



SHIVAJI UNIVERSITY, KOLHAPUR-416 004.

शिवाजी विद्यापीठ, कोल्हापूर - ४१६ ००४.

दुरधनी : (ईपीएबीएक्स) ६२०५७१ (विस्तारित क्र. ५०९३, ५०९३)  
ता. : पुणे-कोल्हापूर केंद्र : ०२१-०२३१-६५६९३३ व ६५९३३३.

Ref.No. SU./B.O.S./Engg./ **011471**

Date:- **3 FEB 2004**

To.  
The Principals,  
of all affiliated Engineering Colleges.

Sub:- The revised syllabus of M.E. (Civil) Sem. II-  
(Construction and Management) Course.

Sir,

With reference to the subject cited above, I am directed to inform you that the University authorities have recently accepted the revised syllabus of Master of Engineering (Civil) Course for the subject of Construction & Management at Semester I to IV under the Faculty of Engineering and Technology.

A copy of the revised syllabus is enclosed herewith for your information and further necessary course of action.

The revised syllabus of second semester will come into force from Second term i.e. Jan., 2004 and onwards. The revised syllabi of Semester III and IV will come into force from the academic year 2004-2005.

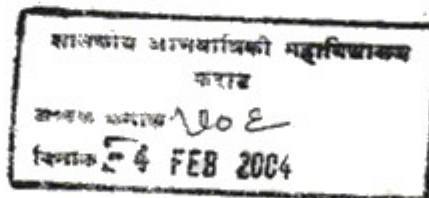
However, two more chances will be given as shown below to the students of the Pre-revised Course to appear the examination:-

Master of Engineering - Semester-II

i) April/May-2004 and ii) October / November-2004

Please bring this to the notice of all the teachers and students concerned.

Thanking you.



Yours faithfully,

*138*  
Dy. Registrar,  
B.O.S. Section.

Encl As above

Copy to - 1) Appointment Section

2) Other Exam. Section-1

3) Affiliation Section

for information and necessary action

Copy F. W. Cs. to 1) Dr. T. D. Sayyad,  
Faculty of Engineering & Technology.

2) Dr. S. A. Halkude,  
Chairman, B.O.S. in Civil Engineering

*S/S  
4/2/04*

*Copy to CED*

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4/2/04  
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~~SHIVAJI UNIVERSITY, KOLHAPUR.~~  
**SHIVAJI UNIVERSITY, KOLHAPUR.**  
**M. E. (CIVIL) – CONSTRUCTION & MANAGEMENT.**  
**FOUR SEMESTER COURSE.**

**SEMESTER- I**

Sr. No.	Name of Subject	Teaching Scheme 60 Minutes period/ Week				Examination Scheme Max. Marks at Uni. Exam.			
		L	T	Pr	Total	TP	TW	OE	Sub. Total
1.	Project Evaluation & Financing.	3	1	-	4	100	25	-	125
2.	Planning & Management of Projects	3	1	-	4	100	25	-	125
3.	Construction Methods	3	1	-	4	100	25	-	125
4.	Construction Equipments.	3	1	-	4	100	25	-	125
5.	Elect. – I	3	1	-	4	100	25	-	125
6.	Seminar – I	-	-	2	2	-	50	-	50

**SEMESTER- II**

Sr. No.	Name of Subject	Teaching Scheme 60 Minutes period/ Week				Examination Scheme Max. Marks at Uni. Exam.			
		L	T	Pr	Total	TP	TW	OE	Sub. Total
7.	Construction Techniques.	3	1	-	4	100	25	-	125
8.	Legal Aspects in Construction Engineering.	3	1	-	4	100	25	-	125
9.	Management Information Systems for Construction Management.	3	1	-	4	100	25	-	125
10.	Computational Methods & Optimization Techniques.	3	1	-	4	100	25	-	125
11.	Elect. – II	3	1	-	4	100	25	-	125
12.	Seminar – II	-	-	2	2	-	50	-	50

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### SEMESTER- III

Sr. no.	Name of Subject	Teaching Scheme 60 Minutes period/ Week				Examination Scheme Max. Marks at Uni. Exam.			
		L	T	Pr	Total	TP	TW	OE	Sub. Total
13.	Lab. Work.	-	-	2	2	-	50	-	50
14.	Dissertation Phase – I with Seminar.	-	5	-	5	-	100	-	100

Seminar based upon dissertation phase - I should be before panel of experts formed by guide.

### SEMESTER- IV

Sr. no.	Name of Subject	Teaching Scheme 60 Minutes period/ Week				Examination Scheme Max. Marks at Uni. Exam.			
		L	T	Pr	Total	TP	TW	OE	Sub. Total
15.	Dissertation Phase – II	-	5	-	5	-	100	200	300

#### Elective – I

1. Entrepreneurship in Construction
2. Human Resource Development in Construction.
3. Work study and Incentive Management.

#### Elective - II

1. Advanced Construction.
2. Appropriate Technology.
3. Environmental Impact Assessment.

### Project Evaluation and Financing

Teaching Scheme  
Lect : 3 hrs per week  
Tut : 1 hrs per week

Examination Scheme  
Paper : 100 Marks  
T. W. : 25 Marks

#### Section-I

1. Economics of engineering projects : Economic factors ,discrete and continuous compounding, inflation, capitalized cost.
2. Financial appraisal criteria, NPV, Benefit - cost ratio, IRR, Accounting rate of return, pay- back period.
3. Analysis of risk: Types of risk, Sensitivity analysis, Monte Carlo simulation, Decision tree analysis, Selection of projects, Fuzzy Systems.

#### Section - II

4. Financial management: Sources of finance, securities, borrowings, debentures, working capital requirement, direct and indirect financial assistance.
5. Accounting: Site Accounts, Preparation, Reporting, Accounting records, Depreciations, Standard budgeting and control.
6. Private Participation in Government Projects , Joint Ventures, BOOT, BOT, External Commercial Borrowings, International Finance.

Term work: Term work is based on the above topics. Case studies and information regarding the latest development from journals and magazines are expected.

#### REFERANCE BOOKS:

1. Managerial and engineering economy by Taylor G.A.
2. Principles of Construction Management by Roy Pilcher.
3. Project preparation Appraisal Implementation by Prasanna Chandra.
4. Corporate finance by Kuchal S. C.
5. Principles of Corporate Finance by Brealey R. A.
6. Fundamentals of Marketing by Stanton W. J.
7. International Construction Contracting by Vaid K. N.
8. Engineering Economics by Riggs.
9. Principles of Engineering Economy by Grant Ireson/ Leavenworth.

## Planning and Management of Projects

Teaching scheme  
Lect : 3 hrs per week  
Tut : 1 hrs per week

Examination scheme  
Paper : 100 Marks  
T.W. : 25 Marks

### Section - I

- 1) Site Organization : Organizational structures for construction field, Site layout, Services required on site.
- 2) Material Management : Functions , Inventory control ,EOQ , ABC analysis, Estimating requirements ,Procurement and Storage of materials.
- 3) Personnel Management : Functions ,Special characteristics, Manpower planning, Recruitment , Placement, Training and induction ,Performance appraisal ,Relevant labour laws.
- 4) Construction Quality Management : SQC charts, Sampling techniques, Quality circles ,ISO 9000 , Management aspects.

### Section- II

- 5). Safety in Construction : Safety Requirements , Safety and health codes , Occupational diseases , Economic aspects , Management of accidents , Safety department.
- 6) Network Analysis : Network compression , Resource allocation ,Cost control , Monitoring of projects, PERT in construction projects , Construction scheduling .
- 7) Work study: Method study and Work measurement, Definitions, Objectives, Basic procedure, Standard time, Performance rating.
- 8) Computers in Construction Management: Application in office, Field , Computerized construction management.

Term work ; Term work is based on above topics . Case studies and information regarding the latest development from journals and magazines are expected.

### REFERENCES BOOKS:

- 1) Critical path methods in construction, ANTILL AND WOODHEADS.
- 2) CPM in construction management, J .J. O BRIEN .
- 3) Principles of management, KOONTZ AND O DONNEL.
- 4) Personal management and industries relations, DALE.
- 5) Principles of management and personal management, A.S.DESHPANDE .
- 6) Accounting for management, S.K.BHATTACHARYA .
- 7) Work study, R.M.CURRIE.

**CONSTRUCTION METHODS**

Teaching Scheme:  
Lect. : 3 hrs per week  
Tut. : 1 hr per week

Examination Scheme  
Paper : 100 Marks.  
T.W. : 25 Marks

**Section-I**

1. Underground and Underwater Construction: Tunnels - Shaft sinking, Tunnel driving in hard and soft strata, Surge chambers- Design criteria. Loads, Assumptions, Types of surge chambers. Underground power stations - Principal types. Underground railway stations - Construction and Maintenance, Parking places. Bedding of conduits. Underwater Construction - Problems encountered, Underwater drilling, blasting, concreting, welding, Underwater structural concrete walls. Protection of structures against attack by ground water.
2. Grouting : Drilling pattern, procedure. Grouting pressure. Applications, Limitation, Efficiency of grouting for dams, tunnels, shafts, mines, Grouting for water control, soil stability and increase in bearing pressure of soils.

Grouting types - Cement - Injection with high pressure screen grouting of alluvial - Clay, Types of clays used. Alluvial grouting test - Chemical grouting - Grouts for injection of fine sands. Resin grouting Polymerization Technique to solutions of grouting Problems. Formulations, selection and application, case studies.

3. Dewatering - Dewatering of shallow and deep open excavations. Effects of ground water movement, methods of ground water control, Shallow and deep well points. Horizontal drainage, vacuum dewatering by electro osmosis, analysis design and formulac.well point system.

**Section-II**

4. Launching of steel, Prestressed, Precast bridges. Site erection methods : Side sloping method for road railway bridges. End Launching Using cranes and gantries, Cantilever method, floatation method. Incremental launching for concrete girders. Case studies of steel cantilevers. Arches, simply supported beams, suspension, cable stayed bridge-launching, Moving formwork, staging, shuttering, centering. Dismantling for maintenance ,repairs, inspection of bridges. Testing of bridges.
5. Cofferdams and Caissons - Cofferdams -Types Design and Construction of single/double wall sheet pile cofferdams, cellular sheet piles. Concrete wall movable cofferdam. Land cofferdams, soldier beam and horizontal sheeting techniques.  
Caissons, Floating caissons-Design considerations, sinking rate, open caissons, pneumatic caissons. Machine bored caissons. Drop caissons. Details design and construction Case Studies.

6. Piling - Behavior of single pile and a group of piles during driving, under loads - Ultimate loads on driven and cast in situ piles, construction details of precast piles, Prestressed, piles steel piles, friction piles. Driven piles, Bored piles. Large diameter bored piles, negative and positive friction. Multiple under reamed piles. Racker piles, sand piles, Anchor piles. Loads on piles, static, vibrating loads, cyclic loading, safe bearing loads. Method of pile driving by vibration, Over water under water and through different grounds.

#### Reference Books:

1. Grouts and Drilling Mud in Engineering Practice- Symposium by Inst. of Engineers-1963  
Butter Worth's.
2. Modern Foundations-N-P-Kurion,Tata McGraw Hill pub.Co.Ltd.
3. Foundation Engineering-G.A. Leonards McGraw Hills Co. Ltd.
4. Bridge Engineering-S. Ponnuswamy, Tata McGraw Hill Co. Ltd.
5. Wells and Caissons-Vijaya Singh, New Chand & Bros. Roorkee.
6. Design and Construction of R.C. Bridges-A.W. Legal, G. Dunn W. A. Kaihurst Pub. Concrete Publications.
7. Large Boreed Piles-Institute of Civil Engineers 1966 Lond on.
8. Modern Foundation Methods-R. Hammond Pub. Oxford & IBII  
Pub. Co.
9. Foundation Engineering by SJ\*. Brahma, Tata mcgraw Hill  
Pub. Co.
10. Construction & Geotechnical Methods in Foundation Engineering R. M. Kocme: McGraw Hill Book Co.
11. Construction Planning Equipments and Methods-Peurifey Rl.
12. Hand Book of Civil Engineering-stubb.
13. Formwork Design and Construction-Wynn.
14. Foundation Engineering-Tomlinson.
15. Cofferdams-While and prentice-Columbia University Press New  
York.
16. Art of Tunneling-Karl Szechy.

**CONSTRUCTION EQUIPMENT**

Teaching Scheme:  
Lect : 3 hrs per week  
Tut: 1 hr per week

Examination scheme:  
Paper Marks: 100 Marks  
Term-Work: 25 Marks

**Section -I**

- 1) Excavating Equipments, Excavators, Shovels-Different types-back hoe, Draglines-Clausbell-Cycles of operations, excavators and their use in different soil conditions. Output criteria, Rippers, Trenchers, Graders.
- 2) Hauling Equipments: Tractor, Dumpers, Trailers, Bulldozer Scrapers, Operation of cycles, matching of Excavating and hauling equipments.
- 3) Compacting Equipments: Properties of soil-soil stabilization, Soil compaction, different types of compacting Equipments- Rollers, Sheep-foot Rollers - pneumatic rollers, Vibrating rollers, Vibrating plates/shoes. Vibratory compaction.
- 4) Conveying and Hoisting Equipments: Different types of conveyors, power requirement damages during operations, Economy of transportations, Cableways and Ropeways, Different types of Hoisting Equipments, such as winch, derricks, and cranes. Rating of cranes and power requirement of cranes.
- 5) Piles and Pile driving Equipments: Pile Classifications, Types of Piles, Pile driving and extracting Equipments, Pile driving rigs, Pile driving hammers, rating of pile hammers, Hammer accessories, pile extractors.

**Section-II**

- 1) Tunneling: Method of Tunneling, Equipments for Conventional tunneling, Jumbo, explosives, Temporary & permanent support and lining. Mucking Equipments, Using of moles, Use of laser beams to guide moles, Ventilations of Tunnels. Advantage and disadvantages in using moles.
- 2) Aggregates: Types of Crushers Selecting Crushing Equipments screens, Washer.  
Concreting Equipment: i) Various Types of Mixers ii) Various types of vibrators, their selection under different conditions.  
Selection of Construction Equipments: Advantages and disadvantages of Digging Machines, Planning of Construction Equipments, Cost analysis, Economic life and replacement, Preventative maintenance, System approach to planning and application- Problems of Equipment Management.

**Reference Books:**

- Herbert L. Nichols - Moving the Earth (D. Van Nostrand Co., Inc. New Jersey).  
 Peurify - Construction Planning, Equipment and Methods Second edition (McGraw Hill Book Co., New York).  
 Handbook of Earth-moving Machinery (Ministry of Irrigation and Power, Central Water and Power Commission, New Delhi).  
 Kellog - Construction Methods & Machinery (Prentice-Hall Inc., New York)  
 Ackerman and Locher - Construction Planning and Plant (McGraw-Hill Book Co., New York).

6. Technical Information and Handy Reckoner on Construction Equipment (Voltas Ltd., Bombay)
7. Jagann Singh - On and With the Earth (W. Newman & Co., Calcutta)
8. Katoch - Tunneling practice, Vols. I, II and in (Water Resources Development Training Centre at University of Roorkee, Roorkee, India)
9. Report of Plant and Machinery Committee (Ministry of Irrigation and Power C.W.J.P.C., New Delhi)
10. Verma M. - Construction Planning and Management through System Techniques Metropolitan Book Co. P. Ltd. New Delhi).
11. David Day - Construction Equipment Guide.

#### Elective -I

#### 1. ENTERPRENEURSHIP IN CONSTRUCTION

Teaching Scheme:  
Lect. : 3 Hrs. per week  
Tuto : 1Hr. week

Examination Scheme:  
Paper : 100 marks  
T.W. : 25 marks

#### Section-I

1. General : Meaning and importance of entrepreneurship, Definition and objectives of industrial estates, awareness and requirements of an entrepreneur, organization dealing with entrepreneurship Govt. and private.
2. Socio-economic bases : Occupational impact on line of manufacture, the impact of education.
3. Project : Selection by identification, size appropriate technology, cost and time scheduling.
4. Project Report : Backing market survey, demand and supply relation, equipment cost space and merit analysis, recommendations.

#### Section-II

5. Project Appraisal: Technical feasibility, commercial soundness, financial capability, economic viability, managerial aspects.
6. Financial Analysis: Resources, loans, terms and conditions, working capital, repayment, security, financial institutes.
7. Problems faced by enterprises : Marketing, finance and taxes, raw and finished materials etc.
8. Civil engineering entrepreneurship : small scale, large scale, optimum size, typical areas and preparation of specialized aspects.

Note : The subject may be taught with suitable case studies.

Term Work : Term work is based on the above topics. Case studies and information regarding the latest development from journals and magazines are expected.

#### Reference Books :

1. Entrepreneurship & growth of enterprise in industrial estates, Dr. N. Gangadhar Rao (Deep & Deep Publ.)
2. A complete guide to successful entrepreneurship, G. N. Pandey. (Vikas Publ. House)
3. Project Appraisal. Prasanna chandra.
4. Entrepreneurship, Govt. of India Publ.

- 12) Construction Machines and Equipment Manufactured India National Institute of Construction Management and Research.
- 13) Earth Moving Plant - V. V. Tucker
- 14) Construction Equipment - Dombrovsky.

## 2. HUMAN RESOURCE DEVELOPMENT IN CONSTRUCTION

### Teaching Scheme:

Lect. : 3 Hrs. per week  
Tuto : 1Hr. week

### Examination Scheme:

Paper :100 marks  
T.W. :25 marks

#### Section-I

1. Introduction: Definition, history of human resource management, objectives, functions, HRD in construction industry , status of construction labour.
2. human resource planning: Formulating human resource plans, various methods, job analysis, job specifications, and job design in construction projects, forecasting personal needs and supply in construction sector.
3. Recruitment and selection: Selecting the project manager and project team, external and internal recruitment, data gathering methods, skill requirements of construction personnel

#### Section-II

4. Training and development : the training process, individual and organizational development, performance appraisal, use of performance appraisal information, establishing the evaluation system.
5. Employee benefits : employee health and safety, wage and salary administration, incentive system, wages of construction industry, retirement and pensions
6. Employee management relations : collective bargaining, trade unions connected with construction with construction industry , trade unions act, Labour Welfare Act , Payment Of Wages Act, Worker's compensation Act , Contract Labour Act, management of conflict.

Term Work : Term work is based on the above topics. Case studies and information regarding the latest development from journals and magazines are expected.

#### Reference Books :

1. Personnel/ human resource management, Terry L. Deep, Mical D. Crino, MacMillan Pub. Company.
2. Personnel management, Edwin B. Flippo, McGraw Hill Book Company
3. Personnel management, managing human resources, Paul S. Greenlaw, John P. Kohl, Harper and Row Pub.
4. Human Behavior at work Keith Davis, Tata McGraw Hill Pub company
5. construction planning and management, P.S.Gahlot, B.M.Dhir, Wiley Eastern Ltd.

Work study and Incentive Management

Teaching scheme:  
Lect : 3 Hrs . week  
Tuto : 1 Hr . week

Examination Scheme  
Paper : 100Marks  
T.W.: 25 Marks

## SECTION - I

1. The Evolution of work study: F. W. Taylor, Gilbreth, Definitions, Objective, Basic Procedure of Work Study, Method Study and Incentive Management. Study and Work Measurements, Work content, Productivity. Work study and it's applications to Civil Engineering.

2. Method Study: Definition, Objectives, Procedure, Selection of the work, recording the facts, Process chart, Symbols, Flow process Charts, Multiple Activity Charts, Two handed Process Charts, String diagram, Travel Charts, Other Types of charts and Diagrams.  
Micro-motion study, Therbligs, Simo charts, Equipments, Cycle graph, chronocycle graph.

3. Work measurement : Time study, Objectives, Procedure, concept of various allowances, Performance Rating, Standard Performance, Standard Time, Time study Equipments.  
Activity sampling (Work Sampling), PETS, Standard data, Analytical Estimation, Work Specifications.

## SECTION II

4. Application of work study: The Human context of work study, Work study as a service to management, Limitations of work study. Criticism of Time study, Training of personals in work study.

5. Standard of living: What and why the driving force of incentive, Administration of incentive schemes, Incentive index and productivity allowances, Geared schemes, Piece of work activity sampling, field counts.

6. Merit Rating: Job evaluation, Installation of Incentive systems, place of Union. The work improvement and system concept, causes of failure of incentive schemes, Ergonomics.

TERM WORK: Term work is based on the above topics. Case studies and information regarding the latest developments from journals and magazines are expected .

**Refernces Books:**

1. Introduction to Work Study, ILO
2. Work Study, R. M. Currie.
3. Project Planning and Control, Turner and Elliot.
4. 4. Work Study applied to building, Geary.
5. Incentive Management, Lincon.
6. Industrial Engineering and Management, O.P.Khanna.