Program: B. Tech (Civil Engg.)

Year: Fourth Semester:-VII Session: 2012-2013

Scheme & Evaluation Pattern

C	C		F	Periods Evaluation L T P Sessional Exter		n	Total				
S. No.	Course No.	Subject	-			5	Sessio	nal	External	1 otai Marks	
110.	INO.	-	L		L T P	P	CT	TA	Total	Exam	Marks
		Semeste	r: VII								
		Theo									
1	TCE-701	Bridge Engineering	3	1	0	30	20	50	100	150	
2	TCE-702	Transportation Engg. II	3	1	0	30	20	50	100	150	
3	TCE-703	Seismology and Earthquake Engg.	3	1	0	30	20	50	100	150	
4		Elective –I	3	1	0	30	20	50	100	150	
5		Elective II	3	1	0	30	20	50	100	150	
6											
		Practical/	Design								
1		Project	0	0	4	0	0	50	50	100	
2		CAD Lab- I	0	0	3	10	15	25	25	50	
3		Industrial Interaction	0	0	2	0	0	25	25	50	
4		Seminar	0	0	2	0	0	50	ı	50	
									TOTAI	L = 1000	
			F	eriod	s		E	valuatio			
S.	Course	Subject				5	Sessio		External	Total	
No.	No.	ů	L	T	P	CT	TA	Total	Exam	Marks	
	•	Semester	:: VIII	-	•	•					
		Theo	ry								
1		Elective – III	3	1	0	30	20	50	100	150	
2		Elective – IV	3	1	0	30	20	50	100	150	
3		Elective – V	3	1	0	30	20	50	100	150	
4		Elective - VI	3	1	0	30	20	50	100	150	
5											
6											
	1	Practical/	Design	n	1					1	
1		Project	0	0	6	0	0	100	200	300	
2		Discipline	0	0	2	0	0	50	-	50	
3		CAD Lab. II	0	0	3	10	15	25	25	50	
4											
1 /1						I	l	ĺ			

TOTAL = 1000

L- Lecture, T- Tutorial, P- Practical, CT- Class Test comprising of two tests in a semester each of 15 marks, TA- Teacher Assessment comprising of Attendance and Home Assignments & Tutorials tests in a semester each of 10 marks.

NAME OF DEPTT./CENTRE: Department of Civil Engineering

1. Subject Code: Course Title: Bridge Engineering

2. Contact Hours: L: 3 T: 1 P:

DETAILS OF THE COURSE:

S. No.	Contents	Contact hours
1	Site investigations, selection of suitable type of bridge, hydraulic	6
	calculations, design loads for multi-lane bridges, analysis of deck slabs.	
2	Load distribution in multi-beam deck.	6
3	Prestressed concrete bridge, prestress losses, temperature and shrinkage	8
	stresses, grillage analysis. Box girder bridge.	
4	Design of arch bridges, bow string girder bridge.	4
5	Design of lattice girder steel bridge, introduction to cable bridges, various	8
	types of bearings and their design.	
6	Various types of bearings and their design.	4
7	Introduction to bridge sub structure, analysis & design of pier, piles & well	6
	foundation.	
	TOTAL	42

S. No.	Name of Books / Author / Publisher	Year of
		publication
1	Mondorf, P.E., "Concrete Bridges", Taylor & Francis.	2006
2	Ryall, M.J., Parke, G.A.R and Harding. J.E., "The Manual of Bridge Engineering", Thomas Telford.	2002
3	Ponnuswamy, S., Bridge Engineering", Tata McGraw-Hill	2005
4	Rajgopalan, N., "Bridge Super Structures", Narosa Publishing.	2006

NAME OF DEPTT./CENTRE: Department of Civil Engineering

1. Subject Code: Course Title: Transportation Engineering-II

2. Contact Hours: L: 3 T: 1 P:

DETAILS OF THE COURSE:

S. No.	Contents	Contact hours
1	Introduction, Permanent Way and Components: History and	8
	administrative setup of Indian Railways; rail gauges, permanent way -	
	functions, requirements, sections in embankment and cutting (single/double	
	track), electrified tracks, locomotives, wheel and axle arrangement, coning of	
	wheels, components – rails, sleepers, ballast and formation.`	
2	Resistances and Stresses in Tracks, Hauling Capacity: Types of	3
	resistances to traction, stresses in different components of track, hauling	
	capacity of a locomotive, tractive effort.	
3	Joints and Fastenings: Types of joints, short welded rails, long welded rails	4
	and continuous welded rails, rail to rail and rail to sleeper fastenings, elastic	
	fastenings.	
4	Track Geometrics, Turnouts and Crossings: Railway alignment, vertical	7
	alignment - gradients and grade effects, horizontal alignment - horizontal	
	curves, super-elevation, concepts of cant excess and deficiency, safe	
	permissible speed, transition curves, widening of gauges and track clearances,	
	points and crossings - terminologies, types of turnouts, design of turnouts,	
	types of crossings, design of crossings.	
5	Track Safety, High speed tracks, Urban railways: Signals classification	6
	and their functions, train operation control systems - absolute, automatic	
	block systems, centralized train control system, ATS, interlocking of tracks -	
	principle of interlocking, types of interlocking, high speed tracks - track	
	requirements, speed limitations, high speed technologies, urban railway -	
	railway systems in urban areas.	
6	Introduction, Aircraft Characteristics and Airport selection: Air transport	6
	development in India, national and international organizations in air	
	transport, aircraft characteristics and their impact on planning of an airport,	
	selection of site for an airport, airport obstruction, imaginary surfaces,	
	runway orientation clam period and wind coverage.	
	1	

7	Geometric Designs: Runway and taxiway geometric designs, exit taxiway,	7
	its design and fillet curves, runway configuration, separation clearance,	
	design of apron and their layouts.	
8	Airport Traffic control Aids: Visual aids, marking and lighting of runway	2
	and apron area, wind and landing direction indicator.	
	TOTAL	42

S. No.	Name of Books / Author / Publisher	Year of
		publication
1	Chandra, S. and Agarwal, M. M., "Railway Engineering", Oxford.	2007
2	Arora, S. P. and Saxena, S. C., "A Text Book of Railway Engineering", Dhanpat Rai Publications.	2004
3	Mundrey, J. S., "Railway Track Engineering", Tata Mcgraw Hill.	2000
4	Khanna, S. K., Arora, M. G. and Jain, S. S., "Airport Planning & Design", Nem Chand and Bros.	2000
5	Horonjeff, Robert and McKelvey, Francis X., "Planning & Design of airports", 4th Ed., McGraw Hill.	1993
6	Saxena, S.C., "Airport Engineering – Planning and Design", CBS Publishers.	2008

NAME OF DEPTT./CENTRE: Department of Civil Engineering

1. Subject Code: Course Title: Seismology and Earthquake Engineering

2. Contact Hours: L: 3 T: 1 P:

DETAILS OF THE COURSE:

S. No.	Contents	Contact hours
1	Introduction to Earthquake Parameters: Earthquake occurrences –	2
	Global Seismic Belts.	
2	Indian Seismic Zoning map, their engineering implications: Damage survey,	2
	seismic intensity, isoseismal maps, More commonly used earthquake	
	parameters like epicenter, epicentral distance, origin time, focus, magnitude,	
	frequency. Elementary information on seismic wase propagation.	
	Demonstration of seismographs to explain earthquake recording	
3	Single Degree of Vibration Freedom System : Introduction to vibration	18
	problems, Undamped and Damped free vibration with viscous damping,	
	Forced vibrations, Steady state, Vibration Isolation, Vibration Measuring	
	Instruments, (Demonstration for determination of damping, frequency etc.),	
	Response of undamped systems to time dependent force functions	
	(Pulse/impulses), Duhamel's Integral, Response to ground motion, Response	
	spectra.	
4	Two Degree of Freedom System: Determination of natural frequency and	2
	mode shapes, Steady state forced vibrations, Undaped vibration absorbers.	
5	Multi Degree of Freedom System: Rayleight's Method - Determination of	12
	fundamental frequency of simple systems, Free vibrations of undamped	
	systems - Determination of frequency and mode shapes by Holzer method,	
	Stodola Method, Evaluation of earthquake forces in multi-storeyed buildings	
	using response spectra.	
6	Earthquake Effects: Ground failures, Local site effects, Effects on ground	3
	and structure.	
7	Introducation to IS Code: 1893, Codal Provisions for evaluation of	3
	earthquake forces on buildings.	
	TOTAL	42

S. No.	Name of Books / Author / Publisher	Year of
		publication
1	Krishna, Jai, chandrasekran, A.R. and Chandra, B. 'Elements of Earthquake	1994
	Engineerng", 2 nd Edition, South Asia Publisher, New Delhi	
2	Okamoto, S. "Introduction to Earthquake Engineering." University of Tokyo	1973
	Press. Tokyo.	
3	Clough, R.W. and Penzien, J. "Dynamics of Structure", Mc Graw Hill Book	1993
	Co., New York.	
4	Chopra, Anil K. "Dynamic of structures", 2 nd Edition. Pearson Education.	2001
5	IS: 1893 Indian Standard - "Criteria for Earthquake Resistant Design of	2002
	Structures General Provisions and Buildings", Bureau of Indian Standard,	
	Manak Bhawan, New Delhi.	
6	IEEE Std. 344-190 x, Recommended Practices for seismic Qualification of	1989
	classes IE Equipment for Nuclear Power Generating station, "Institute of	
	Electrical and Electronics Engineers.	

ELECTIVES

- 1. Ground water Engineering
- 2. Hydro Power Engineering
- 3. Hydraulic Structures
- 4. River Engineering
- 5. Advance Structural Design
- 6. Construction Planning & Management
- 7. Traffic Engineering and Management
- 8. Advance Highway Engineering
- 9. Digital Image Processing
- 10. Air & Water pollution
- 11. Environmental Impact & Risk Management
- 12. Environmental Management & Sustainable Development

NAME OF DEPTT./CENTRE: Department of Civil Engineering

1. Subject Code: Course Title: Ground Water Engineering

2. Contact Hours: L: 3 T: 1 P: 0

DETAILS OF COURSE:

S.	Contents	Contact
No.		Hours
1.	Groundwater occurrence and its role in hydrologic cycle, groundwater bearing	7
	formations, attributes of an aquifer, aquifer classification, flow and storage	
	characteristics of various types of aquifers, recharge processes, storage release	
	mechanisms.	
2.	Differential equations governing groundwater flow in Cartesian coordinates,	8
	Dupuit-forchheimer assumptions, analytical solutions, numerical solutions,	
	regional groundwater planning, stream-aquifer interflows.	
3.	Differential equations governing ground water flow in polar coordinates, well	8
	hydraulics, analytical solutions for confined, leaky confined and unconfined	
	aquifers, image well theory, time-variant pumping rates, well interference,	
	analysis of pumping test data.	
4.	Construction of wells, various drilling techniques.	4
5.	Estimation of recharge, lumped water balance, flow in unsaturated zone,	6
	experimental methods, GEC-97 norms.	
6.	Artificial recharge, induced recharge, roof water harvesting.	4
7.	Contamination of groundwater, quality parameters and standards, river bank	3
	infiltration.	
8.	Ground water modeling packages.	2
	Total	42

S.	Name of books/ Authors/ Publishers	Year of
No.		Publication
1.	Todd, D.K., "Groundwater Hydrology", Wiley.	1980
2.	Walton, W.C., "Ground Resource Evaluation", McGraw-Hill	1970
3.	Jacob Bear, "Hydraulics of Groundwater", McGraw-Hill.	1979
4.	Bouwer, H., "Groundwater Hydrology", McGraw-Hill.	1978
5.	Kruseman, G.P. and Ridder, N.A., "Analysis and Evaluation of Pumping Test Data", IILRI.	1990
6.	Rushton, K.R., "Groundwater Hydrology", John Wiley.	2003
7.	Freeze, R.A. and cherry, J.A. "Groundwater", Prentice Hall.	1979

NAME OF DEPTT./CENTRE: Department of Civil Engineering

1. Subject Code: Course Title: Hydropower Engineering

2. Contact Hours: L: 3 T: 1 P: 0

DETAILS OF COURSE:

S.	Contents	Contact
No.		Hours
1.	Introduction: Prospects of hydropower, sources of energy, hydropower potential,	3
	distribution and development, basin-wise development of hydropower, constraints	
	in hydro power development.	
2.	Stream Flow Data and Hydropower Potential: Flow and load duration curves,	4
	estimation of flow duration curve at ungauged site, primary and secondary power,	
	storage and pondage, load factor, capacity factor, utilization factor, diversity	
	factor.	
3.	Types of Hydro Power Plants: Base and peak load Hydro-power plants, run-of-	3
	river plants, valley dam plants, diversion canal plants, high head diversion plants,	
	pumped-storage power plants.	
4.	Intake Structures: Functions of intake structures, its location types, trash rack-	5
	dimensions, design, spacing of bars, methods of cleaning; design of transition.	
5.	Conveyance System: Power canal-location, site, surges in canals, penstocks-	8
	types, design and layout, economical diameter of penstock, hydraulic losses,	
	branches, air vent, forebay.	
6.	Hydraulic Transients: Basic equations of Unsteady flow through conduits,	8
	method of characteristics, boundary conditions, single-pipeline applications for	
	various valve opening conditions, functions of surge tank and its location, types	
	and design of surge tank, introduction to transient softwares like HAMMER and	
	HYTRAN etc.	
7.	Hydraulic Turbines: Types of turbines, characteristics and efficiency of turbines,	8
	selection of turbines, selection of turbines, cavitations, casing, draft tubes, tail	
	trace and their hydraulic design.	
8.	Small Hydropower Development: Benefits and potential of small hydropower	3
	plants, components of small hydropower plants, trench weir, desilting tank, and	
	turbines.	
	Total	42

S.	Name of books/ Authors/ Publishers	Year of
No.		Publication
1.	Barrow, H.K., "Water Poer Engineering", Tat McGraw-Hill	1943
2.	Varshney, R.S., "Hydro Power Structures", Nem Chand & Bros.	2001
3.	Choudhary, M.H., "Applied Hydraulic Transients, Van Nastrand Reinhold.	1987
4.	Warnick, C.C., "Hydropower Engineering", Prentice-Hall.	1984
5.	"Hydropower Development", Vol.3,4,5,&6, Norwegian Institute of	1992
	Technology, Division of Hydraulic Engineering.	

NAME OF DEPTT./CENTRE: Department of Civil Engineering

1. Subject Code: Course Title: Hydraulic Structures

2. Contact Hours: L: 3 T: 1 P: 0

DETAILS OF COURSE:

S.	Contents	Contact
No.		Hours
1.	Introduction: Hydraulic structures for water resources projects.	2
2.	Embankment Dams: Types, design considerations, seepage analysis and control,	8
	stability analysis, construction techniques.	
3.	Gravity Dams: Forces acting on failure of a gravity dam, stress analysis,	8
	elementary profile, design of gravity dam, other functional features of a gravity	
	dam.	
4.	Spillways: Types and their design, spillway gates, cavitations, aerators and energy	8
	dissipation (terminal structures).	
5.	Channel Transitions: Design principles for subcritical and supercritical flows.	6
6.	Hydropower Plant: Terms relating to hydropower, basic design aspects of	10
	different unit of hydropower plant.	
	Total	42

S.	Name of books/ Authors/ Publishers	Year of
No.		Publication
1.	Singh, B., "Fundamentals of Irrigation Engineering", 9th Ed. Nem Chand &	1997
	Bros.	
2.	Asawa G.L.," Irrigation Engineering", 2 nd Ed., New Age International.	1996
3.	Ranga Raju, K.G., "Flow through Open Channels", Tata McGraw-Hill.	2003
4.	Subramanya, K., "Flow in open Chanels", 2 rd Ed. Tata McGraw-Hill.	2000
5.	Chow V.T., "Open Channel Hydraulics", McGraw-Hill.	1959

NAME OF DEPTT./CENTRE: Department of Civil Engineering

1. Subject Code: Course Title: River Engineering

2. Contact Hours: L: 3 T: 1 P: 0

DETAILS OF COURSE:

S.	Contents	Contact
No.		Hours
1.	Elements of River Geomorphology: Origin and properties of sediments, river	4
	problems control of vegetation an river morphology.	
2.	Soil Erosion and Sediments Yield: Types of erosion, mechanism of soil erosion,	6
	sediment delivery ratio, process based modeling of soil erosion.	
3.	Hydraulics of Alluvial Streams: Incipient motion, modes of sediment transport,	8
	bed-forms., resistance to flow in alluvial rivers, bed load transport, suspended load	
	transport.	
4.	River Geometry and Plan Forms: Stable channels and their geometry, flow	6
	around river bends, braided river, meandering river.	
5.	Gravel Bed Rivers: Hydraulic geometry of gravel bed rivers, armouring, bed	6
	forms and resistance to flow in gravel bed rivers.	
6.	Bed Level Variations in Steams: Degradation, local scour, aggradations,	6
	reservoir sedimentation, mathematical modeling for river bed variations.	
7.	Rivers and Environment: Environmental effects of hydraulic structures, river	6
	pollution, river action plans, stream restoration.	
	Total	42

S.	Name of books/ Authors/ Publishers	Year of
No.		Publication
1.	Garde, R.J., "River Morphology", New Age International.	2006
2.	Julin, P.Y., "Erosion and Sedimentation", Cambridge University Press.	1998
3.	Jansen, P.P.H., "Principles of River Engineering", VSSD Publications.	1994
4.	Rosgen, D., "Applied River Morphology", Wildland Hydrology books, Pagosa Springs.	1996
5.	Graf, W.H. and Altinakar, M.S., 'Fluvial Hydraulics: Flow and Transport	1999
J.	Processes in Channels of Simple Geometery", John Wiley.	1777

NAME OF DEPTT./CENTRE: Department of Civil Engineering

1. Subject Code: Course Title: Advanced Structural Design

2. Contact Hours: L: 3 T: 1 P/D: 2/2

DETAILS OF COURSE:

S.	Contents	Contact
No.		Hours
1.	Inelastic analysis of R.C. beams and frames.	4
2.	Analysis & design of flat slabs; equivalent frame method, direct design method,	6
	deflection calculations.	
3.	Design of shear walls	4
4.	Analysis & design of deep beams	4
5.	Design of grid floors, folded plates, cylindrical shells.	8
6.	Design of industrial buildings, bracing, gantry girders and stepped columns.	8
7.	Microwave tower & transmission line towers	4
8.	Plastic Design.	4
	Total	42

S.	Name of books/ Authors/ Publishers	Year of
No.		Publication
1.	Jain, A.K., "Reinforced Concrete-Limit State Sesign", 6 th Ed., Nem Chand &	2006
	Bros.	
2.	Varghese, P.C., "Advanced Reinforced Concrete Design", Prentice Hall.	2001
3.	Pillai, S.D. and Menon, D., "Reinforced Concrete Design", Tata McGraw-	2003
	Hill.	
4.	Agarwal P. and Shrinkhande, M., "Earthquake Resistance Design of	2006
	Structures", Prentice-Hall of India.	
5.	Krishna Raju, N., "Advanced Reinforced Concrete Design", CBS Publishers.	1986

NAME OF DEPTT./CENTRE: Department of Civil Engineering

1. Subject Code: Course Title: Construction Planning & Management

2. Contact Hours: L: 3 T: 1 P/D: 0

DETAILS OF COURSE:

S.	Contents	Contact
No.		Hours
1.	Network Techniques: Introduction to network techniques; use of computer aided	12
	CPM and PERT for planning, scheduling and control of construction works; bar	
	charts: Error in networks; Types of nodes and node numbering systems.	
2.	Construction Planning: Planning for construction and site facilities using	9
	networks; preparation of construction schedules for jobs, materials, equipment,	
	labour and budgets using CPM.	
3.	Construction Equipments and Methods: Equipment for earthworks; Concrete	12
	construction; Aggregate production; Concrete production, handling and	
	placement; Mixers, vibrations and temperature control.	
4.	Control on Construction: Construction quality control and inspection;	9
	Significance of variability and estimation of risk; Construction cost control;	
	crashing of networks	
	Total	42

S.	Name of books/ Authors/ Publishers	Year of
No.		Publication
1.	Srivastava, U.K., Construction, Planning Management, Galgotia	1999
2.	Peurifoy, R.L., Construction Planning, Equipments and Methods, McGraw	1996
	Hill.	
3.	Ahuja, H.N., Construction Performance Control by Networks, Wiley	1976
	Interscience.	
4.	Moder and Philipese, Project Management with CPM and PERT, Van NO	1970
	Strand.	

NAME OF DEPTT./CENTRE: Department of Civil Engineering

1. Subject Code: Course Title: Traffic Engineering & Management

2. Contact Hours: L: 3 T: 1 P: 0

DETAILS OF COURSE:

S.	Contents	Contact
No.		Hours
1.	Fundamentals of Traffic Flow: Traffic flow elements, time-space diagram, flow-	3
	density relationship, gap and gap acceptance.	
2.	Capacity Analysis: HCM 2000 and IRC guidelines, two-lane highway, multilane	8
	highway, basic freeway sections.	
3.	Design of Intersections, Parking Areas and Terminals: Design of at-grade	6
	intersection, roundabout, grade-separated intersection, on-street parking, off-street	
	parking, parking for disable, truck terminal, container terminal	
4.	Road Safety Engineering: Statistical analysis of accidents, accident modeling,	10
	remedial measures, road safety audit, transportation system management (TSM)	
	techniques, achievable speed reductions, estimate of accident reductions and	
	benefits.	
5.	Traffic Forecasting: Forecast based on past trends and extrapolation, forecast and	3
	mathematical models, period for forecasting, time series approach.	
6.	Survey Execution: Defining data requirements, secondary sources, choice of	2
	survey instrument, design of sampling strategy, the survey plan, cross-sectional	
	and time series surveys, training and administration, participatory transport	
	surveys.	
7.	Forecasting Travel Demand: Demand forecasting approaches, trip generation,	4
	trip distribution, mode choice, traffic assignment, other methods for forecasting	
	demand.	
8.	Planning for Public Transport: Selection of public transport technology, MRTS,	6
	LRTS, BRTS, ITS Modules, driver information and guidance, public transport	
	travel information and ticketing, freight and fleet management, system integration.	
	Total	42

S.	Name of books/ Authors/ Publishers	Year of
No.		Publication
1.	Flaherty C.A., "Transport Planning and Traffic Engineering", Butterworth-	2006
	Heineman.	
2.	Slin, M., guest, P. and Matthews, P., "traffic Engineering Design: Principles	2006
	and Practice", 2 nd Ed., Butterworth-Heinemann.	
3.	Garder, N.J. and Hoel, L.A., "traffic Engineering", 3rd Ed., Brooks/Cole,	2001
	Pacific Grove.	
4.	Kadiyali, L.R., "traffic Engineering and Transport Planning", 6 th Ed., Khanna	2004
	Publishers.	
5.	McShane, William R. and Roses, Roger, P., "traffic Engineering", Prentice	1990
	Hall.	
6.	Virhic, Vikan, R., "Urban Transit Operations, Planning and Economics", John	2004
	Wiley.	

NAME OF DEPTT./CENTRE: Department of Civil Engineering

1. Subject Code: Course Title: Advanced Highway Engineering

2. Contact Hours: L: 3 T: 1 P: 0

DETAILS OF COURSE:

S.	Contents	Contact
No.		Hours
1.	Introduction: National road development programmes, Bombay plan, Lucknow	6
	plan, IRC Vision-2021 and Rural Road Vision-225, comparison and significance,	
	financial analysis of highway projects, vehicle operating cost.	
2.	New Road Materials: Alternate forms of aggregates, theory and specifications of	7
	fillers, additives, emulsions, cutbacks and modifies binder, Mix designs-Marshall,	
	Hubbard Field and Hveem Method, requirement of a mix.	
3.	Pavement Structure-Soil Interaction: Tests on soil (Plate Load, CBR and	3
	Triaxial), strength of pavement materials, importance and functions of each layer	
	of pavement and subgarde.	
4.	Design of Flexible Pavements: Design factors, empirial, semiempiricial and	6
	analytical design methods, California bearing ratio, triaxial, Mclead and Burmister	
	method, advantages and limitations, IRC method of design, design considerations	
	for expressways.	
5.	Design of Rigid Pavements: Design factors, load and temperature stresses, load	8
	transfer devices, design of Dowel and Tie bars, joint requirement and working,	
	IRC methods of design of SFRC pavements, construction techniques and	
	specifications, quality control tests, reinforced concrete pavements, continuously	
	reinforced and prestressed.	
6.	Stabilized Roads: Aggragate mixtures, proportioning, types of stabilizations,	4
	advantages and limitation, special problems related to drainage, control of seepage	
	and capillary rise.	
7.	Pavement Evaluation Techniques for Functional and Structural Evaluation:	2
	Benkalman beam deflection method, flexible and rigid overlays.	
8.	Maintenance of Pavements: Routine and periodic maintenance, special repairs,	6
	maintenance management system, case study of failure of flexible and rigid	
	pavements cracking, settlement, frost heaving and mud pumping in pavements.	
	Total	42

S.	Name of books/ Authors/ Publishers	Year of
No.		Publication
1.	Kerbs, R.D. and Walker, R.D., "Highway Materials", MCGraw-Hill.	1971
2.	Khanna, S.K. and Justo, C.E.G. "highway Engineering", NEm Chand and	2001
	Bros.	
3.	Huang, Y.H. "Pavement Analysis and Design" Prentice Hall	1993
4.	Wright, P.H. and Dixon, K.K., "Highway Engineering", John Wiley.	2004
5.	Kadiyali, L.R. and Lal, N.B., "Principles and Practices of Highway	2006
	Engineering", Khanna Publishers.	

NAME OF DEPTT./CENTRE: Department of Civil Engineering

1. Subject Code: Course Title: Digital Image Processing

2. Contact Hours: L: 3 T: 0 P: 2

DETAILS OF COURSE:

SN	Contents	Contact Hours
1.	Introduction to remote sensing data analysis, spectral, spatial and radiometric resolutions,	6
	visual data interpretation, image formats, digital image and its characteristics, image	
	processing systems.	
2.	Initial data statistics, Histogram and Scatterplot.	2
3.	Image Preprocessing, atmospheric, radiometric an geometric corrections, image enhancement	6
	and restoration, contrast stretching-linear and non-linear.	
4.	Noise removal, low, medium and high pass filters, other filters, multi-spectral enhancement.	5
5.	Image transformation - mathematical operators, KLT, PCA, FFT, image analysis - feature	9
	extraction, pattern recognition.	
6.	Classification - Supervised and unsupervised techniques.	5
7.	Accuracy assessment procedures, post classification techniques.	2
8.	Data fusion, fuzzy logic, advance image processing techniques and concepts, application of	7
	digital image processing to various engineering problems.	
	Total	42

SN	Name of Books / Authors/ Publishers	Year of
		Publication
1.	Agarwal, C.S. and Garg, P.K., "Remote Sensing in Natural Resources Monitoring and	2000
	Management", A.H. Wheeler & Co.	
2.	Chandra, A.M. and Ghosh, S.K., "Remote Sensing and Geographical Information	2005
	Systems", Alpha Science.	
3.	Gonzalez, R.C. and Wintz, P., "Digital Image Processing", Addison Wesley.	2000
4.	Jia, X. and Richards, J.A., "Remote Sensing Digital Image Analysis", 3rd Ed., Springer	1999
	Verlag.	
5.	Mather, P.M., "Computer Processing of Remotely sensed Data", John Wiley.	1999

NAME OF DEPTT./CENTRE: Department of Civil Engineering

1. Subject Code: Course Title: Air and Water Pollution

2. Contact Hours: L: 3 T: 1 P: 0

DETAILS OF COURSE:

S.	Contents	Contact
No.		Hours
1.	Introduction and scope, air and water resources.	4
2.	Dispersion and interaction of pollutants, Air quality: Mass Balance approaches,	8
	box model approaches, air quality dispersion-modeling approaches, Water quality:	
	Mass balance approaches, aquatic ecosystem modeling approaches, air and water	
	chemistry.	
3.	Monitoring and modeling of indoor and ambient air quality, Emission inventory,	4
	key meteorological data.	
4.	Pollution of surface and ground water resources & control mechanisms. Baseline	5
	monitoring of surface waters, ground water quality and quantity, mitigation	
	measures.	
5.	Impact of air and water pollution on ecosystems, mitigation measures.	3
6.	Carrying capacity of air and water sheds.	3
7.	Air and water pollution versus health risk and global climate change, air and water	8
	quality standards, regulations and legislations, national versus international.	
8.	Air Quality management and reclamation of water bodies, technology and policy	7
	options for controlling air and water pollution. Decision methods for evaluation of	
	alternatives.	
	Total	42

S.	Name of books/ Authors/ Publishers	Year of
No.		Publication
1.	Kenneth, W., Warner, F.C. And Davis Wayne, T., "Air Pollution, Its Origin	1997
	and Control", 3 rd Ed., Prentice Hall.	
2.	Mishra, P.C., "Fundamentals of Air and Water pollution", South Asia Books.	1990
3.	Davis, M.L. and Cornwell, D.A., "Introduction to Environmental	2002
	Engineering", McGraw Hill.	
4.	David A. Chin, "Water Quality Engineering in Natural Systems", John Wiley.	2006

NAME OF DEPTT./CENTRE: Department of Civil Engineering

1. Subject Code: Course Title: Environmental Impact and Risk Assessment

2. Contact Hours: L: 3 T: 1 P: 0

DETAILS OF COURSE:

S.	Contents	Contact
No.		Hours
1.	Introduction and scope utility of the EIA process, expended and narrowed scope of EIA, impacts of development activities, planning and management of impact studies.	6
2.	Environmental attributes environmental indices and indicators, environmental assessment, methods and techniques, matrices, network and checklist methods, prediction techniques for quality of environmental attributes.	10
3.	Impact evaluation, assessment of impact on air, water, soil and ground water, noise, biological environment. Assessment ofimpact on socio-economic environment, evaluation methods, mitigation measures.	10
4.	Health risk assessment, hazard identification, toxicology and dose response characterization, exposure characterization, risk characterization, uncertainty in estimates.	10
5.	Risk evaluation, risk acceptance, basic principles of health risk management.	6
	Total	42

S.	Name of books/ Authors/ Publishers	Year of
No.		Publication
1.	Kenneth, W., Warner, F.C. and Davis Wayne, T., "Air Pollution, Its Origin	1997
	and Control", 3 rd Ed., Prentice Hall.	
2.	Mishra, P.C., "Fundamentals of Air and Water Pollution", South Asia Books.	1990
3.	Masters, G., "Introduction to Environmental Engineering and Science",	2004
	Prentice Hall of India.	
4.	Jain, R.K., "Environmental Impact Assessment", John Wiley.	1978
5.	Paustenbach, D.A., "Risk Assessment", A Text Book of Case Studies, John	1992
	Wiley.	

NAME OF DEPTT./CENTRE: Department of Civil Engineering

1. Subject Code: Course Title: Environmental Management &

Sustainable Development

2. Contact Hours: L: 3 T: 1 P: 0

DETAILS OF COURSE:

S.	Contents	Contact
No.		Hours
1.	Introduction and scope, inter-linkages of energy-environment and economy from	5
	engineering infrastructure perspective.	
2.	Concepts of ecology, systems approach and sustainability engineering.	5
3.	Interaction between energy and environmental resources, environmental quality	7
	standards and indices (Indian and International).	
4.	Environmental monitoring, analysis, statistics and data interpretation.	6
5.	Environmental management system, ISO 14000 Series.	4
6.	Impact assessment, life cycle assessment and risk analysis of scientific and	6
	technological developments.	
7.	Environmental legislations, ethics and social responsibility.	4
8.	Sustainable development within the context of global economy, technology and	5
	climate change.	
	Total	42

S.	Name of books/ Authors/ Publishers	Year of
No.		Publication
1.	Baker, S., "Sustainable Development", Taylor & France's.	2006
2.	Krishnamoorthy, B., "Environmental Management", Prentice Hall of India.	2005
3.	Friedman, F.B., "Practical Guide to Environmental Management", Environmental Law Institute.	2003
4.	Environmental Management Plans Demystified: A Guide to ISO 14001-Spam Press.	2001
5.	Calow, P., "Handbook of Environmental Risk Assessment and Management", Blackwell Publishing.	1998