University of Pune
M.E. (Civil) (Hydraulics)

COURSE STRUCTURE FOR M.E. (For 2008 Course)
(w.e.f. June – 2008)

SEMESTER I

CODE	SUBJECT	TEACHING SCHEME Hrs. \ week		EXAMINATION SCHEME Marks					CREDITS
		Lect.	Pr	Paper	TW	Oral	Pr	Total	
501301	Computational Methods in Hydraulics.	3	-	100	-	-	-	100	3
501302	Water Resource Planning and Management	3	-	100	-	-	-	100	3
501303	Fluid Mechanics	3	-	100	-	-	-	100	3
501304	Elective I 1. Remote sensing & GIS in Water Resource Engineering. 2. Dam Engineering 3. Systems Techniques in water Resource Engineering.	3	-	100	-	-	-	100	3
501305	Elective II 1. Closed Conduit Flow 2. Hydro Informatics and Simulation. 3. Hydropower	3	-	100	-	-	-	100	3
501306	Lab Practice I	-	6	-	50	-		50	3
501307	Seminar I	-	4	-	50	-	-	50	2
Total of First Term		15	10	500	100	-	**-**	600	20

EMESTER II

CODE	SUBJECT	TEACHING SCHEME Hrs.\week		EXAMINATION SCHEME Marks					CREDITS
		Lect.	Pr	Paper	TW	Oral	Pr	Total	
501308	Open Channel Hydraulics	3	-	100	-	-	-	100	3
501309	Hydrology	3	-	100	-	-	-	100	3
501310	Sediment Transport & River Mechanics	3	-	100	-	-	-	100	3
501311	Elective III 1.Irrigation & Drainage 2.Coastal Engineering 3.Water Management & Conveyance System	3	-	100	-	-	-	100	3
501312	Elective IV (**Open**)	3	-	100	-	-	-	100	3
501313	Lab Practice II	-	6	-	50	-		50	3
501314	Seminar II	-	4	-	50	-	-	50	2
Total of Second Term		15	10	500	100	-	**-**	600	20

SEMESTER III

CODE	SUBJECT	TEACHING SCHEME Hrs. \ week		EXAMINATION SCHEME Marks					CREDITS
		Lect.	Pr	Paper	TW	Oral	Pr	Total	
501315	Seminar III	-	4	-	50	-	-	50	2
501316	Project Stage I	-	18	-	50	-		50	6
Total of Third Term		-	22	-	100	-	-	100	02

SEMESTER IV

CODE	SUBJECT	TEACHING SCHEME Hrs. \ week		EXAMINATION SCHEME Marks					CREDITS
		Lect.	Pr	Project	TW	Oral	Pr	Total	
501317	Project Stage II	-	18	150	-	50		200	12
Total of Fourth Term		-	18	150	-	50	-	200	12

Note : The Contact Hours for the calculation of load of teacher
Seminar – 1 Hr /week/student
Project - 2 Hr/week/ student

UNIVERSITY OF PUNE
M.E. (CIVIL) (HYDRAULIC ENGINEERING)

SEMESTER I

Subject Code 501301

COMPUTATIONAL METHODS IN HYDRAULICS

Teaching Scheme :
Lectures : 3 Hrs./Week

Examination Scheme:
Theory Paper : 100 Marks
Credits : 3

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1. Numerical Methods :

Partial differential equation Laplace and Poisson's equation-solution, method of characteristics for solution of initial boundary value problems-it's use, relaxation method, finite difference method.

2. Statistics & Probability :

Various distribution binomial, normal, log-normal, Poisson, Beta B, gamma distribution, Pearson type I,II & II distribution test of significance, Chi square test, correlation, simple and multiple regression, Markov Chain, Markov process.

3. Numerical Integration :

Simpson's rule, trapezoidal rule, Guass, Quadrature formulae.

4. Complex Varibles :

Schwarz Christoffel transformation, Conformal mapping, Jukowski transformation, Complex integration, Taylors expansion, Application to boundary value problem.

Reference Books

1. Computational Fluid Dynamics – Anderson.

2. Computational Fluid Mechanics – Victor L. Streeter, Mc-Graw Hill.

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SEMESTER I

Subject Code 501302

WATER RESOURCE PLANNING AND MANAGEMENT

Teaching Scheme :
Lectures : 3 Hrs./Week

Examination Scheme:
Theory Paper : 100 Marks
Credits : 3

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1. Introduction :

Objectives: of water resource planning and management its Necessity. Aspects of water resources planning-Engineering Social of Water Resources Planning and Management Economic aspects.

2. Economic Planning :

Cost benefit studies of single and multipurpose projects – Multi objective planning models. Irrigation management policy, farmers' participation, formation of water users cooperative societies, integrated approach in WRE, state water disputes, state of art integrated water resources management-Different bodies in water resources planning and their introduction-Global Water Partnership, ICOLD, ICID etc.

3. Preparation of feasibility reports.

Reference Books

1. Principle of Water Resources planning-by Goodman.
2. Water Resources System Planning – by M.C. Chaturvedi.
3. Water Resources Planning and Management by-O.J. Helwege.
4. Water Management System Application-A.K. Biswas

UNIVERSITY OF PUNE
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SEMESTER I

Subject Code 501303

FLUID MECHANICS

Teaching Scheme :
Lectures : 3 Hrs./Week

Examination Scheme:
Theory Paper : 100 Marks
Credits : 3

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1. Kinematics of flow :
Continuity Equation in polar and cylindrical coordinates, solving laplace's equation by graphical & relaxation method, conformal mapping. Standard two dimensional flow pattern, source, sink, doublt and their combination.

2. Laminar Flow :
Navier strokes equation-derivation, exact flow between parallel plates-it's exact solution, flow near an oscillating plate & suddenly accelerated plate.

3. Boundary Layer Theroy :
Karman's momentum integral equation, Karman Pohlhausen's solution, boundary layer separation.

4. Turbulent Flow :
Reynold's equation of motion, typical solution, Energy and Momentum equation, Statistical theory of turbulence, Isotropic and homogeneous turbulence, probability density function.

5. Principles of Compressible Flow :
Compressible fluid flow-fundamental equation, continuity equation, energy equation, velocity of propagation. Pressure, density and temperature interms of Mach No, Normal shock in one dimensional compressible flow & compressible flow around immersed bodies.

Reference Books

1. Applied Hydrodynamics – H.R. Vallentine, ELBS Publication
2. Fluid Mechanics-Grade & Mirajgaonkar
3. Fluid Mechanics-Victor L Streeter & E.B. Wylie, Mc-Graw Hill
4. Viscous Fluid Flow-Frank M White, Mc-Graw Hill

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SEMESTER I

Subject Code 501304

ELECTIVE - I
REMOTE SENSING AND G.I.S. IN WATER RESOURCES ENGINEERING

Teaching Scheme :
Lectures : 3 Hrs./Week

Examination Scheme:
Theory Paper : 100 Marks
Credits : 3

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1. Basic principles of photogrammetry and photo interpretation, Introduction and classification of remote sensing and data analysis Fundamental of sensing systems, Concept of Analog and Digital systems. Equipments required.

2. Introduction to G.I.S. Data collection and input processing in G.I.S. Types of database – Spatial database, Attribute database, Data quality and errors in G.I.S.

3. Role of remote sensing data in G.I.S. – Raster analysis, Applications of R.S. & G.I.S. in irrigation and drainage surface runoff estimation, crop yield and land use management, wet land management, watershed management etc.

Reference Books

1. Remote sensing methods & applications – R.Michael Hord, Wihly Interscience Publication.

2. Remote sensing & image interpretation – Lilleson J.T.M. & Krefer R.W. Wiely, New York.

3. Photogrammetry by – Sheford.

4. Remote sensing in Civil Engineering – J.M. Kennie & M.C. Mathews.

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SEMESTER I

Subject Code 501304

ELECTIVE - I
DAM ENGINEERING

Teaching Scheme :
Lectures : 3 Hrs./Week

Examination Scheme:
Theory Paper : 100 Marks
Credits : 3

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1. Gravity Dams :
Forces acting on the gravity dams earthquake force-pseudostatics and dynamic response approach, load classifications, stability analysis, distribution of shear and normal stresses, principle stresses, Stress concentration around openings, foundation treatments. Design of concrete dam. Reservior operation.

2. Arch Dams :
General concepts of trail load theory, elasticshell methods, thik cylinder theory.

3. Earth Dam :
Seepage through dam and its foundations, stability analysis for sudden drowdown condition, steady seepage condition, end of constructions, seismic effects, pore pressures, protection of upstream and downstream slopes.

4. Rockfill Dams :
Relevent rockfill characteristics, general design principal method of construction and compaction.

5. Buttress Dam :
Concepts and Design.

6. Spillways :
Determination of capacity, types of spillways e.g. ogee, siphon, chute, side shaft. Their hydraulic design, creast profile, energy dissipater and divide walls.

7. Spillway Gates :
Vibration, types of gates-trainer, durm, vertical lift and automatic gates.

Reference Books

1. Concrete Dams – R.S. Varsheny
2. Irrigation Water Resources & Water Power Engineering P.N. Modi
3. Earth Dams – J.L. Sherard.

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SEMESTER I

Subject Code 501304

ELECTIVE - I
SYSTEM TECHNIQUES IN WATER RESOURCE ENGINEERING

Teaching Scheme :
Lectures : 3 Hrs./Week

Examination Scheme:
Theory Paper : 100 Marks
Credits : 3

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1. System Concepts :
System concepts, definitions, needs for system approach, different types of system parameters and variables.

2. Linear Programing :
Revision, Big M Method, duality, sensitivity analysis. Application of Linear Programming for Hydraulics & Water Resource.

3. Non Linear Programming :
Unconstrained one Dimensional search methods, Dichotomous search method, Fibonacci, Golden section, multivariable unconstrained, gradient techniques, steepest ascent and desent methods, Newton's methods, Application of Dichotomous search method, Fibonacci & Golden section to the various sectors of Water Resource Engineering, FP methods, constrained Lagrangian multiplier techniques, Kuhn Tucker's conditions, penalty function methods.

4. Dynamic Programming :
Principle of optimality, recursive equations. Application of Dynamic programming to Water Resource Engineering.

5. Stochastic Methods :
Queueing theory, simulation technique, sequencing model, Morkov's process.

6. Capitalisation :
Annuity, benefit-cost analysis. Benefit Cost Analysisfor multi purpose water resource projects.

7. Geometric Programming :
Poynomial, unconstrained minimization problem, arithmatics geometric unequality, solution of unconstrained geometric programming, constrined minimization, geometric programming with mixed inequality constrained.

8. Games Theory.

Reference Books

1. Engineering Optimazation Theory & Practce – S.S. Rao.

2. Operation Research – Taha Hamdey A.

3. Operation Research – Wagner.

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SEMESTER I

Subject Code 501305

ELECTIVE - II
CLOSED CONDUIT FLOW AND HYDRAULIC TRANSIENT

Teaching Scheme :
Lectures : 3 Hrs./Week

Examination Scheme:
Theory Paper : 100 Marks
Credits : 3

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1. Steady flow in simple pipelines :
Pump characteristics, pipeline analysis water Hammer: Fundamental equations, elastics waves in conduites, boundary effects, numerical and graphical methods.

2. Surge Tank :
Differential equation for surge tank, method of solution, simple, and differential surge tanks with expanded chambers.

3. Pipe network analysis (steady state & transient) :
Tree type networks, closed loop systems, general pipe system, computer analysis, use of PIPE2000(KYPIPE) and related programs, transient flow in pipe systems, introduction to SURGE program.

4. Open Channel Hydraulics :
Classification of open channel flows, gradually varied flows, water surface profiles, floodplain hydraulics, use of HEC_RAS(HEC2) program, use of Pipe2000-SWMM program.

Reference Books

1. Open Channel Flow – Ven Te Chow, Mc- Graw Hill.

2. Engineering Fluid Mechanics – K.L. Kumar, Eurasia Publication.

3. Principles of Fluid Mechanics – M.K. Natrajan, Oxford & IBH Publication.

UNIVERSITY OF PUNE
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SEMESTER I

Subject Code 501305

ELECTIVE - II
HYDROINFORMATICS AND SIMULATIONS

Teaching Scheme :
Lectures : 3 Hrs./Week

Examination Scheme:
Theory Paper : 100 Marks
Credits : 3

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1. Introduction :
Concept of hydroinformatics scope of internet and web based modeling in water resources engineering.

2. Introduction to multi criterion decision support system – Components for modeling software.

3. Introduction to Simulation :
Different simulation techniques – Applications of simulation techniques in hydraulics.

4. Introduction to Artificial Neural Networks :
Networks and its training-Back propogation algorithm, Conjugate gradient algorithm, Cascade correlation algorithm, Applications of ANN in WRE.

5. Genetic Algorithm (G.A.) :
Concept, Basic principle of GA, Working principle of GA. Coding, Fitness function, GA. Operations, Reproduction, Cross over Mutation, Applications of GA, in WRE.

Reference Books

1. Neural Network Fundamentals with Graphs, Algorithms, Applications-Bose N.K. & Liang P. McGraw Hill N.Y.

2. Neural Network: A Comprehensive foundation – S. Ragkin, Prentice Hall, N.T.

3. Practical Handbook of GA Applications, Vol-I-L. Chambers, C.R.C. Press-Boca Raton, Florida.

4. Machine Learning Neural Networks, Genetic Algorithm & Fuzzy system – Adeli H. & Hung S.L. John Wiely & Sons inc. N.Y.

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SEMESTER I

Subject Code 501306

LAB PRACTICE I

Teaching Scheme :
Practical : 6 Hrs./Week

Examination Scheme:
Term Work : 50 Marks
Credits : 3

This should be based on the syllabi above.

1. To study growth of a boundary layer along a flat plate detailed investigation.

2. Assignment based on dam break problem or model study on a hydraulic structure or open channel.

3. Assignment based on Chow's method or standard step method for gradually varied flow

4. Design of any type of irrigation scheme

5. Use of software for water resource planning

6. Visit to a hydraulic structure & preparation of visit report.

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SEMESTER I

Subject Code 501307

SEMINAR I

Teaching Scheme :
Practical : 4 Hrs \ Week

Examination Scheme:
Term Work : 50 Marks
Credits : 2

UNIVERSITY OF PUNE
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SEMESTER II

Subject Code 501308

SEMESTER II
OPEN CHANNEL HYDRAULICS

Teaching Scheme :
Lectures : 3 Hrs./Week

Examination Scheme:
Theory Paper : 100 Marks
Credits : 3

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1. Review of uniform flow formulae and design of channels

2. Hydraulic Jump :
Formations of jump in expanding and contracting channel, jump type, jump control, jump on sloping floors.

3. Gradually Varied Steady flow :
Gradually varied steady flow and rapidly varied steady flow in open channels, surface profiles in GVF-analysis, different method of computations, Chow'-s methods, standard step method, finite difference method.

4. Spatially Varied Flow :
Differential Equation of spatially varied flow, profile computation.

5. Stratified Flow :
Equation of motion, exchange coefficients, turbulence theory, waves.

6. Flood Routing :
Muskinghum method, finite difference scheme, channel roating storage, method of characteristics, differential form of Momentum Equation.

7. Unsteady Flow :
Waves, celerity of wave, boundary conditions, standing and progressive wave, positive and negative surges, Dam break problem, deep water, group velocity, solitary wave.

Reference Books

1. Open Channel Hydraulics – Ven Te Chow, Mc-Graw Hill.

2. Flow through Open Channel-K.G.Ranga Raju, Tata Mc-Graw Hill.

3. Flow in Open Channel – K. Subramanya, Tata Mc-Graw Hill.
4. Open Channel Hydraulics-French, Mc-Graw Hill.

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SEMESTER II

Subject Code 501309

HYDROLOGY

Teaching Scheme :
Lectures : 3 Hrs./Week

Examination Scheme:
Theory Paper : 100 Marks
Credits : 3

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1. Introduction :

Depth area duration analysis, Unit hydrograph theory, IUH, Rainfall runoff models-SWM, Tanks, CLS models, Evaporation, Interception, Depression storage, infiltration, their determination.

2. Flow Generation :

Stochastic processes-classification, time series & it's components, various statistical distributions & their uses in hydrology, plotting, position, frequency factors, extreme value theory, synthetic generation of yearly and monthly flows in hydrology.

3. Floods :

Flood estimation by various methods, forecasting of floods, flood frequency analysis, Gumble's, Pearson type I.II.III. distribution Log-normal method, design flood for various hydraulic structures.

4. Ground Water Hydraulics :

Ground water-defination, aquifers, vertical distribution of subsurface water. Darey's Law-itsrange of validity, Dupuit Forchheimer assumption, application of Darcy's law to simple flowsystems governing differential equation for confined and unconfined aquifers, fully & partially penetrating wells, interference of wells, pumping test with steady & unstady flow, method of image.

5. Ground Water Development :

Ground water Exploration, well types, well construction & design, screens, perforations & gravel packs, pumping equipment, quality of ground water, pollution of ground water.

6. Ground Water Conservation :

Ground water budget, seepage from surface water artificial recharge.

7. Potential Theory :

Formulations of Boundary value problems, conformal mapping & its application to simple cases.

8. Use of Finite Element Method for Ground Water Modelling

Reference Books

1. Applied Hydrology-Linsley Kolhar & Paulhas (Mc-Graw Hill)

2. Water Resource & Hydrology-S.K. Garg.

3. Engineering Hydrology-K.Subramanya, Tata Mc-Graw Hill.

UNIVERSITY OF PUNE
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SEMESTER II

Subject Code 501310

SEDIMENTS TRANSPORT & RIVER MECHANICS

Teaching Scheme :	Examination Scheme:
Lectures : 3 Hrs./Week	Theory Paper : 100 Marks
	Credits : 3

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1. Introduction :
Significant sediment properties, beginning of sediment movement-shields analysis and other methods.

2. Bed forms and Resistance :
Bed formation, flow regimes, their significance, resistance analysis.

3. Sediment Transport :
Modes of sediment transport, bed load transport Dubuoy's methods, Einstein's, Meyer Pater Muller's methods and other methods, suspended load transport, total load transport microscopic and methods. Use of remote sensing in determining the sediment load.

4. Design of Stable Channels :
Regimes methods, Kennedy's method, Lacey's methods, Bunch, Simmon-Albertston method and others methods. Tractive force approach.

5. Sediments Measurements :
Bed load measurements, suspended load measurements.

6. Aggradation, Degradation, silting of reservoirs.

7. River Morphology :
Planform river bends, channel characteristics, bifurcations, confluences, river gauging.

8. River Training :
Classification of river training problems, river training methods, guide bank, Groynes or spurs, deflectors, cut offs, pitched island.

Referennce Book

1. Sediment Transport – R.J. Garde

UNIVERSITY OF PUNE
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SEMESTER II

Subject Code 501311

ELECTIVE - III
IRRIGATION AND DRAINAGE

Teaching Scheme :
Lectures : 3 Hrs./Week

Examination Scheme:
Theory Paper : 100 Marks
Credits : 3

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1. Soil water Relationships :
Water storage zones and relative equilibrium states, flow of water in saturated and unsaturated soil, soil moisture determination.

2. Water-Soil Plant Relationships :
Evaporation, transipiration, consumptive use**.**

3. Salinity and Alkalinity in irrigated soil

4. Soil Erosion and conservation

5. Drip Irrigation :
General concept, advantages, disadvantages, elements, design concepts.

6. Lift Irrigation :
General concept, elements of lift irrigation schemes, design consideration involved in intake well, jackwell, rising main, distribution system, concept of cost economics.

7. Sprinkler Irrigation :
General concept, advantage and disvantages, components of the system, types of sprinklers, design concept.

8. Command area, development, onfarm structures, water supply to fields-rotation warabandi.

9. Canal outlets for flow regulation.

10. Drainage of Irrigated Land :

Need and purpose of drainage, water loging, design and construction of drainage systems, Ministry of agriculture- WMD recommendations.

Reference Books

1. Irrigation, Water Resources & Water Power Engineering, P.N. Modi
2. Irrigation Engineering Theory & Design – R.S. Varsheny.

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SEMESTER II

Subject Code 501311

ELECTIVE – III
COASTAL ENGINEERING

Teaching Scheme :
Lectures : 3 Hrs./Week

Examination Scheme:
Theory Paper : 100 Marks
Credits : 3 Hrs.

M.□. Use of linear theory, wave characteristic formulae.

M.□. Use of wave table (Weigel, 1996).

M.□. Construction of wave refraction diagram by hand.

M.□. Construction of wave refraction diagram.

M.□. Use of Rayleigh's distribution for statistical waves.

M.□. Calculation of wave energy density spectrum.

M.□. Estimation of surface wind speed from weather maps.

M.□. Making of wave hindcast/forecast(s).

M.□. Relation between energy density spectrum to "significant" wave height.

M.□. Construction of a storm surge frequency plot.

M.□. Construction of a near shore wave climate frequency plot.

M.□. Calculation of the longshore energy flux factor.

M.□. Calculation of the longshore sediment transport rate.

M.□. Preparation of an engineering sediment budget study.

M.□. Relation between beach volume change to shoreline change (erosion/accretion).

M.□. Beach sand gradation analysis. (VAT)

M.□. Littoral Environmental Observation(LEO) program.

M.□. Estimation of shoreline change using a non-line model.

M.□. Make an appropriate coastal engineering shoreline protection study (E2 Method).

Reference Book

M.□. Coastal Engineering – R.M. Sorensen.

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SEMESTER I

Subject Code 501305

ELECTIVE – II

HYDROPOWER

Teaching Scheme :
Lectures : 3 Hrs./Week

Examination Scheme:
Theory Paper : 100 Marks
Credits : 3

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1. Introduction :
Power resources, Need & advantages, Estimation of Hydropower potential. Calculations for estimation of electrical load on turbines. Load factor, peak demand and utilization factor load duration curve Prediction of load.

2. Classification of Hydropower Plant :
General Management of running of river plants. Storage, pondage, diversion, canal plants, valley dam plants. Pumped storage plants, advantages & disadvantages, types. Tidal power plants.

3. Powerhouse :
Components, Structural details of powerhouse.

4. Penstocks :
Classification, design criteria, water hammer phenomenon, surge tanks, design procedures & details classification, canal surges.

5. Turbines :
Selection, classification, Arrangements in powerhouse. Draft tubes, cavitation, governing of turbines. Design principles of impulse & reaction turbines.

6. Design of micro hydel power plants.

Reference Book

1. Water Power Resources Engineering - Dandekar

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SEMESTER II

Subject Code 501311

ELECTIVE - III
WATER MANAGEMENT AND CONVEYANCE SYSTEMS

Teaching Scheme :
Lectures : 3 Hrs./Week

Examination Scheme:
Theory Paper : 100 Marks
Credits : 3

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1. Nature of waste inputs to water systems, points source and non-point source loading rates.

2. River flow, diffusion and dispersion regimes, pollutant transport mechanisms and modeling Lake and estuaries models, microorganism survival models, dissolve oxygen models, eutrophication reduction, toxic substances and heat management. Application of computer – based models, for water quality and contaminant transport. Contaminant decay modeling.

3. Global and national water problems, law and legislation. Water tariff structures. Hydraulic structure. Quantity estimation of water. Reservoir analysis.

4. Water storage and distribution systems. Design elements of water distribution systems and system modeling. Technology and impacts of water conservation practices and policies on municipal service infrastructure. Measurement techniques.

5. Urban drainage and runoff control; meteorological data analysis, deterministic and stochastic modeling.

6. **Flood Control :**
Structural and nonstructural alternatives. Effects of hydraulic structures on river surface profiles and sediment transport.

7. **Power Generation :**
Hydro and thermal power generation. Low flow augmentation. Economics and decision making.

Reference Book

1. Water resources System Planning – M.C. Chaturvedi.

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SEMESTER II

Subject Code 501313

LAB PRACTICE II

Teaching Scheme :
Practical : 6 Hrs./Week

Examination Scheme:
Term Work : 50 Marks
Credits : 3

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1. Shear Measurements – use of preston tube.

2. Seepage characterstics of various types of soil.

3. Assignments based on sediment transport – Einstein bed load functions,

   OR

   Stable channel design using tractive force theory.

   OR

   Use of resistance laws.

4. Assignments based on stability analysis of gravity/earth/rockfill dams.

5. Assignments based on non linear programming or dynamics or geometric programming or linear programming with sensitivity analysis.

6. Use of software for solving pipe network problems.

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SEMESTER II

Subject Code 501314

SEMINAR II

Teaching Scheme :	Examination Scheme:
Practical : 4 Hrs.\Week	Term Work : 50 Marks
	Credits : 2

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1) Seminar II report and the examination shall be based on the literature survey and the work for the dissertation in the IInd semester.

UNIVERSITY OF PUNE
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SEMESTER III

Subject Code 501301

SEMINAR III

Teaching Scheme :	Examination Scheme:
Practical : 4 Hrs.\ Week	Term Work : 50 Marks
	Credits : 2

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1) Seminar III report and the examination shall be based on the literature survey and the work for the dissertation in the IIIrd semester.

UNIVERSITY OF PUNE
M.E. (CIVIL) (HYDRAULIC ENGINEERING)

SEMESTER III

Subject Code 501316

PROJECT STAGE I

Teaching Scheme :
Practical : 18 Hrs.\ Week

Examination Scheme:
Term Work : 50 Marks
Credits : 6

UNIVERSITY OF PUNE
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SEMESTER IV

Subject Code 501317

PROJECT STAGE II

Teaching Scheme :	Examination Scheme:
Practical : 18 Hrs.\ Week	Project : 150 Marks
	Oral : 50 Marks
	Credits : 12

SEMESTER IV

DESSERTATION

Teaching Scheme :	Examination Scheme:
2 contact hour per student	Term Work : 200 Marks
per week	Oral : 150 Marks

The Project work will start in semester III, and should preferably be a live problem in the industry or a macro-issue having a bearing of performance of the construction industry and should involve scientific research, design, collection and analysis of data, determining solutions and must preferably bring out the individuals contribution.

The dissertation should be presented in a standard format.

The termwork should be continuously evaluated as per the norms / guidelines set up by the B.O.S. for its assessment of 200 Marks.

The oral examination shall be conducted with the help of approved external examiner.