

Title of the Academic Program

Bachelor of Science in Civil Engineering (B.Sc. in Civil Engineering)

Name of the Program Offering Entity

Department of Civil Engineering

Program Educational Objectives (PEOs) of B. Sc. in Civil Engineering Program

Graduates of the B.Sc. in Civil Engineering Program are expected to attain the following Program Educational Objectives (PEOs) within a few (3-5) years of graduation.

1. Graduates will provide effective solutions using civil engineering knowledge, skills and appropriate tools.
2. Graduates will contribute to the society by practicing ethical principles and addressing the environmental, sustainability and societal issues during their professional career.
3. Graduates will enhance their competency to deal the new field problems as an efficient individual or an excellent team member in multidisciplinary environment through life-long learning.

Program Outcomes (POs) or Graduate Attributes of B. Sc. in Civil Engineering Program

Graduates of the B. Sc. in Civil Engineering Program are expected to attain the following Program Outcomes (POs) at the time of graduation.

PO	Description
PO(a)	Engineering knowledge: Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization as specified in K1 to K4 respectively to the solution of complex civil engineering problems.
PO(b)	Problem analysis: Identify, formulate, research literature and analyze complex civil engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences. (K1 to K4)
PO(c)	Design/development of solutions: Design solutions for complex civil engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (K5)
PO(d)	Investigation: Conduct investigations of complex civil engineering problems using research-based knowledge (K8) and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
PO(e)	Modern tool usage: Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to complex civil engineering problems, with an understanding of the limitations. (K6)
PO(f)	The engineer and society: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex civil engineering problems. (K7)
PO(g)	Environment and sustainability: Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex civil engineering problems in societal and environmental contexts. (K7)
PO(h)	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice. (K7)
PO(i)	Individual work and teamwork: Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.
PO(j)	Communication: Communicate effectively on complex civil engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO(k)	Project management and finance: Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO(l)	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Mapping of Program Educational Objectives (PEOs) with Mission of the University

PEO No.	PEO	Mission 1	Mission 2	Mission 3	Mission 4
1	PEO1		X		
2	PEO2			X	
3	PEO3	X			X

Mapping of Program Educational Objectives (PEOs) with Mission of the Department

PEO No.	PEO	Mission 1	Mission 2	Mission 3
1	PEO1	X	X	X
2	PEO2	X	X	
3	PEO3		X	X

Mapping of Program Outcomes (POs) with Program Educational Objectives (PEOs)

Program Outcomes (POs)	Program Educational Objectives (PEOs)		
	PEO1	PEO2	PEO3
PO(a): Engineering knowledge	X		
PO(b): Problem analysis			X
PO(c): Design/development of solutions	X		
PO(d): Investigation			X
PO(e): Modern tool usage	X		
PO(f): The engineer and society		X	
PO(g): Environment and sustainability		X	
PO(h): Ethics		X	
PO(i): Individual work and teamwork			X

PO(j): Communication	X		
PO(k): Project management and finance	X		
PO(l): Life-long learning			X

Knowledge Profile

The B. Sc. in Civil Engineering program is committed to ensure that its curriculum encompasses all the attributes of Knowledge Profile (K1 – K8) as described below and included in the Program Outcome statements.

Knowledge Profile	Attribute
K1	A systematic, theory-based understanding of the natural sciences applicable to the discipline.
K2	Conceptually based mathematics, numerical analysis, statistics and the formal aspects of computer and information science to support analysis and modeling applicable to the discipline.
K3	A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline.
K4	Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline.
K5	Knowledge that supports engineering design in a practice area.
K6	Knowledge of engineering practice (technology) in the practice areas in the engineering discipline.
K7	Comprehension of the role of engineering in society and identified issues in engineering practice in the discipline: ethics and the engineer's professional responsibility to public safety; the impacts of engineering activity; economic, social, cultural, environmental and sustainability.
K8	Engagement with selected knowledge in the research literature of the discipline.

Range of Complex Engineering Problem Solving

The ranges of Complex Engineering Problem Solving (P1 – P7) that should be addressed in the program are given below.

Attribute	Complex Engineering Problems have characteristic P1 and some or all of P2 to P7:
Depth of knowledge required	P1: Cannot be resolved without in-depth engineering knowledge at the level of one or more of K3, K4, K5, K6 or K8, which allows for a fundamentals-based, first principles analytical approach.
Range of conflicting requirements	P2: Involves wide-ranging or conflicting technical, engineering and other issues.
Depth of analysis required	P3: There is no obvious solution, and abstract thinking and originality in analysis are required to formulate suitable models.
Familiarity of issues	P4: Involves infrequently encountered issues.
Extent of applicable codes	P5: Are outside problems encompassed by standards and codes of practice for professional engineering.
Extent of stakeholder involvement and conflicting requirements	P6: Involves diverse groups of stakeholders with widely varying needs.
Interdependences	P7: High level problems including many component parts or sub-problems.

Range of Complex Engineering Activities

The ranges of Complex Engineering Activities (A1 – A5) that should be addressed in the program are given below.

Attribute	Complex activities means (engineering) activities or projects that have some or all of the following characteristics:
Range of resources	A1: Involves the use of diverse resources (for this purpose, resources include people, money, equipment, materials, information and technologies).
Level of interaction	A2: Requires resolution of significant problems arising from interactions among wide-ranging or conflicting technical, engineering or other issues.
Innovation	A3: Involves creative use of engineering principles and research-based knowledge in novel ways.
Consequences for society and the environment	A4: Has significant consequences in a range of contexts, characterized by difficulty of prediction and mitigation.
familiarity	A5: Can extend beyond previous experiences by applying principles-based approaches.

Course Summary/Category of Courses:

Course Category	Credits
Compulsory General Education Courses	9
Optional General Education and Sociology Courses	6
Optional Business and Economics Courses	6
Basic Science Courses	12
Mathematics and Statistics Courses	12
Core Civil Engineering Courses	87
Inter-Disciplinary Engineering Courses	7.5
Elective Civil Engineering Courses	11
Final Year Project	6
Total	156.5

List of Courses

Course Title	Credits	Prerequisite
Compulsory General Education Courses: [Three Courses]	9	
ENG101 Basic English	3	ENG099 if needed
ENG102 Composition and Communication Skills	3	ENG101
GEN226 Emergence of Bangladesh	3	ENG102

Optional General Education and Sociology Courses: [Twocourses]	6	
GEN201 Bangladesh Studies	3	ENG102
GEN203 Ecological System and Environment	3	
GEN204 Western Thought	3	
GEN205 Introduction to Psychology	3	ENG102
GEN207 Industrial Psychology	3	ENG102
GEN208 Introduction to Philosophy	3	
GEN209 Introduction to Social Psychology	3	ENG102
GEN210 International Relation	3	ENG102
GEN211 Concepts of Journalism and Media Studies	3	ENG102
GEN212 Women in Development	3	ENG101
GEN214 Introduction to Development Studies	3	ENG102

GEN223	Contemporary Security Studies in Asia Pacific	3	ENG102, GEN210
GEN225	Demography and Economic Statistics	3	
GEN239	Professional Ethics	3	ENG102
SOC101	Introduction to Sociology	3	
SOC102	Introduction to Anthropology	3	
SOC209	Industrial Sociology	3	
SOC211	Eastern Culture and Heritage	3	
SOC215	Principle of Social and Public Relations	3	ENG102, SOC101
SOC216	Globalization and Social Identity	3	ENG102, GEN210
SOC217	Religion, Ethnicity, Culture and Development in South Asia	3	ENG102, GEN206

Optional Business and Economics Courses [Two Courses]		6	
ACT101	Financial Accounting	3	
BUS321	Business for Engineering and Technology	3	ENG102
FIN101	Principles of Finance	3	ACT101, STA102, ECO101
FIN201	Business Finance	3	FIN101
FIN335	Financial Institutions and Markets	3	ECO102, FIN201
MGT101	Principles of Management	3	ENG101
MGT321	Industrial Management	3	ENG102
MGT337	Production Operations Management	3	STA102
MKT101	Principles of Marketing	3	
MKT201	Marketing Management	3	MKT101
ECO101	Principles of Microeconomics	3	
ECO102	Introduction to Macroeconomics	3	ECO101
ECO200	Agricultural Economics	3	ECO101
ECO260	Environmental and Natural Resource Economics	3	ECO101
ECO357	Mathematical Economics	3	ECO101

Basic Science Courses: [Three Courses]		12	
PHY107	Engineering Physics-I (Mechanics, Waves, and Thermodynamics)	3+1.5	MAT101
PHY207	Engineering Physics-II (Electricity & Magnetism, Physical Optics and Modern Physics)	3	MAT102, PHY107
CHE107	Engineering Chemistry-I	3+1.5	

Mathematics and Statistics Courses: [Four Courses]		12	
MAT101	Differential and Integral Calculus	3	
MAT102	Differential Equations and Special Functions	3	MAT101
MAT104	Coordinate Geometry and Vector Analysis	3	MAT101
STA102	Statistics and Probability	3	

Core Civil Engineering Courses		87	
Basic Civil Engineering: [Eleven Courses]		33	
CE100	Civil Engineering Drawing	0+1.5	
CE101	Analytic Mechanics	3	
CE102	Computer Aided Drafting	0+1.5	
CE103	Surveying and Introduction to GIS	3+1.5	
CE200	Details of Construction	0+1.5	

CE201	Engineering Materials	3+1.5	
CE203	Engineering Geology and Geomorphology	3	
CE208	Quantity Surveying and Cost Analysis	0+1.5	
CE211	Mechanics of Solids-I	3+1.5	CE101
CE213	Mechanics of Solids-II	3	CE211
CE261	Fluid Mechanics	3+1.5	
Civil Engineering Practice: [Two Courses]		7.5	
CE301	Professional Practices and Communication	3+1.5	
CE401	Project Planning and Construction Management	3	
Structural Engineering: [Five Courses]		16.5	
CE311	Structural Analysis and Design-I	3	CE213
CE315	Design of Concrete Structures-I	3+1.5	CE311
CE319	Design of Steel Structures	3+1.5	CE311
CE410	Concrete Structures Design Sessional	0+1.5	CE315
CE411	Structural Analysis and Design-II	3	CE311
Environmental Engineering: [Two Courses]		7.5	
CE331	Environmental Engineering-I	3+1.5	
CE431	Environmental Engineering-II	3	CE331
Geotechnical Engineering: [Two Courses]		7.5	
CE341	Principles of Soil Mechanics	3+1.5	CE203, CE213
CE441	Foundation Engineering	3	CE341
Transportation Engineering: [Two Courses]		7.5	
CE351	Transportation Engineering-I	3	
CE_451	Transportation Engineering-II	3+1.5	CE351
Water Resources Engineering: [Two Courses]		7.5	
CE361	Open Channel Flow	3+1.5	CE261
CE_461	Hydrology, Irrigation and Flood Control	3	CE361

Inter-Disciplinary Engineering Courses: [Two Courses]		7.5	
CSE227	Numerical Methods and Computer Programming	3+1.5	
EEE165	Basic Electrical Technology	3	

Elective Civil Engineering Courses: [Six Courses]		11	
<i>[Six courses: Two theoretical courses from one of the following five groups as a Major (4 Cr.) and One compulsory sessional course from that Major group (1.5 Cr.) + Two theoretical courses from one of the remaining four groups as a Minor (4 Cr.) and One compulsory sessional course from that Minor group (1.5 Cr.)]</i>			
Group A: Structural Engineering			
Theoretical Courses			
CE413	Introduction to Steel-Concrete Composite Structures	2	all CE300 level courses
CE415	Prestressed Concrete	2	all CE300 level courses
CE417	Design of Concrete Structures-II	2	all CE300 level courses
CE419	Introduction to Finite Element Method	2	all CE300 level courses

CE421	Dynamics of Structures	2	all CE300 level courses
CE423	Design of Concrete Structures-III	2	all CE300 level courses
Sessional Course			
CE412	Computer Aided Analysis and Design of Structures Sessional	0+1.5	all CE300 level courses
Group B: Environmental Engineering			
Theoretical Courses			
CE433	Solid and Hazardous Waste Management	2	all CE300 level courses
CE435	Environmental Pollution Management	2	all CE300 level courses
CE437	Environmental and Sustainable Management	2	all CE300 level courses
Sessional Course			
CE432	Design of Water Supply, Sanitation and Sewerage Systems Sessional	0+1.5	all CE300 level courses
Group C: Geotechnical Engineering			
Theoretical Courses			
CE443	Earth Retaining Structures	2	all CE300 level courses
CE445	Elementary Soil Dynamics	2	all CE300 level courses
CE447	Soil-Water Interaction	2	all CE300 level courses
Sessional Course			
CE442	Geotechnical Engineering Design Sessional	0+1.5	all CE300 level courses
Group D: Transportation Engineering			
Theoretical Courses			
CE455	Transportation Engineering-III: Traffic Engineering Design and Management	2	all CE300 level courses
CE457	Transportation Engineering-IV:Pavement Management, Drainage and Airport	2	all CE300 level courses
CE459	Transportation Engineering-V	2	all CE300 level courses
Sessional Course			
CE454	Transportation Engineering Sessional-II:Pavement Design and Traffic Studies	0+1.5	all CE300 level courses
Group E: Water Resources Engineering			
Theoretical Courses			
CE465	Flood Mitigation and Management	2	all CE300 level courses
CE467	Groundwater Engineering	2	all CE300 level courses
CE469	River Engineering	2	all CE300 level courses
CE471	Hydraulic Structures	2	all CE300 level courses

CE473	Coastal Engineering	2	all CE300 level courses
Sessional Course			
CE462	Water Resources Engineering Sessional	0+1.5	all CE300 level courses

Final Year Project		6	
CE400	Capstone Project	6	112.5 Cr. and all CE300 level courses

Course Flowchart

Year	1 st Year		2 nd Year		3 rd Year		4 th Year	
Course	Course No. (Credit)	Pre-requisite	Course No. (Credit)	Pre-requisite	Course No. (Credit)	Pre-requisite	Course No. (Credit)	Pre-requisite
1 st Semester	ENG101 (3)		<i>GEN226 (3)</i>	ENG102	<i>OGEN-II (3)</i>		CE333/CE431 (3)	CE331
	MAT101 (3)		<i>MAT104 (3)</i>	MAT101	<i>OBE-I (3)</i>		CE410 (0+1.5)	CE315
	CHE107 (3+1.5)		PHY207 (3)	MAT102, PHY107	CE311 (3)	CE213	CE411 (3)	CE311
	<i>EEE165 (3)</i>		CSE227 (3+1.5)		CE331 (3+1.5)		CE441 (3)	CE341
	CE100 (0+1.5)		CE200 (0+1.5)		CE341 (3+1.5)	CE203, CE213	CE453/CE_451 (3+1.5)	CE351
	CE101 (3)		CE211 (3+1.5)	CE101	CE451/CE351 (3)		*CE400 (6)	112.5 Cr. and all CE300 level courses
	18		19.5		21		21	
2 nd Semester	ENG102 (3)	ENG101	<i>OGEN-I (3)</i>		<i>OBE-II (3)</i>		CE401 (3)	
	<i>MAT102 (3)</i>	MAT101	CE201 (3+1.5)		CE301 (3+1.5)		CE463/CE_461 (3)	CE361
	<i>STA102 (3)</i>		CE203 (3)		CE315 (3+1.5)	CE311	ECE (Major) Theory (4)	All CE300 level courses
	PHY107 (3+1.5)	MAT101	CE213 (3)	CE211	CE319 (3+1.5)	CE311	ECE (Major) Sessional (0+1.5)	All CE300 level courses
	<i>CE102 (0+1.5)</i>		CE261 (3+1.5)		CE461/CE361 (3+1.5)	CE261	ECE (Minor) Theory (4)	All CE300 level courses
	CE103 (3+1.5)		<i>CE408/CE208 (0+1.5)</i>				ECE (Minor) Sessional (0+1.5)	All CE300 level courses
	19.5		19.5		21		17	
Credit	37.5		39		42		38	
Total Credit							156.5	

Abbreviations:

OGEN = Optional General Education and Sociology Courses
OBE = Optional Business and Economics Courses
ECE = Elective Civil Engineering Courses

*N.B.: The course CE400 (Capstone Project) is continued for one year. The result of this course will be assigned one year after registration.

Description of Core Civil Engineering Courses

CE100 Civil Engineering Drawing

Credits: 0+1.5

Prerequisite: None

Course Content

Lines and lettering; plane geometry: drawing of linear and curved geometric figures, e.g. pentagon, hexagon, octagon, ellipse, parabola, hyperbola; solid geometry: concept of isometric view and oblique view, theory of projections; drawing of isometric view of 3D objects such as cube, prism, pyramid, cone and cylinder; projections of cube, prism, cone, cylinder; developments of cube, pyramid, cone, cylinder; plan, elevations and sections of one storied buildings and bridges.

CE101 Analytic Mechanics

Credits: 3

Prerequisite: None

Course Content

Coplanar and non-coplanar force systems; moments; analyses of two-dimensional frames and trusses; friction; flexible chords; centroids; moments of inertia of areas and masses; plane motion; impulse and momentum; internal forces and friction; introduction to space frames.

CE102 Computer Aided Drafting

Credits: 0+1.5

Prerequisite: None

Course Content

Introduction to computer usage; introduction to CAD packages and computer aided drafting: drawing editing and dimensioning of simple objects; plan, elevations and sections of multi-storied buildings; reinforcement details of building components and other civil structures.

CE103 Surveying and Introduction to GIS

Credits: 3+1.5

Prerequisite: None

Course Content

History of surveying, introduction to surveying, orientation with survey equipments and instruments, reconnaissance survey/project survey, linear measurements, traverse survey, triangulation, levelling, contouring, calculation of area and volumes, house setting, problems of heights and distances, curve and curve ranging. transition curves, super-elevation and vertical curves, tachometry: introduction, principles and problems of tachometry, Introduction to astronomical survey and Photogrammetry; Introduction to geographic information system (GIS) and global positioning system (GPS); Introduction to Remote sensing.

CE200 Details of Construction

Credits: 0+1.5

Prerequisite: None

Course Content

Types of building, components of a building, design loads, framed structure and load bearing wall structure; foundations: shallow and deep foundation, site exploration, bearing capacity of soil, standard penetration test; brick masonry: types of brick, bonds in brickwork, supervision of brickwork, defects and strength on brick masonry, typical structures in brickwork, load bearing and non-load bearing walls, cavity walls, partition walls; lintels and arches: different types of lintels and arches, loading on lintels, construction of arches; stairs: different types of stairs, floors: ground floors and upper floors; roofs and roof coverings; shoring; underpinning; scaffolding and formwork; plastering, pointing, painting; distempering and white washing; cement concrete construction; sound insulation: acoustics; thermal insulation; house plumbing: water supply and wastewater drainage; thunder arrestor.

CE201 Engineering Materials

Credits: 3+1.5

Prerequisite: None

Course Content

Properties and uses of aggregates, brick, cement; sand, lime, mortars; concrete; concrete mix design; admixtures; wood structures and properties; shrinkage and seasoning; treatment and durability; mechanical properties; wood products; basic property of FRP composites and available FRP composite products; steel; aluminum; introduction to geo-textiles; definition of stress and strain; plane stress and strain condition; identification of strain components of elastic, elasto-plastic and elasto-visco-plastic materials; time dependent strain response of these materials due to different types of loadings; mathematical and simple rheological modeling for prediction of creep behavior; ferro-cement: advantages and uses; corrosion and prevention of steel in RC structures; offshore structures; material for ground improvement.

CE203 Engineering Geology and Geomorphology

Credits: 3

Prerequisite: None

Course Content

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.

CE208 Quantity Surveying and Cost Analysis

Credits: 0+1.5

Prerequisite: None

Course Content

Earthwork excavation for roadway, earthwork computation from spot levels; estimation for residential building: estimation of slab, beam, column, footing; analysis of rates, specifications, costing of residential building; estimation and costing of septic tank; estimation and costing of underground water reservoir; estimation and costing of retaining wall; estimation and costing of slab culvert; estimation and costing of bridges; highways construction; estimation of steel truss; computer aided quantity estimation; construction site survey and estimation.

CE211 Mechanics of Solids-I

Credits: 3+1.5

Prerequisite: CE101

Course Content

Concepts of stress and strain, constitutive relationships; deformations due to tension, compression and temperature change; beam statics: reactions, axial force, shear force and bending moments; axial force, shear force and bending moment diagrams using method of section and summation approach; elastic analysis of circular shafts, solid non-circular and thin walled tubular members subjected to torsion; flexural and shear stresses in beams; shear centre; thin walled pressure vessels.

CE213 Mechanics of Solids-II

Credits: 3

Prerequisite: CE211

Course Content

Symmetric and unsymmetric bending of beams; stress transformation, failure criteria; beam deflection by direct integration and moment area method; buckling of columns; elastic strain energy and external work; cable and cable supported structures; bolted, riveted and welded joints.

CE261 Fluid Mechanics

Credits: 3+1.5

Prerequisite: None

Course Content

Fluid properties; fluid statics; kinematics of fluid flows; fluid flow concepts and basic equations- continuity equation, Bernoulli's equation, energy equation, momentum equation and forces in fluid flow; steady incompressible flow in pressure conduits, laminar and turbulent flow, general equation for fluid friction; empirical equations for pipe flow; minor losses in pipe flow; pipe flow problems-pipes in series and parallel, branching pipes, pipe networks.

CE301 Professional Practices and Communication

Credits: 3+1.5

Prerequisite: None

Course Content

Project: characteristic feature, types and life cycle; type of contracts and estimates; Development Project Proposal (DPP); Procurement regulations and law; documents for procurement of works, goods, services and their application; tender procedure with the light of PPR; claims, disputes and arbitration procedure. Communication: concepts, methods and strategies for effective speaking and inter-personal communication; business and engineering reports, proposals and messages; conducting meetings; Ethics: Engineering ethics and professionalism; code of ethics for engineers; Workplace responsibilities and rights of Engineers; Truth and truthfulness; Responsibilities of Engineers: Commitment to society, health, safety, liability and life-long learning.

CE401 Project Planning and Construction Management

Credits: 3

Prerequisite: None

Course Content

Project planning and evaluation; feasibility reports; cash flows, payback period, internal rate of return; benefit-cost ratio; cost-benefit analysis case studies; Planning and scheduling, PERT, CPM; resource scheduling; linear programming and application. Principles of management; construction management: principles, project organization, methods and practices, technology, management of materials and equipments, site management, contracts and specifications, inspection and quality control, safety, economy. Conflict management; psychology in administration: human factors in management; human resource management. Demand forecasting; inventory control; stores management; procurement; legal issues in construction; environmental regulations; construction safety.

CE311 Structural Analysis and Design-I

Credits: 3

Prerequisite: CE213

Course Content

Stability and determinacy of structures; analysis of statically determinate trusses and arches; influence lines; moving loads on beams, frames and trusses; analysis of suspension bridge. Wind and earthquake loads; approximate analysis of statically indeterminate structures: braced trusses, portal method, cantilever method and vertical load analysis of multi storied building frames; deflection of beams, trusses and frames by virtual work method.

CE315 Design of Concrete Structures-I

Credits: 3+1.5

Prerequisite: CE311

Course Content

Fundamental behavior of reinforced concrete; introduction to strength design and alternate design methods; flexural design of beams (singly reinforced, doubly reinforced, T-beam) using strength design method; design of beam for shear and diagonal tension, design of columns under uniaxial and biaxial loadings, design of one way slabs; design of two-way edge supported slabs; structural design of footings and pile caps.

CE319 Design of Steel Structures

Credits: 3+1.5

Prerequisite: CE311

Course Content

Behavioural principles and design of structural steel; design of tension members, bolted and welded connections; compression members; residual stress, local buckling, effective length; flexural members; lateral torsional buckling; design of beam-columns; connection design, moment connections, column bases; detailing of steel structures.

CE410 Concrete Structures Design Sessional

Credits: 0+1.5

Prerequisite: CE315

Course Content

Analysis and design of superstructure of multistoried RC building for gravity, wind and earthquake loads, analysis and design of foundation of multistoried RC building.

CE411 Structural Analysis and Design-II

Credits: 3

Prerequisite: CE311

Course Content

Analysis of statically indeterminate beams and frames by moment distribution, consistent deformation/flexibility and stiffness methods; algorithms for implementing direct stiffness method using computer; influence lines of statically indeterminate beams and frames.

CE331 Environmental Engineering-I

Credits: 3+1.5

Prerequisite: None

Course Content

Introduction to Environmental Engineering: water, health and sanitation, ecology and environment; climate change; biodiversity; contemporary environmental issues. Water Supply Engineering: Water requirement in urban (water demand, population prediction, water demand for street fire hydrant and interior fire protection) and rural communities; the hydrologic cycle and water availability; water supply sources; ground water exploration: aquifer properties and ground water flow, well hydraulics, water well design, drilling, construction and maintenance; shallow hand tubewells, deep tubewells, deep set pumps, pond sand filter, rain water harvesting system and alternative water supplies for problem areas. Surface water collection and transportation; pumps and pumping machineries; water distribution systems; analysis and design of distribution network; fire hydrants; water meters; water loss control (auditing, unaccounted for water, leak detection and water conservation). Water quality requirements; water treatment: plain sedimentation, coagulation, flocculation, filtration, disinfection; miscellaneous treatment methods; low cost treatment methods (arsenic/iron removal plants etc.) for rural communities; water safety plans.

CE431 Environmental Engineering-II

Credits: 3

Prerequisite: CE331

Course Content

Wastewater Engineering: introduction; estimation of wastewater; wastewater collection systems; hydraulics of sewer; design, construction and maintenance of sanitary sewer and storm drainage system; sewer appurtenances; plumbing system.

Microbiology of wastewater; wastewater characteristics; wastewater treatment and disposal; treatment and disposal of industrial effluents; sludge treatment and disposal;

Sanitation and health: Sustainable development goals (SDGs) on water and sanitation; economical sanitation technologies / system for urban and rural communities (conventional system, pit latrine, pour-flush latrine, small bore sewerage system, septic tank system and ecological sanitation). Sustainable development; Sustainability of water and sanitation services; participatory development approach in water and sanitation sector; community management of water and sanitation services.

Introduction to solid and hazardous waste management; socioeconomic impact assessment; introduction to environmental pollution (water pollution, air pollution, noise pollution). Introduction to food sanitation. Introduction of EIA.

CE341 Principles of Soil Mechanics

Credits: 3+1.5

Prerequisite: CE203, CE213

Course Content

Introduction to geotechnical engineering; formation, type and identification of soils; soil composition; soil structure and fabric; index properties of soils; weight volume relationship; engineering classification of soils; soil compaction; principles of total and effective stresses; permeability and seepage; stress-strain-strength characteristics of soils; compressibility and settlement behavior of soils; lateral earth pressure; stress distribution.

CE441 Foundation Engineering

Credits: 3

Prerequisite: CE341

Course Content

Soil investigation techniques; types of foundations; bearing capacity of shallow and deep foundations; settlement and distortion of foundations; design and construction of footings, rafts and piles; slope stability analyses.

CE351 Transportation Engineering-I: Transportation Planning and Traffic Engineering

Credits: 3

Prerequisite: None

Course Content

Transportation engineering, transportation functions; transportation systems, functional components, factors in transportation development, transportation modes, public transportation, emerging modes; intelligent transportation system: components and applications; transport planning: concepts, scope and hierarchy, process, goals and objectives, inventories, socio-economic activities, land use-transport interaction, travel demand forecasting, traffic impact assessment; road safety and accident analysis. Geometric design of highways: design controls and criteria, cross sectional elements, alignment, sight distance, intersection and interchange layouts, planning and design of bicycle and pedestrian facilities; traffic engineering: fundamentals of traffic engineering, vehicle and traffic characteristics, traffic control devices and systems, introduction to signal optimization tools, traffic studies, planning and design of parking facilities, roadway lighting; transportation in Bangladesh: transportation modes and networks, constraints and challenges, transport demand and modal share, road classification and design standards.

**CE_451 Transportation Engineering-II:
Pavement Design and Railway Engineering**

Credits: 3+1.5

Prerequisite: CE351

Course Content

Pavement materials: bituminous binders, cement, aggregates, embankment material, soil stabilization; mix design methods; low cost roads; flexible and rigid pavement: pavement components and functions, pavement design and construction, road maintenance; Rail traffic management and signalling; transportation demand, supply and equilibrium; road traffic assignment, network equilibrium, system optimality; traffic flow theory, shockwaves, deterministic and stochastic queuing analysis.

CE361 Open Channel Flow

Credits: 3+1.5

Prerequisite: CE261

Course Content

Water resources engineering is a major branch of civil engineering deals with Open channel flow and its classification; velocity and pressure distributions; energy equation, specific energy and transition problems; critical flow and control; concept of uniform flow, Chezy and Manning equations, estimation of resistance coefficients and computation of uniform flow; momentum equation and specific momentum; hydraulic jump theory and analysis of gradually varied flow; computation of flow profiles; design of channels.

CE_461 Hydrology, Irrigation and Flood Control

Credits: 3

Prerequisite: CE361

Course Content

Hydrologic cycle; Weather and hydrology; Precipitation, Evaporation and transpiration; Infiltration; Stream flow; Application of telemetry and remote sensing in hydrologic data acquisition; Rainfall-runoff relations; Hydrographs, unit hydrographs; Hydrologic routing; Statistical methods in hydrology. Plant-soil-water relationship; consumptive use and estimation of irrigation water requirements; canal layout in irrigation; methods of irrigation; quality of irrigation water; problems of irrigated land, flood and its management, Climate change and hydrologic challenges in Bangladesh.

Elective Civil Engineering Courses: 11 Credits

*[Six Courses: Two theoretical courses from one of the following five groups as a **Major (4 Cr.)** and One compulsory sessional course from that **Major group (1.5 Cr.)** + Two theoretical courses from one of the remaining four groups as a **Minor (4 Cr.)** + One compulsory sessional course from that **Minor group (1.5 Cr.)**]*

Group A: Structural Engineering
Theoretical Courses

CE413 Introduction to Steel-Concrete Composite Structures

Credits: 2

Prerequisite: All CE300 Level Courses

Course Content

Introduction to steel-concrete composite structures; advantages of composite construction; interaction between steel and concrete, shear connectors, elastic analysis of composite beams, beam-column connections, behavior of different types of composite columns, axial load capacity and interaction diagrams for composite columns.

CE415 Prestressed Concrete

Credits: 2

Prerequisite: All CE300 Level Courses

Course Content

Prestressed Concrete: concepts of prestressing; materials; anchorage systems; loss of prestress; analysis of sections for flexure, shear, bond and bearing; analysis of end block and composite sections; beam deflections; cable layout; partial prestress.

Design of prestressed concrete beams for simple and continuous spans; ideas about use of AASHTO – PCI sections for standard spans; design considerations for prestressed concrete pipes, piles, poles and railway sleepers.

CE417 Design of Concrete Structures-II

Credits: 2

Prerequisite: All CE300 Level Courses

Course Content

Introduction to floor systems and design of column supported slabs (flat plates, detailing of flat plate, direct design method); design of beam for torsion; bond and anchorage; introduction to slender column; seismic detailing; design of RCC retaining and shear walls. Prestressed Concrete: concepts of prestressing; materials; anchorage systems; analysis of sections for flexure and shear; design of prestressed concrete beam. Introduction to Strengthening of RC Structures.

CE419 Introduction to Finite Element Method

Credits: 2

Prerequisite: All CE300 Level Courses

Course Content

Introduction to finite element method as applied to stress analysis problems; basic equations in elasticity, matrix displacement formulation, element shapes, nodes, nodal unknowns and coordinate system, shape functions, strain displacement matrix, methods for assembling stiffness equations e.g. direct approach, Galerkin's method, virtual work method, principle of minimum potential energy; introduction to isoparametric formulation; discretization of a structure and mesh refinement, one dimensional stress-deformation and two dimensional plane stress and plane strain analysis of stress-deformation problems; numerical integration and computer application.

CE421 Dynamics of Structures

Credits: 2

Prerequisite: All CE300 Level Courses

Course Content

Single degree of freedom system, formulation of equation of motion; free vibration response; response to harmonic, impulse and general dynamic loading; vibration analysis by Rayleigh's method; response spectra; two degrees of freedom system.

CE423 Design of Concrete Structures-III

Credits: 2

Prerequisite: All CE300 Level Courses

Course Content

Analysis and design for torsion; design of one way and two way joist slabs with or without beam on the column line; slender columns; strut-and-tie models (design of deep beam), design of reinforcement at joints; design and detailing of lateral load resisting components. Introduction to Demolition of RC Structures.

Sessional Course

CE412 Computer Aided Analysis and Design of Structures Sessional

Credits: 0+1.5

Prerequisite: All CE300 Level Courses

Course Content

Structural idealization, computer modeling of frame structures, computer aided analysis and design of various reinforced concrete and steel structures, e.g. high-rise building, modular bridge, water tower etc.

Group B: Environmental Engineering

Theoretical Courses

CE433 Solid and Hazardous Waste Management

Credits: 2

Prerequisite: All CE300 Level Courses

Course Content

Solid Waste Management: sources and types of solid wastes; physical and chemical properties of solid wastes; solid waste generation (Separation at source); on-site handling, storage and processing; collection of solid wastes; transfer stations and transport; resources and energy recovery and recycling (Reduction, Re-used & Recycling- 3R concept); decomposition of solid waste: anaerobic treatment/biogasification, aerobic treatment/composting; thermal treatment, land disposal. Hazardous Waste Management: identification, sources and characteristics of hazardous wastes; different types of hazardous waste, hazardous waste management plant; methods of treatment (physical, chemical, biological and thermal treatment; fixation/stabilization) and disposal(landfill and ocean dumping) of hazardous waste. Healthcare waste management, categories of healthcare waste, treatment methods of healthcare waste. Integrated solid waste management and life cycle inventory analysis.

CE435 Environmental Pollution Management

Credits: 2

Prerequisite: All CE300 Level Courses

Course Content

Water pollution: sources and types of pollutants, emerging contaminants; waste assimilation capacity of streams; dissolved oxygen modeling; ecological balance of streams; industrial pollution; lake pollution and eutrophication; heavy metal contamination; groundwater pollution; marine pollution; water quality problems in Bangladesh; pollution control measures: water quality monitoring and management.

Air pollution: sources and types of pollutants; effects of various pollutants on human health, materials and plants; air pollution meteorology; introduction to air quality models; air pollution monitoring and control measures; global warming, climate change and ozone layer depletion; acid rain.

Noise pollution, basics of noise modeling, and control measures.

Legal framework for environmental protection: environmental standards and legislations in Bangladesh.

CE437 Environmental and Sustainable Management

Credits: 2

Prerequisite: All CE300 Level Courses

Course Content

Environment and development projects: environment and sustainable development; environmental policies and legislation; environmental implication of sectoral development; environmental quality standards; environmental issues and priorities; environmental impact assessment of development schemes-baseline. studies, assessment methodologies; economics of environmental management; contemporary issues; case studies.

Sessional Course

CE432 Design of Water Supply, Sanitation and Sewerage Systems

Credits: 0+1.5

Prerequisite: All CE300 Level Courses

Course Content

Design of water supply and sewerage system: estimation of industrial, domestic and fire demands, designing deep tube well and water distribution network; estimation of industrial, domestic and commercial wastewater generation, wastewater network design; household plumbing system design; design of water and wastewater treatment plant; computer application in environmental engineering; field visits and reporting.

Group C: Geotechnical Engineering **Theoretical Courses**

CE443 Earth Retaining Structures

Credits: 2

Prerequisite: All CE300 Level Courses

Course Content

Foundation of structures subjected to lateral loads; rigid and flexible earth retaining structures; methods of construction: dewatering and slurry-wall construction, braced excavation, sheet piles, cofferdams, caissons.

CE445 Elementary Soil Dynamics

Credits: 2

Prerequisite: All CE300 Level Courses

Course Content

Elementary vibrations; dynamic properties of soil; seismic response of soils: site effects, site amplification, liquefaction problems, remedial measures and earthquake hazards.

CE447 Soil-Water Interaction

Credits: 2

Prerequisite: All CE300 Level Courses

Course Content

Introduction to soil-water interaction problems: permeability, seepage, capillarity and soil suction; slopes subjected to water current, wave action etc; theories of filters and revetment design; geotechnical design of landfills; stability of slopes subjected to seepage.

Sessional Course

CE442 Geotechnical Engineering Design Sessional

Credits: 0+1.5

Prerequisite: All CE300 Level Courses

Course Content

Interpretation of soil test results, design of foundations: shallow and deep foundation; introduction to computer aided design of foundations; footing, pile, raft/mat foundations; retaining structures; reinforced soils.

Group D: Transportation Engineering **Theoretical Courses**

CE455 Transportation Engineering-III: Traffic Engineering Design and Management

Credits: 2

Prerequisite: All CE300 Level Courses

Course Content

Advanced concepts of traffic management, management strategies; analysis of traffic flow characteristics; traffic control devices; intersection control and design; grade separation and interchanges; computer application in traffic system analysis; introduction to micro simulation and ITS; NMT issues and road safety.

CE457 Transportation Engineering-IV:

Pavement Management, Drainage and Airport

Credits: 2

Prerequisite: All CE300 Level Courses

Course Content

Pavement management systems; evaluation and strengthening of pavements; drainage: highway drainage and drainage structures; airports: importance, advantages and trends in air transportation, planning and design of airports, aircraft characteristics related to airport design, types and elements of airport planning studies, airport configuration, geometric design of the landing area, terminal area, heliports, design of airport pavements, lighting, marking and signing, airport drainage, introduction to airside planning, design and operations software.

CE459 Transportation Engineering-V: Urban Transportation Planning and Management

Credits: 2

Prerequisite: All CE300 Level Courses

Course Content

The urban transport problems and trends; road network planning; characteristics and operation of different transit and para-transit modes, planning transit network; estimating system costs and benefits, pricing and financing, evaluation, transit users attitude, policies and strategies for transit development in metropolitan cities; freight traffic planning and management; selected transport case studies, congestion management; safety management; environmental issues and sustainable transport.

Sessional Course

CE454 Transportation Engineering Sessional-II: Pavement Design and Traffic Studies

Credits: 0+1.5

Prerequisite: All CE300 Level Courses

Course Content

Design of flexible and rigid pavement and air field pavements; geometric design; road intersection design and interchanges; traffic studies; computer models and application packages.

Group E: Water Resources Engineering **Theoretical Courses**

CE465 Flood Mitigation and Management

Credits: 2

Prerequisite: All CE300 Level Courses

Course Content

Flood and its causes; methods of flood management: structural and non structural measures such as reservoirs, levees and flood walls, channel improvement, interior drainage, floodways, land management, flood proofing, flood zoning, flood hazard mapping, flood forecasting and warning. Economic aspects of flood management: flood risk and vulnerability analysis, direct and indirect losses of flood, flood damage assessment, flood damage in urban and rural areas.

CE467 Groundwater Engineering

Credits: 2

Prerequisite: All CE300 Level Courses

Course Content

Groundwater in hydrologic cycle and its occurrence. Physical properties and principles of groundwater movement. Groundwater and well hydraulics. Groundwater resource evaluation. Groundwater levels and environmental influences. Water mining and land subsidence. Groundwater pollution and contaminant transport. Recharge of groundwater. Saline water intrusion in aquifers. Groundwater management.

CE469 River Engineering

Credits: 2

Prerequisite: All CE300 Level Courses

Course Content

Behavior of alluvial rivers; river channel pattern and fluvial processes; aggradations and degradation, local scours, river training and bank protection works; navigation and dredging sediment movement in river channels, bed form and flow regimes.

CE471 Hydraulic Structures

Credits: 2

Prerequisite: All CE300 Level Courses

Course Content

Principles of design hydraulic structures, types of hydraulic structures; design of dams, barrages, weirs, spillways, energy dissipaters and spillway gates; cross drainage works.

CE473 Coastal Engineering

Credits: 2

Prerequisite: All CE300 Level Courses

Course Content

Coast and coastal features; tides and currents; tidal flow measurement; waves and storm surges; docks and harbors; forces of waves and tides in the design of coastal and harbor structures; coastal sedimentation processes; deltas and estuaries; shore protection works; dredging and dredgers.

Sessional Course

CE462 Water Resources Engineering Sessional

Credits: 0+1.5

Prerequisite: All CE300 Level Courses

Course Content

Design of hydraulic structures, river training works.

Final Year Project

CE400 Capstone Project

Credits: 6

Prerequisite: 112.5 Cr. and all CE300 level courses

Course Content

The capstone project is an intense engineering exercise which is assigned to the final year students that spans for three consecutive semesters. The capstone project generally involves a process of solving civil engineering related practical problems with considerations of safety; serviceability, economy, sustainability and impacts on society and environment. During this project, students will work in a team who will develop a viable solution for a real-life problem with guidance from the project advisor. At the end of the project, students will prepare a professional technical report which must be submitted to the project advisor and department.

Inter-Disciplinary Engineering Courses: [Two Courses]

CSE227 Numerical Methods and Computer Programming

Credits: 3+1.5

Course Content

Introduction to Numerical Methods: root finding using bisection, Regular-Falsi, Newton-Raphson's, Secant and Jacobi Methods. Error Analysis. Solutions of simultaneous linear equations using Gauss-Jordan elimination method. Interpolation: Lagrange's polynomials, Newton's polynomials and Splines. Least square curve fitting. Numerical Integrations: Trapezoidal rules, Simpson's rule, Romberg integration and quadratures. Finite Difference: forward, backward and central differences and Richardson's extrapolation. Solutions of ordinary and partial difference equations using finite difference technique. Solution of eigenvalue equation.

Introduction to Computer. Algorithm development and flow-chart construction for problem solving using computer. Information representation within computer: binary number system, binary arithmetic, binary codes. Structured Programming Concept: data types, variables, constants, operators, expressions, assignments, type conversions in assignments, formatted input/output, decision making and branching, decision making and looping, arrays, character string, functions, program structures, recursions, pointers pointer to function, advanced data types, user defined data types, advanced operators, records, file management, dynamic variables, linked lists. Programming for scientific and engineering problem solving.

EEE165 Basic Electrical Technology

Credits: 3

Course Content

Electrical units and standards; Electrical networks and circuit solutions: Series, parallel, node and mesh current analysis; Measurement of electrical quantities: current, voltage, resistance. AC circuit analysis: Instantaneous current, voltage and power, effective current and voltage, average power. Introduction to energy conversion. Introduction to electrical wiring for residential and commercial loads. Stand by generator and substation design considerations.

Basic Science Courses

PHY 107: Engineering Physics I (Mechanics, Waves, and Thermodynamics)

Credits: 3+1.5

Prerequisite: MAT101

Course Content

Mechanics: Newton's law of motion; Kinetic and potential energy; Conservation of Energy; Conservation of Linear Momentum; Systems of particles; Collisions; Rotational Dynamics; Conservation of Angular Momentum; Equilibrium of Rigid Bodies; Elasticity.

Fluid Mechanics: Concept of Fluids; Pressure and Density; Pressure and force, Pascal's principle, Archimedes principle, General Concept of Fluid Flow; the Equation of Continuity; Bernoulli's Equation; Applications; Fields of Fluid-Flow. Viscosity of fluids, Poiseuille's law; Stokes' law; Determination of coefficient of viscosity of liquids and gases, drag force and terminal velocity.

Waves & Oscillations: Differential equation of a Simple Harmonic Oscillator, total energy and average energy, Combination of simple harmonic oscillations, Damped oscillation, Determination of damping co-efficient. Forced oscillation, Resonance, Two-body oscillations, Reduced mass, Differential equation of a progressive wave, Interference of wave, Power and Intensity in Wave Motion; Stationary wave, Group velocity and phase velocity, Architectural acoustics, Reverberation and Sabine's formula.

Heat & Thermodynamics: Concept of heat and temperature, kinetic theory of gases, Isothermal and Adiabatic Changes; Reversible and Irreversible processes; the first law of thermodynamics and its application, second law of thermodynamics, Carnot Cycle; Efficiency of heat engines, Carnot Theorem; Entropy and disorder.

PHY 207: Engineering Physics II (Electricity & Magnetism, Physical Optics and Modern)

Credits: 3

Prerequisite: MAT102, PHY107

Course Content

Electricity and Magnetism: Concept of electric charge, electric field, Gauss's Law and its application, electric potential, capacitors with dielectrics, energy stored in a capacitor, charging and discharging of a capacitor. Magnetic field: Magnetic field, Magnetic force on a current carrying conductor, Biot-Savart law, Ampere's law and application of Ampere's law. Torque on a current carrying loop, Hall effect, Faradays Law of electromagnetic induction, Magnetic properties of matter; Hysteresis curve.

Physical Optics: Light is an EM wave, dual character of light, interference of light, Young's double slit experiment, Newton's rings, interferometers; diffraction of light; Fresnel and Fraunhofer diffraction, diffraction by single slit, resolving power of optical instruments, diffraction at double slit and N-slits-diffraction grating; polarization; production and analysis of polarized light, Brewster's Law, polarization by double refraction, Nicol prism, polarimeters, polaroid; idea of Lasers

Modern Physics: Theory of radiation, Photo-electric effect, Compton effect, pair production and pair annihilation, production of continuous and characteristic X-rays; X-ray diffraction; wave properties of particles: de Broglie's hypothesis, phase velocity and group velocity of matter waves, particle diffraction; Davission-Germer experiment; radioactivity; Postulates of quantum theory, Heisenberg's uncertainty relation, simple applications of Schrödinger equation.

CHE 107: Engineering Chemistry - I

Credits: 3+1.5

Prerequisite: None

Course Content

Atomic Properties and Binding Forces: Atoms, molecules and forces between them, Forces in solids and bindings, Ionic bond, Covalent bond, Metallic bond, Hydrogen bond and Vander Wall's force; properties of gases.

Oxidation and Reduction: Oxidation and reduction, Oxidation number, Analytic reagents.

Acid and Bases: Strong and weak acids and bases, pH, Buffer solutions, Neutralization curves, Indicators for acid-base titrations.

Chemical Equilibrium & Thermodynamics: Chemical equilibrium; concepts of chemical thermodynamics and thermochemistry; electrolysis, Galvanic cells, electrodes and electrode reactions, reduction potential, the chemical series, standard hydrogen electrode, Measurement of pH.

Chemical Solutions: Different types of solutions and their colligative properties. Selective Organic Compounds: Aliphatic and aromatic organic compounds with their derivatives.

Basics of Biochemistry: Amino acids, Peptides and proteins, Hemoglobin as an allosteric model, Enzymes, Cofactors, Bioenergetics, Membrane transport, Metabolism of proteins, Carbohydrates, Lipids, Nucleic acids. The course includes lab work based on theory taught.

Mathematics and Statistics Courses

MAT 101: Differential and Integral Calculus

Credits: 3

Pre-requisites: None

Course Content

Differential Calculus: Limit, Continuity and differentiability. Successive differentiation of various types of functions. Leibnitz's theorem. Rolle's theorem. Mean value theorems. Taylor's and Maclaurin's theorems in finite and infinite forms. Lagrange's form of remainders. Cauchy's form of remainders. Expansion of functions. Evaluation of indeterminate forms by L'Hospital rule. Partial differentiation. Euler's theorem. Tangent and normal. Concavity of functions. Determination of maximum and minimum values of functions and points of inflection with Applications. Curvature, Asymptotes.

Integral Calculus: Integration by the method of substitution. Standard integrals. Integration by successive reduction. Definite integrals, its properties and use in summing series. Walli's formulae. Improper integrals. Beta function and Gamma function. Area under a plane curve and area of a region enclosed by two curves in Cartesian and polar co-ordinates. Volumes of solids of revolution. Volume of hollow solids of revolution by shell method. Area of surface of revolution. Jacobians. Multiple integrals with applications.

MAT 102: Differential Equations and Special Functions

Credits: 3

Pre-requisites: MAT101.

Course Content

Ordinary Differential Equations: Degree and order of ordinary differential equations. Formation of differential equations. Solutions of first order differential equations; Separable & homogeneous equations, Exact equation. Integrating factor. Equations made exact by integrating factors. First order linear equation. Bernoulli's equation. Higher order linear homogeneous equation with constant coefficients. Initial and Boundary value problems. Linear non-homogeneous equation with constant coefficients: Method of undetermined coefficients, Method of variation of parameters, Operator method; Series solution; Frobenius method.

Partial Differential Equations: Formation of PDEs & First order linear PDEs. Solution of PDEs of first order; Lagrange's Method. Second Order homogeneous & non-homogeneous PDEs with constant coefficients. Wave equations. Particular solutions with boundary and initial conditions.

Special Functions: Legendre differential equation and Legendre polynomials, Recurrence relations for Legendre polynomials, Spherical harmonics, Bessel differential equation, Bessel functions, Recurrence relations for Bessel functions, Modified Bessel functions, Hermite differential equation, Hermite polynomials, Hyper-geometric function.

MAT 104: Co-ordinate Geometry and Vector Analysis

Credits: 3

Pre-requisites: MAT101

Course Content

Two-Dimensional Geometry: Change of axes, transformation of co-ordinates, Pair of straight lines, Circles: Tangents and Normals, Chord of Contact, System of Circles: Orthogonal Circles. Conic Section: Parabola, Ellipse & Hyperbola. The general equation of second degree, Identification of Conics.

Three-Dimensional Geometry: Co-ordinate systems; Direction cosines & direction ratios, Plane, Straight line: The Shortest distance, Sphere: Tangent Plane. Cylinder and Cone.

Vector Analysis: Vectors and Scalars, Algebra of vectors, Vector differentiation and vector integration, Gradient, Divergence and Curl: Cartesian, Spherical, Polar and cylindrical systems, Physical significance of Gradient, Divergence and Curl. Green's theorem, Divergence theorem, Stoke's theorem and their applications.

STA 102: Statistics and Probability

Credits: 3

Pre-requisites: None

Course Content

Introduction: Nature and scope, nature of statistical data, Attributes and variables, Discrete and continuous variables, Methods of data collection, Tabulation, graphs and diagrams; Measure of location: characteristics of an ideal measure, Arithmetic mean, Geometric mean, Harmonic mean, Median, Mode, Quartiles, Deciles, Percentiles; Measure of dispersion: Absolute measure, Relative measure, Range, Standard deviation, Mean deviation, Quartile deviation, Co-efficient of dispersion, Co-efficient of variation, Skewness and kurtosis; Regression and correlation: relation between variables, Fitting of regression lines, Simple correlation, multiple correlation and regression; Theory of probability; Theorems of total, compound and conditional probability, Random variables Bayes theorem, Discrete and continuous random variables, Probability function, Expectation of sum and products, Concept of Binomial, Poisson and Normal distribution, Random process, Auto correlation function of a random process, multiple random process, Basic concepts of discrete and continuous probability distributions, Markov process, Queuing process; Sampling techniques; Test of significance: Test of means, Variance, Correlation coefficients and regression coefficients.

Compulsory General Education Courses

ENG 101: Basic English

Credits: 3

Prerequisite: ENG099 (if required)

Course Content

This course is designed to provide students with the opportunity for understanding and improving all four skills in English with special emphasis on reading and writing. Lessons are balanced in this way: Grammar and vocabulary lessons to improve the students' accuracy in real-life settings; speaking and listening lessons to improve their confidence, fluency and presentation skills; and reading and critical thinking lessons to provide integrated language practice involving diverse topical issues. Overall, students' capacity to organize and present ideas in English is developed.

ENG 102: Composition and Communication Skills

Credits: 3

Prerequisite: ENG101

Course Content

In this composition course, students will study the principles of writing and analyzing non-fiction prose, focusing on argument and academic research strategies. As students, one should be able to write a literate and well-argued essay and should be able to read a literary text with some understanding and sensitivity. For practical purposes, this means that students should be able to write an effectively organized and substantial essay that is generally grammatically and syntactically sound, and acquire the capacity to identify and discuss prose features. In English 102, students will acquire and polish the tools fundamental to effective writing and reading that will help them participate successfully in the discourse systems of the university and beyond.

GEN 226: Emergence of Bangladesh

Credits: 3

Prerequisite: ENG102

Optional General Education and Sociology Courses: [Two Courses]

GEN 201: Bangladesh Studies

Credits: 3

Prerequisite: ENG102

Course Content

The objective of this course is to familiarize the students with the notion of our glorious struggle for the independence of Bangladesh as well as the thematic areas of national importance and public good. The course will be offered from an interdisciplinary perspective with the aim of covering a wide range of issues including the pre-colonial and colonial historical episodes leading to the emergence of the nation-state; geographic features, natural resources, and environmental aspects; education, society, and politico-cultural change, economic and social inequality, and urbanization; functioning of state focusing judicial, administrative, and legislative systems and governance; socio-economic development focusing on economic growth plans (rural and urban), poverty eradication, livelihoods, social transformation, social safety net, local governance, role of NGOs, civil society, and development agencies and partners.

GEN 204 : Western Thought

Credits: 3

Course Content

The aim of the course is to introduce students to some masterpieces of western literature. The course includes selections from William Shakespeare, Charles Dickens, Anthon Chekov, Guy de Mupassant, Robert Frost, T.S. Eliot.

GEN 205 : Introduction to Psychology

Credits: 3

Prerequisite: ENG102

Course Content

This introductory course on Psychology aims at familiarizing the students of other disciplines with the central concepts and theories of Psychology. It covers both the traditional areas of Psychology and applied topics, including the biological foundations of behavior, sensation, perception, learning, memory, abnormal behavior and treatment and health psychology. The course will not only provide the students with a conceptual overview of understanding human behavior and mental processes, but also a pathway to self-understanding, offer the potentials of a future career, and will give them an opportunity for intellectual discovery.

GEN 207: Industrial Psychology

Credits: 3

Prerequisite: ENG102

Course Content

Industrial Psychology (I/O Psychology) is the applied field in which the principles of psychology are used to provide insights into how organizations function, and why they do, what they do. This course is based on the science of peoples' behavior at work and the application of psychological principles of organizational and work settings. The purpose of I/O Psychology is to show how it will directly influence ones lives as job applicants, trainees, employees, managers, coordinators, and consumers, in brief, the nature of work in modern society. It is going to make students familiar with Job Analysis, Performance Appraisal, Assessment Methods for Selection and Placement, Selecting Employees, Training and Development, Theories of Employee Motivation, Job Satisfaction and Organizational Commitment, Productive and Counter Productive Behavior, Working Conditions, Employee Health and Safety from behavioral perspective.

GEN 208: Introduction to Philosophy

Credits: 3

Course Content

This course is designed to familiarize students with some fundamental problems and issues in philosophy. As a course in a second or higher order discipline concerned with critical thinking, this can help us improve our ways of making sense of the world. This will provide an opportunity for cultivating the skills of evaluating arguments and developing the habits of cooperative rather than adversarial argumentation for problem solving and effective deliberation. The topics to be discussed include: Definition, Nature and Scope of Philosophy; Thinking as the way we make sense of the world; Problem Solving as Thinking Critically; Theories of Reality; Knowledge; Values; Theories of Truth; Proofs for the existence of God; Problem of Freedom of Will; Mind-Body Relation; Existentialism, Pragmatism and Logical Positivism as philosophical trends.

GEN 210 : International Relations

Credits: 3

Prerequisite: ENG102

Course Content

The study of International Relations attempts to analyze world events and speculate future in a systemic way. The basic objective of this course is to understand the world that is fast changing. Towards this end, this course intends to equip the students with knowledge and analytical tools necessary to comprehend, evaluate, and respond to an increasingly complex array of problems both at the national and international levels. The course focuses on such key areas as Theories of International Relations, Concept of Power, War and Peace, Diplomacy, United Nations, Regional Organizations, Nuclear Arms Race, Inter-State Conflict and Cooperation, International Terrorism and Counter Terrorism, Third World Poverty, International Development, and Globalization.

GEN 211: Concepts of Journalism and Media Studies

Credits: 3

Prerequisite: ENG102

Course Content

The broad objective of the course is to examine the basic tenets of newspaper journalism on one hand and media studies on the other. Journalism: the specific objective of the course in Journalism is to show how research, organize and write stories; understand the internal structures of newspapers; advertising, circulation

and readership and editorial policies of the newspapers; different political systems in which media exists, newspaper censorship and laws of libel as well as ethical issues. Media Studies: The students will be introduced to the various forms of media including print and electronic such as newspaper, radio and television; conceptual learning about operating system of different form of media especially the applications of information technology in TV; news script writing for print and TV media.

GEN 223: Contemporary Security Studies in Asia-Pacific

Credit: 3

Prerequisite: ENG102, GEN210

Course Content

This course focuses on contemporary socio-economic and politico-military security issues in the context of Asia-Pacific region. The course will make an attempt to introduce key elements of global and regional security-nuclear security threats, rise of strategic powers and forms and dimensions of security in relation to national and international politics. The course also explores future perception of threats and preventive mechanisms to develop confidence building among the actors. It will address both theoretical and applied knowledge of security discourse in the context of global politics. The objective of the course is to examine the rationale of the security studies and to consider the implications of traditional security in the context of international relations and politics.

GEN 225: Demography and Economic Statistics

Credit: 3

Course Content

The course is designed to introduce students to basic concepts of demographic measurement and modeling used to study changes in population size and composition. The course covers basic measures of mortality, fertility and migration; life table construction; multiple decrement life tables; stable populations; population projections; and age patterns of vital events. Students will learn to apply demographic methods through a series of weekly problem sets.

This course covers basic descriptive statistical techniques used in analyzing data in the perspective of social science. Statistics is the science of collecting, organizing, summarizing, and analyzing information in order to draw conclusions. Statistics is a discipline that plays a major role in many different areas. For example, it is used in sports to help a sports team make informed decisions about their competition. It is used to predict the outcome of elections and to help determine government policies. Statistics assists in determining the effectiveness of new medications. It is used by agronomists to find higher yielding varieties of crops. Animal scientists use statistics to find new feeding regimes for animals. Statistics plays a major role in economics in testing hypotheses about economic relations. Statistical models are used by economists to predict economic output, interest rates, stock and commodity prices, and many other economic variables. The above applications will be highlighted in this course.

GEN 239: Professional Ethics

Credits: 3

Pre-requisite: ENG102

Course Content

This course is designed to introduce ethical and spiritual commitment in the profession in order to maintain higher standard at work environment. More specifically, the course will focus on moral character, character development, moral leadership, developing morality in organization, moral behavior, characteristics of moral standards, moral issues and ethical principles, moral obligations, spirituality, natural laws-the concept of a moral being, duties and rights, applying natural laws, moral decision-making process-steps in the decision making process, making ethical decisions, decision strategies, personal morality, codes of professional conduct-purpose of a code of conduct, critical elements in the development of a code of professional conduct, rules of professional conduct, professional standards.

SOC 101: Introduction to Sociology

Credits: 3

Course Content

Introduction: Definition of Sociology. Nature and scope of Sociology. Origin and development of Sociology. Relationships with other Social Sciences. The emergence of Sociology and Fourfold origin of Sociology

Basic Concepts of Sociology: Group, Association, Institution, Community, Norms and Values, Role and Status, Folkways and Mores, Society and Organization

Culture: Definition. Elements of culture (norms, values, symbols, language). Material and Non- Material Culture. Cultural Lag, Cultural Evolution. Diversity and integration. Counter Culture, Cultural Relativism, Ethnocentrism, Cultural Integration).

Sub-culture. Basic elements of Bangladesh Culture, Cultural Traits and Complex.

Social Structure: Definitions of Social Structure. Levels of social structure (Micro and Macro). Components of social structure. Theories of Social Structure. Patterns of social relationships (exchange, Cooperation, Conflict, Competition, Domination and Subordination). Impact of structure upon individual.

Socialization: Definition. Nature and nurture. Dynamics of socialization. Socialization and early life cycle (Mead, Piaget, Erikson). Agents of socialization.

Social Groups and Social Interaction: Definition. Types of groups. Group dynamics. Functions of groups. Definition; Agencies of Social Control

Social Control: Definition of Social Control; Agencies of Social Control; Deviance and Crime. Explanation of deviance. Normal and Deviant careers.

Social Stratification: Definition. Types and theories of Stratification (Conflict, functional and other theories).

Social Institutions: Family; Functions of Family. Definitions of Family. Types of Family. State, Nature of State, Political Parties, Social Institutions, Economic Institutions; Education and Cultural Institutions.

Social Change and Technology: Definition. Perspectives of change. Sources of Change. Modernization. Theories of Social Change, Evolution, Progress and Development.

SOC 102: Introduction to Anthropology

Credits: 3

Course Content

The Anthropological Approach: Anthropology as a Field of Knowledge. Modes of Anthropological Understanding: Theory, Interpretation and Science. Different branches of Anthropology.

An Evolutionary Perspective: Human Evolution: The hominid lineage, The primate behavioral lineage, Language, and symbols. The Growth of Culture: Pre-historians as anthropologists, Paleolithic peoples, Food-producing, Urbanism and the Rise of states.

Culture, Society, and the Individual: Theories of Culture: Evolutionism, Diffusionism, Parallelism, Culture and people: Some basic concepts, The Anthropological concept of culture, The relation of culture to society.

Language and Communication: the nature and organization of language, and from language to culture. Culture and the individual: culture and personality, and beyond cultural determinism.

Marriage, Family and Kinship: Marriage, Types of marriage, Why is Marriage Universal? Restrictions on Marriage: The Universal Incest Taboo, Childhood Familiarity Theory, Freud's Psychoanalytic Theory, Family-Disruption Theory, Cooperation Theory, Inbreeding Theory, Form of Marriage. The Family, Variation in Family Form. Kinship and the Structure of Kinship and Kinship Terminology

Religion and Magic: Origin of Religion, Elements of Religion. The Universality of Religion, Variation in Religious Beliefs and Practices, Functions of Religion, Theories of Religion, Magical Practices and Its influence on Society, Rituals and Rites. Religion and Adaptation, Religious Changes and Revitalization Change.

Tribal Peoples: Toward a Systematic View: The Tribal World as Mosaic, as Ladder, and as System. Modes of subsistence. Modes of adaptation: Contemporary hunter-gatherers, tropical horticulturalists, and pastoral adaptations. How cultures change: cultural ecology-cultural materialism.

The Tribal World: Economic systems: systems of production, the economics of distribution, and the integration of economic systems. Social structure: kinship in tribal societies, descent systems, kinship and social relations, marriage, family, and community. Marriage in comparative perspective: marriage contracts and transactions, incest, exogamy and alliance. Power and politics: the processes of politics, worlds of women, and worlds of men. Structures of inequality: law and social control, religion, ritual, myth, and cosmos. The integration of societies. The structure of cultures. Ethnic minorities and the notion of tribe in colonial politics.

Anthropology and the Present: Response to cataclysm: the tribal world and the expansion of the west, the peasants, and the creation of the third world. Cities: anthropology of cities, anthropology in cities. Social science and the postcolonial world. Decolonizing anthropology and toward Human Survival.

GEN209: Introduction to Social Psychology

Credits: 3

Prerequisite: ENG102

Course Content

Introduction: Definition. Nature and scope of Social Psychology. Origin and development of Social Psychology as a scientific discipline. Relation of Social Psychology with other social and biological sciences. Schools of Psychology: Development of schools of modern social psychology. Methods of Social Psychology. Psychology of cognition.

Sensation and Perception: Types. Theories of Sensation and Perception, Stages of perception, Social and Cultural Determinants of Perception. Significance of stimulus and response. Meaning and various types of instincts. Development of self socialization of individual.

Social Interaction: Theories of social interaction. Group dynamics, Process of leadership, Types of Leadership, Types of group. Group solidarity. Morale and cohesiveness. Group leadership.

Motivation: Biogenic and Sociogenic motivation. Motivational Cycles.

Behavior: Instinctive Behavior vs. learned behavior, Learning, Definition of Learning, Theories of Learning (Thorndike, Pavlov, Skinner), Socialization and its agencies.

Mass Behavior: Crowd; Audience; Mob; Fashion; Fad.

Collective Behavior: Public Opinion, Process, Factors and Agencies of Public Opinion, Propaganda, Rumor.

Attitude: Attitude Formation and Attitude Change, Scales to measure attitude (Thurstone Scale, Bogardus Scale, Likert Scale).

Personality: Theories of personality (Kardiner, Linton, Mead, Benedict, Adler, Harney and Freud). Personality and culture (Horno, Linton, Mead, Kardiner). Personality and class. Personality measurement.

SOC 209: Industrial Sociology

Credits: 3

Course Content

Introduction: Nature and scope of Industrial Sociology. Foundation of Industrial Sociology. Relationship with rural and urban sociology. Approaches of Industrial Sociology.

Industrialization: The pre-industrial and industrial revolution. Industrializing and industrial society. Structural and functional dimension of industrial society. Pre-conditions and major barriers of industrialization. Industrialization of Bangladesh.

The Social Structure of Industrial Society: Role differentiation and distribution. Internationalization of New Values: rational work, discipline, and industrial bureaucracy. Industrial Management.

Problems of Industrial Society: Forces of stability and strains. Industrial conflict. Marginality and Individualization. Alienation and Anomie. Problems of employment and unemployment.

Social Organization of Industry: Industrial organization. Bureaucracy. Management and human relations. Hawthorne study. Industrial interest group. Organizational behavior.

Industrial Relations: Trends, issues and theories of industrial relations. Industrial conflict. Trade unionism. Collective bargaining. Psychological approach. Marxist approach of industrial relations.

Social Security: Health and medical care in industry. Problems of housing. Education and rehabilitation.

Industrialization in Bangladesh: Causes, trends, and problems of industrialization. Comparison with developing and developed countries.

SOC 211: Eastern Culture and Heritage

Credits: 3

Course Content

The objective of this course is to introduce the culture and civilization of eastern part of the world. The specific goal is to make the students familiar with different religions, culture and heritage, and intellectual tradition of this region. Major topics include: a brief study of the life of early man; an analytical view about cultural settings of our present and ancient civilizations; various features of Eastern epistemology; an elaborate

discussion about various features of culture and heritage of our subcontinent especially in Bangladesh; cultural contact between the East and the West; and contributions of some major scholars of Eastern tradition.

GEN203: Ecological System and Environment

Credits: 3

Course Content

The objective of this course is to help students learn basic environmental problems and ecological principles, develop their ability to use these principles to interpret ecological problems and understand the repercussions of environmental mismanagement. Topics include: Environment science, input reduction, population bomb, resources, ecology and population, abundance control, community diversity, energy flow, type of species, demography, resource management, biodiversity, pollution, controlling pollution, water pollution, air pollution, ethics.

GEN212: Women in Development

Credits: 3

Prerequisite: ENG101

Course Content

The course focuses on conceptual overview and practical tools for understanding the role of women in development process. It discusses the interrelationship between various development issues and gender. The course helps students to become aware of gender issues in both theoretical and Bangladesh contexts. It also attempts to help students to contribute to the efforts to eliminate all forms of gender discrimination in Bangladesh society. The course examines the role of women in economic development. Students are expected to gather knowledge and skill to develop a career plan in the perspective of gender. The course includes feminist analysis of international relations and development theories and Women Development Policy and Programme in Bangladesh. Topics include: Sex and Gender, Society; Patriarchy; Men-Women relationship in the patriarchal society, Theories of WID, WAD and GAD, Gender role, division of labour and gender needs. Women's reproductive health and right, Adolescence health care in relation to gender, Health and nutritional and HIV/AIDS issues in relation with gender, Gender and poverty, Gender and environment, Violence against women, One stop crisis centre visit/ Visit to a village, Case preparation, CEDAW and its clauses, Constitutional and fundamental rights of women, Beijing platform for action(PFA), Anti-dowry laws, and labour laws.

GEN214: Introduction to Development Studies

Credits: 3

Prerequisite: ENG 102

Course Content

The course provides an introductory look at the theories and concepts, which form the foundation of development. The student throughout the course will be facilitated to critically assess contemporary development issues such as poverty, gender discrimination and lack of access to natural resources. Key theoretical concepts such as modernization, liberalism, development projects and human rights will be addressed along with the usefulness of social research.

SOC 215: Principles of Social and Public Relations

Credits: 3

Prerequisite: ENG 102

Course Content

The primary objective of this course is to familiarize students with the basic concepts and principles of public relations. At the end of the course, students should have attained knowledge and understanding of the role and functions of public relations in an industrialized society, the basic tools, process and theories of public relations which include research, planning, communication, evaluation and the use of dynamic communication strategies to achieve organizational goals. This course also strives for a better understanding of public relations activities, impression management and how public relations works during crisis situations in personal and organizational arena.

SOC 216: Globalization and Social Identity

Credits: 3

Prerequisite: ENG 102

Course Content

This course has been designed to provide a comprehensive understanding of basic principles of globalization and social identity from an analytical perspective. The course will aid the students to make analytical conclusions regarding key social issues such as migration, governance, terrorism, globalization and international trade. From a developing nation perspective the course will also shed light on the debate between the Asian and Western Value systems, and thus provide a comprehensive view of people's perceptions of the globalizing world.

SOC 217: Religion, Ethnicity, Culture and Development in South Asia

Credit: 3

Prerequisite: ENG102, GEN206

Course Content

The socio-cultural and political existence of South Asian countries is often challenged by religious and cultural intolerance in recent times, although they are theoretically multi-ethnic and multi-religious countries. As a result, the socio-cultural and philosophical foundation of ethnic minorities is often neglected in the political processes in the name of democracy and economic development. In other words, the cultural identity of the ethnic and religious minorities is controlled through the politics of social exclusion and isolation. In many cases, the notion of social exclusion and isolation between the majority and minority has even spread into the thinking of the rural people of these countries. The policy of social exclusion has been used mostly to maintain and control the politics within the countries of South Asia.

This course will examine how the democratic processes uphold or fail to uphold cultural diversity within the socio-cultural and political conditions of these countries. It will also explore how religious and cultural identities and the social and philosophical foundations of the ethnic communities are addressed in the political processes in South Asia. More specifically, this course will critically examine the issues of social inclusion and exclusion, the socio-political and historical contexts and the ethical and development practices of diverse ethnic communities and development.

Optional Business and Economics Courses: [Two Courses]

ACT 101: Financial Accounting

Credits: 3

Course Content

This course aims to disseminate accounting and reporting fundamentals to the beginners. Upon the completion of the course, the participants are expected to be expert in drafting financial statements independently with the style of reading financial statements and the regulatory (national and international) requirements. The course includes the chapters titled introduction, users and branches of accounting, conceptual framework of accounting, generally accepted accounting principle, institutional framework, financial statements, accounting cycle, measuring and recording business transaction, concept of adjusting and closing entries, worksheet, accounting for merchandising operations, accounting information systems, internal control and cash, accounting for receivables, and inventories, plant assets - natural resources and intangible assets and accounting for depreciation.

BUS 321: Business for Engineering and Technology

Credits: 3

Prerequisite: ENG102

Course Content

This course should be taught with emphasis on engineering technological dimensions and practical examples drawn from engineering organizations and practices. Topics to be covered: Business Environment (Types of

Business, Entrepreneurship skills, the external environment of business, SWOT and PEST Analysis, Steps in setting up a new business). General Management (Managerial Roles and Organization Structure, Typical Structure of a manufacturing organization, Managerial tools for Decision making, Leadership, Motivation models, Strategic planning). Operational Management (Product and Services, product design and process selection, Faculty location and layout, Operational planning and scheduling, quality management, inventory and material management, productivity measurement and improvement). Financial Management (Basic accounting and financial concepts, Introduction to Financial Statement, Financial Statement Analysis).

FIN 101: Principles of Finance

Credits: 3

Prerequisites: ACT 101, STA 102, ECO 101

Course Content

This course is designed to provide the basic concepts, principles, analytical methods and tools that are used in basic financial management. The course includes the following topics- the study of financial environment including financial markets, instruments and institutions, risk and return, valuation of financial assets, introduction to capital budgeting and financial statement analysis.

FIN 201: Business Finance

Credits: 3

Prerequisites: FIN 101

Course Content

This course has been designed to develop understanding of both theoretical and practical issues of financial decision making tools for the students. After completing this course, students are expected to be able to make many financial decisions both at strategic and operation level related to cost of capital, analyzing company's current financial policies and redesign a more effective financial planning and controlling mechanism through ratio analysis, short-term liability management, management of working capital, managing the very basics of operation process like management of inventory, management of receivables, designing credit policy that improves the market share and cash flow, usability of financial and operating leverage to multiply the return to the shareholders.

FIN 335: Financial Institutions and Markets

Credits: 3

Prerequisites: ECO 102, FIN 201

Course Content

Financial Markets facilitate the flow of funds in order to finance the investment by individual, corporations and Governments. Financial Institutions are the key players in Financial Markets. Hence an understanding of money markets, capital markets: equity market and bond market, financial instruments traded in these markets, valuation and risks of these instruments, determination of interest rates, term structure of interest rates, primary market and stock offering, secondary market and market microstructure, mutual funds operations, pension funds operations, discussions of major financial institutions and the understanding of the Financial Markets and Institutions in Bangladesh with its regulatory environment are the major focus of this course.

MGT 101: Principles of Management

Credits: 3

Prerequisites: ENG101

Course Content

Meaning and importance of management, evaluation of management thought, managerial decision making, environmental impact on management, corporate social responsibly, planning setting objectives, implementing plans, organizing, organization design, managing change, human resource management- directing, motivating, leading managing workgroups, controlling- controlled principles, processes and problems, managing in a changing environment.

MGT 321: Industrial Management

Credits: 3

Pre-requisite: ENG102

Course Content

This course should be taught with emphasis on engineering and technological dimensions and practical examples drawn from engineering organizations and practices. Topics to be covered: Business Environment (Types of Business, Entrepreneurship skills, the external environment of business, SWOT and PEST Analysis, Steps in setting up a new business). General Management (Managerial Roles and Skills, Five Basic Functions of Management, Organization Structure, Typical structure of a manufacturing organization, Managerial tools for Decision Making, Leadership, Motivation models, Strategic Planning). Operations Management (Product and Services, Product design and process selection, Facility location and layout, Operation planning and scheduling, quality management, inventory and material management, productivity measurement and improvement). Financial Management (Basic accounting and financial concepts, Introduction to Financial Statements, Financial statement analysis).

MGT 337: Production Operations Management

Credits: 3

Prerequisites: STA 102, MGT 101

Course Content

This course is designed to provide the students with an understanding of the foundation of the operations function in both manufacturing and service. The course provides a general introduction and frameworks to manage manufacturing and service operations efficiently. Topics include Introduction to Operation Management, Operation strategy, Forecasting Models, Material Requirement Planning (MRP), Production Scheduling, Facility Location and Layout Planning, Decision Analysis, PERT/CPM Analysis, Gant Chart, Supply Chain Management.

MKT 101: Principles of Marketing

Credits: 3

Course Content

This course is designed to introduce fundamental marketing concepts, theories and analytical tools critical to manage profitable customer relationships in today's highly competitive and complex business environment. It provides an overview of all the marketing activities involved in the provision of products to final and organizational consumers. A diverse range of marketing topics is covered in this course including marketing strategy and planning, the marketing environment and how to monitor it, consumer and organizational behavior, marketing research, market segmentation and development of target markets, new product development, pricing, distribution, promotion and international marketing.

MKT 201: Marketing Management

Credits: 3

Prerequisite: MKT 101

Course Content

This course aims at developing a solid understanding of the basic terminology, concepts, tools, and frameworks in marketing. A broad range of marketing issues in a variety of consumer, industrial, and service environments is covered. Topics include consumer buying behavior, market segmentation, product positioning, marketing mix, sales force management, and market research techniques.

ECO 101: Principles of Microeconomics

Credits: 3

Course Content

Introduction to Economic theory. The concept of scarcity and choice; production possibility frontier; economic systems. theory of demand and supply. Importance of market price. Consumer behavior: Theory of utility.

Production: theories related to production; costs of production. Market Structure: Perfect Competition and Monopoly, and an introduction to monopolistic competition and oligopoly markets. Factor market: introduction to the labor market, Rent theory.

ECO 102: Introduction to Macroeconomics

Credits: 3

Prerequisite: ECO 101

Course Content

Macroeconomic is the policy oriented part of economics. The course will deal with the concepts and measurement of national income, inflation, unemployment, with an attempt to reveal how macro-economic variables such as national income, unemployment, inflation can be manipulated by government policies. The course will also introduce the macro-economic models using a graphical.

Approach: consumption function, investment theory, equilibrium and disequilibrium models of macro economy - classical and Keynesian theory. The focus of the discussion in the course will be on acquainting students with the macroeconomic fundamentals of an economy.

ECO 200: Agricultural Economics

Credits: 3

Prerequisite: ECO 101

Course Content

Introduction of agriculture as an industry; economics of agricultural production, farm management, land economics, rural organization, agricultural credit and finance, agricultural law, agricultural marketing, agrarian reform, agricultural policy, agricultural prices, structure and scope of Bangladesh agricultural sector.

ECO 260: Environmental and Natural Resource Economics

Credits: 3

Prerequisite: ECO 101

Course Content

This course aims at exploring and examining human relationship with environment with special emphasis on Bangladesh. The course surveys the economic, cultural, social, and political aspects of human population dynamics, food resources and hunger, mineral and energy resources, air, land and water pollution, wilderness and wildlife resources, urban and rural land usage, and toxic waste management from environmental and conservation viewpoints. The course makes recommendations and probes possible solutions to contemporary resource and environmental problems of Bangladesh. Current issues important to the environment are stressed in class projects.

ECO 357: Mathematical Economics

Credits: 3

Course Content

Economic models and equilibrium analysis, linear models and matrix algebra, differentiation and comparative statics, comparative statics of general function models, optimization and equilibrium, exponential and logarithmic functions, multi variable optimization, optimization with equality constraints, economic dynamics and integral calculus.