

UTTARAKHAND TECHNICAL UNIVERSITY

Program: B. Tech (Civil Engg.)

Year: Fourth

Semester:-VII

Session: 2012-2013

Scheme & Evaluation Pattern

S. No.	Course No.	Subject	Periods			Evaluation			Total Marks	
			L	T	P	Sessional		External Exam		
						CT	TA			Total
Semester: VII										
Theory										
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	-	50
TOTAL = 1000										
S. No.	Course No.	Subject	Periods			Evaluation			Total Marks	
			L	T	P	Sessional		External Exam		
						CT	TA			Total
Semester: VIII										
Theory										
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										
Practical/Design										
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										

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.

UTTARAKHAND TECHNICAL UNIVERSITY

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 calculations, design loads for multi-lane bridges, analysis of deck slabs.	6
2	Load distribution in multi-beam deck.	6
3	Prestressed concrete bridge, prestress losses, temperature and shrinkage stresses, grillage analysis. Box girder bridge.	8
4	Design of arch bridges, bow string girder bridge.	4
5	Design of lattice girder steel bridge, introduction to cable bridges, various types of bearings and their design.	8
6	Various types of bearings and their design.	4
7	Introduction to bridge sub structure, analysis & design of pier, piles & well foundation.	6
TOTAL		42

SUGGESTED BOOKS :

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

UTTARAKHAND TECHNICAL UNIVERSITY

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 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.’	8
2	Resistances and Stresses in Tracks, Hauling Capacity: Types of resistances to traction, stresses in different components of track, hauling capacity of a locomotive, tractive effort.	3
3	Joints and Fastenings: Types of joints, short welded rails, long welded rails and continuous welded rails, rail to rail and rail to sleeper fastenings, elastic fastenings.	4
4	Track Geometrics, Turnouts and Crossings: Railway alignment, vertical 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.	7
5	Track Safety, High speed tracks, Urban railways: Signals classification 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
6	Introduction, Aircraft Characteristics and Airport selection: Air transport 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.	6

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

SUGGESTED BOOKS :

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

UTTARAKHAND TECHNICAL UNIVERSITY

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 – Global Seismic Belts.	2
2	Indian Seismic Zoning map, their engineering implications : Damage survey, seismic intensity, isoseismal maps, More commonly used earthquake parameters like epicenter, epicentral distance, origin time, focus, magnitude, frequency. Elementary information on seismic wave propagation. Demonstration of seismographs to explain earthquake recording	2
3	Single Degree of Vibration Freedom System : Introduction to vibration 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.	18
4	Two Degree of Freedom System : Determination of natural frequency and mode shapes, Steady state forced vibrations, Undamped vibration absorbers.	2
5	Multi Degree of Freedom System : Rayleigh's Method - Determination of 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.	12
6	Earthquake Effects : Ground failures, Local site effects, Effects on ground and structure.	3
7	Introduction to IS Code: 1893, Codal Provisions for evaluation of earthquake forces on buildings.	3
	TOTAL	42

SUGGESTED BOOKS :

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

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

UTTARAKHAND TECHNICAL UNIVERSITY

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

SUGGESTED BOOKS :

S. No.	Name of books/ Authors/ Publishers	Year of 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

UTTARAKHAND TECHNICAL UNIVERSITY

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

SUGGESTED BOOKS :

S. No.	Name of books/ Authors/ Publishers	Year of 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 Technology, Division of Hydraulic Engineering.	1992

UTTARAKHAND TECHNICAL UNIVERSITY

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

SUGGESTED BOOKS :

S. No.	Name of books/ Authors/ Publishers	Year of Publication
1.	Singh, B., "Fundamentals of Irrigation Engineering", 9 th Ed. Nem Chand & Bros.	1997
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 Channels", 2 nd Ed. Tata McGraw-Hill.	2000
5.	Chow V.T., "Open Channel Hydraulics", McGraw-Hill.	1959

UTTARAKHAND TECHNICAL UNIVERSITY

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

SUGGESTED BOOKS :

S. No.	Name of books/ Authors/ Publishers	Year of 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 Processes in Channels of Simple Geometry", John Wiley.	1999

UTTARAKHAND TECHNICAL UNIVERSITY

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. No.	Contents	Contact Hours
1.	Inelastic analysis of R.C. beams and frames.	4
2.	Analysis & design of flat slabs; equivalent frame method, direct design method, deflection calculations.	6
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

SUGGESTED BOOKS :

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

SUGGESTED BOOKS :

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

SUGGESTED BOOKS :

S. No.	Name of books/ Authors/ Publishers	Year of 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 Bros.	2001
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 Engineering", Khanna Publishers.	2006

UTTARAKHAND TECHNICAL UNIVERSITY

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, visual data interpretation, image formats, digital image and its characteristics, image processing systems.	6
2.	Initial data statistics, Histogram and Scatterplot.	2
3.	Image Preprocessing, atmospheric, radiometric and geometric corrections, image enhancement and restoration, contrast stretching-linear and non-linear.	6
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 extraction, pattern recognition.	9
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 digital image processing to various engineering problems.	7
Total		42

SUGGESTED BOOKS :

SN	Name of Books / Authors/ Publishers	Year of Publication
1.	Agarwal, C.S. and Garg, P.K., "Remote Sensing in Natural Resources Monitoring and Management", A.H. Wheeler & Co.	2000
2.	Chandra, A.M. and Ghosh, S.K., "Remote Sensing and Geographical Information Systems", Alpha Science.	2005
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 Verlag.	1999
5.	Mather, P.M., "Computer Processing of Remotely sensed Data", John Wiley.	1999

UTTARAKHAND TECHNICAL UNIVERSITY

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. No.	Contents	Contact 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 of impact 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

SUGGESTED BOOKS :

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

