourashava Ordinance, Town Improvement Act, East Bengal Building Construction Act, Building Regulations of RAJUK. Land acquisition and compensation rules and regulations. The meaning of development-the control of development including planning permission, development orders, purchase notice, the enforcement of planning controls, compensation and betterment problems with reference to Bangladesh.

Plan 405: Development Planning

3.0 credits; 3 hours/week theory

The nature of development planning. The rationale for planning in developing economies. Phases of development plan - the macrophase (national), the middle phase (regional), and the microphase (microregional). Aims, objectives and procedures of planning at different phases. Relationships among the macro, middle and the microphase.

Formulation of development plans: Use of models in planning - aggregate models, sector models, and inter-sectoral models. Important considerations in choosing particular models. Some problems of development planning: The concept of capital-output ratio; the choice of technique; investment criteria.

Development planning in Bangladesh: Organizations involved in national, regional and local level planning. Types of national plans. The process of approval of plans. Processing of development projects and the use of standard proforma. Political factors in development planning in Bangladesh. Assessment of development plans of Bangladesh.

Plan 407: Urban and Regional Economics

3 credits; 3 hours/week theory

Urban economics: Nature and functions of cities. urban spatial structure: models of urban spatial structure; models of intra-urban location decisions. Urban growth: the economic base and urban growth; the human ecological approach to urban growth; communication theory and urban growth; city size and urban growth. Nature of urban problems: land use, housing, urban transportation, urban environment and urban poverty. The urban public sector: urban fiscal problems; methods of financing urban government expenditures.

Regional economics: The region as a concept. Regional structure: systems of cities; industrial location patterns; transportation and the spatial organization of economic activities. Measurement and change in regional economic activity: regional accounts; interregional theory of income and trade; regional economic growth. Regional policy: the national interest and regional objective; aggregate efficiency and interregional equity; alternative strategies for problem regions.

Plan 412: Participatory Planning Workshop

3.0 credits; 6 hours/week sessional

Local level planning and its importance. Contexts of local level planning. Approaches to local level planning. Guidelines for local level planning. People's participation in planning—meaning and types of participation. Approaches to participation-organizational and functional. Problems of participation.

Group projects involving application of participatory approach to planning for the preparation of local level plans.

Plan 413: Urban Management and Governance

3 credits; 3 hours/week theory

Important factors influencing urban management. Principles, tools and methods of management. Organizations involved in urban management and their functions: service functions, regulatory functions, urban planning and development, staff management, financial administration, public relations, intergovernmental relations. Community participation in urban management.

Definition and scope of governance. Aspects of and stake holders in urban governance in Bangladesh. Problems of governance in large cities.

Plan 415: Planning of Utility and Municipal Services

3 credits; 3 hours/week theory

Nature of urban and rural services. Comparison between physical and social infrastructure services. Needs for services according to age groups: population pyramids and needs for social services. Planning, funding, provision, management and maintenance of basic utility services in urban areas: water supply, sewerage, drainage, electricity supply, gas and telephone, and associated problems: under-funding, under-investment, cost recovery, inadequate maintenance, lack of coordination and ineffective management. Participation and partnership in urban services management.

Types of municipal services: transport infrastructure, street lighting, water supply, solid waste management, parks and open spaces, graveyards, markets, slaughter house, basic services for slums, public health and education. Revenue sources of city corporations and municipalities, and problems faced in the delivery of services and collection of taxes.

Plan 417: Planning of Tourism and Recreational Facilities

3.0 credits; 3 hours/week theory

Key concepts in recreation planning. Recreation needs and resources. Functions and classification of open space, parks, and recreation areas. Analyses of demand, supply and use pattern. Parks and open space standards - approaches to developing standards. Selection of sites. The recreation space master plan and its components. Implementation strategies.

Plan 419: Land Development and Management

3.0 credits; 3 hours/week theory

Land management in Bangladesh: land records, transfer, taxation, legal aspects. Urban and rural land policies in Bangladesh and other neighboring countries. Urban land development techniques: land bank, excess condemnation, guided land development, land readjustment. Land subdivision. Land market in Bangladesh. Land Information System (LIS): essential elements, planning and designing an LIS, data acquisition, data management, data manipulation and analysis, applications for planning, development control and management purposes.

Plan 431: Rural Development Planning II

3 credits; 3 hours/week theory

Rural-urban disparities; rural-urban linkages and rural-urban migration; people's participation and rural development; Rapid Rural Appraisal and Participatory Rural Appraisal; rural services and utilities development (transport, water supply, sanitation, electrification and extension services); rural economic and social sectors development—agriculture, rural non-farm activities, community development, women's empowerment, health and nutrition, education; rural growth centre development in Bangladesh; strengthening local level institutions and rural development in Bangladesh; NGOs and rural development; rural poverty and micro credit programs for rural poverty alleviation; disaster management planning in rural areas; practices and experiences of rural development in developed and developing countries.

Plan 434: Regional Planning Studio

3.0 credits; 6 hours/week sessional

Individual or group projects involving application of planning techniques for analyzing problems related to regional development planning.

Plan 446: Transportation Planning Studio

3.0 credits; 6 hours/week sessional

Case studies in transportation studies and planning. Workshops on local area transport planning, vehicular and pedestrian circulation plan for residential area, shopping complex, precinct, and other practical and field works related to courses Plan 343 and 345.

Plan 451: Environmental Planning and Management

3.0 credits; 3 hours/week theory

Theories of natural systems. Concepts important to environmental planning. The environmental impacts of human actions. The environmental planning procedures: Defining planning area; inventory of environmental resources; assessment of environmental impacts - impact identification, impact measurement and impact evaluation. Mitigation of environmental impacts: impact prevention measures; impact management measures. Case studies in environmental management.

Plan 453: Environmental and Resource Economics

3.0 credits; 3 hours/week theory

An introduction to welfare economics examining basic concepts including consumer surplus, Pareto optimality, externalities and the welfare of future generations. Alternative economic approaches to pollution and congestion control, costing, the role of taxes and subsidies, the sale of pollution rights, the use of environmental standards and pollution control technology. Cost effectiveness analysis. Basic concepts of social cost-benefit analysis. Economic theories relating to resource depletion and conservation.

Plan 470: Internship

Non-credit; 4 weeks

4 weeks of internship in a planning related job at an organization/firm prescribed by the department. Performance will be evaluated based on report submitted by the intern and evaluation of the reporting officer at the organization/firm. Grade awarded shall be 'S' for satisfactory and 'U' for unsatisfactory.

Plan 471: Natural Hazards and Disaster Management

3 credits; 2 hours/week theory, 2 hours/week sessional

Meaning of hazard and disaster, types of hazards, assessment of hazards, vulnerability analysis, risk assessment, analysis of disaster-related behavior pattern, people's awareness and perception of hazards and response to danger, disaster management cycle, disaster management planning, links between development planning and disaster management planning, social considerations and people's participation in disaster management, institutional framework for disaster management. Hands-on exercises on hazard and risk assessment, land use planning with emphasis on vulnerability reduction etc.

2.2 COURSES FROM ARCHITECTURE DEPARTMENT

Arch 106: Basic Design

3.0 credits; 6 hours/week

Forms in nature, their understanding and evolution; two dimensional composition, points, straight lines and curves, and geometric shapes; understanding and use of composition elements like balance, proportion, scale, harmony, movement, etc.

Arch 116: Graphics for Planners

3.0 credits; 6 hours/week

Lettering; mechanical and freehand drawings; use of scale and instruments; sectional and isometric views of solid geometric figures: plan, elevation, and section. One and two point perspectives; shade and shadow of different projection drawings.

Arch 145: Elements of Architecture

2.0 credits; 2 hours/week

Introduction to Architecture and Architectural Design. Elements of composition: balance, scale, proportion, etc. Understanding of different architectural historical periods: Ancient, Classical, Roman, Gothic Renaissance, Baroque, Roccoco. Different art movements and their impact. The cultural history of human development in different regions of the world as depicted in architecture. Environmental and regional influences on architecture. Trend of architecture in Bangladesh.

Arch 226: Landscape Planning Studio

3.0 credits; 6 hours/week

Application of design and planning principles and techniques of landscape developments. Site analysis and study of landscape elements. Application of landscape conservation principles and strategies on regional level development process.

Arch 233: Landscape Planning and Design

2.0 credits; 2 hours/week

Introduction to landscape planning and its scope. Historical references landscape planning and design. Basic design methods and approaches. Ecological systems and climatic elements. Landscape conservation in macro and regional level. Landscape planning in urban scale for residential, recreational and commercial environments. Site development objectives and design principles. Plantation and plantation design.

Arch 355: Urban Design

3.0 credits; 3 hours/week

Historical overview of urban design - from tree dwelling to Renaissance. Definition of urban design, its aims and objectives. Elements of design - unity and space, proportion and scale, balance, uniformity and contrast, etc. and their application in urban design. Urban aesthetics. Urban spaces and their types and perception. City planning and design according to artistic principles, approaches and levels of analysis.

2.3 COURSES FROM HUMANITIES DEPARTMENT

Hum 125: English

2.0 credits: 2 hours/week theory

General Discussion: Introduction, Mastering Various Approaches to Learning English.

Grammatical Problem: Construction of Sentences, Grammatical Problems, Sentence variety and style, Conditionals, Grammar and Usages, Vocabulary and Diction.

English phonetics: The Phonetic systems and correct English Pronounciation.

Reading Skill: Discussing Readability, Scan and Skim Reading, Generating Ideas through Purposive Reading, The reading of Selected Stories.

Writing Skill: Priniciples of Effective Writing, Organization in writing, Planning and Development, Composition, Precis writing

General Strategies for the Writing Process: Generating Ideas, Identifying Audiences and Purposes, Constructing Arguments, Stating Problems, Drafting and Finalizing.
Approaches to Communication: Communication Today, Business communication, Organization and Organizational Behavior, Developing Intra-personal Interpersonal Relationship, Introducing Dialogue.
Specific Applications of: Tenders and Quotations, Resumes and Job Letters, Journal Articles, Technical and scientific Presentation.

Hum 171: Micro-Economics

3.0 credits; 3 hours/week theory

Introduction: Definition of Economics, concept of micro-economics. Utility, Demand and Supply Analysis: elasticity of demand and supply, consumer's surplus. Indifference Curve Analysis: Price line, consumer's equilibrium, marginal analysis. Theory of Production: Law of returns, rational region of production, profit maximization, small scale production and large-scale production, optimization. Cost Analysis and Cost Curve: Short-run and long-run, fixed cost and variable cost. Concept of market and market structure: Classification of markets. Theory of Distribution: Marginal productivity theory, equity in income distribution.

Hum 177: Macro-Economics

3.0 credits; 3 hours/week theory

Introduction: The concept of macro-economics, savings, investment and employment, national income. Theory of Employment: Classical and modern theory of employment. Inflation: Concept of inflation, measures for controlling inflation. Determinants of income and employment: consumption function. Investment function: Types of investment, marginal efficiency of capital. Unemployment and full employment: types of unemployment, unemployment and inflation. Multiplier and Accelerator. Money and Interest: The demand for money - supply of money - alternative theories of demand for money.

Hum 179: Sociology

3.0 credits; 3 hours/week theory

Scope. Some basic Concepts. Social Evolution and Technique of Production. Culture and Civilization. Social Structure of Bangladesh. Population and Resources. Oriental and Occidental Societies. Industrial Revolution. Family - urbanization and industrialization. Urban Ecology. Rural Sociology. Sociology of Development and Underdevelopment. Socialisation: Process of social learning; Socialisation and family structure.

Hum 221: Public Finance

3 credit; 3 hours/week theory

Meaning and scope of public finance. Public expenditure: nature, principles and effects. Taxation: principles, types and effects. Public debt. The public budget: balanced and unbalanced budget. Deficit financing. Fiscal policies and their impacts. Public finance in Bangladesh: nature and structure of taxation, national budget and fiscal policies.

Hum 225: Accounting

2.0 credits; 2 hours/week theory

Introduction to Accounting; Accounting equation; Business data processing—Transaction, Double entry mechanism, Journal, Ledger, Trial balance. Preparation of financial statement, financial statement analysis.

Long-term investment decision—Capital budgeting; Decision under uncertainty. Cost concept and classification; Cost-volume-profit analysis; Break-Even-Point & sensitivity analysis. Taxation-Definition of tax; types of tax; Cannons of tax; Tax administration in Bangladesh; Tax holiday; Capital allowance; corporation tax; Tax credit.

Hum 271: Social Psychology

2.0 credits; 2 hours/week theory

Introduction to Social Psychology. The Nature of Social Psychology. Social factors in perceptual cognitive processes: Social perception; person perception. Social attitudes: The nature of attitude; the formation of attitude; the change of attitude. Process of social learning; Socialisation and family structure. Emerging norms and conformity. Leadership.

Youths and drugs: youths in Bangladesh; Sources of frustration among youths, drugs as a menace to the society and individuals.

Hum 272: Developing English Skills

1.5 credits: 3 hours/week sessional

Grammar: Tense, Article, Preposition, Subject Verb Agreement, Clause, Conditional and Sentence Structure.

Vocabulary Building: Correct and Precise Diction, Affixes, Level of Appropriateness; Colloquial and standard, Informal and Formal.

Developing Reading Skill: Strategies of Reading-Skimming, Scanning Prediction, Inferencing; Analysing and Interpreting Variety of Texts; Practicing Comprehension from Literary and Non Literary Texts.

Developing Writing Skill: Sentences, Sentence Variety, Generating Sentences; Clarity and Correctness of Sentences; Linking Sentences to Form Paragraphs, Writing Paragraphs, Essays, Reports, Formal and Informal Letters.

Listening Skill and Note Taking: Listening to Recorded Texts and Class Lectures and Learning to Take Useful Notes Based on Listening.

Developing Speaking Skill: Oral Skills Including Communicative Expressions For Personal Identification, Life at Home, Giving Advice and Opinion, Instructions and Directions, Requests, Complaints, Apologies, Describing People and Places, Narrating events.

Hum 281: Political Science and Local Government

3.0 Credits; 3 hours/week theory

Some basic concepts of government and politics, functions, organs and forms of modern state and government. Government and politics of Bangladesh. Some major administrative systems of developed countries.

Local government system in Bangladesh and its evolution. Relations between national and local governments. Structure, composition and functions of local government bodies. Local level planning and resource mobilization. Problems and issues related to capacity building in local government bodies.

2.4 COURSES FROM CIVIL ENGINEERING DEPARTMENT

CE 209: Construction Materials

2.0 credits; 2 hours/week

Types, preparation, properties and uses of materials - such as stone, brick, cement, sand, concrete, timber, soil, ferrous and non-ferrous metals and plastics. Specifications and quality control.

CE 327: Elements of Solid Mechanics

3.0 credits; 3 hours/week

Force, resultants and components, moments and parallel coplanar forces, centroids, moment of inertia. Fundamental concepts of stress and strain.

Mechanical properties of materials: stress and strain in members subject to tensile, compressive and shear forces; bending moment and shear force diagrams for statically determinate structures.

CE 329: Elements of Civil Engineering Structures

3.0 credits; 3 hours/week

Prerequisite CE 327

Structural forms and systems for buildings, bridges, communication and transmission structures; loads on structures; types of foundation, concept of bearing capacity and settlement.

Introduction to design in reinforced and prestressed concrete; design codes.

CE 439: Basic Environmental Engineering

3.0 credits; 3 hours/week

Water Supply: objectives and basic elements of water supply system; water requirements; water requirements; population prediction and water demand assessment; fire demand; planning of water supply systems - sources, abstraction, transmission, treatment and distribution.

Sanitation: urban and rural sanitation; low-cost sanitation technologies; elements of a conventional water borne system - collection, transportation, treatment and disposal; planning of sanitation systems.

Environmental pollution - air, water and soil, and noise pollution.

2.5 COURSE FROM WATER RESOURCES ENGINEERING DEPARTMENT

WRE 309: Introduction to Water Resources Planning

3.0 Credits; 3 hours/week

Hydrologic cycle, precipitation, stream flow, evaporation and transpiration, rainfall-runoff relationship, hydrograph analysis, storm water drainage, groundwater occurence and wells; behaviour of alluvial rivers, navigation and dredging, river training and bank protection works; irrigation planning and methods of irrigation; flood mitigation approaches; integrated water resources management—economic, social, environmental and institutional aspects.

2.6 COURSES FROM MATHEMATICS DEPARTMENT

Math 101: Mathematics – I

2.0 credits; 2 hours/week

Algebra and Geometry:

Algebra in system description. Graphs and Coordinate Geometry; linear equations, interpretation of linear inequalities, graphical solution of equations. Functions; definition, implicit and inverse functions, the standard functions, the power function, the logarithmic function, the exponential function, trigonometric function, polynomial and rational functions, the hyperbolic function, the logistic function.

Matrix Algebra: Definition of a matrix, algebra of matrices, multiplication of matrices, transpose of a matrix and inverse of matrix, rank and elementary transformation of matrices, solution of linear equations.

Math 103: Mathematics – II

2.0 credits; 2 hours/week

Differential Calculus: Limit, continuity and differentiability, successive differentiation, maxima and minima of functions of single variable.

Integral calculus: Integration by substitution and by parts, standard integrals, definite integrals, area under plane curves.

Differential Equation: Solution of 1st order differential equation by various methods, solutions of general linear equations of 2nd and higher order.

2.7 COURSE FROM CHEMISTRY DEPARTMENT

Chem 207: Basic Environmental Chemistry

3.0 Credits; 3 hours/week

Introduction to environmental science and its scope.

Radioactivity and radioactive particles; atomic structure. The periodic table; chemical bonds; acids and bases; concentration of solutions. Organic Compounds, organic families and functional groups. Introduction to polymers. Environment, environmental segments, lithosphere, hydrosphere, biosphere and atmosphere. Composition of atmosphere. Chemical species and particulates present in earth. Industrial hazards, air and water pollutants. Sources and different kinds of pollutants. Toxicity of pollutants. Discussion on the properties of water and waste water. Characteristics of waste water, concepts and measurement of DO, BOD, COD, etc. Transformation processes of pollutants.