SYLLABUS

OF

M.E. CIVIL (Construction & Management.)

w. e. f.   2017

Savitribai Phule Pune University [SPPU]

M. E. Civil Engg. [Construction and Management] 2017 Course

Course Structure

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

1 Credit = 2 Modules/Units

SEMESTER=I

Code	Subject	Teaching Scheme	Examination Scheme					Credits
		Lect/ Practs.	Paper		TW	Oral/Presentation	Total	
			In Semester Assessment	End Semester Assessment				
501021	Applications of Statistical Methods in construction	4	50	50	--	--	100	4
501022	Management and Project Planning in Construction	4	50	50	--	--	100	4
501023	Construction Technology	4	50	50	--	--	100	4
501024	TQM in Construction	4	50	50	--	--	100	4
501025	* Elective I	5	50	50	--	--	100	5
501026	Lab Practice I	4	--	--	50	50	100	4
	Total:-	**25**	**250**	**250**	**50**	**50**	**600**	**25**

*** Elective I - Students should select the combination of technical and interdisciplinary courses in order to complete 5 credits from following list.**

501 025 -Elective I

Code	4 Credits Course	Code	1 Credit Course	Code	Audit Course (No Credit Course)
501025 A	Cyber Security / Information	501 025 F	Economics & Finance For Engineers	501025 **J**	Mass communication, Photography and Videography
501025 B	Sustainable Construction Materials	501 025 **G**	Foreign Language I	501025 **K**	Yoga and Meditation
501025 C	Disaster Management	501 025 H	Engineering Ethics		
501025 **D**	Retrofitting of Structures	501 025 **I**	Intellectual Property Rights		
501025 **E**	Construction Safety				

SEMESTER –II

Code	Subject	Teaching Scheme	Examination scheme					Credits
		Lect./ Pract.	Paper		TW	Oral/Presentation	Total	
			In Semester Assessme	End Semester Assessment				
501027	Construction Contracts Administration and Management	4	50	50	--	--	100	4
501028	Project Economics and Financial Management	4	50	50	--	--	100	4
501029	Operations Research	4	50	50	--	--	100	4

501030	** Elective II	5	50	50	--	--	100	5
501031	Lab Practice II	4	- -	--	50	50	100	4
501032	Seminar I	4	-	--	50	50	100	4
	Total	**25**	**200**	**200**	**100**	**100**	**600**	**25**

**** Elective II - Students should select the combination of technical and interdisciplinary courses in order to complete 5 credits from following list.**

501 030 -Elective II

Code	4 Credits Course	Code	1 Credit Course	Code	Audit Course (No Credit Course)
501030 A	Human rights	**501 030 E**	Foreign Language II	**501 030 I**	Performing Arts
501030 B	Human Resource Development	**501 030 F**	Building Services and Maintenance	**5010 30 J**	Principle centered Leadership
501030 C	Material Management	**501 030 G**	Green Building Design and Construction		
501 030 D	Value Engineering & Valuation	**501 030 H**	Forensic Civil Engineering		

SEMESTER –III

Code	Subject	Teaching Scheme	Examination scheme					Credits
		Lect./ Pract.	Paper		TW	Oral/ Presentation	Total	
			In Semester Assessment	End Semester Assessment				
601033	Environment and energy for sustainable construction	4	50	50	--	- -	100	4
601034	Research Methodology	4	50	50	--	- -	100	4
601035	*** Open Elective	5	50	50	--	- -	100	5
601036	Seminar II	4	--	--	50	50	100	4

601037	Project Work Stage I	8	--	--	50	50	100	8
	Total	**25**	**150**	**150**	**100**	**100**	**500**	**25**

***** Elective III – Open Elective - Students should select the combination of technical and interdisciplinary courses in order to complete 5 credits from following list.**

601 035 – Open Elective III

Code	**4 Credits Course**	**Code**	**1 Credit Course**	**Code**	**Audit Course (No Credit Course)**
601 035A	Advanced Construction Technology	**601 035 E**	Construction Equipment Management	**601 035 I**	Chess
601 035B	Infrastructure Development	**601 035 F**	Foreign Language	**601 035 J**	Abacus
601 035C	International Contracting	**601035 G**	Risk Analysis & Mitigation Practice		
601 035 D	Thrust Areas in Project Management	**601 035 H**	Safety Practices in Construction		

SEMESTER –IV

Code	**Subject**	**Teaching Scheme**	**Examination scheme**				**Credits**
		Lect./ Pract.	**Paper**	**TW**	**Oral/Presentation**	**Total**	
601038	Seminar III	5	--	50	50	100	5
601039	Project Work Stage II	20	--	150	50	200	20
	Total	**25**		**200**	**100**	**300**	**25**

EXAMINATION SCHEME

A) Compulsory Subjects: Credits 4

Total marks: 100

To be done at Institute Level		University Exam	
In semester assessment Units 1-4		**End-semester assessment**	
Class tests	30 Marks	Units 1-4	18Marks
Assignments /Mini Project	20 Marks	Unit 5	16 Marks
		Unit 6	19 Marks
Total	50 Marks	Total	50 Marks

B) Elective Subjects: Credits 5

Total marks: 100

Module 1 (Credits-4)			
In semester assessment Units 1-4		**End-semester assessment**	
Class tests	15 Marks	Units 1 & 2	12Marks
Assignments	10 Marks	Unit 3& 4	14Marks
		Unit 5	12 Marks
		Unit 6	12 Marks
Total	25 Marks	Total	50 Marks

Module 2 (Credit 1)	
In semester assessment	Units 1 - 2
Class Tests/ Assignments	**25 Marks**

Savitribai Phule Pune University [SPPU]

M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

SEMESTER I

501 021- Application of Statistical Methods in Construction

Teaching Scheme:
Lectures: 4 Hrs. /Week
Credits: 4

Examination Scheme:
Theory Paper: 100 Marks
In Semester Assessment: 50 marks
End Semester Assessment: 50 marks
Duration: 3 hrs.

Unit – 1 **(8 Hours)**

Probability: 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.

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

Unit – 2 **(8 Hours)**

Sampling: 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.

Unit -3 **(8 Hours)**

Testing: Testing Hypothesis: Sampling of distribution – Test based on Normal Distribution, Students-t test, chi-square, K-S test for goodness of fit and distribution. Analysis of variance one Way & two way classification.

Unit – 4 **(8 Hours)**

Correlation Analysis: Correlation types, co-efficient. Bi-variate Frequency Distribution, Scatter Diagram, Correlation Analysis, Practical applications in civil engineering projects.

Regression Analysis: Regression and Multivariate Analysis, Multiple Regression Analysis Nonlinear Regression. Use of regression analysis in Construction Projects.

Unit – 5 **(8 Hours)**

Simulation: Simulation – Types, case studies in construction using simulation Techniques, simulation software's used. Griffi's waiting line Method, Concept of Downtime Cost of Equipment, Cox and Nunally Model, Failure Cost Profile (FCP), LID.

Unit – 6 **(8 Hours)**

Applications: Use of mathematical models based on probabilistic and statistical methods, Simulation in risk identification, analysis and mitigation of project risks. EOQ in civil Engineering, Sensitivity analysis, ABC analysis.

Reference Books

1.Applied Statistics and Probability for Engineers---Montgomery and Runger—Wiley,India.

2. Probability and Statistics for Engineers –Miller, Freund-Hall, Prentice India Ltd. 2009

3. Applied Mathematics for Engineers and Physiscists-pipes and Harvill. McGraw Hill International Edition, 1970

4. Sampling techniques-Cochran, Wiley Series, 2008.

5. Statistics-Concepts and Controversies-David S. Moore-Freeman Company, New York.

6. Reliability Principles and practices-Calabro-McGraw Hill Book Company, 1963

7. Shrivastava, Shenoy & Sharma, Quantitative Techniques for Managerial Decisions, Wiley, 1989.

8. Applied Statistics for Civil and Environmental Engineers by Kottegoda.- Stratford Books

M.E. CIVIL (Construction & Management)

Subject: Management and Project Planning in Construction

(Syllabus – Revision Year 2016)

Subject Code: 501022

Teaching Scheme:
Lectures: 4 Hrs. /Week
Credits: 4

Examination Scheme:
Theory Paper: 100 Marks
In Semester Assessment: 50 marks
End Semester Assessment: 50 marks

Syllabus

Unit–1 **(8 Hours)**

A)Basics of Management:

Modern scientific management(Contribution by Fayol , F.W. Taylor , Mayo), Management Functions, Management Styles, SWOT Analysis in construction

B)Project Management:

Basic forms of organization with emphasis on Project and matrix structures; project life cycle, planning for achieving time, cost, quality, project feasibility reports based on socio-techno-economic environmental impact analysis, project clearance procedures and necessary documentation for major works like dams, multistoried structures, ports, tunnels, Qualities, role and responsibilities of project manager, Role of Project Management Consultants, Enterprise Resource Planning (ERP)

Unit 2 **8 Hours**

Project Scheduling:

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

Unit 3 **8 Hours**

a) Project Controlling :

Monitoring and Control, Crashing, Resource Leveling, Updating.

b) Construction site management:

Site mobilization – demobilization aspects, various Resources management based on funds availability, coordinating, communicating & reporting Techniques, Application of MIS to construction, Training for Construction Managers ,Engineers , Supervisors

Unit -4 **8 Hours**

Work Study:

a) Definition, Objectives, basic procedure, method study and work measurement, Work study applications in Civil Engineering.

b) Method study – Definition, Objective, Procedure for selecting the work, recording facts, symbols, flow process charts, multiple activity charts, string diagrams.

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

Unit -5 **8 Hours**

Safety Engineering:

a) Causes of Accidents on various sites, safety measures and safety policies to be adopted, determination of safety parameters, personal protective equipment. Workmen Compensation Act, Minimum wages act

b) Type Of Industrial Hazards-Nature, Causes And Control Measures, Hazard Identifications And Control Techniques - HAZOP, FMEA, FMECA. -Cost of Construction Injuries-Legal Implications

c) Safety Organization –Safety Policy, Safety Record Keeping, Safety Culture, Safety and First Line Supervisors, Middle Managers, Top Management Practices, Sub contractual obligation, Project Coordination and Safety Procedure

Unit – 6 **8 Hours**

Administration of Incentive Schemes

a) Necessity, Merit rating, job evaluation, installation, modification and maintaining of incentive schemes based on implementation experience.

b) Introduction to artificial intelligence technique ANN, Fuzzy Logic , Genetic Algorithms

Introduction to BIM

Any ERP based software training/assignment is compulsory (in lab practice I & II)

Reference books

1. Construction Planning & management By P S Gahlot & B M Dhir , New Age International Limited Publishers

2. Construction Project planning & Scheduling By Charles Patrick, Pearson, 2012
3. Construction Project Management Theory & practice --- Kumar Neeraj Jha, Pearson,2012
4. Construction management Fundamantals by Knutson, Schexnayder, Fiori, Mayo, Tata McGraw Hill, 2nd Edition, 201
5. Modern construction management--.Harris, Wiley India.
6. Construction Management and Planning by Sengupta and Guha-Tata McGraw Hill publication.
7. Project Management – K Nagrajan – New age International Ltd.
8. Work study – Currie.
9. Professional Construction Management Barrie-Paulson-McGraw Hill Institute Edition.
10. Project Management – Ahuja H.N. – John Wiely, New York.
11. Construction Project Management Planning, Scheduling and Controlling-Chitakara-Tata McGraw Hill, New Delhi
12. Construction Management – Roy, Pilcher
13. Construction Management – O’Brien.
14. Project Management-Planning and Control---Rory Burkey 4th ed.—Wiley,India.

M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

SEMESTER I

501 023 - Construction Technology

Teaching Scheme:	Examination Scheme:
Lectures: 4 Hrs. /Week	Theory Paper: 100 Marks
Credits: 4	In Semester Assessment: 50 marks
	End Semester Assessment: 50 marks

UNIT -1 **(8 hours)**

Underground Construction : Underground– Tunnel-Shaft, Sinking and construction, Micro Tunneling, Tunnel driving in hard and soft strata, bedding of conduits, Soil excavation and Compaction Technology.

UNIT – 2 **(8 hours)**

Under water construction : Problems encountered in excavation, Underwater drilling, blasting, Grouting methods in soft and hard soil including Jet grouting and Chemical grouting, Dewatering in shallow and deep excavations using different methods, Vacuum Dewatering and Well point system.

UNIT – 3 **(8 hours)**

Construction using Concrete Technology: Concrete – Various types and erection methods of shuttering, Operation and erection of Ready Mix Concrete Plant, Pumped Concrete, Concrete mix design with various methods of concreting and also underwater concreting using tremie method, Concreting for under water Construction, Self-compacting concrete.

UNIT – 4 **(8 hours)**

Pile Construction : Piling – Single pile and a group piles (Bored and Driven) bored piles, Working loads and ultimate loads on driven and cast- in-situ piles, Piles in land and marine structures. Construction details of precast piles, pre stressed piles, steel piles and friction piles.

Pile Capacity - Load test on piles initial and routine for vertical, horizontal, uplift loads and integrity test, failure of piles and causes, Methods of pile driving by Vibration and Construction of micro piles, Diaphragm Walls.

UNIT – 5 **(8 hours)**

Coffer Dams: 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, coffer dams with touching and interlocking piles and diaphragm wall.

UNIT – 6 **(8 hours)**

Caissons: Types, box, pneumatic and open caissons, Well foundations, details, design and Construction of pneumatic and precast caissons.

Minimum 1 Case study with Presentation by students be discussed /analyzed in each of the above topics with Subject Teacher.

Reference Books:

1. Construction Technology: Analysis, and Choice, 2ed,Bryan, Wiley India

2. Construction Planning, Equipment and methods – Peurifoy-Tata McGraw Hill Publication

3. Construction Equipment Planning and Applications – Dr. Mahesh Varma

4. Brochures Published by various agencies associated with construction.

5. Journals such as CE & CR. Construction world, International Construction.

5. Document Reports of actual major works executed.

6. Construction Technology by Roy Chudley and Roger Greeno, Prentice Hall, 2005.

7. Dr. Kumar Niraj Jha, “ Formwork for Concrete Structures”, Mc Graw Hill Publication

M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT)

501 024 TQM in Construction

Teaching Scheme:	Examination Scheme:
Lectures: 4 Hrs. /Week	Theory Paper: 100 Marks
Credits: 4	In Semester Assessment: 50 marks
	End Semester Assessment: 50 marks

Unit –1 **(6 hours)**

Concept of Quality:

Definition of quality as given by Deming, Juran, Crosby, difference between Quality control,

Quality Assurance (QA/QC). Total quality control (TQC) and Total Quality Management (TQM), Need for TQM in construction industry.

Organization necessary for implementation of quality, Quality manual-Contents, data required,

preparation, responsibility matrix, monitoring for quality- PDCA Cycle. Quality aspects in every phase in the life cycle of Construction project.

Unit-2 **(6 Hours)**

Quality Control tools and statistical quality Control:

(A) Histogram, Pareto diagram, Fishbone diagram, Quality control chart-Testing required for quality control of construction material used in RCC Work- destructive and Non destructive Test (NDT)

(B) Statistical Quality Control- Necessity, Benchmarking, Application of dispersion methods in quality control of construction activity.

Unit –3 **(6 Hours)**

Training and development of Human Resources:

Training needs assessment, technical and managerial competencies necessary for achieving quality, preparation for training. Training on Project Rework Reduction Tool (PRRT) software- training for preparation of checklist necessary for RCC work, for commonly used formats.

Unit –4 **(6 Hours)**

Development of quality circles, quality inspection team, inspection reports, monitoring and control, 360’ feedback for quality.

Unit –5 **(6 Hours)**

Study of ISO 9004- Quality System Standards.

Purpose of ISO Standards. Difference between ISO 9001 and ISO 9004.Certification process for ISO 9001. Certification bodies involved. Eight Principles of ISO-Basic meaning, applying these principles for an effective quality process in the organization. Management support and commitment necessary for achieving implementation for quality system standards.

Unit–6 **(6 Hours)**

Achieving TQM on Construction Projects:

Advantages, barriers, principles, steps in implementation, seven types of construction defects.

Determining cost of poor quality including hidden cost.

Quality functions deployment (QFD). Importance of third party quality audits. CIDC-CQRA quality rating systems, customers satisfaction surveys, Non Conformity reports (NCR), remedial strategy for reducing NCR’s.

Unit –7 **(6 Hours)**

Six Sigma:

Definition of six sigma, evolution – Historical aspects, probability distribution Six sigma ratings, Six sigma training, six sigma as an effective tool in TQM.

Unit –8 **(6 Hours)**

Application of Six Sigma tool to :

i) RCC Work in building

ii) DLC and PQC layers in road construction

(iii) Assessment of overall construction process from concept to completion of a construction project.

Reference Books

1. International Standards Organization – ISO 9001 and ISO 9004
2. Mantri Handbook – A to Z of Construction – Mantri Publications
3. Juran's Quality Handbook – Joseph M. Juran, A. Blanton. Godfrey – Mcgraw Hill International Edition (1998)
4. Probability and Statistics for Engineers – Miller, Freund-Hall, Prentice India Ltd.
5. Quality Control and Total Quality Management, P.L.Jain, Tata Mcgraw Hill Publ.

501 025 -A-Elective I - Cyber Security / Information security (4 Credits course)

Teaching Scheme:
Lectures: 4 Hrs. /Week
Credits: 4

Examination Scheme:
Theory Paper: 75 Marks
In Semester Assessment: 25 marks
End Semester Assessment: 50 marks

Module -- 1

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

Module --2

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

Rights of Netizens 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

501 025 –B –Elective I- Sustainable Construction Materials (4 Credits course)

Teaching Scheme:
Lectures: 4 Hrs. /Week
Credits: 4

Examination Scheme:
Theory Paper: 75 Marks
In Semester Assessment: 25 marks
End Semester Assessment: 50 marks

Module 1:

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

Module 2:

Various construction chemicals/admixtures , Fly ash and its use in concrete ,Silica fume concrete ,Self compacting concrete, Fiber Reinforced plastics and concrete ,Light weight concrete

Module 3:

Crumb modified bitumen Rubber, Glenium Concrete,Materials used in nuclear-containment structures.

Module 4:

High performance concrete,Nano technology in cement concrete, Ferrocement Technology

Reference Books:

1. Concrete Technology by Neville
2. Construction Materials, Methods & Techniques(3e) by William P Spence, Yesdee Publication 2012, Pvt. Ltd,, Chennai, India
3. Concrete Structure properties & Materials by Mehta P.K & Mantreio P.J.M, Prentice hall.
4. Concrete Technology by M.S.Shetty, S.Chand Publ.
5. Building Materials by M L Gambhir, Neha Jamwal, Tata McGraw Hill Publ.
6. New Building Materials and Construction World magazine.
7. Ferrocement Construction Mannual-Dr. D.B.Divekar-1030,Shivaji Nagar, Model Colony, Pune.
8. Civil Engineering and Construction Review magazine
9. Engineering Materials –Dr. S.V.Deodhar

501 025–C-Elective I - Disaster Management (4 Credits course)

Teaching Scheme:	Examination Scheme:
Lectures: 4 Hrs. /Week	Theory Paper: 75 Marks
Credits: 4	In Semester Assessment: 25 marks
	End Semester Assessment: 50 marks

Module 1:

Disasters – Natures and extent of disasters, natural calamities such as earthquake, floods, drought volcanoes, 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. Casual management, risk management.

Module 2:

Emergency Management program – 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 program.

Module 3:

Various organizations registered with Government and NGO's working for disaster relief- Challenges faced by organizations. Methods of assessment of impact of disasters such as photogrammetric methods, media survey, ground data collection.

Module 4:

International adopted practices for disaster mitigation. Rules and regulations, Monitoring aspects of disaster mitigations programs.

Reference Books:

1. An Introduction to Disaster Management –Natural Disasters and Man Made Hazards, S.Vaidyanathan, Ikon Books
2. Construction Engineering and Management – Seetharaman, Umesh Publ.
3. NICMAR Publications
4. Different sites on internet on disaster management
5. Project Management – K Nagarajan – New Age International Ltd.
6. Disaster Management Handbook by Jack Pinkowski – CRC Press (Taylor and Francis group)

501 025 –D-Elective I - Retrofitting of Structures (4 Credits course)

Teaching Scheme:	Examination Scheme:
Lectures: 4 Hrs. /Week	Theory Paper: 75 Marks
Credits: 4	In Semester Assessment: 25 marks
	End Semester Assessment: 50 marks

Module 1:

Importance of rehabilitation repairs and retrofitting as a part of construction engineering. Difference between the term. Rehabilitation studies of buildings, underground construction, bridges, streets and highways, sewage treatment plants – masonry work, R.C.C. works, steel structures- types of distress.

Module 2:

Numerical condition surveys for foundation, structural and functional deterioration, design criteria, materials and technology. 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).

Module 3:

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.

Module 4:

New Construction materials, processes and techniques used for repairs, rehabilitation and retrofitting-Construction chemicals based on nanotechnology, construction points based on nanotechnology, various types of fibre wrappings etc.

Reference Books:

1. Technology of Building Repairs, Raikar R N
2. The Bombay Building Repairs & Reconstruction Board Act 1969, Govt. of Maharashtra
3. Maintenance & Repairs of Buildings, P. K. Guha
4. Concrete Structures Protection Repair and Rehabilitation, R. Dodge Woodson, Elsevier Publication
5. Construction, Maintenance & Restoration and Rehabilitation of Highway Bridges, K. S. Rakshit
6. Retrofitting of Concrete Structures by Externally Bonded FRP's – CEB – FIP, Technical report,

501 025 –E-Elective I - Construction Safety (4 Credits course)

Teaching Scheme: Examination Scheme:

Lectures: 4 Hrs. /Week Theory Paper: 75 Marks

Credits: 4 In Semester Assessment: 25 marks

End Semester Assessment: 50 marks

Module 1:

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.

Module 2:

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 used.

Module 3:

Various safety equipment and gear used on site. First aid on site, Safety awareness program. Labor laws, legal requirement and cost aspects of accidents on site, Incentive for safety practices.

Module 4:

Study of safety policies, methods, equipment, training provided on any ISO approved construction Company ,safety in office, working on sites of high rise construction, deep excavation

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.

501 025 -F Elective –I - Economics and Finance for Engineers (1 Credit Course)

Teaching Scheme:
Lectures: 1 Hr. /Week
Credits: 1

Examination Scheme:
In Semester Assessment: 25 marks

Module 1:

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.

Module 2:

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. Financial Management, Khan.
2. Financial management, Prassanachandra

501 025 –G-Elective –I - Foreign Language -I (French-I) (1 Credit Course)

Teaching Scheme:
Lectures: 1 Hr. /Week
Credits: 1

Examination Scheme:
In Semester Assessment: 25 marks

Module 1:

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

Module 2:

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

501 025 - H -Elective –I -Engineering Ethics (1Credit Course)

Teaching Scheme:
Lectures: 1 Hr. /Week
Credits: 1

Examination Scheme:
In Semester Assessment: 25 marks

Module 1:

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.

Module 2:

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

501 025 –I- Elective –I Intellectual Property Rights (1Credit Course)

Teaching Scheme:
Lectures: 1 Hr. /Week
Credits: 1

Examination Scheme:
In Semester Assessment: 25 marks

Module-1

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",

(501025) Elective –I (J) 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

501 025 –K-Elective II - Yoga and Meditation (Audit course--Non 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-Vilom Pranayam, UjjayiPranayam, BhramariPranayam, Bhastrika Pranayam, Agnisar Pranayam, 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

SEMESTER - I

501 026 Lab Practice – I

Teaching Scheme
Pract. 4 hrs./ week
Credits – 4

Examination Scheme
Oral : 50 Marks,
TW: 50 Marks

----Term work should consist of any 6 assignments out of the first 8 .

----Assignments 9,10 are compulsory.

1. Assignment on use of means of dispersion in quality control.
2. Assignment on formulation of linear regression equation between a dependent variable and independent variable, applicable in construction.
3. Working out total number of construction equipment necessary to complete a particular quality of item work in a particular time and determining its direct cost per MODULE-for construction equipment working in a group.
4. Assignment on showing the schematic of a pumped concrete layout and determining the total length of the pipe-line required, considering dependent factors.
5. Assignment on developing a precedence network, calculation of floats and project crashing.
6. Assignment on work study
7. Any 2 assignments on Elective I
8. Site Visits 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

10. Assignment on using MS Excel, MS Project software and ERP software to be done

M. E. (CIVIL) CONSTRUCTION AND MANAGEMENT

SEMESTER - II

501 027-Construction Contracts Administration and Management

Teaching Scheme:
Lectures :4 Hrs./Week
Credits : 4

Examination Scheme:
Theory Paper : 100 Marks
In Semester Assessment : 50 marks
End Semester Assessment : 50 marks
Duration : 3 hrs.

Unit 1 :Construction Contracts : 8 hours

a) Indian Contract Act (1872) :a) Definition of the contract as per the ACT. Valid, Voidable, Void contracts, Objectives of the act.(from model 5)

b) Clauses 1 to 75- Contract formation, contract performance, valid excuses for non-performance, Breach of contract, effects of breach- understanding the clauses and applying them to situations/scenarios on construction projects. Importance of the Workmen's Compensation Act on construction projects.

Unit 2: Contract Formation 8 hours

a) Standard forms of contracts, methods of inviting tenders, pre-bid meetings, pre-qualification system, scrutiny of tenders and comparative statement.

b) Contract formation, conditions of contracts, contracts with various stakeholders on a major construction projects, contract pricing by the client, project management consultants and the contractor, contract performance, contract correspondence and contract closure.

Unit 3: Contract Conditions 8 hours

a) General condition and Particular conditions,

b) Conditions of Ministry of Statistics and Program Implementation- Government Of India. Model forms of contract.

Unit 4: FIDIC 8 hours

ICE conditions-Introduction, FIDIC conditions- evolution of FIDIC document, types based on whether design is of employer or contractor, Design & Build contract, EPC contract, short forms of contract- Colour Code. Various conditions of Red Book.

Unit : 5 Construction Claims and Dispute Resolution 8 hours

a) Construction Claims : Extra items and causes of claims. Types of construction claims, documentation. settlement of claims

b) Dispute Resolution: Causes of disputes and importance of role of various stakeholders in prevention of disputes, Alternate Dispute Resolution methods- mediation, conciliation, arbitration and Dispute Resolution Boards.

Unit 6 Conciliation & Arbitration **8 hours**

Indian Arbitration And Conciliation Act 1996 Difference between 1940 Act and 1996 Act. Extent of application of 1996 Act. Objectives, general provisions. Composition of the arbitral tribunal, jurisdiction of arbitral tribunal, duties, power of arbitrators. **Conciliation:** Conciliation and its provisions in the Act, Conduct of conciliation and arbitral proceedings, grounds for challenge. Arbitral award and its enforcement. Procedure of appeal against the awards.

Reference Books:

1) Civil Engineering Contracts and Estimates - B. S. Patil – Universities Press- 2006 Edition, reprinted in 2009.
2) The Indian Contract Act (9 of 1872), 1872- Bare Act- 2006 edition, Professional Book Publishers.
3) The Arbitration and Conciliation Act,(1996), 1996 (26 of 1996)- 2006 Edition, Professional Book Publisher.
4) Law of contract Part I and Part II, Dr. R.K. Bangia- 2005 Edition, Allahabad Law Agency.
5) Arbitration, Conciliation and Alternative Dispute Resolution Systems- Dr. S.R. Myneni- 2004 Edition, reprinted in 2005- Asia Law House Publishers.
6) The Workmen's Compensation Act, 1923 (8 of 1923) Bare Act- 2005- Professional Book Publishers.
7) Standard General Conditions for Domestic Contracts- 2001 Edition- Published by Ministry Of Statistics and Program Implementation, Government of India.
8) FIDIC Document (1999).
9) Dispute Resolution Board foundation manual-www.drbf.org.

M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT) SEMESTER II

501 028- Project Economics & Financial Management

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

Unit 1 **8 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 for working capital, Estimation of requirements of working capital, Credit Management, Cash Management,. Corpus Fund

Unit 2 **8 hours**

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. Cost pricing method

Unit 3 **8 hours**

Financial Planning: Need and sources of Finance, Long term finance planning, Stock, Borrowings, Debentures, Loan Capital, Public Deposit, Dividend Policies, Bonus Shares, Market value of shares, Reserves.

Budget: Budgetary control system. Types of budgets, Procedure for master budgets. Budget manual. Accounting Information System:, Project Commentary, project Running Commentary

Unit 4 **8 hours**

Corporate Sector: Corporate tax planning, Public policies on ICRA grading of exchange, World financial market, Role of financing institutes in Construction sector, SEBI regulation., GST, CGST, SGST, Direct Tax Court System

Unit 5 **8 hours**

Construction Accounts: Accounting process, preparation of profit and loss account and balance sheet as per the companies Act2013, preparation of contract accounts for each project, methods of recording and reporting site accounts between project office and head office, Ratio Analysis. Escrow Account for PPP Project.

Unit 6 **8 hours**

Case Studies (Any Two) : Case studies for 1)PPP projects 2)Dams and Canals 3)Mass Transit System 5)Government Funded Projects with respect to a) Project Appraisal b) Raising of funds c) Cost to complete analysis

Reference Books

1. Construction project scheduling and control ----Mubarak, Wiley India**.**
2. Construction Management & PWD Accounts --- D Lal, S. K. Kataria & Sons, 2012
3. Construction Management and Accounts -- Singh H. Tata McGraw Hill, New Delhi, 1988
4. Construction Management: Planning and finance-- Cormican D. Construction press, London, Feb 2002.
5. Principles of Corporate Finance, Brealey R.A. Tata McGraw Hill, New Delhi, 2003.
6. Engineering Economics—Kumar---Wiley,India.
7. Engineering Economy, Leland T. Blank. Anthony Tarquin. McGraw Hill, 2008.
8. Engineering Economics, David Bedworth, Sabah Randhawa. McGraw Hill, 1996.
9. Real Estate, Finance and investment, Bruggeman. Fishr, McGraw Hill, 2010.
10. Foundations of Financial Management', Block Hirt. McGraw Hill, 2009.
11. Case studies in finance, Burner, McGraw Hill, 2009.
12. Cases in Finance , DeMello McGraw, 2003.
13. The cost management toolbox ; A Managers guide to controlling costs and boosting profits. Oliver, Lianabel. Tata McGraw Hill, 1999.
14. "Financial Management" – Indian Institute of Banking and Finance – Macmillan Publications.
15. Projects planning, Analysis Selection, Implementation and Review, Prasanna Chandra Tata McGraw Hill, New Delhi, 2005
16. Fundamentals of Engineering Economics—Pravin Kumar, Wiley, India.

M.E. (CIVIL) (CONSTRUCTION AND MANAGEMENT) SEMESTER II

501 029 -Operations Research

Teaching Scheme:

Lectures: 4 Hrs./Week

Credits: 4

marks

Examination Scheme:

Theory Paper : 100 Marks

In Semester Assessment : 50

End Semester Assessment : 50 marks

Duration : 3 hrs.

Unit 1 **8 hours**

Use of Operations Research in Civil Engineering and Managerial Decision making process. Introduction to Optimization Techniques and their application in Engineering Planning, Design and Construction. Various models; Objective function and constraints, convex and concave functions, regions and sets.

Unit 2 **8 hours**

Linear programming: Formulation of Linear optimization models, Civil engineering applications. Simplex method, special cases in simplex method, Method of Big M, Two phase method, duality, sensitivity analysis.

Unit 3 **8 hours**

a) Transportation Model and its variants,

b) Assignment Model and its variants.

c) Decision theory.

Unit 4 **8 hours**

(a)Dynamic programming: Multi stage decision processes, Principle of optimality, Recursive equation, Application of D.P.

b) Non-Linear programming: Single variable unconstrained optimization –Local & Global optima, Uni-modal Function- Sequential Search Techniques: Dichotomous, Fibonacci, Golden Section methods.

Unit 5 **8 hours**

Multivariable optimization without constraints-The gradient vector and Hessian Matrix, Gradient techniques, steepest ascent/decent technique, Newton’s Method. Multivariable optimization with equality constraints-Lagrange Multiplier Technique.

Unit 6 **8**

hours

(a) Queuing Theory, Simulation.

(b) Sequencing model – n jobs through 2, 3 and M machines.

(c) Replacement models.

(d) Games Theory.

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Reference Books

1. Operations Research by Hamdy A.Taha
2. Engineering Optimazation Theory & Practice – S.S. Rao., Wiely.
3 .Engineering Optimization—Methods and Applications—Ravindran,Wiely
4. Operations Research by J.K.Sharma
5. Quantitative Techniques in Management by N.D.Vohra
6. Principles of Construction Management by R.Pilcher
7. Operations Management by E.S.Buffa
8. Principles of Operations Management by H.M.Wangner
9. Principles of Operation Research – Wagner, Prentice Hall.
10. Operation Research – Hira and Gupta, S.Chand
11.Operations Research: Principles and Practice-Ravindrav,Philip&Solberg,Wiley,India

501 030 –A -Elective II Human Rights (4 Credits course)

Teaching Scheme:
Lectures: 4 Hrs./Week
Credits: 4

Examination Scheme:
Theory Paper : 75 Marks
In Semester Assessment: 25 marks
End Semester Assessment: 50 marks
Duration: 3 hrs.

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 .

References:

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

501 030-B-Elective II Human Resource Development (4 Credits course)

Teaching Scheme :	Examination Scheme:
Lectures :4 Hrs./Week	Theory Paper : 75 Marks
Credits : 4	In Semester Assessment : 25 marks
	End Semester Assessment : 50 marks
	Duration : 3 hrs.

Unit 1

Introduction: Need of HRD in the context of globalization, Organization Policies various HRD parameters viz. Elements of the ICDP i.e. integrated construction development paradigm, key elements of HRD such as basic literacy, functional skills, supervisory skills, entrepreneurship skills. Database concept & application in Human Resource Information System

Unit 2 : Recruitment process

Recruitment policies, Pre requisites skills- Soft and technical skills. Employee testing & selection Personal Management – Concept of Personal Management, Responsibilities & authority Role and Function of Personal Manager, Necessity of Personal Management

Unit 3

Training: –Training of multi-skilled workforce, quality, productivity and employee relations in construction, contractors & sub-contractors – selection, training & development, performance appraisal, potential appraisal, training rewards and recognition etc. Selection of contractors region wise & retaining, Upgrading HRD for construction MNC/Multi portfolio project handling organization. formation of joint ventures, privatization and BOT type of systems. CIDC – IGNOU Training programs.

Unit 4

Career Plan & development

Career development cycle, career need assessment, use of assessment centers by small organization, teams synergy,

Participative management

Reference Books

1. Human Resource Management by Biswajeet Pattanayak
2. Human Resource Management by Gary Dessler & Biju Varkkey, Pearson publication
3. Managing Human Resources by Bohlander & Snell
4. Personnel Management' by Monappa A. – Tata McGraw Hill,new delhi.1997
5. Harvard Business Review, "Appraising Perfoprmance Appraisal," Tata McGraw Hill.
6. Nair,MRR, "Excellence through Human Resource D evelopment", Tata McGraw Hill.
7. Rao T , "HRD in the New Economic Environment", Tata McGraw Hill.
8. Pareck , "HRD in the New Millenium", Tata McGraw Hill.
9. Singh, "Selected Reading in HRD" Tata McGraw Hill.

501 030—C- Elective II --Materials Management (4 Credits course)

Teaching Scheme :
Lectures :4 Hrs./Week
Credits : 4

Examination Scheme:
Theory Paper : 75 Marks
In Semester Assessment : 25 marks
End Semester Assessment : 50 marks
Duration : 3 hrs

Unit – 1

Importance of Materials Management: Importance of material management and its role in construction industry-scope, objectives and functions, Integrated approach to materials management, Role of materials manager.

Unit - 2

Codification and procurement: 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 (MRP) Material requirement planning, planning, purchase procedure, legal aspects.

Unit - 3

Inventory and Stores Management:

(a) 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.

(b) 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.

Unit–4

Quality Control and use of MMS: 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. Use of (MMS) – Materials Management Systems in materials planning, procurement, inventory, control, cost control etc. Application of software in MM such as TALLY, ERP, SAP etc.

Reference Books

1. Purchasing and Inventory Control- by K. S. Menon, Wheeler Publication.
2. Materials Management, P.Gopalkrishnan, Prentice Hall
3. Handbook of materials management, P.Gopalkrishnan, Sundershan, Prentice Hall.
4. Inventory Management, L.C.Jhamb, Everest Publ.

Elective –II

(501030 D) Value Engineering and Valuation (4 credits)

Teaching Scheme :
Lectures :4 Hrs./Week
Credits : 4

Examination Scheme:
Theory Paper : 75 Marks
In Semester Assessment : 25 marks
End Semester Assessment : 50 marks
Duration: 3 hrs

Unit 1: Value Analysis **8 hours**

a) Value Engineering: Definition, Importance to Contractors, Potential VE Applications Value : basic and secondary functions, factor contributing to value such as aesthetic, ergonomic, technical, economic : identifying reasons or unnecessary costs :

b) 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.

Unit 2 Life cycle costing: **8 hours**

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

Unit 3 :VE Methodology **8 hours**

Orientation phase, Information phase, Function Analysis phase, Creative Phase, Evaluation Phase, Development Phase, Presentation Phase, implementation Phase

Unit 4: Application of Value Engineering to a Construction Project **8 hours**

VE during the Planning Phase of a Construction Project , VE during the Design Phase of a Construction Project, VE during the Construction Phase of a Construction Project

Unit 5: Valuation **8 hours**

Types of value, purposes of valuation factors affecting value. Different methods of valuation for different types of assets such as land and building, horticulture, historical places.

Unit 6 Valuation Report

Valuation Report, contents, standard formats, Case study of any one Report.

Reference Books

1. Value Engineering: Analysis And Methodology By Del Younke

2. Industrial Engg. & Mgt., O.P.Khanna, Dhanpat Rai Publ.
3. Industrial Organization & Engg. Economics, T.R.Banga, S.C.Sharma, Khanna Publ.
4. Estimating and Costing in Civil Engineering: Theory and Practice B.N Dutta Published S. Dutta & Company, Lucknow.
5. Estimating, Costing Specifications & valuation in Civil EngineeringBy: M.Chakraborty Published By: Author.
6. Estimating and Costing By: G.S.Birdie
7. Estimating and Costing By: Rangwala Published By: Charotar Publishing House,
8. Practical Information for Quantity Surveyors, Property valuers, Architects Engineers and Builders, P.T.Joglekar, Pune Vidyarthi Griha Prakashan, 2008 reprint.

501 030—E-Elective II-- Foreign Language –II French-II (1 Credit course)

Teaching Scheme:	Examination Scheme:
Lectures : 1 Hrs./Week	In Semester Assessment : 25 marks
Credits : 1	

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

501 030—F--Elective II Building Services and Maintenance

(1 Credit course)

Teaching Scheme:

Lectures: 1 Hrs./Week

Credits: 1

Examination Scheme:

In Semester Assessment: 25 marks

Module 1

Integrated design: factors affecting selection of services/systems, Provision of space in the building to accommodate building services, Structural integrity of building services equipment. Sound and vibration attenuation features, Provisions for safe operation and maintenance,

Building services engineering system for intelligent buildings: Introduction to information transmission systems, communication and protection system, call systems, public address system and Building automation/management systems.

Module 2

The concepts and importance of energy conservation and energy efficiency for environmental protection, environmental protection and maintenance of building services systems, selection of environmentally friendly products and materials used in building services systems. Co-ordination and management of design and installation of various building services systems during the design and construction stages in particular the builder's works. Computer-aided design and installations of building services. Testing and commissioning of building services systems: fire safety systems, vertical transportation equipment ventilation systems, etc. Sick building syndrome. The impacts of life-cycle-cost on planning and implementation. An appreciation of capital and operating costs. Implication of low cost, inefficient equipment, poor installation, inadequate access for maintenance.

Reference books

1. Buiding Services—S.M.Patil---(ISBN-978-81-7525-980-5), 1-C,102,Saamana Pariwar Society,Gen A.K.Vaidya Marg, Goregaon (E),Mumbai-65

2. Building Maintenance Management, 2ed,---Chanter, Wiley India

3. Miantenance of Buildings—A.C.Panchodhari—New Age International Publishers.

Subject: - 501030 – G-Elective II - Fundamentals of Green Building Design and Construction

(1 Credit course)

Teaching Scheme:

Lectures: 1 Hrs./Week | Examination Scheme:

Credits: 1 | In Semester Assessment: 25 marks

Unit 1

a. Definition of Sustainability, Need of sustainability, advantages, issues related to impact on Environment. (Major Environment Challenges),

b. Introduction to Green Building, Principles of Green Building (Site Aspect :- Soil conservation, Vegetation retention, Energy Efficiency, Materials and Resources, Water Efficiency, rainwater harvesting, grey water gardening, solid waste management, , Indoor Environmental Quality:- Passive cooling and heating**,** Transportation, Pollution Control Green Building Rating system and its criteria for evaluation of building (For E.g. LEED, IGBC, TERI-GRIHA, etc.), Design Aspect: - Building green team, integrated design process.

c. Construction Aspect, Zero Carbon emission building/ Zero Carbon Housing/ Zero Energy Housing,

Unit 2

a. Innovations in Green building techniques/ green materials / Sustainable Materials.

b. Material selection criteria, Benefits of Use on green material, Replacement of conventional material by green material eg:-(Concrete, Bricks, sloping roof material, admixtures, plantation, paints, etc.)

c. Life Cycle Cost Analysis of Green Building

Reference Books --

1.C.J. Kibert (2008) “Sustainable Construction: Green Building Design and Delivery”, 3rd Ed., John Wiley, Hoboken, New Jersey

2.G.T. Miller Jr. (2004) “Living in the Environment: Principles, Connections, and Solutions”, 14th Ed., Brooks Cole, Pacific Grove, California

3. Energy Conservation Building Code (ECBC)

501 030- H--Elective II -- Forensic Civil Engineering (1 Credit course)

Teaching Scheme:

Lectures: 1 Hrs./Week

Credits: 1

Examination Scheme:

In Semester Assessment : 25 marks

Module 1

Introduction to forensic engineering, Forensic investigations-tools and techniques, Failures-types, causes and mechanisms, Monitoring and instrumentation, Mitigation of failure.

Module 2

Professional practice and ethics, Legal issues, Repairs and remediation, Risk and risk assessment, Assessment of damage,Case studies.

References:

Proceedings, Conference on Forensic Civil Engineering, Association of Consulting Civil Engineers(I),August,2013

501 030—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.

.

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.

501 030 – 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

501 031 Lab Practice II

Teaching Scheme: Examination Scheme

Pract. 4 hrs../week Oral: 50 Marks

Credits: 4 TW: 50 Marks

Term work should consist of any 6 assignments out of the first 8, assignments 9 and 10 are compulsory.

1. Assignment on study on a tender/contract document on Civil Engineering Work.
2. Assignment on preparation of comparative statement for an item rate contract.
3. Assignment on project cash flow statement and its evaluation using at least 2 methods.
4. Assignment on preparation of a balance sheet for any construction organization.
5. Assignment on use of linear programming
6. Assignment on use of Transportation Model.
7. Any 2 assignments on Elective-II
8. 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.

10. Assignment on any one software used - An estimation and tendering software /primavera software / ERP software. Students are required to operate the software; The demonstration of software is not expected.

501 032 Seminar – I

Teaching Scheme: **Examination Scheme:**

4 Hours/Week TW: 50 marks

Credits: 04 Oral/Presentation: 50 marks

Seminar I: Shall be on state of the art topic of student's own choice approved by an authority. The student shall submit the duly certified seminar report in standard format, for satisfactory completion of the work by the concerned Guide and head of the department/institute.

SEMESTER - III

601 033-Environment & Energy for Sustainable Construction

Teaching Scheme:
Lectures: 4 Hrs./Week
Credits: 4

Examination Scheme:
Theory Paper : 100 Marks
In Semester Assessment: 50 marks
End Semester Assessment: 50 marks
Duration: 3 hrs.

Module –1

Environment and its impact:

Concept of Environment & Environmental Impact Factors & area of consideration for Mega Projects such as Airports, Highways, Power Projects, Water Related Projects. 3E's Environmental Economics, Ethics & Ecology of sustainable development.

Measurement of Environmental &Socio Economic Impact & Other concepts: Natural /Physical Environmental Impacts, Social Impacts, Economic Impacts Concept of Significance

Effect, Commitments of resources.

Module –2

Socio Economic Impacts: Physical, Social, Aesthetic and Economic Environment, Type of Socio economic Impacts, Outline of basic steps in performing the socio economic assessment, Fiscal Impacts Analysis

Module –3

Environment and pollution Control Laws:

Rules and regulations & Laws governing Energy ,Conservation in India & developed Nations – Energy Conservation Act 2001,Revisions and present state of implementation standardization & Labeling ,Electricity Act 2003 ,Revisions and present status of implementation

Module-4

Moduleed nations Framework Convention on Climate change(UNFCC),Protocol, Conference of Parties(COP), Clean Development Mechanism(CDM),Prototype Carbon Funds(PCF), Carbon credits and its trading, Benefits to developing countries

Module –5

Energy Efficient Projects & Financing of energy Efficiency Projects :

Energy efficient Projects, Evaluation of energy efficient projects, Various ways of financing Energy efficient projects, Role of Financial Institutions and corporate banks, Deferred Payment Financing , Types of energy Performance Contracts, Energy Services Companies (ESCOs), and their role, Emphasis on ESCOs

Module -6

Clean Development Mechanism Benefits for Energy Conservation Projects, Methodology and Procedure: What is CDM? Methodology & Procedures for CDM, Eligibility, Criteria, UNFCCC, Role of UNFCCC & Government of India.

Module –7

Energy Efficient Services: Energy building design-Energy efficient and environmental friendly building-Thermal phenomena-Thermal comfort-Indoor air quality-climate, sun and solar radiation-Psychometrics-passive heating and air cooling systems- Energy analysis-active HVAC Systems-Preliminary investigation- goals and policies –energy audit-types of wastage-priority of conservative measures- maintenance of energy program.

Module –8

Energy Management: Energy management of electrical equipment – Improvement of power factor-management of maximum demand-Energy savings in Pumps-Fans-Compressed air Systems-energy savings in lighting system-air conditioning system-Applications-Facility operation and maintenance- facility modifications – energy recovery dehumidifier- water heat recovery –steam plants and distribution systems-improvement of boiler efficiency- frequency of blow down – steam leakage-Steam flash and condense return.

Reference Books:

1. Environmental Monitoring and Characterization by Artiola CBS Publishers 2006.
2. Environmental Engineering, 4 E by Weiner CBS Publishers 2010.
3. Socioeconomic and Environmental Impacts of Biofuels, by Alexandros Gasparatos and per Stromberg, October 2012.
4. Environmental and Pollution Laws in India by Justice T. S. Doabia, I. P. S. Doabia and M. S, S. Doabia, Second Edition 2010,
5. Environmental Impact Assessment and Audit by Larry W. Canter Environmental, Tata McGraw Hill.
6. Environmental Pollution and Control, 4th Edition, J. Jeffrey Peirce, P Aarne Vesilind and Ruth Weiner, Nov 1997
7. Financing Energy Efficiency: Forging The Link
8. Between Financing And Project Implementation, By Silvia Rezessy And Paolo Bertoldi, Institute Of Energy European Commission, May 2010
9. Public Procurement Of Energy Efficiency Services Lessons From International

Experience by Jas Singh, Dilip R. Limaye, Brian Henderson, And Xiaoyu Shi

10. Energy Management Handbook By Steve Doty And Wayne C. Turner, 8th Edition
11. Energy Conservation Act 2001, Electricity Act 2003.

601 034: Research Methodology

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

Unit 1: 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. Developing a Research Proposal Format of research proposal, Individual research proposal, Institutional research proposal, Significance, objectives, methodology, Funding for the proposal, Different funding agencies. Framework for the planning

Unit 2: 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.

Unit 3: Data collection, Measuring, Sampling and Scaling

Classification of data, benefits and drawbacks of data, evaluation of data, qualitative 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.

Unit 4: Preliminary data analysis

Testing of hypothesis- concepts and testing, analysis of variance techniques, introduction to non-parametric tests. Validity and reliability, Approaches to qualitative and quantitative data analysis.

Unit 5: Advanced data analysis techniques

Correlation and regression analysis, Introduction to factor analysis, discriminant analysis, cluster analysis, multidimensional scaling, Descriptive statistics, Inferential statistics, Multi-dimensional measurement and factor analysis

Unit 6: Report writing

Need of effective documentation, importance of report writing, types of reports, report structure, report formulation, Plagiarism. Research briefing, presentation styles, impact of presentation, elements of effective presentation, writing of research paper, presenting and publishing paper, patent procedure.

References

1**.** Research Methodology: concepts and cases, Deepak Chawla and Neena Sondhi, Vikas Publishing House Pvt. Ltd.

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.
5. Research Methodology: An Introduction, 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.

601035—Open Elective- III

601035A– Advanced Construction Technology

Teaching Scheme:	Examination Scheme:
Lectures: 4 Hrs./Week	Theory Paper : 75 Marks
Credits: 4	In Semester Assessment: 25 marks
	End Semester Assessment: 50 marks
	Duration: 3 hrs.

Unit 1

Construction of power generating structures – Atomic Power stations, Thermal power stations. Co-generation Power Plant, Windmills, Transmission towers, Chimneys (single and multi-flue), cooling towers - Natural draft cooling towers (NDCT) & Induced draft cooling tower (IDCT), Ash handling system, Containment Structure, Electro Static Precipitator (ESP), Case study of Kaiga atomic power station, Madras atomic power station. Or Any other Case Study and Safety Hazards

Unit 2

Bridges, Steel Bridges, Arch Bridges, Cantilever Bridges Segmental construction & Box Girders. Construction of special type of bridges such as cable stayed bridge, suspension and Pre-stressed bridge, construction of foundation and Super structure.

Unit 3

Construction of Metro Railway & Monorail - Underground and over ground structures, different methods and techniques of construction. Problems and solutions – during maintenance and up-keep of structures. Fire, Ventilation , Dewatering and power supply, Subsidence, Vibration etc., Concept of Magrail.

Unit 4

High rise buildings – Construction methods and techniques using different materials, Minerals, Admixtures in-situ concrete, Precast Concrete & Structural Steel, finished concrete, tunnel form, fire Fighting ,Safety & Hazards, Job Safety Analysis.

Innovative methods of construction – Slip form technology, Jump form technology, Aluform & Tunnel Form Technology, Dry wall technology, Plastering Machines.

Unit 5

Offshore structure such as- Beacons, Oil drilling Platforms, light houses.

Barges- Jackup Platform, Deck Barge, Hydro clam barges, Hoppers Barges, Submersible barges, Function, utilization & economics of barges.

Unit 6

Dredging System, Mechanism, Hydraulic dredger in waves, Water & Booster System, Dredging in navigation system, Agitation dredging system, silt dredging system, water injection system, Pneumatic dredging system, Amphibious & scrapper dredging system, Advantages & Disadvantages of Various Dredging System , Production Cycle for Dredgers, Application, Capacity of dredgers, & its economical use, dredging economics

Reference Books :

1. Construction Technology by Roy Chudley and Roger Greeno, Prentice Hall, 2005.
2. Construction Planning, Equipment and methods – Peurifoy-Tata McGraw Hill Publication
3. Construction Equipment Planning and Applications – Dr. Mahesh Varma
4. Manuals, brochures, publications from construction companies, firms etc.
5. Reports of actual works executed.
6. NICMAR Publications on Construction Engineering
7. Dr. Kumar Niraj Jha, “ Formwork for Concrete Structures”, Mc Graw Hill Publication

601 035—B--Elective III -- Infrastructure Development (4 Credits course)

Teaching Scheme :
Lectures :4 Hrs./Week
Credits : 4

Examination Scheme:
Theory Paper : 75 Marks
In Semester Assessment : 25 marks
End Semester Assessment : 50 marks
Duration: 3 hrs.

Module—1

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.

Module—2

Status of Infrastructure in India:

Road sector Port , Railway, communication, water supply and drainage, Power sector, oil and gas industry, Health and educational services. Infrastructure Development, Indian budget and its relation with Infrastructure development projects in India. Various programs related with Infrastructure development in rural and urban sector.

Public Private Partnership (PPP) in Infrastructure, Draft Concession Agreement for PPP projects, Escrow Agreement.

Module—3

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. FDI in Infrastructure development, Problem areas and solutions.

Module – 4

Provisions made for Infrastructure Development in the 12^{th} and 13^{th} five year plans of the planning

commission Government of India. Formation of the Indian Infrastructure Development Corporation.

SPV's for Infra projects.

JNNURM - Jawaharlal Nehru National Urban Renewal Mission, PMGSY – Pradhan Mantri Gram Sadak Yojana, RGGVY - Rajiv Gandhi Grameen Vidyutikaran Yojana, Ports Connectivity Projects, Indira Gandhi International Air Port project, Indo – US Nuclear Deal, Nuclear Power Projects in India

Reference Books

1. Construction Engineering & management of Projects(For Infrastructure & Civil Works) by S. C. Sharma, Khanna Publishers, 2nd Edition, 2011
2. India Infrastructure Report – Rakesh Mohan.
3. Infrastructure Today – Magazine.
4. Document of five year plans, published by Govt. of India.
5. Public Private Partnership in Infrastructure by R. N. Joshi Vision Publications – 2010.
6. Infrastructure Development in India by Rajarshi Majumder Rawat Publications – 2010
7. Journal of the 'Indian Roads' Congress.
8. Indian Highways – Journals.

601 035- C- Elective III - International Contracting (4 Credits course)

Teaching Scheme :	Examination Scheme:
Lectures :4 Hrs./Week	Theory Paper : 75 Marks
Credits : 4	In Semester Assessment : 25 marks
	End Semester Assessment : 50 marks
	Duration : 3 hrs

Module –1

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

Module – 2

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.

Module – 3

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

Module – 4

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

UNICTRAL Proceedings for International Arbitration. Institutionalized Arbitration, CIDC – SIAC Arbitration.CASE studies of any 2 major project executed/functioning under International contracting.

Reference Books:

1. A Short Course in International Contracts: Drafting the International Sales by By Karla C. Shippe : world trade press
2. FIDIC documents
3. Construction Contracts & Claims – Simon M.S. McGraw Hill, New York
4. Unified Contract Documents by Ministry of Statistics and program implementation, Government of India.

5. Dispute Review Board Manual by Robert Matyas and Mathews.
6. International Construction Contracting – K.N.Vaid-NICMAR Publication

601 035 – D-Elective III -Thrust Areas in Project Management (4 Credits course)

Teaching Scheme :	Examination Scheme:
Lectures :4 Hrs./Week	Theory Paper : 75 Marks
Credits : 4	In Semester Assessment : 25 marks
	End Semester Assessment : 50 marks
	Duration : 3 hrs.

Module—1

Project Pre-planning and Partnering

a) **Project preplanning:-**

Project Influence cost diagram. Need for project preplanning in the context of time and cost overruns, reduction in economic benefits. Definition selecting pre-planning team and evaluation of alternatives. Decision whether to invest in project design Concept of PDRI—Project definition rating index. PDRI for residential and industrial buildings. Utility of PDRI with respect to benchmarking. Any case study on Project pre—planning.

b) Project partnering:-

Delimitation, partnering as an effective risk sharing mechanism, partnering charter,

partnering workshop. Advantages of partnering role in preventing construction disputes, risk management and QM. C Critical success factors for implementation Any case study on project partnering.

Module-2

S. W. O. T. analysis and S. C. M

a) S. W. O. T

Strengths, Weaknesses, opportModuleies, threats analysis. Conduct S. W. O. T. for individual construction organization, Indian Construction industry. Advantages, S. W. O. T. matrix utility of S. W. O. T. matrix on strategic planning and management.

b) S. C. M.

Supply Chain Management. Concept of Supplier and customer in context of ISO. Identifying the chain associated connecting various processes between the supplier and the customer in context of construction project. Management strategy for implementing S. S. C. M. in construction organizations and on construction projects. Benefits of S. C. M.

Module-3

Critical Chain Management (CCM) and Fast Track Construction

Critical Chain Management (CCM):--

Concept of critical chain in construction projects based on the theory of constraints. Developing critical chain plans for a single project and multiple projects. Measuring, monitoring and controlling the critical chain. Advantages of CCM.

Fast Track Construction:--

Diagrammatic representation of the concept of the fast track construction. Advantage, suitability of fast track construction. Form of contract suitable for fast track projects. Concept of guaranteed maximum pricing (GMP). Any one case study on fast track constriction.

Module--4

Earned Value Analysis and Project Reporting

Earned Value Analysis:--

Definition of earned value. Importance of Earned value analysis. Concepts of cost variance, schedule variance, cost performance index and schedule performance index methods of determining earned value viz. Ratio method, repetitive type work package method, Complex construction work package method, start or finish method. Accounting practices for determining the earned value.

Project Reporting

Guidelines for report preparation, various stakeholders of projects associated with reporting. Scheduling program default report content, report Sorting, selection criteria, interpretation. Reporting requirements of particular specifications. Use of project Management software's in reporting. Study of sample project reports.

Reference Books

1. Pre-project planning handbook—published by Construction Industry Institute (CIT) USA. ASCE journal papers on project pre-planning to be used. ASCE journal papers on project partnering to be used.
2. Project Management—Financial evaluation with strategic planning, networking and control—Bhavesh Patel—2nd edition 2010, reprinted in 2011—Vikas publishing House Pvt. Ltd.
3. Scheduling Construction Projects—Principles and practices—Sandra Weber—Indian edition published in 2012—Pearson Publication.
4. Construction Project management—Planning, Scheduling and controlling—K. K. Chitkara—Eight reprint 2004, Tata McGraw Hill Publishing Company Limited.

601035—Open Elective- III

601035 E - Construction Equipment Management

Teaching Scheme :
Lectures :1 Hr./Week
Credits : 1

Examination Scheme:
In Semester Assessment : 25 marks

.

Unit 1 **6 Hours**

Equipment Management: Equipment Management, Costing, Optimum utilization and Equipment selection, depreciation, interest on capital, Manpower, Spare parts etc, Documentation, Log-Books, History Books, Periodical MIS Report

Equipment maintenance - Planned, unplanned, preventive, breakdown maintenance, merits and demerits of maintenance

Unit 2 **6 Hours**

Construction Equipment: Construction Equipment's – Understanding basics, Capacity, Function & Efficiency of All Machinery, involving all machinery data, power use, fuel consumption and labour utilization. Equipment for Earthmoving Machinery, Concreting Equipment, Material Handling Equipment such as cranes, boom, lift and maintenance transportation Equipments.
Work cycle time of any machine with corrective factors, depreciation of equipment, operative cost, inventory cost control, higher/rental- a) Average Investment value, b) Annual Ownership Cost.

Reference Books:

1. Construction Technology: Analysis,and Choice, 2ed,Bryan, Wiley India
2. Construction Planning, Equipment and methods – Peurifoy-Tata McGraw Hill Publication
3. Construction Equipment Planning and Applications – Dr. Mahesh Varma
4. Brochures Published by various agencies associated with construction.
5. Journals such as CE & CR. Construction world, International Construction.
5. Document Reports of actual major works executed.
6. Construction Technology by Roy Chudley and Roger Greeno, Prentice Hall, 2005.
7. Dr. Kumar Niraj Jha, " Formwork for Concrete Structures", Mc Graw Hill Publication

601 035—F-Elective III Foreign Language - French-III (1 Credit course)

Teaching Scheme :
Lectures :1 Hr./Week
Credits : 1

Examination Scheme:
Theory Paper : 25 Marks
In Semester Assessment : 25 marks

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

601 035 - G -Elective III Project Risk Analysis and Mitigation Techniques

(1 Credits course)

Teaching Scheme:
Lectures: 1 Hr./Week
Credits: 1

Examination Scheme:
In Semester Assessment: 25 marks

Module – 1 - Risk analysis

General – Importance of Risk, types of risks, quantifiable and un-quantified risks. Micro, market, project level risk analysis approach. Risk analysis and Management for projects (RAMP) – Identifying risk events. Probability distribution. Stages in Investment, life-cycle; determination of NPV and its standard deviation for perfectly co-related, moderately co-related and un-correlated cash flows.

Dealing with uncertainties

Sensitivity analysis, scenario analysis simulation, decision tree analysis, risk profile method, certainly equivalent method; risk adjusted discount rate method, certainty index method, point estimated method.

Module –2

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 un-quantified 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. Project Risk Analysis And Management Guide By John Bartlett APM Publishing Limited, 2004 2nd Edition
2. Industrial Engineering And Management Of Manufacturing Systems.- Dr.Surendra Kumar Satya Prakashan
3. RAMP Handbook By Institution Of Civil Engineers And The Faculty And Institute Of Actuariesthomas Telford Publishing, London.
4. Construction Engineering And Management – Seetharaman.
5. Projects Planning Analysis Selection Implementation And Review – Prasanna Chandra.
6. Construction Project Management, K. K. Chitkara, Tata Mcgraw Hill Publ.
7. Construction Management Practice, Dr.V.K.Raina, Shroff Publ.
8. Projects, Prasanna Chandra, Tata Mcgraw Hill Publ.
9. Project Management, K.Nagarajan, New Age International
10. www.cidc.in

601 035—H--Elective III - Safety Practices in Construction

(1 Credit course)

Teaching Scheme :	Examination Scheme:
Lectures :1 Hr./Week	In Semester Assessment : 25 marks
Credits : 1	

Module 1:

Introduction to Construction Safety And Safety Technology--Introduction to construction safety; historical background and current perspective; Government's policy in industrial safety; safety & health legislation in India, Construction Sites (Safety) Regulations; Codes of practice; Potential hazards/risks associated with construction sites and high risk activities such as the use of hoist, Working at height and working in confined space. Safety in typical civil structures – Dams-bridges-water Tanks-Retaining walls-Critical factors for failure-Regular Inspection and monitoring. Safety in Erection and closing operation - Construction materials –Specifications – suitability – Limitations – Merits and demerits – Steel structures –Concrete structure. Workplace ergonomics including display screen equipment and manual handling, personal protective equipment, first aid and emergency preparedness, fire safety, electrical hazards.

Module 2:

Construction Safety Management and Accident Prevention

Safety training; safety policy; safety committees; safety inspection; safety audit; reporting accidents and dangerous occurrences.Accident Prevention: Principles of accident prevention; job safety analysis; fault tree analysis; accident management

References

1. *Accident Prevention Manual for Industrial Operations*, NSC, Chicago, 1982.

2. Fulman, J.B., *Construction Safety, Security, and Loss Prevention,* John Wiley and Sons,1979.

601 035 - I - Elective III - CHESS

(Audit course--Non 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

601 035 – J -Elective III ABACUS

(Audit course--Non Credit course)

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

SEMESTER III

601 036 Seminar – II

Teaching Scheme:	**Examination Scheme:**
Lectures: 4 Hours/Week	**TW: 50 Marks**
Credits: 4	**Oral/Presentation: 50 marks**

The student is required to deliver a seminar in second semester on the topic relevant to latest trends in Civil Engineering preferably on the topic of sub specialization based on the Electives selected by him/her by authority. This report shall be based on the field training aspects with respect to the electives chosen. Minimum of 15 days field training to be done before submitting this report. The student shall submit the seminar report in standard format, duly certified for satisfactory completion of the work by the concerned guide and head of the Department/ Institute.

601 037 Project Stage I

Teaching Scheme	**Examination Scheme**
Practical: 8 Hours/week	**Term Work: 50 Marks**
Credits: 8	**Oral: 50 Marks**

Project Stage-I is the integral part of the dissertation project. The project should be based on the knowledge acquired by the students during the coursework and should contribute to the needs of the society. The project aims to provide an opportunity of designing and building complete system or subsystems in an area where the students like to acquire specialized skills.

The student shall complete the part of the project that will consist of problem statement, literature review: project overview, scheme of implementation (Mathematical Model/block diagram/PERT chart, etc)and Layout & Design of setup. As a part of project stage I, the student shall deliver a presentation on advancement in Technology pertaining to selected topic.

The student shall submit the report of project work completed partly in standard format approved by the University.

SEMESTER IV

601 038 Seminar – III

Teaching Scheme:
Lectures: 5 Hours/Week
Credits: 5

Examination Scheme
TW: 50 Marks
Oral/Presentation: 50 marks

Seminar III: Shall preferably be an extension of seminar II, based on an additional field training of 15 days. The student shall submit the duly certified seminar report in standard format, for satisfactory completion of the work by the concerned guide and head of the Department/Institute.

601 039 Project Work Stage II

Teaching Scheme
Lectures: 20 Hours/Week
Credits: 20

Examination Scheme
TW: 150 marks
Oral/Presentation: 50 marks

Project Work Stage-II: In Project Work stage –II, the student shall complete the remaining part of the project which will consist of the fabrication of set up required for the project, work station, conducting experiments and taking results, analysis and validation of results and conclusions.
The student shall prepare the duly certified final report of the project work in standard format for satisfactory completion of the work by the concerned guide and head of the Department/Institute.