UNIVERSITY OF PUNE
M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

COURSE STRUCTURE FOR M.E. (2008 COURSE)

CODE	SUBJECT	TEACHING SCHEME		EXAMINATION SCHEME					CREDITS
		Lect.	Pr	Paper	TW	Oral	Pr	Total	
501101	Mathematics	3	-	100	-	-	-	100	3
501102	Management and Project Planning in Construction	3	-	100	-	-	-	100	3
501103	Construction Technology	3	-	100	-	-	-	100	3
501104	Elective I a) New Construction Materials b) Disaster Management c) Repairs, Rehabilitation, Retrofitting of Structures d) Construction Safety	3	-	100	-	-	-	100	3
501105	Elective II a) Resources Management b) TQM in Construction c) Value Engineering d) Project Risk Analysis and Mitigation Techniques	3	-	100	-	-	-	100	3
501106	Lab Practice I	-	6	-	50	-		50	3
501107	Seminar I	-	4	-	50	-	-	50	2
Total of First Term		15	10	500	100	-	-	600	20

SEMESTER II

CODE	SUBJECT	TEACHING SCHEME		EXAMINATION SCHEME					CREDITS
		Lect.	Pr	Paper	TW	Oral	Pr	Total	
501108	Construction Contracts Administration and Management	3	-	100	-	-	-	100	3
501109	Project Economics and Financial Management	3	-	100	-	-	-	100	3
501110	Operation Research	3	-	100	-	-	-	100	3
501111	Elective III a) Advanced Construction Technology b) Infrastructure Development c) International Contracting	3	-	100	-	-	-	100	3
501112	Elective IV (**Open**)	3	-	100	-	-	-	100	3
501113	Lab Practice II	-	6	-	50	-		50	3
501114	Seminar II	-	4	-	50	-	-	50	2
Total of Second Term		15	10	500	100	-	**-**	600	20

SEMESTER III

CODE	SUBJECT	TEACHING SCHEME		EXAMINATION SCHEME					CREDITS
		Lect.	Pr	Paper	TW	Oral	Pr	Total	
501115	Seminar III	-	4	-	50	-	-	50	2
501116	Project Stage I	-	18	-	50	-		50	6
Total of Third Term		-	22	-	100	-	**-**	100	8

SEMESTER IV

CODE	SUBJECT	TEACHING SCHEME		EXAMINATION SCHEME					CREDITS
		Lect.	Pr	Project	TW	Oral	Pr	Total	
501117	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) (CONSTRUCTION AND MANAGEMENT)

SEMESTER I

Subject Code 501101

Mathematics

Teaching Scheme :
Lectures : 3 Hrs./Week

Examination Scheme:
Theory Paper : 100 Marks
Credits : 3
Duration : 4 hours

1. Probability theory and its importance : Definition of probability, Rules of Probability, The Baye's theorem. Random variable. Probability distribution. Mean or Expectation of Random variable. Properties of Mean of Expectation.

2. Theoretical probability Distributions : Binomial Distribution, Poisson Distribution. Normal Distribution, Exponential Distribution, Beta, Gamma.

3. Sampling and sampling distribution : Probability samples, Non-probability samples, sample Random sampling, Other sampling schemes, sampling distribution and standard error, some Sampling and Quality control. Use of concepts of standard deviation, coefficient of variance, range in quality control of concreting and similar such activities.

4. Correlation and Regression and Multivariate Analysis : Bivariate Frequency Distribution Scatter Diagram, Correlation Analysis, Multiple Regression Analysis-Non linear Regression. Use of regression analysis in resources management.

5. Simulation – Types, case studies in construction using simulation techniques, simulation softwares used.

6. Use of mathematical models based on probabilistic and statistical methods, simulation in risk identification, analysis and mitigation of project risks.

Reference Books

1. Probability and Statistics for Engineers –Miller, Freund-Hall, Prentice India Ltd.
2. Applied Mathematics for Engineers and Physiscists-pipes and Harvill. McGraw Hill International Edition.
3. Sampling techniques-Cochran, Wiley Series.
4. Statistics-Concepts and Controversies-David S. Moore-Freeman Company, New York.
5. Reliability Principles and practices-Calabro-McGraw Hill Book Company.

UNIVERSITY OF PUNE
M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

SEMESTER I

Subject Code 501102

MANAGEMENT AND PROJECT PLANNING IN CONSTRUCTION

Teaching Scheme :
Lectures : 3 Hrs./Week

Examination Scheme:
Theory Paper : 100 Marks
Credits : 3
Duration : 4 hours

General Management – Comparison between traditional management and modern scientific management, roles of Taylor, Fayol, Mayo and Megregor. Management functions, Management styles.

Project Management – Basic forms of organization with emphasis on Project and matrix structures; project life cycle, planning for achieving time, cost, quality, safety requirements of projects, project feasibility reports based on socio-techno-economic-environmental impact analysis, project clearance procedures and necessary documentation for major works like dam, multi-storeyed structures, ports, tunnel, Qualities. Role, responsibility of projects Manager, Role of PMC (Project Management Consultants) on major projects, Web based project management.

Construction Scheduling – Work break down structure, activity cost and time estimation in CPM, PERT, RPM (Repetitive Project Modelling) techniques. LOB technique Mass haul diagrams. Precedence Network Analysis softwares in Construction scheduling (MSP, prima vera, Construction manager).

Construction Management – Site mobilization – demobilization aspects, various Resources management based on funds availability, organizing and monitoring of the construction work with respect to cost-time schedules, co-ordinating – communicating- reporting technique Application of MIS to construction, monitoring and control mechanisms, Training of Construction Managers.

Work Study : Definition. Objective, basic procedure, method study and work measurement work study applications in Civil Engineering.
Method study – Definition, Objective, Procedure for selecting the work, recording facts, symbols, flow process charts, multiple activity charts, string diagrams.

Work measurement – Time and motion studies, Concept of standard time and various allowance, time study equipment performance rating. Activity sampling time-tapse photography technique. Analytical production studies.

Administration of Incentive Schemes – Necessity, Merit rating, job evaluation, installation, modification and maintaining and incentive scheme based on implementation experience.

Minimum 2 case studies covering the above contents.

Reference books

1. Construction Management and Planning by Sengupta and Guha-Tata McGraw Hill publication.
2. Project Management – K Nagrajan – New age International Ltd.
3. Work study – Currie.
4. Professional Construction Management barrie-Paulson-McGraw Hill Institute Edition.
5. Project Management – Ahuja H.N. – John Wiely, New York.

6. Construction Project Management Planning, Scheduling and Controlling-Tata McGraw Hill, New Delhi
7. Construction Management – Roy, Pilcher
8. Construction Management – O'Brien.

UNIVERSITY OF PUNE
M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

SEMESTER I

Subject Code 501103

CONSTRUCTION TECHNOLOGY

Teaching Scheme	Examination Scheme
Lect. 3 hrs./week	Theory Paper : 100 Marks, Credits 3 Duration : 4 hours.

Underground and underwater construction – Tunnel-Shaft sinking, Tunnel driving in hard and soft strata, bedding of conduits. Under water construction – Problems, encountered. Underwater drilling, blasting, concreting .
Construction of under deep water-concrete diaphragm walls

Concrete – Various methods of shuttering, Ready Mix Concrete, Pumped Concrete

Grouting Methods
Cement grouting, colgrout, colcrete process, prepacked concrete, intrusion grout. Alluvial grouting, various types of clay grouting. Chemical grouting – grouts for injection of fine sands. Resin-grouting. Polymerisation technique. Field procedure, applications and limitations.

Dewatering – Dewatering of shallow and deep open excavations. Effect of ground water movement. Methods of groundwater control. Shallow and deep well points. Horizontal drainage, vacuum dewatering by electro-osmosis, single and multiple well system, group of wells. Draw down factors, vertical sand drains, pressure relief beneath excavation, well point pumps, headers discharge lines control of surface water. Installation and operation of well point system.

Piling – Behaviour of single pile and a group piles during driving, under loads-ultimate loads on driven and cast in Situ piles. Construction details of precast piles, prestressed piles, and steel piles, friction piles.
Driven and bored piles, large diameter piles, negative and positive skin friction, multiple under reamed piles, raker piles, sand piles, Anchor piles, load on piles – Static. Vibrating loads, cyclic loading, safe bearing load, methods of pile driving by vibration above and under water through different strata, micro piles.

Coffer dams and Caisson
Cofferdams – types, design and construction of single, double wall. Cofferdam. Sheet pile cofferdams, concrete wall movable cofferdam, land cofferdams, soldier construction method. Cofferdam wall by ICOS method, caissons, details, design and construction.

Minimum 1 Case study in each topic covered above.

Reference Books

1. Construction Planning, Equipment and methods – Peurifoy-Tata McGraw Hill Publication
2. Construction Equipment Planning and Applications – Dr. Mahesh Verma
3. Brochures Published by various agencies associated with construction.
4. Journals such as CE & CR. Construction world, International Construction.

Document Reports of actual major works executed.

UNIVERSITY OF PUNE
M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

SEMESTER I

Subject Code 501104 (Elective I)

NEW CONSTRUCTION MATERIALS

Teaching Scheme	Examination Scheme
Lect. 3 hrs./week	Theory Paper : 100 Marks, Credits 3
	Duration : 4 hours.

Material composition and properties, production, storage, distribution, testing, acceptance criteria applications, limitations of use, economic consideration, recent development related to the following materials to be studied.

1. Various construction chemicals/admixtures.
2. Flyash and its use in concrete
3. Silica fume concrete
4. Self compacting concrete
5. Fibre Reinforced plastics and concrete
6. High performance concrete
7. Smart materials
8. Materials used in nuclear-containment structures
9. Glenium Concrete
10. Crumb modified bitumen Rubber

Reference Books

1. Concrete Technology by Neville
2. Concrete Technology by M.S.Shetty
3. Building Materials by Ghosh
4. New Building Materials and Construction World magazine
5. Civil Engineering and Construction Review magazine

UNIVERSITY OF PUNE
M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

SEMESTER I

Subject Code 501104 (Elective I)

DISASTER MANAGEMENT

Teaching Scheme	Examination Scheme
Lect. 3 hrs./week	Theory Paper : 100 Marks, Credits 3
	Duration : 4hours.

Disasters – Natures and extent of disasters, natural calamities such as earthquake, floods, drought volcanoes, forest forest, coasts hazards, landslides etc. Manmade disasters such as chemical and industrial hazards, nuclear hazards, fire hazards etc.

Disaster Management – Financing relief expenditure, legal aspects, rescue operations. Casually management, risk management.

Emergency Management programme – Administrative setup and organization. Hazard analysis, training of personnel, information management, emergency facilities and equipment necessary public awareness creation, preparation and execution of the emergency management programme.

Reference Books

1. Construction Engineering and Management – Seetharaman
2. CECR's Journals
3. NICMAR Publications
4. Different sites on internet on disaster management
5. Project Management – K Nagarajan – New Age International Ltd.

UNIVERSITY OF PUNE
M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

SEMESTER I

Subject Code 501104 (Elective I)

(c) REPAIRS, REHABILITATION, RETROFITTING OF STRUCTURES

Teaching Scheme	Examination Scheme
Lect. 3 hrs./week	Theory Paper : 100 Marks, Credits 3
	Duration : 4 hours.

Importance of rehabilitation as a part of construction engineering.

Rehabilitation studies of buildings, underground construction, bridges, streets and highways, sewage treatment plants – masonry work, R.C.C. works, steel structures- types of distress. Numerical condition surveys for foundation, structural and functional deterioration, design criteria, materials and techniques.

Predictive performance models, evaluating alternatives based on technical, commercial, management, financial feasibilities, data collection and database management, maintenance of rehabilitated structures. Procedure adopted by BIFR (Board of Industrial and Financial Reconstruction)

Earthquake damages of buildings,their retrofitting, restoration, effects of earthquakes, response of buildings to earthquake motion, factors related to building damages due to earthquake, methods of seismic retrofitting, restoration of buildings.

UNIVERSITY OF PUNE
M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

SEMESTER I

Subject Code 501104 (Elective I)

CONSTRUCTION SAFETY

Teaching Scheme	Examination Scheme
Lect. 3 hrs./week	Theory Paper : 100 Marks, Credits 3
	Duration : 4 hours.

Construction Safety Management – Role of various parties, duties and responsibilities of top management, site managers, supervisors etc. role of safety officers, responsibilities of general employees, safety committee, safety training, incentives and monitoring. Writing safety manuals, preparing safety checklists and inspection reports.

Safety in construction operations – Safety of accidents on various construction sites such as buildings, dams, tunnels, bridges, roads, etc. safety at various stages of construction. Prevention of accidents. Safety measures.

Safety in use of construction equipment e.g. vehicles, cranes, hoists and lifts etc. safety of scaffolding and working platforms. Safety while using electrical appliances. Explosives

Various safety equipment and gear used on site. First aid on site.

Labour laws, legal requirement and cost aspects of accidents on site.

Study of safety policies, methods, equipment, training provided on any ISO approved construction company.

Reference Books

1. Construction safety manual published by National Safety Commission of India.
2. “Safety Management in Construction Industry” – A manual for project managers. NICMAR Mumbai.
3. Construction Safety Handbook – Davies V.S.Thomasin K, Thomas Telford, London.
4. “ISI for safety in Construction – Bureau of Indian Standrads.
5. “Safety management” –Girimaldi and Simonds, AITBS, New Delhi.

UNIVERSITY OF PUNE
M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

SEMESTER I

Subject Code 501105 (Elective II)

Resources Management

Teaching Scheme
Lect. 3 hrs./week

Examination Scheme
Theory Paper : 100 Marks, Credits 3
Duration : 4 hours.

(I) Materials Management

1. Importance of martial management and its role in construction industry-scope, objectives and functions, Integrated approach to materials management, Role of materials manager.

2. Classification and Codification of materials of construction. ABC analysis-Procedure and its use, Standardization in materials and their management, Procurement, identification of sources of procurement, vendor analysis. Vendor analysis concept of (MRKP) Material requirement planning, planning, purchase procedure, legal aspects.

3. Inventory Management – Inventory Control techniques. EOQ, Advantages and limitation of use of EOQ, Periodic ordering, order point control, safety stock, stock outs, application of AC analysis in inventory control, concept of (JIT)- Just in time management, Indices used for assessment of effectiveness of inventory management.

4. Stores Management : Receipt and inspection, care and safety in handling, loss on storage, wastage, Bulk purchasing, site layout and site organization, scheduling of men, materials and equipment.

5. Quality Control – Conventional methods of quality control of Construction materials. Statistical method of quality control, sampling techniques quality control in process. Quality management and its economics.

6. Use of (MMS) – Materials Management Systems in materials planning, procurement, inventory, control, cost control etc.

(II) Equipment Management – Working out number of construction equipment required based on the individual equipment work cycle, and based on the total time available and quantum of work. Working out the total hourly cost and the cost per unit of item for the various construction machinery. Concept of equipment log book. Concept of equipment selection based on optimal used.

(III) Two case studies involving major construction projects to study their equipment management.

(IV) Need for development of human resource, flow diagram of human resource development and human resource management. Training, competency development, capacity building of resources required at grass root level and at the managerial level in construction. OLDES programme of CIDC – IGNOU.

Reference Books

1. Purchasing and Inventory Control- by K.S.Menon, Wheeler Publication.
2. Construction equipment planning and applications-Dr.Mahesh Verma
3. Construction planning, equipment and methods-Peurifoy-Tata McGraw Hill publication.
4. Human Resource Management by Biswajeet Pattanayak
5. Managing Human Resources by Bohlander & Snell

UNIVERSITY OF PUNE
M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

SEMESTER I

Subject Code 501105 (Elective II)

TQM in Construction

Teaching Scheme
Lect. 3 hrs./week

Examination Scheme
Theory Paper : 100 Marks, Credits 3
Duration : 4 hours.

1. Quality : Necessity for improving Quality in the context of Global Challenges.

2. Concept of Quality Control, Quality Assurance, Quality Management and Total Quality Management (TQM)

3. Study of various Quality Standards in Construction : Related to building materials and other inputs for construction processes, methods and techniques for construction outputs, products and services, such as BIS, BS, Indian standard, British, American, German & Japanese standards, Managing Quality in various projects stages from concept to completion by building quality into design of structures, Inspection of incoming material and machinery In process quality inspections and tests.

4. Designing of quality manuals, checklists and inspection reports, installing the quality assurance system, monitoring and control.

5. Quality Assurance Department and quality control responsibilities of the line organization. Quality in foundations and piling work, structural work. Concreting, electrical system building facilities, waste recycling and maintenance.

6. Developing quality culture in the organization : Training of people, Bench – marking quality. Quality circles.

7. Study of ISO 9000, ISO 14000 and QS 9000 standards and certification procedures.

UNIVERSITY OF PUNE
M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

SEMESTER I

Subject Code 501105 (Elective II)

VALUE ENGINEERING

Teaching Scheme	Examination Scheme
Lect. 3 hrs./week	Theory Paper : 100 Marks, Credits 3
	Duration : 4 hours.

Value : Meaning of value, basic and secondary functions, factor contributing to value such as aesthetic, ergonomic, technical, economic : identifying reasons or unnecessary costs :

Value Analysis : 10 Commandments of value analysis; value analysis team; principles of value analysis, elements of a job plan viz. orientation, Information, presentation. Implementation, follow up action, benefits of value analysis, various applications; assessing effectiveness of value analysis.

Life cycle costing – Forecasting of Capital as well as operating & maintenance costs, time value, present worth analysis, DCF methods, ROR analysis, sensitivity analysis.

UNIVERSITY OF PUNE
M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

SEMESTER I

Subject Code 501105 (Elective II)

PROJECT RISK ANALYSIS AND MITIGATION TECHNIQUES

Teaching Scheme	Examination Scheme
Lect. 3 hrs./week	Theory Paper : 100 Marks, Credits 3
	Duration : 4 hours.

General – Importance of Risk, types of risks, quantifyable and unquantified risks.

Risk analysis and Management for projects (RAMP) – Identifying risk events. Probability distribution. Stages in Investmentlife-cycle; determination of NPV and its standard deviation for perfectly co-related, moderately co-related and un-correlated cash flows. Sensitivity analysis, scenario analysis simulation, decision tree analysis, risk profile method, certainly equivalent method; risk adjusted discount rate method, certainty index method, 3 point estimated method; use of risk prompts, use of Risk Assessment tables, details of RAMP process, utility of Grading of construction entities for reliable risk assessment.

Risk Mitigation – by elimination, reducing, transferring, avoiding, absorbing or pooling. Residual risk, mitigation of unquatified risk. Coverage of risk through CIDC's MOU with the Actuarial Society of India through risk premium such as (BIP) – Bidding Indemnity Policy (DIMO) – Delay in meeting obligation by client policy, (SOC) – Settlement of claims policy (LOP)- Loss of profit policy (TI). Transit Insurance policy (LOPCE) Loss of performance of construction equipment policy.

Reference Books

1. Industrial Engineering and Management of manufacturing systems.- Dr.Surendra Kumar Satya Prakashan
2. RAMP Handbook by institution of Civil Engineers and the faculty and Institute of Actuaries- Thomas Telford publishing, London.
3. Construction Engineering and Management – Seetharaman.
4. Projects Planning analysis selection implementation and Review – Prasanna Chandra.

UNIVERSITY OF PUNE
M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

SEMESTER I

Subject Code 501106

Lab Practice – I

Teaching Scheme
Pract. 6 hrs./week

Examination Scheme
TW : 50 Marks, Credits 3

Term work should consist of any (six) exercises from the following :

1. Minimum Two site visits to study construction techniques and use of major construction equipment associated with ongoing major construction works. Visit Report to be submitted.

2. Collection of techno-commercial information as regards new construction materials, new construction methods, new type of construction equipment.

3. performing and reporting on time and motion study work measurement of any one construction activity

4. Field exercise on EOQ and bulk purchase.

5. Preparation, crashing and updating of precedence-network for a major construction work.

6. Exercise on Resource Levelling.

7. Exercise on Cash Flow analysis.

8. Preparation of models/charts related to various construction techniques, equipment, organizational structures of existing companies etc. (Group Activity to generate interest and explore creativity-Group of 4 students per model/chart).

Seminar I

Teaching Scheme
1 contact hour per student per week

Examination scheme
Term work : 50 marks. Credits -2

Pract. -4 hrs/week

UNIVERSITY OF PUNE
M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

SEMESTER II

Subject Code 501108

CONSTRUCTION CONTRACTS, ADMINISTRATION AND MANAGEMENT

Teaching Scheme	Examination Scheme
Lect. 3 hrs./week	Theory Paper : 100 Marks, Credits 3
	Duration : 4 hours.

1. Contracts Administration – The standard forms of building contracts, the rights of building owners, adjoining owners and third parties. The Indian Contract Act, Sale of Goods Act. Professional ethics, Global tenders and B.O.T. System

2. Arbitration Awards & Dispute Resolving oards – Indian Arbitration Act, arbitration agreement, conduct of arbitration, power and duties of arbitrator, rules of evidence/ preparation and publication of awards, methods of enforcement, impeding and award. Limitations of arbitration in the Indian context (DRB's)Dispute resolving boards-necessity, formation, functioning advantages.

3. Industrial Act and Labour Laws – Industrial Dispute Acts, payment of wages act, Minimum Wages Act, Indian Trade Union Act, Limitation Act, Workmen's Compensation Act.

4. Injunctions – Types, Temporary, perpetual, mandatory, when referred.

5. Indemnity and Guarantee- Difference between the two contracts of Guarantee and Indemnity. Consideration for gurantee, surety's liability, discharge of surety.

6. Bailment – Nature of transactions, delivery of bailee, care to be taken, Bailee's responsibility, Termination, Bailment of pledges.

Reference Books

1. Construction contracts and claims – Simon M.S., McGraw Hill, New York
2. Construction contrat management-NICMAR publication
3. handbook of estimating & costing for Quanity Surveyors-P.T.Joglekar
4. Estimates and contracts B.S.Patil

UNIVERSITY OF PUNE
M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

SEMESTER II

Subject Code 501109

PROJECT ECONOMICS & FINANCIAL MANAGEMENT

Teaching Scheme	Examination Scheme
Lect. 3 hrs./week	Theory Paper : 100 Marks, Credits 3
	Duration : 4 hours.

Principles of Economics – Importance of the economic background to measurement, objectives of business firm. Factors bearing on size of firms. Motives to growth. Obstacles to growth of firms, Study of present economy.

Capital – Analysis of need working capital, Estimation of requirements of working capital, Credit Management, Cash Management, Managing payments to suppliers and out standings.

Economic Analysis – Cost implication to different forms of construction and maintenance and maintenance and replacement lives of material, Installation and running cost of services, Capital investment in project, Cost analysis by traders and by functional element, Cost planning techniques, Cost control during design and Construction, Depreciation, Various Appraisal Criteria Methods. Break-even analysis, Cash flow analysis, Risk Analysis and Management Practice, Role of Lender's Engineer.

Financial Planning – Long term finance planning, Stock, Borrowings, Debentures, Loan Capital, Public Deposit, Dividend Policies, Bonus Shares, Market value of shares, Reserves. Over and under capitalisation.

Budget – Budgetary control system. Types of budgets, Procedure for master budgets. Budget manual. Cash now forecast.

Problems of expansion and merger of companies, Corporate tax planning, Public policies on ICRA grading of exchange, World financial market, Role of financing institutes in Construction, CIDC-IRA grading of construction entities.

Construction Accounts – Accounting process, preparation of profit and loss account and balance sheet as per the companies Act, 1956, preparation of contract accounts for each project, methods of recording and reporting site accounts between project office and head office.

Case study of how project appraisal is done, funds are raised, accounts are kept for execution of a major construction project.

Reference Books

1. Prasanna Chandra, 'Projects planning, Analysis Selection, Implementation and Review. Tata McGraw Hill, New Delhi.
2. Singh H. 'Construction Management and Accounts", Tata McGraw Hill, New Delhi.
3. Cormican D. 'Construction Management : "Planning and finance", Construction press, London.
4. Brealey R.A. "Principles of Corporate Finance", Tata McGraw Hill, New Delhi.
5. Leland T. Blank. Anthony Tarquin. 'Engineering Economy' McGraw Hill.
6. David Bedworth, Sabah Randhawa. 'Engineering Economics' McGraw Hill.
7. Bruggeman. Fishr 'Real Estate, Finance and investment' McGraw Hill.
8. Block Hirt. 'Foundations of Financial Management' McGraw Hill.

9. Burner ‘Case studies in finance’. McGraw Hill
10. DeMello ‘Cases in Finance’ McGraw
11. Oliver, Lianabel ‘ The cost management toolbox ; A Managers guide to controlling costs and boosting profits.’ Tata McGraw Hill.

UNIVERSITY OF PUNE
M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

SEMESTER II

Subject Code 501110

OPERATIONS RESEARCH

Teaching Scheme	Examination Scheme
Lect. 3 hrs./week	Theory Paper : 100 Marks, Credits 3
	Duration : 4 hours.

System Concepts, system parameters and objectives, system classification, system cycle, open and closed systems. Identification of Civil Engineering, Systems and their methods of analysis. Mathematical representation of a system.

Optimization techniques, various models, objectives functions and constraints, convex and concave functions, regions and sets.

Linear programming, two phase method, method of Big M, dual. Sensitivity analysis. Allocation problems, Transportation problem, Assignment problem.

Non-Linear programming : unconstrained programming, One dimensional search techniques Dichotomous, Fibonacci and Golden section. Multivariable problems, unconstrained, Gradient techniques, steepest ascent/descent technique, Newtons method, DFP method.

Constrained optimiziation Lagrangian multiplier technique, Kuhn Tucker's conditions. Penalty functions method.

Dynamics programming, principle of optimality.

Stochastic methods : Queuing theory, simulation, sequencing.

Capitalization, Annuity, Selection of project based on Benefit-cost Analysis. NPV, IRR, PBP etc.

Games Theory and its application to construction Management.

Replacement models.

Reference Books

1. Operation's Researh- schaum
2. Optimization techniques –S.S.Rao
3. Quantitative technique – L.C.Jhamb
4. Operations Research – TAHA
5. Operations Research – J.K.Sharma, Macmillan India Ltd.
6. Modern Production/Operations Management – Buffa Sarin, Wiley Publication
7. Principles of Operatin's Research – Wangner.

UNIVERSITY OF PUNE
M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

SEMESTER II

Subject Code 501111 (Elective III)

ADVANCED CONSTRUCTION TECHNOLOGY

Teaching Scheme	Examination Scheme
Lect. 3 hrs./week	Theory Paper : 100 Marks, Credits 3 Duration : 4 hours.

Construction of power generating structures – Altomic Power stations, Thermal power stations. Windmills, transmission towers.

Bridges, types construction of special type of bridges such as cable stayed bridge, suspension and prestressed bridge, construction of foundation and super structure.

Off shore structure, types, methods of construction and maintenance.

Construction, maintenance of underground railways.

Construction of diaphragm walls

Principles and construction of machine foundations.

Principles, methods of fast track construction projects.

Minimum 1 case study to be covered for each of the above topics.

Reference Books

1. Same as those for Construction Technique.
2. Manuals brochures publications from construction companies, firms etc.
3. Reports of actual works executed.
4. NICMAR Publications on Construction Engineering.

UNIVERSITY OF PUNE
M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

SEMESTER II

Subject Code 501111 (Elective III)

INFRASTRUCTURE DEVELOPMENT

Teaching Scheme	Examination Scheme
Lect. 3 hrs./week	Theory Paper : 100 Marks, Credits 3
	Duration : 4 hours.

Construction Industry – Nature, characteristics, size and structure Role of infrastructure development in employment generation and improving of the National economy. Various Agencies associated with infrastructure development in India as regards various sectors.

Status of Infrastructure in India- Indian government policy, Roads and buildings, communication, water supply, irrigation, power energy sectors, ports and aviation, health and educational services, rural development.

Issues related to infrastructure development – pre – requisites necessary to ensure success for switching over from public sector management to private sector management, issues in developing, funding and managing infrastructure projects, role, responsibility of project management consultants.

Reference Books

1. India Infrastructure Report – Rakesh Mohan
2. Infrastructure Today - Magazine
3. Document of five year plans, published by Govt. of India.

UNIVERSITY OF PUNE
M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

SEMESTER II

Subject Code 501111 (Elective III)

INTERNATIONAL CONTRACTING

Teaching Scheme	Examination Scheme
Lect. 3 hrs./week	Theory Paper : 100 Marks, Credits 3 Duration : 4 hours.

International contracting – meaning, scope, nature, present status of the International construction market, role of Asia- Pacific region countries in the present construction development. Impact of WTO/GATS on the Indian Construction Sector as regards domestic market and export sector.

Study and application of various conditions of contract under the FIDIC document development of regulatory framework. Project exports from India.

International financing : Various institution such as WB, IMF, ADB. African bank etc. and their role, rules – regulations in funding various projects, forming alliance, bilateral and multilateral funding, trade practices etc.

International Projects – Types of BOT systems such as BOT, BOOT, BOO, DBO, BOR, BLT, BRT, BTO & DBGO, MOOT, ROO, ROT, BOLT – Contractual procedures, special features, methods of handling.

Selection of personnel to suit socio-economic-environmental culture in other countries, suitable organisational structure.

Disputes Resolving – International Courts, formation of DRB's (Dispute resolving boards) functioning and experiences in India and abroad, Advantages of DRB's

CASE studies of any 2 major project executed/functioning under International contracting.

Reference Books

4. FIDIC documents
5. Construction Contracts & Claims – Simon M.S. McGraw Hill, New York
6. Unified Contract Documents by CIDC
7. Dispute Review Board Manual by Reboert Matays and Mathews.
8. International Construction Contracting – K.N.Vaid-NICMAR Publication

UNIVERSITY OF PUNE
M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

SEMESTER II

Subject Code 501112 (Elective IV)

Open Elective

Teaching Scheme	Examination Scheme
Lect. 3 hrs./week	Theory Paper : 100 Marks, Credits 3
	Duration : 4 hours.

UNIVERSITY OF PUNE
M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

SEMESTER II

Subject Code 501113

Lab Practice II

Teaching Scheme	Examination Scheme
Pract. 6 hrs./week	TW : 50 Marks, Credits 3

Termwork should consist of any (6) exercises from the following.

1. Minimum two site visits to study the feasibility aspects, tendering procedures, accounting systems, funds raising and other financial management aspects, billing procedures etc. associated with on-going major construction work-visit report to be submitted.
2. Study and use of various computer softwares, use in the field associated with
    i) Project Management
    ii) Estimating, Costing, Tendering (Atleast one software package in each)
3. Collection and study of tender notices, tender documents of contract document associated with Civil Engineering works.
4. Exercise on contract document associated with Civil Engineering works.
5. Exercise on Valuation : Valuation of land and building using various methods report to be submitted on O-1 format.
6. Elective 1 : Any 2 assignments
7. Elective 2 : Any 2 assignments
8. Web based project management.

UNIVERSITY OF PUNE
M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

SEMESTER II

Subject Code 501114

SEMINAR II

Teaching Scheme	Examination Scheme
Pract. 4 hrs./week	TW : 50 Marks, Credits 2

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

UNIVERSITY OF PUNE
M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

SEMESTER III

Subject Code 501115

SEMINAR III

Teaching Scheme	Examination Scheme
Pract. 4 hrs./week	TW : 50 Marks, Credits 2

Seminar III report and the examination shall be based on the analysis and findings of the work done for the dissertation in the IIIrd semester.

UNIVERSITY OF PUNE
M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

SEMESTER III

Subject Code 501116

PROJECT STAGE I

Teaching Scheme	Examination Scheme
Pract. 18 hrs./week/project Stage	TW : 50 Marks, Credits 6

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 dissertation should be presented in a standard format.

The term work should be continuously evaluated as per the norms/guidelines set up by the BOS for its assessment of 200 marks.

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

UNIVERSITY OF PUNE
M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

SEMESTER IV

Subject Code

PROJECT STAGE II

Teaching Scheme	Examination Scheme
Pract. 18 hrs./week/project Stage	Project : 150 marks
	Oral : 50 Marks, Credits 12

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 dissertation should be presented in a standard format.

The termwork should be continuously evaluated as per the norms/guidelines set up by the BOS for its assessment of 200 marks.

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