SYLLABUS

OF

M.E. CIVIL
(HYDRAULICS)

To be effective from

Academic Year 2013

UNVERSITY OF PUNE

M.E. (Civil - Hydraulics)-2013 Course

University of Pune, Document on Rules and Regulation for P.G.Courses be referred for the detailed information.

1Credit =2 Modules=15 Hrs.

Course Structure

Semester I

Code	Subject	Teaching Scheme	Examination scheme					Credits
		Lect./ Pract.	Paper		TW	Oral /Presentation	Total	
			In Semester Assessment	End Semester Assessment				
501 041	Fluid Mechanics	4	50	50	--	--	100	4
501 042	Irrigation and Drainage	4	50	50	--	--	100	4
501 043	Planning and Management of Water Resources	4	50	50	--	--	100	4
501 004	Research Methodology	4	50	50	--	--	100	4
501 044	* Elective I	5	50	50	--	--	100	5
501 045	Lab Practice I	4			50	50	100	4
	Total	**25**	**250**	**250**	**50**	**50**	**600**	**25**

501 044 Elective I

Code	2 Credits Course	Code	1 Credit Course	Code	Audit Course (No Credit Course)
501 044A	Cyber Security / Information security	**501 044 F**	Economics & Finance For Engineers	**501 044 K**	Mass communication, Photography and Videography
501 044B	Computational Methods	**501 044 G**	Foreign Language –I	**501 044 L**	Yoga and Meditation
501 044C	Energy and Environment	**501 044 H**	Engineering Ethics		
501 044D	Hydropower	**501 044 I**	Intellectual Property Rights		
501 045E	Remote Sensing and GIS for Water Resources Management	**501 044 J**	Sanskrit-I		

SEMESTER –II

Code	Subject	Teaching Scheme	Examination scheme					Credits
		Lect./ Pract.	Paper		TW	Oral/Presentation	Total	
			In Semester Assessment	End Semester Assessment				
501 046	Open Channel Hydraulics	4	50	50	--	--	100	4
501 047	Sediment Transport and River Mechanics	4	50	50	--	--	100	4
501 048	Hydrology	4	50	50	--	--	100	4
501 049	Elective II	5	50	50	--	--	100	5
501 050	Lab Practice II	4	--	--	50	50	100	4
501 051	Seminar I	4	--	--	50	50	100	4
	Total	**25**	**200**	**200**	**100**	**100**	**600**	**25**

501 049 -Elective II

Code	2 Credits Course	Code	1 Credit Course	Code	Audit Course (No Credit Course)
501 049A	Human Rights	**501 049 E**	Foreign Language II	**501 049 I**	Performing Arts – Music and Dance
501 049B	Coastal Engineering	**501 049 F**	Geological Exploration for Civil Engineering Structures	**501 049 J**	Principle Centred Leadership
501 049C	Water Management	**501 049 G**	Corporate Soft skills		
501 049D	Hydroinformatic	**501 049 H**	Sanskrit II		

SEMESTER –III

Code	Subject	Teaching Scheme	Examination scheme					Credits
		Lect./ Pract.	Paper		TW	Oral/Presentation	Total	
			In Semester Assessment	End Semester Assessment				
601 052	Dam Engineering	4	50	50	--	--	100	4
601 053	Optimization Techniques	4	50	50	--	--	100	4
601 054	Elective III	5	50	50	--	--	100	5
601 055	Seminar II	4	--	--	50	50	100	4
601 056	Project Stage I	8	--	--	50	50	100	8
	Total	**25**	**150**	**150**	**100**	**100**	**500**	**25**

601 054--Elective III

Code	2 Credits Course	Code	1 Credit Course	Code	Audit Course (No Credit Course)
601 054--A	Ground Water Modelling	**601 054--E**	Project Funding	**601 054H**	Chess
601 054--B	Closed Conduit Flow	**601 054--F**	Foreign Language	**601 054 I**	Abacus
601 054--C	Integrated Water Resources Management	**601 054--G**	Rural Engineering I		
601 054--D	Climate Change				

SEMESTER –IV

Code	Subject	Teaching Scheme	Examination scheme				Credits
		Lect./ Pract.	Paper	TW	Oral /Presentation	Total	
			--				
601 057	Seminar III	5	--	50	50	100	5
601 058	Project Stage II	20	--	150	50	200	20
	Total	**25**	**--**	**200**	**100**	**300**	**25**

UNIVERSITY OF PUNE
M.E. (Civil) (Hydraulics)
Semester I

501 041 Fluid Mechanics

Teaching Scheme : Examination Scheme: Lectures :4 Hrs./Week
Theory Paper : 100 Marks In Semester Assessment: 50 marks
Credits : 4 End Semester Assessment: 50 marks
Duration of end semester exam. 3 hrs.

Module 1

Basics

Revision of concepts in basic Fluid Mechanics such as classification of flows, Equation of continuity for three dimensional flow in Cartesian co-ordinates, equation of continuity for one-dimensional flow along a streamline, types of motion, rotational and irrotational motion, velocity potential, stream function and flow net, Euler's equation of motion along a streamline and its integration, Bernoulli's equation

(Numerical Problems should not be asked on unit No.1)

Module 2

Kinematics of Flow

Continuity Equation in polar and cylindrical coordinates, solving laplace's equation by graphical & relaxation method.

Module 3

Conformal mapping. Standard two dimensional flow pattern, source, sink, doublt and their combination.

Module 4

Laminar Flow

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

Module 5

Boundary Layer Theroy

Development of boundary layer on a flat plate nominal, displacement, momentum, energy thicknesses, laminar, transitional and turbulent boundary layer, laminar sub layer, Local and mean drag coefficients.

Module 6

Karman's momentum integral equation, Karman Pohlhausen's solution, Boundary layer separation.

Module 7

Turbulent Flow

a)Reynold's equation of motion, typical solution, Energy and Momentum equation
b)Statistical theory of turbulence, Isotropic and homogeneous turbulence, probability density function.

Module 8

Principles of Compressible Flow

(a)Compressible fluid flow-fundamental equation, continuity equation, energy equation, velocity of propagation. Pressure, density and temperature in terms of Mach No,
(b)Normal shock in one dimensional compressible flow & compressible flow around immersed bodies.

Reference Books

1. Hydraulic Engineering---Roberson, Wiley India
2..Fluid Mechanics through Problems by R.J.Garde, New Age International Publishers
3. Applied Hydrodynamics – H.R. Vallentine, ELBS Publication
4. Fluid Mechanics-Grade & Mirajgaonkar
5. Fluid Mechanics-Victor L Streeter & E.B. Wylie, Mc-Graw Hill

6. Viscous Fluid Flow-Frank M White, Mc-Graw Hill
7. Boundary Layer Theory- H. Schlichting, Springer New-York 2000
8. Fluid Mechanics-Frank M White, Mc-Graw Hill
9. Fluid Mechanics-Fundamentals and Applications- Cengel and Cimbala, McGraw-Hill

UNIVERSITY OF PUNE
M.E. (Civil) (Hydraulics)
Semester I
501 042 Irrigation and Drainage

Teaching Scheme : Examination Scheme: Lectures :4 Hrs./Week
Theory Paper : 100 Marks In Semester Assessment: 50 marks
Credits : 4 End Semester Assessment: 50 marks
Duration of end semester exam.: 3 hrs.

Module 1
Soil Water Relationships
Water storage zones and relative equilibrium states, flow of water in saturated and unsaturated soil, soil moisture determination. Water-Soil Plant Relationships : Evaporation, transpiration, consumptive use .
Module 2
Soil Salinity
Salinity and Alkalinity in irrigated soil , Soil Erosion and conservation
Module 3
Irrigation Systems
Drip Irrigation: General concept, advantages, disadvantages, elements, design concepts.
Module 4
Lift Irrigation: General concept, elements of lift irrigation schemes, design consideration involved in intake well, jack well, rising main, distribution system, concept of cost economics.
Module 5
Sprinkler Irrigation: General concept, advantage and disvantages, components of the system, types of sprinklers, design concept.
Module 6
Traditional Systems
Command area, development, onfarm structures, water supply to fields-rotation warabandi.
Module 7
Canals
Canal outlets for flow regulation. , Canal Automation
Module 8
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-Theory and Practice-A.M.Michael-- Vikas Publishing House, Pvt Ltd.
3. Irrigation Engineering Theory & Design – R.S. Varsheny.
4. Ground hydrology--Todd, Wiley India**.**

UNIVERSITY OF PUNE
M.E. (Civil) (Hydraulics)
Semester I
501 043 Planning and Management of Water Resources

Teaching Scheme : Examination Scheme: Lectures :4 Hrs./Week
Theory Paper : 100 Marks In Semester Assessment: 50 marks
Credits : 4 End Semester Assessment: 50 marks
Duration of end semester exam.: 3 hrs.

Module 1
Introduction
Objectives: of water resource planning and management, its Necessity, Aspects of water resources planning, water resource development; needs and opportunities; social goals

Module 2
Characteristics
Spatial and temporal characteristics of water resources, constraints for its development like non-reversibility; planning region and horizon.

Module 3
Economic Planning
Cost benefit studies of single and multipurpose projects– multi objective planning models, financial analysis of water resources projects, allocation of cost of multipurpose projects; repayment of cost.

Module 5
Water Demand
Demand for drinking water; irrigation, hydropower; navigational; planning for flood control.

Module 6
Management of Water Resources
Characteristics and functions of reservoir; reservoir sedimentation; conservation storage; conflict among uses, Reservoir operation studies - effect on river regime; long term simulation; reliability; resiliency and vulnerability assessment

Module 7
Management of Ground-Water Resources, Ground water evaluation; conjunctive use of surface and ground water.

Module 8
Economics
Discounting techniques; benefit cost parameters; estimation of benefits and costs; appraisal criteria; social benefit cost analysis. Basin planning; inter-basin transfer of water

Reference Books
1. James, L .D., and Lee, R. R., “Economics of Water Resources Planning”, Mc Graw Hill.
2. Principles of Water Resources planning-by Goodman.
3. Water Resources System Planning – by M.C. Chaturvedi.
4. Water Resources Planning and Management by-O.J. Helwege.
5. Water Management System Application-A.K. Biswas
6. Water resource Engineering- Linsley and Franzini, Mc Graw-Hill
7. Water resources planning and management- Grafton and Hussey, Cambridge Uni. press

University of Pune
M.E. (Civil) (Hydraulics)--2013Course
Semester I
501 004 : Research Methodology

Teaching Scheme	**Examination Scheme**
Lectures: 4 hours/week	**In semester Exam: 50 marks**
Credits 4	**End Sem. Exam. : 50 marks**
	Duration of End Sem.Exam:3Hrs

Module1:
Introduction to Research ,Meaning of research ,types of research, process of research, Sources of research problem, Criteria / Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem, formulation of research hypotheses**.** Search for causation

Module 2:
Developing a Research Proposal Format of research proposal, Individual research proposal, Institutional research proposal,Significance,objectives,methodology,Funding for the proposal,Different funding agaencies.Framework for the planning

Module 3:
Literature survey- Definition of literature and literature survey, need of literature survey, sources of literature, elements and objectives of literature survey, styles of literature survey, and strategies of literature survey.

Module 4:
Data collection ,Measuring,Sampling and Scaling—Classification of data, benefits and drawbacks of data, evaluation of data,qualititative methods of data collection, methods of qualitative research, Sampling,sample size,sampling strategy,attitude measurement and scaling, types of measurements, criteria of good measurements, classification of scales.

Module 5:
Preliminary data analysis- Testing of hypothesis- concepts and testing , analysis of variance techniques, introduction to non parametric tests.Valedity and reliability,Approaches to qualitative and quantitative data analysis,

Module 6:
Advanced data analysis techniques-Correlation and regression analysis, Introduction to factor analysis, discriminant analysis, cluster analysis, multidimensional scaling, Descriptive statistics, Inferential statistics,Mutidimentional measurement and factor analysis

Module 7:
Report writing—Need of effective documentation, importance of report writing, types of reports, report structure, report formulation,Plagirism.

Module 8:
Presentation of research---Research briefing, presentation styles, impact of presentation, elements of effective presentation, Writing of research paper, presenting and publishing paper, patent procedure,

Reference Books:

1. Research Methodology: concepts and cases—Deepak Chawla and Neena Sondhi,Vikas Publishing House Pvt.Ltd. (ISBN 978-81-259-5205-3)
2. Research Methods for Business—Sekaran Uma and Rogure Boudie—Wiley,India
3. Research Methodology: Methods and Trends', by Dr. C. R. Kothari--- New Age International Publishers.
4. Research Methods in Education---Louis Cohen,Manion,Morrison---Routledge(Taylor &Francis Group) / -- Cambridge University Press India Pvt. Ltd.-ISBN-978-0-415-58336-7
5. Research Methodology: An Introduction' by Wayne Goddard and Stuart Melville
6. Research Methodology: A Step by Step Guide for Beginners', by Ranjit Kumar
7. Research in Education---John Best and James Kahn,Prentice Hall of India Pvt.Ltd.

e-Resource---For class room ppts---www.wileyeurope.com/college/sekaran

University of Pune
M.E. (Civil) (Hydraulics)--2013Course
Semester I
501 044 : Elective –I

Teaching Scheme
Lectures: 5 hours/week
Credits 5

Examination Scheme
In semester Exam: 50 marks
End Sem. Exam. : 50 marks
Duration of End Sem.Exam:3Hrs

Select any combination having total of 5 credits from following technical / interdisciplinary courses

501 044 Elective I

Code	2 Credits Course	Code	1 Credit Course	Code	Audit Course (No Credit Course)
501 044A	Cyber Security / Information security	**501 044 F**	Economics & Finance For Engineers	**501 044 K**	Mass communication, Photography and Videography
501 044B	Computational Methods	**501 044 G**	Foreign Language –I	**501 044 L**	Yoga and Meditation
501 044C	Energy and Environment	**501 044 H**	Engineering Ethics		
501 044D	Hydropower	**501 044 I**	Intellectual Property Rights		
501 044E	Remote Sensing and GIS for Water Resources Management	**501 044 J**	Sanskrit-I		

501 044 –A-Elective I - Cyber Security / Information security (2Credits course)

Module1

Basic Concepts of Technology and Law*:* Basics of Information Technology, Basics of Indian Legal System, Information Technology Act 2000 (Amended), Relevant Amendments in all other laws.E-Contract**:** The essence of digital contracts, Law of Contract, Construction of E-contracts, Issues of security, Employment contracts, Consultant Agreements and Digital signature

Module2

Intelligent Property Issues in Cyber space: Doman names and related issues, Copyright in digital media, Patents in cyber world.

Rights of Neitzens and E- Governance: Privacy and freedom issues in cyber world, E-Governance, Cyber crimes and Cyber laws.

Module 3

Information Security Fundamentals: Background, Importance, Statistics, National and International Scenario, Goals of security, Confidentiality, Privacy, Integrity, Non-repudiation, Availability.

Essentials of computer security - Sources of security threats – Intruders, Viruses, Worms and related threats - Threat identification - Threat analysis - Vulnerability identification and Assessment.

Module 4

Security Investigation: Need for Security, Business Needs, Threats, Attacks, Legal, Ethical and Professional Issues

Access Control, Intrusion Detection and Server Management, Firewalls:

Overview of Identification and Authorization, Overview of IDS, Intrusion, Detection Systems and Intrusion Prevention Systems, User Management, Overview of Firewalls, Types of Firewalls, DMZ and firewall features

Security Policies and Management: Security Policy Design, Designing Security Procedures, Risk Management and Assessment Techniques, Security standards, Security Models. Security Management Practices, Security Laws, Information Classification Process, Risk Management, Security Procedures and Guidelines, Business Continuity and Disaster Recovery, Ethics and Best Practices, Security Assurance,

Reference Books:

1) Bakshi P M and Sri R K, Cyber and E-commerce Laws, Bharat Publishing House, 1st Edn, 2002
2) Syed Shakil Ahmed, Rajiv Raheja, A handbook on Information technology: Cyber law and E-Commerce, Capital Law House, 2004
3) Rodney D Ryder, Business Process Outsourcing, Date Protection and Information Security, Wadhwa & Co., 1st Edn, 2001
4) Vakul Sharma, Information Technology Law and Practice, Delhi Law House, 3rd Edn, 2011
5) Lipton, K., Cyberspace Law Cases and Materials, 2nd edition. Aspen Publishers. NY: New York, 2006
6) Michael E Whitman and Herbert J Mattord, Principles of Information Security, Vikas Publishing House, New Delhi, 2003
7) Micki Krause, Harold F. Tipton, Handbook of Information Security Management, Vol 1-3 CRC Press LLC, 2004.
8) Michael E Whitman and Herbert J Mattord, Principles of Information Security, Vikas Publishing House, New Delhi, 2003

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501 044 –B-Elective I - Computational Methods (2Credits course)

Module1

Numerical differentiation I: Partial differential equation Laplace and Poisson's equation-solution, method of characteristics for solution of initial boundary value problems, relaxation method, its applications related to water resources engineering, Numerical differentiation II.

Module2

Finite Difference, Gaussian elimination and Gauss, Jordan methods, matrix inversion, Gauss seidel method – Nonlinear equations – Regula falsi and Newton- Raphson methods

Module3

Statistics and Probability

Moments, Skewness and Kurtosis, Probability, conditional probability, various theoretical distributions like binomial, normal, log-normal, Poisson, gamma distribution, Pearson type I, II & II distribution test of significance, Gumbel distribution, testing of hypotheses – Large sample tests for mean and proportion, Chi-square test

Module4

Regression and Correlation

Regression and correlation – rank correlation – multiple and partial correlation – analysis of variance-one way and two way classifications – experimental design – Latin square design, Time series analysis.

Reference Books:

1.Higher Engineering Mathematics by B. S. Grewal (Khanna Publication, Delhi).

2.Venkatraman, M.K., Numerical Methods in Science and Engineering, National Publisher Company.
3.Numerical Methods by Krishna Raju
4.Shanthakumar M.S., Numerical Methods & Analysis
5.Gupta, S.C. and Kapur, V.K., "Fundamentals of Mathematical Statistics ", Sultan Chand & Sons, New Delhi, 1999.
6.Computational Fluid Dynamics – Anderson.
7.Computational Fluid Mechanics – Victor L. Street er, Mc-Graw Hill.

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501 044 –C -Elective I - Energy and Environment (2Credits course)

Module1

Energy Crisis

Historical events, energy requirement of society in past and present situation, availability and need of conventional energy resources, major environmental problems related to the conventional energy resources, future possibilities of energy need and availability.

Non-conventional energy sources: Hydro power plant, tidal energy, biomass energy, wind energy, Hydrogen as a source of energy, energy conversion technologies, their principles, equipment and suitability in context of India. Environmental impacts of these technologies.

Module 2

Solar Energy Option

Sun as source of energy, direct methods of solar energy collection, process of photovoltaic energy conversion, solar energy conversion technologies and devices, their principles, working and application, environmental impacts of solar energy.

Biomass Energy: Concept of biomass energy utilization, types of biomass energy, conversion processes, biogas production, biomass gasification process and technologies, environmental impacts of biomass energy. (Including numerical)

Module 3

Energy Storage

Types of energy storage, devices for sensible and latent heat storage, energy storage in dry batteries, nickel-cadmium batteries, secondary heat storage, chemical storage, environmental consequences of energy storage systems. (Including numerical)

Module 4

Energy Recovery Systems

Approaches to waste Energy Utilization, Equipment, Utilization System, objective, principles of heat transfer, Gas to Gas heat transfer, Gas to Liquid heat transfer, Recovery of waste heat in coil coating, Non-conventional liquid fuels, Heat recovery by Cogeneration. (Including numerical)

Reference Books

1. Bewik M.W.M. - Handbook of organic waste conversion.
2. Bokris J.O. - Energy, the solar hydrogen alternative.
3. Rai G.D - Non-conventional Energy Sources

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501 044 –D -Elective I - Hydropower—(2Credits course)

Module1

Introduction

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

Module 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.

Module3

Powerhouse And Penstock

Components, Structural details of powerhouse, classification, design criteria, water hammer phenomenon, surge tanks, design procedures & details classification, canal surges.

Module 4

Turbines

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

Reference Books :

1. Water Power Engineering – M.M. Dandekar and K. N.Sharma, Vikas Publishing House, 2010.
2. Water Power Engineering – R. K. Sharma and T. K. Sharma, S. Chand & Co. Ltd., 2003.
3. Hydro-Power Structures – R. S. Varshney, Nem Chand Publishers, 1977.

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501 044 –E -Elective I - Remote Sensing and GIS for Water Resources Management (2Credits course)

Module1

Introduction

Photogrammetry and Cartography

Aerial photography – terms and definitions; Geometry of aerial photographs; Flight planning; Aerial camera; film and filter combinations; Film processing; printing & procurement of aerial photos; Stereoscopy and types of stereoscopes; Photogrammetry; Basics of Analytical & Digital photogrammetry; Photogrammetric mapping & mapping accuracy; Cartography – terms and definitions; Map projections and reference spheroids; Map numbering systems; Base maps and thematic maps; Map legend symbols & border information; Design and layout of maps.

Module2

Remote Sensing & Processing

Fundamentals of Remote Sensing, Image Interpretation and Advances in Remote Sensing

Physics of Remote Sensing – terms and definitions; Electromagnetic spectrum; radiation laws; Scattering; Reflection; Absorption and Transmission; Platforms and sensors in Remote Sensing; Types of sensors used in R S; Ground truth data in remote sensing; Instruments for ground truth data collection; Aerial photo-interpretation – objectives & definitions; Factors affecting image interpretation; Elements of image interpretation; Use of image interpretation keys; Image interpretation techniques and methods of analysis.

Digital Image Processing

Digital Images – terms and definitions; Digital image Data formats; Computer Hardware for digital image processing; Basic Statistics used in DIP; Radiometric & Geometric Errors and Corrections in DIP; Image enhancement; Contrast enhancement; Filtering Techniques in DIP; Principal component analysis; Supervised and Un-Supervised Techniques; Accuracy assessment of Classified Data; Image Fusion.

Module3

GIS- Thematics

Geographical Information System

Computer hardware and its components; Data storage & handling in computer data types modern computers; Workstation and personal computers; Components of GIS; Basic terms and definitions; Data handling in GIS; Input Storage; Processing and output data; Geographical data types; Database structures in GIS; Raster and Vector data in GIS; Spatial data Analysis; Global Positioning System- Introduction and definition; GPs satellites and constellation; GPs segments – space segments; Control segments; User segments; GPS signals and codes; GPS receivers; Different mode of measurement and post processing of data; Accuracy of GPS measurement.

Thematic Applications

Hydrological cycle-precipitation-types of precipitation; analysis of precipitation data; Methods of estimating average rainfall using GIS; Runoff estimation; Advantages of water balance study; water balance components; methods of estimating Evapotranspiration soil moisture; water balance computation; Types of erosion, transpiration and deposition of sediment; soil loss estimation methods; Concept of watershed management; watershed work plans; watershed management programmes; cost benefit studies; role of remote sensing and GIS in watershed management.

Module4

Applications

Water Resources Management & Development Management: Flood Risk Zone Mapping and Flood Damage Assessment; Flood Frequency Analysis; Drought Monitoring; Satellite Based Drought Information; Irrigation Water Management; Mapping and Evaluation of Irrigation Command; Site suitability analysis for Water Harvesting Structure.

Development: Reservoir Sedimentation; Impact of River Valley Project on Environment; Water Logging and Drainage; Water Resources Project Planning using Remote Sensing & GIS; Familiarization of Remote Sensing Data Products and Data Ordering; Watershed Conservation Planning and Management.

Reference Books:

1. Fundamentals of Remote Sensing: George Joseph.
2. Remote Sensing and Image Interpretation: Lillesand & Keifer.
3. Physical aspects of Remote Sensing: PJ Curran.
4. Remote Sensing Principles and Interpretation: F.F. Sabins.
5. Introduction to Remote Sensing: J.B. Campbell.
6. Remote sensing Models and methods for image processing by Robert A. Schowengerdt, second edition, 1997, Academic Press
7. Remote sensing & image interpretation – Lilleson J.T.M. & Krefer R.W. Wiely, New York.
8. Photogrammetry by – Sheford.
9. Remote sensing in Civil Engineering – J.M. Kennie & M.C. Mathews.
10. Fundamentals of Cartography, Ramesh, P. A., Concept Publishing Co., New Delhi.
11. Mapping and Compilation, Rampal, K.K.,Concept Publishing Co.,New Delhi.
12. Basic Cartography, Vol. 1, 2nd ed., Anson, R.W. & Ormeling, F.J., Elsevier Applied Science, Publishers, London.
13. http://www.cnr.colostate.edu/class_info/nr502/lg1/map_projections/form_case_aspect.html
14. http://www.cnr.colostate.edu/class_info/nr502/lg1/map_projections/developable_surfaces.html
15. Colorado State U.http://www.cnr.colostate.edu/class_info/nr502/lg1/map_projections/
16. Kang-tsung Change, 2003, Introduction to Geographic Information Systems (2nd Edition), McGraw-Hill Higher Education press.
17. Keith C. Clarke, 2003, Getting Started with Geographic Information System (4th Edition), Prentice Hall press.

501 044 –F- Elective –I Economics and Finance for Engineers (1Credit Course)

Module1:

Introduction & Basics of Economics & Finance: Meaning & necessity of: Economics, Costing & Finance, History & fundamentals of Economics, Basics of Finance & Accounting, rates of interest, Basics of Financial Statement, Financial Analysis, Inflation, etc.

Module2:

Principles of Costing, Estimation & Valuation: Basics of Costing, activity based costing & case studies, Basics of Estimation & Valuation, present & future values of properties, Profitability & Financial Decisions, Inventory Management

Reference

1. As specified by the instructor

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501 044 –G- Elective –I Foreign Language -I (French-I) (1Credit Course)

Module1:

Introduction: Glimpse of France, life of French people (Culture, food, etc.), French alphabets, accent, etc., Unit zero of the Text Book (Grammar, Vocabulary, and Lesson), Exercise of Unit zero of Text Book & workbook

Module2:

French Lessons: Brief revision, Unit-1 of the Text Book (Grammar, vocabulary), Unit-1, Lesson 1 of the Text Book, Exercise of Unit-1, Lesson 1 of the Text book & workbook

Reference

1. Jumelage-I Text Book by Manjiri Khandekar & Roopa Luktuke (Latest edition)
2. Jumelage-I workbook by Roopa Luktuke

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501 044 –H- Elective –I Engineering Ethics (1Credit Course)

Module1:

Introduction : Meaning & scope of Ethics in general & for engineers in particular, Moral obligations and rules in engineering,Categories of moral,Work Culture, Corporate, local & global issues, Rights & responsibilities of Engineers, Conflicts in the profession, Mental Stresses & Emotional Intelligence

Module2:

Code of Ethics for Engineers: First principles of Engineering Ethics & Ethical terminology, Social Values, Character, considerations for general Individuals, Engineers & the Society, Recommendations of the Professional bodies (Code of Conduct), Introduction to Copyright, IPR (Intellectual Property Right), Plagiarism & Legal issues

Reference

1.Ethics in Enginerring Practice and Research---Carolin Whitbeck—Cambridge University Press—ISBN—978-1-107-66847-8

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501 044 –I- Elective –I Intellectual Property Rights (1Credit Course)

Module1

Introduction to Intellectual Property Rights

Nature of Intellectual Property: Patents, Designs, Trademarks and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development.

International Scenario

International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

Module2

Patent Rights

Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.

Recent Developments in IPR

Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies,

Reference Books

1 Prabuddha Ganguly, " Intellectual Property Rights",Tata Mc-Graw Hill.
2 Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd, 2007
3 Robert P. Merges, Peter S. Menell, Mark A. Lemley "Intellectual Property in New",

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501 044 –J- Elective –I Sanskrit I (1Credit Course)

Module 1

A) Brihat samhita – aadhyay 21: 1 to 15sholkas
B) Brihat samhita – aadhyay 21:– 16 to 30 sholkas

Module2

A) Brihat samhita – aadhyay 21:– 31 to 37 sholkas
aadhyay 22 :– 1to 7 sholkas
B)Brihat samhita – aadhyay 23 : 1 to 9 shlokas

For the entire syllabus students have to prepare these subhashitmalas with their translation, explanation, reasoning behind the each sholka.

References:

1. Brihatsamhita by Varah Mihira

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501 044 –K - Elective –I -- Mass communication, Photography and Videography

(Audit Course—No Credits)

Module 1:

Mass Communication - Theories & methods

Concepts and Theories, Communication concepts, Process and Function, Interpersonal & Intra personal, Group behaviour, need for Mass Communication. Relevance of Communication Theories to Practice, Models of Communication, Impact and Effect of Communication Old and new media, Communication Techniques, - Feedback and Evaluation of Communication Effect, Interview and Questionnaires- Method of Data Analysis, use of Information Technology, various methods of mass communication like seminars, conferences, print and digital media, internet, CDs, DVD, movies, U-tube, video conferencing.

Module 2 :

Photography and Videography

Camera Basics, Still Photography, Lenses, Exposure, Composition, Colour. Shot Angle, Camera Movement, Light techniques and final printing.

Videography Basics – Video camera –types, mounting. Sound Basics, Film Sound appreciation, Sound Track analysis, Editing Basics, Fragmentation

Juxtaposition: Frame, Shot, Sequence, Scene Time, Pace, Rhythm. Learning basic editing software and primary editing on available/given materials.

Reference Books

1 Richard Dimbleby and Graeme Burton, 1995, More than words: An introduction to communication, London: Routledge.

2. Melvin L. DeFleur and Everette E. Dennis, 1991, Understanding mass communication, New Delhi: Goyal Saab.

3. Marshall McLuhan, 1964, Understanding Media, New York: McGraw –Hill

4. Wilbur Schramm, 1964, Mass media and national development, the role of information in developing countries, Stanford: Stanford University Press.

5. Holman, Tomlinson, Sound for film and television, Focal Press

6. McCormick, Tim and Rumsey, Francis, Sound and recording: An introduction, Focal Press

7. Talbot-Smith, Michael, Sound engineering explained, Focal Press

8. Talbot-Smith, Michael, Sound assistance, Focal Press

9. Altman, Rick, ed., Sound theory sound practice, Routledge Talbot-Smith, Michael, Sound engineer's pocket book, Focal Press

10. Truebitt, Rudy and David, Trubitt, Live sound for musicians,

11. Hal Leonard Nathan, Julian, Back to basic audio,

12. Newnes Yewdall, Lewis, David, Practical art of motion picture sound, Focal Press

13. Leider, N., Colby, Digital audio workstation, McGraw-Hill

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501 044 –L-Elective I Yoga and Meditation (Audit course--No Credit course)

Module 1

Yoga: Sukshma (subtle) yoga techniques, Difference between physical exercises and yogasans, Impact of yogasans on human body, benefits of yogasans, Patanjali yoga sutras, Technique of different yogasans like, Trikonasan, Ardhachandrasan, Padmasan, Akarnadhanurasan, Ardhamatsendrasan, Vajrasan, Pachhimottanasan, Bhujangasan, Shalbhasan, Dhanurasan, Naukasan, Makrasan, Pawanmuktasan, Halasan, Sarvangasan, Shavasan, Suryanamaskar(Sun Salutation), Yoga and Food.

Module 2

Meditation: Breathing Technique, Pranayam, Benefits of Pranayam, Precautions for Pranayam, Kumbhak, Bandh(Locks), Chakras, Mudra, Technique of Pranayam,Anulom-VilomPranayam, UjjayiPranayam, BhramariPranayam, BhastrikaPranayam, AgnisarPranayam, KapalbhatiPranayam, Meditation(Dhyan).

References Books:

Light on Yoga: by B.K.S. Iyengar, Harper Collins Publishers India

1. Light on Pranayama: by B.K.S. Iyengar, Harper Collins Publishers India
2. Yoga for Dummies by Georg Feuerstein and larry Payne, Wiley India publishing
3. Yoga, Pilates, Meditation & Stress Relief By Parragon Books Ltd
4. The Yoga Sutrasby Patanjali, Swami Satchidananda, Integral Yoga Publications
5. Meditation - Science and Practice by N. C. Panda, D. K. PrintworldPublisher
6. YogPravesh by Vishwas VMandlik,YogchaitanyaPrakashan
7. Asanand YogVigyan, BhartiyaYogSansthan, Delhi
8. PranayamVigyan, BhartiyaYogSansthan, Delhi

Reference Web Sites:

1. http://www.artofliving.org/in-en/yoga
2. http://www.artofliving.org/in-en/yoga/sri-sri-yoga/sukshma-yoga-relaxation

3. http://www.yogsansthan.org/
4. http://www.yogapoint.com/
5. http://www.divyayoga.com/
6. http://www.yogaville.org/about-us/swami-satchidananda/
7. http://www.yogaVision.net
8. http://www.swamij.com

University of Pune
M.E. (Civil) (Hydraulics)--2013Course
Semester I
1Credit =15 Hrs.

501 045 : Lab. Practice–I

Teaching Scheme	**Examination Scheme**
Lectures: 4 hours/week	**Term work : 50marks**
Credits : 4	**Oral : 50 marks**

Lab Practice I

The lab. practice-I will be based on completion of assignments / practicals / reports of site visits, confined to the course in that semester.

The term work will consist of –

I) A journal giving details of the following experiments/assignments.
1.Solution of Laplace equation by graphical / relaxation method.
2.Flow past a cylinder/ aerofoil using Wind Tunnel.
3.Growth of a boundary layer along a flat plate using Wind Tunnel.
4Assignment based on reservoir/channel routing using different analysis methods / spread sheet.
5 Case study of optimization of reservoir operations
6. Study and use of GIS software in hydraulic engineering

II) Visit reports of minimum three site visits, exploring the field aspects for various subjects

III) . Study of one research paper from referred journal and it's report in the form of discussion

IV) Report on minimum 2 software applications on any subject of the semester.

V) Report on atleast one patent with its details studied in any subject of the semester.

VI) Technical review and critique of a research article/paper on any topic from the refereed journal paper related to any subject learnt in the semester–

Oral will be based on the Term Work of Laboratory Practice I.

University of Pune
M.E. (Civil) (Hydraulics)--2013Course
Semester II
501 046 Open Channel Hydraulics

Teaching Scheme	**Examination Scheme**
Lectures: 4 hours/week	**In semester Exam. : 50 marks**
Credits 4	**End Semester Exam. : 50 marks**
	Duration of End Sem.Exam:3Hrs

Module 1
Uniform Flow and Depth Energy
a) Review of uniform flow formulae, design of channels.
b) Depth energy relationships, open channel transitions

Module 2
Hydraulic Jump
a) Classical hydraulic jump, jump types, Energy dissipation, Control of hydraulic jump and its importance,
b) Formations of jump in expanding and contracting channel, jump on sloping floors.

Module 3
Gradually Varied Steady Flow
Gradually varied steady flow and rapidly varied steady flow in open channels, surface profiles in GVF-analysis.

Module 4
Computation of Gradually Varied Steady Flow
Different method of computations, Chow'-s methods, standard step method, finite difference method.

Module 5
Flood Routing
a) Muskinghum method, finite difference scheme, channel routing storage.
b) Method of characteristics, differential form of Momentum Equation.

Module 6
Spatially Varied Flow
a) Differential Equation of spatially varied flow.
b) Profile computation.

Module 7
Unsteady Flow
Waves, celerity of wave, boundary conditions, standing and progressive wave, positive and negative surges.

Module 8
Dam Break Analysis
Dam break problem, deep water, group velocity, solitary wave.

Reference Books :
1. Open Channel Hydraulics – Ven Te Chow, Mc-Graw Hill, 1959.
2. Flow in Open Channel – K. Subramanya, Tata Mc-Graw Hill, 1986.
3. Flow through Open Channel-K.G.Ranga Raju, Tata Mc-Graw Hill, 1993.
4. Open Channel Hydraulics- Richard H. French, Mc-Graw Hill, 1986.
5. Open Channel Flow- F. M. Henderson, Macmillan Publishing Co. Inc., 1966.

General Reading Suggested:

Codes: 1) I.S. 4997 (1968). "Criteria for design of hydraulic jump type stilling basins with horizontal and sloping apron". Bureau of Indian Standards, New Delhi.

Hand books: 1) Peterka, A.J. (1984). "Hydraulic design of stilling basins and energy dissipators". Eng. monograph no. 25, U.S. Bureau of Reclamation.

2) Water measurement manual. (2001). "Chapter 7-weirs". A water resources technical publication, U.S. Bureau of Reclamation.

e-Resourses: Research Publications in

1) ASCE Journal of Hydraulic Engineering
2) ASCE Journal of Hydrologlic Engineering
3) ASCE Journal of Irrigation and Drainage
4) ASCE Journal of Water Resources Planning and Managament
5) IAHR Journals

University of Pune
M.E. (Civil) (Hydraulics)--2013Course
Semester II
501 047 Sediment Transport and River Mechanics

Teaching Scheme
Lectures: 4 hours/week
Credits 4

Examination Scheme
In semester Exam. : 50 marks
End Semester Exam. : 50 marks
Duration of End Sem.Exam:3Hrs

Module 1
Introduction
Definition of sediment, fluvial hydraulics, Origin and formation of sediments, Nature of sediment problems, fundamental properties of individual sedimentary particles, Concept of fall velocity, Bulk properties of sediment.

Module 2
Incipient Condition of Motion
Approaches of establishment of incipient motion, Shields analysis and other methods.
Regimes of flow – study of different bed forms like ripples, dunes, antidunes with characteristics, significances, resistance analysis.

Module 3
Sediment Transport
Modes of sediment transport, Introduction to different bed load equations – empirical, dimensional and semi-theoretical equations

. **Module 4**
Detailed study of DuBoys equation, Enstein equation, Meyer-Peter and Müller equation, Saltation mechanism, Concept of suspended load, total load, wash load.

Module 5
Stable Channel Design
Concept of stable channel, Design procedures such as regime method, Kennedy method, Lacey method, Introduction to other methods such as Bunch, Simmon-Albertston method, Tractive force approach

Module 6
Sediment Measurements
Bed load measurement, suspended load measurement, Planform river bends, Channel characteristics, bifurcations, confluences, river gauging, continuity Equation for sediment, stream bed changes during Floods, Agradation, Degradation, Silting of reservoir.

Module 7
River Training Works
Objective of river training and bank protection, River training for flood control, navigation, Guiding the flow, sediment control, River bank protection,

Module 8
Introduction to alluvial river models. Introduction to sediment transport through pipes.

Reference books
1 Yang. C.T. " Sediment Transport theory and Practice " McGraw –Hill , New-York, 1996
2. Graf, W.H. "Hydraulics of Sediment Transport", McGraw –Hill , New-York,1971
3.Raudkivi, A.J. " loose Boundary Hydraulics"2nd edition, Pergamon Press, 1976
4.F.M.Hendorson," Open Channel Flow "Mac Millan , New York , 1996
5.Grade, R.J. and Ranga Raju, K.G."Mechanics of Sediment Transport and Alluvial Stream Problems" New Age International(P)Ltd.Publications,New Delhi , 2006.

University of Pune
M.E. (Civil) (Hydraulics)--2013Course
Semester II
501 048 Hydrology

Teaching Scheme
Lectures: 4 hours/week
Credits 4

Examination Scheme
In semester Exam. : 50 marks
End Semester Exams. : 50 marks
Duration of End Sem.Exam:3Hrs

Module 1
Introduction
a) Depth Area Duration Analysis, Unit Hydrograph Theory, IUH, Rainfall Runoff models, SWM, Tanks, CLS models
b) Evaporation, Interception, Depression Storage, Infiltration, Their Determination

Module 2
Flow Generation
a)Stochastic processes-classification, time series & it's components, various statistical distributions & their uses in hydrology, plotting, position, frequency factors,
b) Extreme value theory, synthetic generation of yearly and monthly flows in hydrology.

Module 3
Floods
Flood estimation by various methods, forecasting of floods, flood frequency analysis

Module 4
Gumble's, Pearson type I.II.III distribution Log-normal method, design flood for various hydraulic structures

Module 5
Ground Water Development
Ground water-definition, aquifers, vertical distribution of subsurface water.
Darey's Law-its range of validity, Dupuit Forchheimer assumption, application of Darcy's law to simple flow systems governing differential equation for confined and unconfined aquifers

Module 6
Well Hydraulics
Fully and partially penetrating wells, interference of wells, pumping test with steady & unsteady flow, method of image

Module 7
Ground Water Exploration
a) Ground water Exploration, well types, well construction & design, screens, perforations & gravel packs, pumping equipment,
b) Quality of ground water, pollution of ground water.

Module 8
Ground Water Budget
a) Ground water budget, seepage from surface water artificial recharge
b) Sea water Intrusion in to coastal aquifers

Reference Books :

1 Hydrology Principles-Analysis-Design by H.M.Raghunath, New Age International Publishers
2 .Applied Hydrology-Linsley Kolhar & Paulhas ,Mc-Graw Hill Publication
3.Ground water Hydrology—David Todd—Wiley,India
4 Water Resource & Hydrology,S.K. Garg.
4 Engineering Hydrology-K.Subramanya, Tata Mc-Graw Hill.
5.Applied Hydrology- Ven Te Chow, David R. Maidment, Larry .W. Mays, Tata McGraw Hill
6.Textbook of Hydrology ,P. Jayarami Reddy, Laxmi Publication, New Delhi
7. Stochastic Hydrology. Jayarami Reddy, Laxmi Publication, New Delhi
8. Hydrologic Modeling Statistical Methods and Applications, R. H. Mccuen and W. M. Snyder, Prentice Hall, New Jersey, U. S. A.
9.Applied Hydrology, K. N. Mutreja ,Tata McGraw Hill Publication

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University of Pune
M.E. (Civil) (Hydraulics)--2013Course
Semester II
501 049 -- Elective II

Teaching Scheme
Lectures: 4 hours/week
Credits 4

Examination Scheme
In semester Exam. : 50 marks
End Semester Exams. : 50 marks
Duration of End Sem.Exam:3Hrs

Select any combination having total of 5 credits from following technical / interdisciplinary courses

Code	2 Credits Course	Code	1 Credit Course	Code	Audit Course (No Credit Course)
501 049A	Human Rights	**501 049 E**	Foreign Language II	**501 049 I**	Performing Arts – Music and Dance
501 049B	Coastal Engineering	**501 049 F**	Geological Exploration for Civil Engineering Structures	**501 049 J**	Principle Centred Leadership
501 049C	Water Management	**501 049 G**	Corporate Soft skills		
501 049D	Hydroinformatics	**501 049 H**	Sanskrit II		

501 049 –A Elective II --Human Rights (2 Credits course)

Module 1

Human Rights – Concept, Development, Evolution

- Philosophical, Sociological and Political debates
- Benchmarks of Human Rights Movement.

Human Rights and the Indian Constitution

- Constitutional framework
- Fundamental Rights & Duties
- Directive Principles of State Policy
- Welfare State & Welfare Schemes

Module 2:

Human Rights & State Mechanisms

- Police & Human Rights
- Judiciary & Human Rights
- Prisons & Human Rights
- National and State Human Rights Commissions

-**Module 3:**

Human Rights of the Different Sections and contemporary issues

- Unorganized Sector ,
- Right to Environment, particularly Industrial sectors of Civil Engineering and Mechanical Engineering .

-Globalization and Human Rights

- Right to Development,

Module 4. :

Citizens' Role and Civil Society

- Social Movements and Non-Governmental Organizations
- Public Interest Litigation

-Role of Non Government organizations in implementation of Human rights.

- Right to Information

Human Rights and the international scene –Primary Information with reference to Engineering Industry.(2 hrs)

- UN Documents
- International Mechanisms (UN & Regional)
- International Criminal Court

Reference Books:

1. Introduction to International Humanitarian Law by Curtis F. J. Doebbler - CD Publishing
2.Human Rights in India- A Mapping ,Usha Ramanathan: free download from http://www.ielrc.org/content/w0103.pdf
3. Study material on UNESCO,UNICEF web site
4.Information, by Toby Mendel - UNESCO **,** 2008

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501 049 –B Elective II Coastal Engineering -- (2 Credits course)

Module 1

Basics

Basic understanding of wave mechanics including wave propagation, data analysis and prediction in costal zone. Global tidal phenomena, Tidal analysis. Wave forces on coastal structures.

Module 2

Coastal Processes

Coastal process-Erosion/accretion due to waves, long shore transport (Littoral drift) estimate of wave induced sediment, budget. Tides, effect of Tides, stability of inlets. Effect of construction of coastal structures on Stability of shoreline / beaches.

Module 3

Design of Marine Structures

Design of Marine Structures: Seawalls, Revetments, Breakwater rubble mound, composite, floating and pneumatic types, and jetties. Offshore structures, Oil Production platform, sub marine pipelines. Model studies.

Module 4

Design Technology

Dredging Technology: Types of dredgers, design of disposal methods of dredged materials environmental effects of dredging etc. Pollution in Coastal zone Management Marine Environment-Oil spills and Containment, disposal of waste/dredged spoils etc.

Reference Books:

1. Brunn Per ,B. U. Naik, “Shore Protection Manual”, NIO Goa
2. Quinn A. D., “Port Planning”, Mc Grow Hill Book Co. New York
3. Richard Silvester, “Coastal Engineering”, Vol-I-II, University of Western Australia
4. Shore Protection Manual-U.S.Waterways Experiment Station Corps of Engineer,
5. Costal Engineering Research Center, Vickburg andU.S.A.1984.Coastal Protection Manual 2002.
6. Harbour and Coastal Engineering”, Vol I&II, Ocean and Coastal Engineering Publication, NIOT, Chennai

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501 049 –C Elective II Water Management -- (2 Credits course)

Module 1

Introduction: Global and national water problems, law and legislation, Indian Government Policies and Programs, Quantity estimation of water –urban and rural sectors’ requirement

Water Laws: Constitutional provisions, National Water Policy, riparian rights / ground water owner ship, prior appropriation, permit systems, acquisition and use of rights, scope for privatization.

Module 2

Economics of water: Water as economic good, intrinsic value, principles of water pricing & water allocation, capital cost, opportunity cost, internal rate of return, benefit cost analysis, principles of planning and financing of water resources project.

Module 3

Watershed management: Objectives of Planning Watershed Projects, Guidelines for Project Preparation, Approach in Govt. programmes, people’s participation, conservation farming, Watershed management planning, identification of problems, objectives and priorities, socioeconomic survey

Module 4

Flood management: causes of floods, structural and non-structural measures, mitigation plan, flood damage assessment, use of geoinformatics,

Drought management: types of droughts, severity index, drought forecasting, damage assessment, mitigation plan, use of geoinformatics.

Reference Books

1. Water Resources Systems Engg, D. P. Loucks, Prentice Hall
2. Chaturvedi, M.C. " Water Resources Systems Planning and Management" Tata McGraw Hill
3. James L.D and Lee R.R " Economics of Water Resources Planning", McGraw Hill
4. Water resources hand book; Larry W. Mays, McGraw International Edition

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501 049 –D Elective II Hydroinformatics-- (2 Credits course)

Module 1

Introduction

Concept of hydroinformatics scope of internet and web based modeling in water resources engineering. Introduction to multi criterion decision support system – Components for modeling software.

Module 2

GIS in Topology

Data input-Existing GIS data –meta data-conversion of existing data-Creating new data Geometric transformation-control points-RMS error. Application of geometric transformation Spatial data editing –location errors-topological errors- topological editing –nontopological editing—other editing operations. Attribute data input and management- Attribute data in GIS-Relational model-Attribute data entry-manipulation of fields and attribute data

Module 3

Cartography

Data display and cartography- symbolization- map design

Data exploration- attribute data querry-spatial data querry-raster data querry- Graphic visualisation

Vector data analysis- Buffering-ovelay-distance measurement-pattern analysis Raster data analysis-Local operations – Neighbourhood operations-zonal operations-Other raster data operations.

Module 4

Mapping

Terrain mapping and analysis-Teraain mapping- TIN contouring –slope and aspect-surface curvature – Raster vs TIN, Viewshed and watersheds- Viewshed analysis- application for view shed analysis-Watershed analysis Filled DEM –Flow direction- Flow accumulation-stream network and stream link. Factors influencing watershed analysis- applications, Introduction to spatial analysis-global and local methods-kriging. Application of GIS to various fields of Engineering.

Reference Books

1. Chang, K (2005). Introduction to Geographic Information Systems, Tata Mc Graw Hills Edition, NewDelhi.
2. Burrough and McDonnel, Principles of Geographical Information System, Oxford University Press, 1998.
3. Praveen kumar, Jay Alameda, Peter Bajcsy; Hydroinformatics, Taylor & Francis, 2006.
4. Maidment D. R., Arc Hydro, GIS for Water resources, ESRI Press, 2002.
5. Han J. , M. Camber; Data Mining: Concepts and techniques, Morgan Kaufmann, San Francisco, 2001.
6. Lowire. W. (1997) - Fundamentals of Geophysics. Cambridge Low price Editions.
7. Dobrin M.B. (1981) Introduction to Geophysical prospecting. McGraw – Hill International Book Company.

8. Kearey.P and Brooks.M (1984) An Introduction to Geophysical Exploration- ELBS.
9. Burger. H.R. (1992)- Exploration Geophysics of the Shallow Subsurface: Prentice Hall
10. Robinson. E.S. and Coruh.C. (2002)- Basic Exploration Geophysics– John Wiley.

501 049 E-Elective II Foreign Language –II French-II (1 Credit course)

Module 1

French Grammar and Vocabulary: Unit-1, Lesson 2 of the Text Book (Grammar & Vocabulary), Unit-1, Lesson 1 of the Text Book, Exercise of Unit-1, Lesson 2 of the Text Book & workbook

Module 2

Advance Vocabulary, Writing & Speaking: Unit-1, Lesson 3 of the Text Book (Grammar & Vocabulary), Unit-1, Lesson 3 of the Text Book, Exercise of Unit-1, Lesson 3 of the Text Book & workbook, Revision & speaking practice

Reference

1. Jumelage-I Text Book by Manjiri Khandekar & Roopa Luktuke (Latest edition)
2. Jumelage-I workbook by Roopa Luktuke

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501 049 –F Elective II Geological Exploration for Civil Engineering Structures (1 Credit course)

Module 1

Geological Exploration and Its Field Techniques

Definition, scope and objective of geological exploration, controls. A concise account of limitations and applications of various geophysical exploration methods; the problem of ambiguity in geophysical interpretations; the principle, types, origin, instruments, field procedure and interpretations of self-potential method. The principals involved, instruments used, field procedures adopted and interpretations applied in electrical resistivity methods. Physical basis and applications of seismic, gravity, magnetic, electrical, electromagnetic, seismic and radiometric prospecting. Evaluation of outcrop, trenching, pitting, channeling. Structural Map preparation, subsurfacial map and interpretation. Methods of sampling; Drilling and its application: Types of drills and drill bits, core, core logging.

Module 2

a) Dam and Reservoir

Definition and Scope of Dams, Types of Dam, and Preliminary Geological studies carried out for site investigations of Dams and Reservoir. Detailing of Exploratory methods for finalizing the Dam or Reservoir site. Direct and Indirect Methods of Investigation. Exploration Types. Precautions for interpretation on the field and of the field. Considering the Problem from Maharashtra Cases can be elaborated.

b) Tunnel and Bridges

Definition, Scope of Tunneling, Parts of tunnels, Types of Tunnel, Preliminary and Detailed Geological Studies related to exploration of tunnel; Indirect and Direct Methods of Investigations for Tunnel. Measures to be considered for Portal of tunnels. Case study discussion based from India. Outcrop Study, Topographic Study, Indirect and Direct Methods of Lithological identification, Preparation of Lithology Map, Sub – Surface Investigation, Settlement, Erosion features etc. Case Study from Maharashtra.

Reference Books:

1. Ramachandra Rao M.B. (1975) – Outlines of Geophysical Prospecting – A manual for Geologist: University of Mysore.
2. N W Gokahale: Engineering Geology,
3. Fundamentals of Geology for Engineers

4. Applied Geophysics by Thelford
5. Dohr.G. (1984): Applied Geophysics- English Book Depot.

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501 049 –G Elective II -- Corporate Soft Skills--- (1 Credit course)

Module 1

Introduction: Work Culture in general & specific to the Corporate, Interpersonal Skills & Verbal Communication, Emotional Intelligence& its use, Attitude & Team building

Module 2

Additional Management Skills, Leadership & Resolving Conflicts, Corporate Communication Skills, Positive attitude, Counselling & Motivation Skills, Performance Enhancement Skills

Reference:

1. As specified by the instructor

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501 049 –H Elective II -- Sanskrit- II--- (1 Credit course)

Module 1

A) Brihatsamhita – aadhyay 53: 1 to 20 sholkas
B) Brihatsamhita – aadhyay 53:– 21 to 40 sholkas

Module 2

A) Brihatsamhita – aadhyay 53 :– 40 to 60sholkas
B) Brihatsamhita – aadhyay 53: 61 to 80 shlokas

For the entire syllabus students have to prepare these subhashitmalas with their translation, explanation, reasoning behind the each sholka.

References:

1. Brihatsamhita by Varah Mihira

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501 049 -- I ---Elective II Performing Arts – Music and Dance
(Audit course--Non Credit course)

Module 1 :

Indian Music

Vocal, Instrumental, Sur, Laya, Tal. Ragas and their classification based on time and "Raasa-Nirmitee". Seasons and Ragas. Various "Bandishes" and "Gharanas" or styles. Light Indian Music-different types.

Experiencing ethos and bliss by listening to performances of various reputed artists. Experiencing oneness with nature and the super power by performing individually or in a group.

Module 2 : Indian Classical Dance

Types –Kathak, Bharatnatyam, Kuchipudi, Odissy etc. Importance of "Abhinaya" (acting) in dance. Role of "Taala" and "Laya" in dance. Various dance form. Various gharanas in traditional dance types Fusion with other dance styles. Experiencing the Indian cultural power through individual and group performances.

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Books/Audio CD

1.Hindustani Sangeet Paddhati by Pt.Vishnu Narayan Bhatkhande publ. Swarganga Foundation.
2.Jivi Jivai (Golden Voice Golden Years) Pt.Jasraj, Publ. Bandishes with notations composed by the author.
3.Pranav Bharati, by Pt.Ompraksh Thakur, publ. Swarganga foundation.

4.Rasa Gunjan by Pt.Birju Maharaj, Publ. Swarganag foundation
5.Anup Rag Vilas by Pt.Kumar Gandharava, Bandishes composed and sung by author mostly available on cassettes Swarganga Foundation.
6.The dance Orissi – Mohan Khokar published by (2010) Abhinav Publications, New Delhi
7.Introduction to Bharata's Natyashastra by Adya Rangacharya, Munshiram Manoharlal publication.
8. Art of Dancing classing and folk dance by priyabala Shah, Parimal publication
9.Tantra Mantra Yantra in Dance: An Exposition of Kathaka, by Ranjana Shrivastava, D.K.Prinword Pvt. Ltd.

501 049 – J --- Elective II Principle Centered Leadership
(Audit course--Non Credit course)

Module 1 :

Motivation, Leadership and Competency

a) Motivation:--

Necessity, types, means of providing extrinsic motivation. Leadership. Qualities of a leader. Types of Leadership viz. Lassez Fairre, transactional, transformational. Principle centered leadership based on Stephen Covey habits.

b) Competency Mapping:-

Definition of competency. Generic, functional and Strategic Competencies. Importance of developing competencies. Identification of competency gaps at managerial cadre level through benchmarking requirements based on role, mapping and assessment. Training and Developmental programs for competency gap closure.

Module 2 :

Entrepreneurship and strategic Management

a) Entrepreneurship: - Qualities of an entrepreneur. Business ideas generation methods—creative imagination, brainstorming, newspaper exercise activity. Ideas evaluation based on John Mullion's 7 point test concept of a B—plan.

b)Strategic Management: --

Necessity in the context of global challenges. Objectives of strategic management. Forecasting abilities and methods. Developing organizations for the achievement of strategic objectives. Dealing with uncertainties.

Reference Books

1. Seven habits of highly effective people—Stephen Covey—Franklin Covey Publications
2. Living the seven habits Stephen Covey—Franklin Covey Publications
3. 8th Habit – from effectiveness to greatness Stephen Covey—Franklin Covey Publications
4. Human Resource Development In The Building Industry, Vinita Shah, published by NICMAR
5. Human Resources Management & Human Relations , V P Michael , Himalaya
6. Human Resource Management Biswajeet Pattanayak published by Prentice Hall
7. Construction project Management, integrated approach—Feedings First Indian Reprint 2011—Yesdee publications
8. Cases in Strategic Management, Amita Mital , Tata Mcgraw Hill

University of Pune
M.E. (Civil) (Hydraulics)--2013Course
Semester I
1Credit =15 Hrs.

501 050 : Lab.Practice–II

Teaching Scheme	**Examination Scheme**
Lectures: 4 hours/week	**Term work : 50marks**
Credits : 4	**Oral : 50 marks**

Lab Practice II

The lab. practice-I will be based on completion of assignments / practicals / reports of site visits, confined to the course in that semester.

The term work will consist of –

I) A journal giving details of the following experiments performed in laboratory /assignments.
1. Characteristics of Hydraulic Jump in horizontal and sloping channel
2. Control of location of hydraulic jump in a rectangular channel
3. Velocity distribution in open channel flow using pitot tube or current meter
4. Use of open channel flow simulation software like HEC RAS /MIKE
5. Numerical simulation of 1-D open channel flow using MATLAB
6. Assignment on unit hydrograph theory.
7. Case study of hydrograph for ungauged catchment.
8. Numerical simulation of flow in CFD .
9. Two assignments based on Electives.

II) Visit reports of minimum two site visits, exploring the field aspects for various subjects

III) . Study of one research paper from referred journal and its report in the form of discussion

V) Report on atleast one patent with its details studied in any subject of the semester.

VI) Technical review and critique of a research article/paper on any topic from the refereed journal paper related to any subject learnt in the semester–

Oral will be based on the Term Work of Laboratory Practice I.

University of Pune
M.E. (Civil) (Hydraulics)--2013Course
Semester II
1Credit =15 Hrs.
501 051 - Seminar – I

Teaching Scheme	Examination Scheme
Pract. 4 hrs./week	Oral : 50 Marks,
	TW :: 50 Marks
	Credits 4

The seminar I shall be on state of the art topic of own choice approved by the guide
Term work of the seminar should consist of spiral bound report ,preferably printed on both the sides of pages on any technical topic of interest associated with the post graduate course and should be submitted in a standard format having the following contents .

i. Introduction
ii. Literature Survey
iii. Theoretical contents
iv. Relevance to the present national and global scenario of construction industry
v. Strengths and weaknesses of the particular area of seminar

vi. R & D in the particular area
vii. Field Applications / case studies / Experimental work / software application / Benefit cost studies – feasibility studies
viii. Vendors associated
ix. Conclusions
x. References

Students should prepare a power point presentation to be delivered in 15 minutes and should be able to answer questions asked in remaining five minutes.
It is desired that based on the seminar work, a paper be prepared and presented in a state / national conference.

At the end of first year, the students are required to undergo through a field training of minimum 2 weeks duration. The presentation and separate report of the vacational training will be submitted along with report of seminar II.

University of Pune
M.E. (Civil) (Hydraulics)--2013Course
Semester III
601 052 Dam Engineering

Teaching Scheme
Lectures: 4 hours/week
Credits 4

Examination Scheme
In semester Exam. : 50 marks
End Semester Exam. : 50 marks
Duration of End Sem.Exam:3Hrs

Module 1

Gravity Dams

Introduction, Different terms related to dams, External components of gravity dam, Internal components of gravity dam, Conditions favoring gravity dams, Forces acting on gravity dam , Combinations of loading for design, Seismic analysis of dam, Terms related to seismic analysis, Determination of Seismic forces, Stress analysis in gravity dam, Stress concentration, Middle third rule, ,Modes of failure of gravity dam, Elementary profile of gravity dam, Stress analysis for elementary profile.

Module 2

Design methods of gravity dam, Gravity Method or 2 D Method, Finite element method, Slab analogy method, Trial load twist method, Lattice analogy method, Model experimental studies or methods, Single step method, Multiple step method or Step by step method, Construction of gravity dams, Preparation of foundation, Construction of masonry, Colgrout masonry, Concreting in gravity dams, Roller Compacted Concrete (R.C.C.)

Temperature control in mass concreting, Crack formation in gravity dam, Construction joints Keys, Water seal

Module 3

Arch Dams Introduction, Concept of Arch Dam, Conditions favoring an arch dam, Layout of an arch dam, Classification of an arch dam, Constant angle arch dam, Constant radius arch dam, Variable radius arch dam,Arch gravity dam, Double curvature arch dam,Design of an arch dam, Basic assumptions in design of arch dam, Forces acting on an arch dam, Significant factors in design of arch dam, Soundness of abutment,Seismic stability of arch dams, Methods of arch dam design,Thin cylinder method

Module 4

Buttress dams,Advantages of Buttress dams,Limitations of Buttress dams., Types of buttress dams

Rockfill dams, Historic development of rockfill dam, Components of rockfill dam, Types of rockfill dams, Characteristics of material for rockfill dams, Significant design parameters for rockfill dam, Construction aspects of rockfill dam, Roller compacted concrete (R.C.C) dams, Concept and philosophy of R.C.C. dam, Design Considerations in R.C.C. dam, Advantages of R.C.C,Limitations of R.C.C.

Module 5

Earth Dam Earth Dams: Introduction; Components Factors influencing design; Design investigations, Design of components; Construction. Failure of earth dams , Conditions of analysis – Forces acting on earth dam, Factor of safety; Codal provisions; Earthquake effects,Stability of foundation

Module 6

Seepage Analysis in earth dam : Types of flow; Laplace equation; Flow net in isotropic, anisotropic and layered media; Entrance-exit conditions; Theoretical solutions; Determination of phreatic line. Determination of seepage discharge , steady seepage state, sudden draw down conditions;

Module 7

Spillways and Gates

Introduction, Data collection for design of spillway, General principles of spillway, Different key levels and heads in spillway, Selection of site for spillway, Selection of size of spillway, Components of spillway, Classification of spillway, Classification based on operation, gates, features, Principles of hydraulic design of some important spillways , Energy dissipation below spillway, The need, Classification of energy dissipation devices, Energy dissipation in stilling basin, Stilling basin, Components of stilling basin, Types of stilling basins, Indian standard stilling basins, Energy dissipation through buckets, Correlation between jump height and tail water depth, Basics of hydraulic jump

Spillway gates, Classification of spillway crest gates, Classification based on function, Classification based on movement of gates, Classification based on special ,features, Requirements of spillway gates, Maintenance of gates, Inspection of gates

Module 8

Instrumentation in dam, Objectives of Instrumentation , Instrumentation data system , Working principles of Instruments , Selection of Equipments Various types of Piezometers, Vibrating wire settlement cells ,settlement gauge, inclinometer; Jointmeter, Vibrating wire pressure cell, Distributed fibre optics temperature tool.

Reference Books

1. Concrete Dams – R.S. Varsheny
2. Irrigation Water Resources & Water Power Engineering P.N. Modi
3. Earth Dams – J.L. Sherard.
4.Dam Hydraulics--Vischer, Wiley India**.**

University of Pune
M.E. (Civil) (Hydraulics)--2013Course
Semester III
601 053 Optimization Techniques

Teaching Scheme
Lectures: 4 hours/week
Credits 4

Examination Scheme
In semester Exam. : 50 marks
End Semester Exam. : 50 marks
Duration of End Sem.Exam:3Hrs

Module 1

Linear Programming I System concepts, definitions, needs for system approach, different types of system parameters and variables. Introduction to Optimization techniques, Linear programming basic concepts, graphical method, Simplex method **,** Big M Method, duality, sensitivity analysis. Application of Linear Programming for Hydraulics & Water Resource

Module 2

Non Linear Programming I : Unconstrained one Dimensional search methods, Dichotomous search method, Fibonacci, Golden section, multivariable unconstrained, gradient techniques, steepest ascent and descent methods, Newton's methods

Module 3

Non Linear Programming II Application of Dichotomous search method, Fibonacci & Golden section to the various sectors of Water Resource Engineering, constrained Lagrangian multiplier techniques

Module 4

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

Module 5

Stochastic Methods: Queuing theory, simulation technique, sequencing model, Morkov's process

Module 6

Decision Analysis: Protype examples,Decision making without experimentation,with experimentation,Decision trees,Utility theory.

Module 7

Games Theory: Formulation of two person games,zero sum games,solving games,Proto type examples,Gaming with mixed strategies,Graphical solution procedure**.**

Module 8

Simulation-The essence of simulation,Applications of simulations,Generation of random numbers and observations,Outline of major simulation.

Reference Books

1.Operations Research-Concepts and Cases-Frederick Hiller,Gerald Liberman---Tata Mc-Graw Hill
2. Engineering Optimazation Theory & Practice – S.S. Rao., Wiely.
3.Engineering Pmtimization-Methods and Applications—Ravindran--Wiely
4. Operation Research – Taha Hamdey A.
5. Principles of Operation Research – Wagner, Prentice Hall.
6. Operation Research – Hira and Gupta, S.Chand

University of Pune
M.E. (Civil) (Hydraulics)--2013Course
Semester III
601 054 -- Elective III

Teaching Scheme
Lectures: 4 hours/week
Credits 4

Examination Scheme
In semester Exam. : 50 marks
End Semester Exams. : 50 marks
Duration of End Sem.Exam:3Hrs

Select any combination having total of 5 credits from following technical / interdisciplinary courses

601 054--Elective III

Code	2 Credits Course	Code	1 Credit Course	Code	Audit Course (No Credit Course)
601 054--A	Ground Water Modelling	**601 054--E**	Project Funding	**601 054H**	Chess
601 054--B	Closed Conduit Flow	**601 054--F**	Foreign Language	**601 054 I**	Abacus
601 054--C	Integrated Water Resources Management	**601 054--G**	Rural Engineering I		
601 054--D	Climate Change				

601 054 –A Elective III Ground Water Modelling-- (2 Credits course)

Module 1

Groundwater Occurrence & Movement: General Introduction, Darcy's law, application of Darcy's law to confined and unconfined aquifers, wells - fully & partially penetrating wells, multiple wells, interference of wells, pumping test with steady and unsteady flow

Surface and sub-surface investigation of ground water: Geological/geophysical exploration/remote sensing/electric resistivity/seismic refraction based methods for surface investigation of ground water, test drilling and ground water level measurement

Sub-surface ground water investigation through geophysical/resistivity/ spontaneous potential/radiation/temperature/caliper/fluid conductivity/fluid velocity/miscellaneous logging

Module 2

Planning of groundwater development: Water balance, assessment of recharge, utilizable recharge, Groundwater estimation norms in India, Constraints on groundwater development. Planning of ground water development in canal command areas-conjunctive use models, planning of ground water development in coastal aquifers

Module 3

Numerical modeling of groundwater flow: Ground water modeling through porous media/analog/electric analog/digital computer models; Review of differential equations, finite difference solution, direct problem, inverse problem; groundwater modeling using finite element method

Artificial ground water recharge: Concept, methods of artificial ground water recharge, waste water recharge for reuse, water spreading

Module 4

Management of Ground Water: Ground water basin management concept, hydrologic equilibrium equation, ground water basin investigations, data collection & field work, dynamic equilibrium in natural aquifers, management potential & safe yield of aquifer, stream-aquifer interaction.

Saline water intrusion in coastal aquifers: Ghyben-Herzberg relation between fresh & saline waters, shape & structure of fresh & saline water interface

Upcoming of saline water, fresh-saline water relations on oceanic islands, sea water intrusion in Karst terrains, saline water intrusion control

Reference Books

1. Remson, I., Hornberger, G.M., and Molz. F.J., Numerical methods in sub-surface hydrology, Wiley Inter Science.
2. Rushton, K.R. and Redshaw, S.C., Numerical analysis by analog & digital methods, John Wiley.
3. Todd, D.K., Groundwater Hydrology, John Wiley, 1980.
4. Groundwater Modeling by Anderson.
5. Numerical ground water modeling by A K Rastogi, Penram International Publishing (India) Pvt Ltd. 2007

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601 054 –B Elective III Closed Conduit Flow and Hydraulic Transient -- (2 Credits course)

Module 1

Steady Flow in Simple Pipelines

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

Module 2

Surge Tank

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

Module 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.

Module 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.

601 054 –C Elective III-- Integrated Water Resources Management -- (2 Credits course)

Module 1

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

Module 2

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

Module 3

Flood Control

Structural and nonstructural alternatives. Effects of hydraulic structures on river surface profiles and sediment transport.

Module 4

Power Generation

Hydro and thermal power generation. Low flow augmentation. Economics and decision making.

Reference Book

1. Water resources System Planning – M.C. Chaturvedi.
2. Water Resources Systems Engg, D. P. Loucks, Prentice Hall
3. Water Resources Systems, P. R. Bhave, Narosa Publishing House

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601 054 –D Elective III-- Climate Change-- -- (2 Credits course)

Module 1

Atmosphere and its constituents, Synoptic observations- surface and upper air, Tropical meteorology: Easterly Waves, ET-ITCZ, Inversion. Monsoon – Onset, Activity, Withdrawal, Breaks, Depressions, Easterly Jet Stream. Post Monsoon - Cyclones in the Indian Seas,N. E. Monsoon

Module 2

Global Climatology - Global distribution of pressure and temperature at m.s.l. in winter and summer, distribution of annual rainfall and its variability, distribution of moisture and clouds.Vertical distribution of temperature. General circulation of atmosphere, Development of monsoons, Major categories of world climates

Module 3

Indian Climatology - Different seasons. Distribution of Means Sea level pressure/temperature in different seasons, Wind circulation and temperature distribution over India in lower, middle and upper troposphere in different seasons. Indian rainfall in different seasons. Indian summer monsoon, onset, withdrawal, rainfall distribution, inter annual variability of monsoon. Main synoptic pressure systems causing weather over India in different seasons

Module 4

Recent trends in climatology

Reference Books

1. Atmosphere, Weather and Climate R.J. Barry and R.G. Chorley (Methuen Publication)
2. General Climatology" Critchfield
3. South West Monsoon" by Y.P. Rao (IMD Publication) .
4. An Introduction to Meteorology by S. Pettersen
5. Elements of meteorology by Miller, Thompson and Paterson

6. General Meteorology by H.R. Byer
7. Monsoon by P.K. Das
8. Tropical Meteorology by T.N. Krishnamurthy
9. Tropical Meteorology by Riel.
10. Tropical Meteorology Vol 1, 2, 3, by G.C. Asnani

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601 054 –E-Elective III Project Proposal writing and funding (1 Credit course)

Module 1

Introduction to grants and their place in the development of organizations, planning skills needed for strong proposals. Components of an application, Helpful tools and resources, Strategies for developing a proposal, How to identify potential funding sources, How to read and understand proposal guidelines and requests for proposals (RFP), Writing objectives, Preparation and justification of budgets ,Protocols for use of animal and human subjects in research, Cost sharing and sub-contracts, Procedures for grants submission and grants start up, The grant review process, Writing cover letters, Preparing a curriculum vitae.

Module 2

Study a proposal or a dummy proposal written for sanctioning of grant for BCUD,AICTE etc.
Develop and submit a draft a proposal for a grant sanctioning authority (related to a particular project) with the following main points:
a. Identify a fundable topic, based on a need or a problem you've identified
b. Identify a potential funder
c. Obtain their program description and application forms
d. Develop a draft proposal that meets the funder's requirements.
The proposal may include:
1. Problem statement
2. Research design / work plan
3. Time line
4. Budget
5. Project personnel
6. Other supporting documents

Reference: As specified by the instructor

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601 054 - F- Elective III Foreign Language French-III (1 Credit course)

Module 1: French Grammar and Vocabulary: Unit-1, Lesson 4 of the Text Book (Grammar & Vocabulary), Unit-1, Lesson 4 of the Text Book, Revision & speaking practice

Module 2: Advance Vocabulary, Writing & Speaking, Exercise of Unit-1, Lesson 4 of the Text Book & workbook , Practicing Simple conversation in French, Revision & practice of conversation (Simple questions & answers)

Reference: Jumelage-I Text Book by Manjiri Khandekar & Roopa Luktuke
Jumelage-I workbook by Roopa Luktuke

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601 054 –G--Elective III Rural Engineering-I (1 Credit course)

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Module 1:

Rural Development and Infrastructure development.

Introduction to rural engineering, elements of rural engineering , productivity, animal husbandry and agriculture, rural art and craft, Infrastructure development such as irrigation,

communication, village betterment, transportation, education such as educational institute, Financial assistance from Z.P. and other sources.
Human Resources and development.,Health care center, rural sanitation, combined program for women and pre school children. Employment generation, integrated ruler development programme, landless employment guarantee program , present rural status, role of NGO and corporate sector.

Module 2:

Socio Economic Development

Rural population growth rate, rural literacy, manpower, cultivators, agriculture, industrial worker, manufacture worker, rural poverty. Five years plan for rural development.

Govt. Policy and schemes for rural development.

Various policies for rural development, various schemes such as micro finance and rural banking, integrated village development model, Swaranjayanti Gram Swarozgar Yojana, Samparan Grammen Rozgar Yojana, Micro finance and rural banking

Reference: As specified by the instructor

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601 054 – H -- Elective III Chess (Audit Course---No Credit course)

Module 1

Introduction of chess game, What is chess board, the place of chess board , Chess pieces position & its moves, The concept of attacking, , The concept check with different pieces, Mate/Checkmate, Castling, Pawn Promotion, Notation, Stalemate, Pointing

Module 2

End game, attacking a piece, Opening principles, Piece exchange, Pin, Defining the draws in Chess

Reference: As specified by the instructor

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601 094-I- Elective III Abacus (Audit Course---No Credit course)

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Module 1

Introduction of Abacus, addition & subtraction with help of help of small friends, big friends & big family, Concept of visualization, Multiplication & Division

Module 2

Additional & Subtraction with decimal concept, Determine cube root & square root

Reference: As specified by the instructor

University of Pune
M.E. (Civil) (Hydraulics)--2013Course
Semester III
601 055 Seminar – II

Teaching Scheme	Examination Scheme
Pract. 4 hrs./week	Oral : 50 Marks,
	TW :: 50 Marks
	Credits 4

Term work should consist of ---

I) Spiral bound report preferably, printed on both the sides of paper on the topic of dissertation work and should be submitted in a standard format having the following contents.

i) A report on training undergone on a construction project site/organization/for a period of minimum 15 days, including the data collection necessary for the project work.

ii) A report on the topic of dissertation, containing the following:

a) Literature review and problem statement formulation.

b) Research Methodology and proposed schedule of completion of project work.

Students should prepare a power point presentation to be delivered in 15 minutes and should be able to answer questions asked in remaining five minutes.

II) Spiral bound report preferably, printed on both the sides of paper on vacational training of 2 weeks

University of Pune
M.E. (Civil) (Hydraulics)--2013Course
Semester III
601 056 Project Stage I

Teaching Scheme	Examination Scheme
Pract. 8 hr./week	Oral: 50 marks
	TW : 50 marks
	Credits 8

The project work will start in semester III, and should preferably be a live problem in the industry or macro-issue having a bearing on 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 Project (dissertation) stage I report should be presented in a standard format, in a spiral bound hard copy, preferably printed on both the sides of paper, containing the following contents.

i. Introduction including objectives, limitations of study.
ii. Literature Survey, background to the research.
iii. Problem statement and methodology of work
iv. Theoretical contents associated with topic of research
v. Field Applications, case studies
vi. Data collection from field/organizations or details of experimental work/analytical work
vii. Part analysis / inferences
viii. Details of remaining work to be completed during the project work stage II
ix. References

Students should prepare a power point presentation to be delivered in 25 minutes and should be able to answer questions asked in remaining five minutes.(It is preferred that at least one paper on the research area be presented in a conference or published in a referred journal.)

University of Pune
M.E. (Civil) (Hydraulics)--2013Course
Semester IV
601 057 Seminar – III

Teaching Scheme	Examination Scheme
Pract. 5 hrs./week	TW : 50 Marks
	Oral / Presentation : 50 marks
	Credits: 5

Term work should consist of a spiral bound report on the topic of dissertation work, preferably typed on both the sides of pages and should be submitted in a standard format.
Seminar III will be assessed based on the requirements of completion of project work for the project stage II.
Students should prepare a power point presentation to be delivered in 15 minutes and should be able to answer questions asked in remaining five minutes.

University of Pune
M.E. (Civil) (Hydraulics)—2013 Course
Semester IV
601 058-Project work - Stage II

Teaching Scheme	Examination Scheme
Pract. 20 hrs./week	Oral/Presentation : 50 Marks
	TW: 150 Marks
	Credits: - 20

The final dissertation should be submitted in black bound hard copy preferably typed on both the sides of paper as well as a soft copy on CD.

(The due weightage will be given for the paper(s) on topic of project presented in conferences or published in referred journals.)
The Term Work of Dissertation of semester IV will be assessed jointly by the pair of internal and external examiners, along with oral examination of the same.