

**ACADEMIC REGULATIONS**  
**COURSE STRUCTURE AND SYLLABI**  
**FOR**  
**M.TECH.**  
**INFRASTRUCTURE ENGINEERING AND**  
**MANAGEMENT**  
**( CIVIL ENGINEERING)**  
**2012-2013**



**COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

**GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING**  
(AUTONOMOUS)  
ACCREDITED BY NAAC WITH A GRADE WITH A CGPA OF **3.47/4.00**  
**AFFILIATED TO JNTU KAKINADA**  
MADHURAWADA, VISAKHAPATNAM 530048



## *Vision*

*To evolve into and sustain as a Centre of  
Excellence in Technological Education  
and Research with a holistic approach.*

## *Mission*

*To produce high quality engineering graduates with the requisite theoretical and practical knowledge and social awareness to be able to contribute effectively to the progress of the society through their chosen field of endeavor.*

*To undertake Research & Development, and extension activities in the fields of Science and Engineering in areas of relevance for immediate application as well as for strengthening or establishing fundamental knowledge.*

## FOREWORD

*It is three years since the G.V.P College of Engineering has become Autonomous with the appreciation and support of erstwhile JNTU and the fast growing new JNTU-K. The college is progressing well with its programmes and procedures drawing more and more accolades from its sister autonomous colleges and higher authorities. The student community, also could adjust well to the new system without any acrimony.*

*The College is enriched with the experience of running the Post-graduate programmes under Autonomous stream. It is a moment of pride and achievement that the first Autonomous batch of M.Tech in some branches left the college to the satisfaction of all concerned including firms visited the campus for placements.*

*Another larger than canvas picture is foreseen for the programmes wherein the college is getting the funds through TEQIP - II for up-scaling the PG education and research under sub- component 1.2. In this connection two new PG Programmes have been introduced in Mechanical, Electrical Engineering.*

*New set of Boards of Studies, Academic council and Governing Body has further strengthened our hands by endorsing the practices and suggested recommendations.*

*The encouragement given by the affiliating JNTU-K has left no task insurmountable.*

*Principal*

*MEMBERS ON THE BOARD OF STUDIES  
IN  
CIVIL ENGINEERING*

- Prof. Manchikanti Srinivas, Head of the Department.
- Dr. B. Sivarama Sarma, Head R&D, L&T Construction Research & Testing Centre, Chennai.
- Prof. D.S.R. Murthy, Department of Civil Engg., A.U., Visakhapatnam.
- Prof. P. Uday Bhaskar, Department of Civil Engg., JNTU-K.
- Prof. D. Nagesh Kumar, Water Resources & Environmental Engg., Dept. of Civil Engg. , IISc., Bangalore.
- Dr. K. Raja Gopal, Professor in Civil Engineering, IIT Madras.
- Sri K. Ravi Kumar, Project Director, Sheladia Inc., Visakhapatnam.
- Ms. Hasini Alahari , M.Tech., GVPCOE.

All faculty of the department.

**ACADEMIC REGULATIONS**  
(Effective for the students admitted into  
first year from the academic year 2012-2013)

The M.Tech Degree of JNTU-KAKINADA shall be recommended to be conferred on candidates who are admitted to the program and fulfill all the requirements for the award of the Degree.

**1.0 ELIGIBILITY FOR ADMISSION:**

Admission to the above program shall be made subject to the eligibility, qualifications and specialization as per the guidelines prescribed by the APSCHE and AICTE from time to time.

**2.0 AWARD OF M.TECH. DEGREE:**

- a. A student shall be declared eligible for the award of the M.Tech. degree, if he pursues a course of study and completes it successfully for not less than two academic years and not more than four academic years.
- b. A student, who fails to fulfill all the academic requirements for the award of the Degree within four academic years from the year of his admission, shall forfeit his seat in M.Tech. Course.
- c. The duration of each semester will normally be 20 weeks with 5 days a week. A working day shall have 7 periods each of 50minutes.

### 3.0 COURSES OF STUDY:

<b>M.TECH. COURSES</b>	<b>INTAKE</b>
Chemical Engineering	18
Computer Science and Engineering	18
CAD/CAM	18
Infrastructural Engineering and Management	18
Structural Engineering	18
Power System Control and Automation	18
Embedded Systems & VLSI Design	18
Communications & Signal Processing	18
Software Engineering	18
Power Electronics & Drives	18
Computer Aided Analysis And Design (CAAD)	18

### 4.0 ATTENDANCE:

The attendance shall be considered subject wise.

- a. A candidate shall be deemed to have eligibility to write end semester examinations in a subject if he has put in at least 75% of attendance in that subject.
- b. Shortage of attendance up to 10% in any subject (i.e. 65% and above and below 75%) may be condoned by a Committee on genuine and valid reasons on representation by the candidate with supporting evidence.
- c. Shortage of attendance below 65% shall in no case be condoned.
- d. A student who gets less than 65% attendance in a maximum of two subjects in any semester shall not be permitted to take the end- semester examination in which he/she falls short. His/her registration for those subjects will be treated as cancelled. The student should re-register and repeat those subjects as and when offered next.



- e. If a student gets less than 65% attendance in more than two subjects in any semester he/she shall be detained and has to repeat the entire semester.
- f. A stipulated fee shall be payable towards condonation of shortage of attendance.

## **5.0 EVALUATION:**

The Performance of the candidate in each semester shall be evaluated subject-wise, with 100 marks for each theory subject and 100 marks for each practical, on the basis of Internal Evaluation and End Semester Examination.

- a. A candidate shall be deemed to have secured the minimum academic requirement in a subject if he secures a minimum of 40% of marks in the End Examination and a minimum aggregate of 50% of the total marks in the End Semester Examination and Internal Evaluation taken together.
- b. For the theory subjects 60 marks shall be awarded based on the performance in the End Semester Examination, 40 marks shall be awarded based on the Internal Evaluation. One part of the internal evaluation shall be made based on the average of the marks secured in the two Mid–Term Examinations of 30 each conducted one in the middle of the Semester and the other immediately after the completion of instruction. Each mid-term examination shall be conducted for a duration of 120 minutes with 4 questions without any choice. The remaining 10 marks are awarded through an average of continuous evaluation of assignments / seminars / any other method, as notified by the teacher at the beginning of the semester.
- c. For Practical subjects, 50 marks shall be awarded based on the performance in the End Semester Examinations, 50 marks

shall be awarded based on the day-to-day performance as Internal marks. A candidate has to secure a minimum of 50% in the external examination and has to secure a minimum of 50% on the aggregate to be declared successful.

- d. There shall be a seminar presentation during III semester. For seminar, a student under the supervision of a faculty member, shall collect the literature on a topic and critically review the literature and submit it to the Department in a report form and shall make an oral presentation before the Departmental Committee. The Departmental Committee consists of the Head of the Department, supervisor and two other senior faculty members of the department. For Seminar there will be only internal evaluation of 50 marks. A candidate has to secure a minimum of 50% to be declared successful.
- e. For Seminar in I, II Semesters in case of the course structure of having 5 Theory + 2 Labs. + 1 Seminar, a student has to deliver a seminar talk in each of the subjects in that semester which shall be evaluated for 10 marks each and average marks allotted shall be considered. A letter grade from A to C corresponding to the marks allotted may be awarded for the two credits so as to keep the existing structure and evaluation undisturbed.

A – Excellent	(average marks $\geq$ 8)
B – Good	( $6 \leq$ average marks $< 8$ )
C – Satisfactory	( $5 \leq$ average marks $< 6$ )

If a satisfactory grade is not secured, one has to repeat in the following semester.

- f. In case the candidate does not secure the minimum academic requirement in any subject (as specified in 4.0 a, c) he has to reappear for the End Examination in that subject.

A candidate shall be given one chance to re-register for each subject provided the internal marks secured by a candidate are less than 50% and he has failed in the end examination. In such a case the candidate must re-register for the subject (s) and secure required minimum attendance. Attendance in the re-registered subject (s) has to be calculated separately to become eligible to write the end- examination in the re-registered subject(s). In the event of re-registration, the internal marks and end examination marks obtained in the previous attempt are nullified.

- g. In case the candidates secure less than the required attendance in any subject(s), he shall not be permitted to appear for the End Examination in that subject(s). He shall re-register for the subject(s) when next offered.
- h. Laboratory examination for M.Tech subjects must be conducted with two Examiners, one of them being Laboratory Class Teacher and second examiner shall be other than Laboratory Teacher.

## **6.0 EVALUATION OF PROJECT / DISSERTATION WORK:**

Every candidate shall be required to submit the thesis or dissertation after taking up a topic approved by the Departmental Research Committee (DRC).

- a. A Departmental Research Committee (DRC) shall be constituted with the Head of the Department as the chairman and two senior faculty as members to oversee the proceedings of the project work from allotment to submission.
- b. A Central Research Committee (CRC) shall be constituted with a Senior Professor as chair person, Heads of all the

Departments which are offering the M.Tech programs and two other senior faculty members.

- c. Registration of Project Work: A candidate is permitted to register for the project work after satisfying the attendance requirement of all the subjects (theory and practical subjects.)
- d. After satisfying 6.0 c, a candidate has to submit, in consultation with his project supervisor, the title, objective and plan of action of his project work to the DRC for its approval. Only after obtaining the approval of DRC the student can initiate the Project work
- e. If a candidate wishes to change his supervisor or topic of the project he can do so with approval of DRC. However, the Departmental Project Review Committee shall examine whether the change of topic/supervisor leads to a major change in his initial plans of project proposal. If so, his date of registration for the Project work shall start from the date of change of Supervisor or topic as the case may be whichever is earlier.
- f. A candidate shall submit and present the status report in two stages at least with a gap of 3 months between them after satisfying 6.0 d.
- g. The work on the project shall be initiated in the beginning of the second year and the duration of the project is for two semesters. A candidate shall be permitted to submit his dissertation only after successful completion of all theory and practical subject with the approval of CRC but not earlier than 40 weeks from the date of registration of the project work. For the approval by CRC the candidate shall submit the draft copy of the thesis to the Principal through the concerned Head of the Department and shall make an oral presentation before the CRC.

- h. Three copies of the dissertation certified by the supervisor shall be submitted to the College after approval by the CRC.
- i. The dissertation shall be adjudicated by one examiner selected by the Principal. For this HOD shall submit in consultation with the supervisor a panel of 5 examiners, who are experienced in that field.
- j. If the report of the examiner is not favorable, the candidate shall revise and resubmit the dissertation, in a time frame as prescribed by the CRC. If the report of the examiner is unfavorable again, the dissertation shall be summarily rejected then the candidate shall change the topic of the Project and option shall be given to change the supervisor also.
- k. If the report of the examiner is favorable, viva-voce examination shall be conducted by a board consisting of the supervisor, Head of the Department and the examiner who adjudicated the dissertation. The Board shall jointly report candidate's work as:
  - A. Excellent
  - B. Good
  - C. Satisfactory

## **7.0 AWARD OF DEGREE AND CLASS :**

A candidate shall be eligible for the respective degree if he satisfies the minimum academic requirements in every subject and secures satisfactory or higher grade report on his dissertation and viva-voce.

After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of M.Tech. Degree he shall be placed in one of the following three classes.

<b>% of Marks secured</b>	<b>Class Awarded</b>
70% and above	First Class with Distinction
60% and above but less than 70%	First Class
50% and above but less than 60%	Second Class

The marks in internal evaluation and end examination shall be shown separately in the marks memorandum.

The grade of the dissertation shall also be mentioned in the marks memorandum.

#### **8.0 WITHHOLDING OF RESULTS:**

If the candidate has not paid any dues to the college or if any case of indiscipline is pending against him, the result of the candidate will be withheld and he will not be allowed into the next higher semester. The recommendation for the issue of the degree shall be liable to be withheld in such cases.

#### **9.0 TRANSITORY REGULATIONS:**

A candidate who has discontinued or has been detained for want of attendance or who has failed after having studied the subject is eligible for admission to the same or equivalent subject(s) as and when subject(s) is/are offered, subject to 6.0 e and 2.0

#### **10.0 GENERAL**

1. The academic regulations should be read as a whole for purpose of any interpretation.
2. In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Chairman Academic Council is final.

3. The College may change or amend the academic regulations and syllabus at any time and the changes amendments made shall be applicable to all the students with effect from the date notified by the College.
4. Wherever the word he, him or his occur, it will also include she, hers.

\*\*\*

## COURSE STRUCTURE

### I SEMESTER

COURSE CODE	THEORY/LAB	L	P	C
10CE2101	Infrastructure Planning and Finance Management	4	-	4
10CE2102	Contracts and Arbitration	4	-	4
10CE2103	Remote Sensing and GIS in Civil Engineering	4	-	4
10CE2104	Industrial Structures	4	-	4
10CE2105	Urban Hydrology, Storm Drainage and Management	4	-	4
	Elective-I	4	-	4
10CE2106	Management of Human Resources, Safety, and Quality in Construction			
10CE2107	Airport Planning			
10CE2108	Power Plant Design			
10CE2109	GIS Lab		3	2
<b>Total</b>		<b>24</b>	<b>3</b>	<b>26</b>

### II SEMESTER

COURSE CODE	THEORY/LAB	L	P	C
10CE2110	Construction Planning, Scheduling and Management	4	-	4
10CE2111	Construction Methods and Equipment	4	-	4
10CE2112	Environmental Impact Assessment and Management	4	-	4
10CE2113	Geotechniques for Infrastructure	4	-	4
10CE2114	Urban Transport Alternatives	4	-	4
	Elective-II	4	-	4
10CE2115	Ports & Harbour Structures			
10CE2116	Pavement Evaluation and Management			
10CE2117	Irrigation Water Distribution Systems			
10CE2118	Project Management Lab		3	2
<b>Total</b>		<b>24</b>	<b>3</b>	<b>26</b>



**III SEMESTER**

<b>COURSE CODE</b>	<b>THEORY/LAB</b>	<b>L</b>	<b>P</b>	<b>C</b>
<i>Commencement of Project Work</i>				
10CE21S1	SEMINAR	-	-	<b>2</b>

**IV SEMESTER**

<b>COURSE CODE</b>	<b>THEORY/LAB</b>	<b>L</b>	<b>P</b>	<b>C</b>
10CE2119	PROJECT WORK DISSERTATION / THESIS EXCELLENT/GOOD/SATISFACTORY/ NON-SATISFACTORY	-	-	<b>56</b>

## **INFRASTRUCTURE PLANNING AND FINANCE MANAGEMENT**

**Course Code : 10CE2101**

**L P C**  
**4 0 4**

### **UNIT - I**

**INFRASTRUCTURE:** Governing Features, Historical overview of Infrastructure development in India. Infrastructure Organizations & Systems.

### **UNIT - II**

**INFRASTRUCTURE PLANNING:** Infrastructure Project Budgeting and Funding; Regulatory Framework; Sources of Funding

### **UNIT - III**

**FINANCIAL MANAGEMENT FUNDAMENTALS:** Time value of money, cash flow, Inflation - depreciation, taxes, inflation, Personnel cost - Equipment costs – overheads

### **UNIT - IV**

**INFRASTRUCTURE FINANCE MANAGEMENT:** Life-cycle costing, evaluation of alternatives, cost-benefit analysis, Feasibility Studies.

### **UNIT - V**

**CONSTRUCTION FINANCE MANAGEMENT:** Procurement and Efficient use of resources – Statement of Changes in Financial Position (SCFP), Preparation of SCFP on Working Capital Basis, Cash Basis, and Total Resources Basis – SCFP usefulness.

### **UNIT - VI**

**FINANCIAL STATEMENT ANALYSIS:** Ratio Analysis, Working Capital (WC) Management; Capital Investing Decisions; Capital budgeting Decisions; Capital Finance Analysis;

## **UNIT - VII**

**CONSTRUCTION ACCOUNTING:** Essentials of Time Value of Money under discrete compounding; Cash flow from the points of view of contractor, owner/client, effect of contract clauses on cash flow. General features of contracting – turnkey projects.

## **UNIT - VIII**

**FINANCIAL STATEMENTS:** Accounting Conventions; Interrelationship between profit and loss accounting; Gross Profit – its determination. Trading Account; Manufacturing Account; Profit and Loss Accounting;

### **Text books:**

1. Vasant Desai, “Project Management”, Himalaya Publishing , 1st Edition , 2010
2. James C. Van Horne, John M. Wachowicz, “Fundamentals of Financial Management”, PHI, 2nd Edition, 2000
3. Ronald W Hudson, “Infrastructure Management: integrating design, Construction, maintenance, rehabilitation and renovation”, MGH, 1st Edition, 1997

### **References:**

1. The India Infrastructure Report, Ministry of Finance, Govt. of India, 2000
2. Sengupta and Guha, “Construction Management and Planning”, , TMH 2<sup>nd</sup> Edition, 2002
3. Erza, Solomon, “Theory of Finance Management”, Columbia University Press, 2nd Edition, 1996
4. Foster, George, “Financial Statement Analsis”, Englewood & Cliffs, Prentice Hall, 1st Edition, 1995
5. Mehata, Dileep R., “Working Capital Management”, Englewood & Cliffs, Prentice Hall, 1st Edition, 2000
6. Wagner, Heavy M., “Principles of Operational Research”, Englewood & Cliffs, Prentice Hall, 2nd Edition, 2008
7. Anthony, Robert N, “Accounting Principles”, Irwin Press, 3rd Edition, 2008

8. Becker, M., “Modern Accounting Theory”, Prentice Hall, 2nd Edition, 2001
9. Benjamin James J., “Financial Accounting”, Dame Publishing, 3rd Edition, 2000
10. Anderson., LP, Millar, V.V.Thomson, D.L., “The Finance Function”, Scranton, Pa, Intext Pubs, 4th Edition, 2007

\*\*\*

## CONTRACTS AND ARBITRATION

**Course Code : 10CE2102**

**L P C**  
**4 0 4**

### **UNIT-I**

**CONSTRUCTION SPECIFICATIONS:** Standard specifications, development interpretation.

### **UNIT- II**

**CONTRACTS AND MANAGEMENT OF CONTRACTS:** Engineering contracts and its formulation – Definition and essentials of a contract

### **UNIT- III**

types of contracts and clauses for contracts – Preparation of tender documents – Issues related to tendering process –Awarding contract

### **UNIT- IV**

Time Of Performance - provisions of contract law – Breach of contract.

Contracts for projects under International AID

### **UNIT- V**

Performance of Contracts- Discharge of a contract – Classification of contracts – Indian Contract Act 1872 – Extracts and variations in engineering contracts

### **UNIT- VI**

**LAWS RELATED TO CONSTRUCTION INDUSTRY :** Labour and Industrial laws – payment of wages act, contract labour Workmen’s compensation act – Insurance, Industrial dispute act.

### **UNIT- VII**

**ARBITRATION OF ENGINEERING CONTRACTS:** Indian Arbitration Act 1940 – Issues in arbitration process – Institutional

arbitration

## **UNIT- VIII**

**ALTERNATE DISPUTE RESOLUTION:** The arbitration and reconciliation ordinance 1996 – Law on contracts 1994

### **Text Books:**

1. “Codes of Practice and Standard Specifications” of AP PWD, CP WD, MES etc.,
2. “Engineering Contracts and Arbitration”, by B.J. Vasavada, Jubilee Publications, 2<sup>nd</sup> Edition., 1996
3. “Laws relating to Building and Engineer’s Contracts” by G.T. Gajaria – M.M. Tripathi Pvt. Ltd., Mumbai, 1<sup>st</sup> Edition.,1985.

### **Reference Books:**

1. “Professional Practice” by Roshan Namavat”, published by Anupbhai Publications, Mumbai, 5<sup>th</sup> Edition., 1996.
2. M.O’c Horgon and F.R. Roulstion “ Project Control of Engineering contracts E and FN, SPON, NY, 2<sup>nd</sup> Edition.,1988.
3. K. Collex, “Managing Construction Contracts”, Reston Publishing Company, Virginia,5<sup>th</sup> Edition., 1982.
4. W.B. Park “Construction Bidding for Projects”, John Wiley, Ny, 1<sup>st</sup> Edition.,1978.
5. "Latest Amenedments to latest versions of Building Bye-Laws and Engineering Contract Laws”.

\*\*\*

## REMOTE SENSING AND GIS IN CIVIL ENGINEERING

**Course Code : 10CE2103**

**L P C**  
**4 0 4**

### **UNIT-I**

**FUNDAMENTALS OF REMOTE SENSING :** Aerial photography, definition, Physics of Remote Sensing, Electromagnetic radiation and its interactions with Atmosphere, Spectral reflectance of Earth objects.

### **UNIT-II**

**DATA ACQUISITION-1 :** Various platforms, Satellite sensors.

### **UNIT -III**

**DATA ACQUISITION -2 :** Satellite sensors, it is characteristics – Optical, Thermal and Microwave, Different types of data products and their characteristics, Satellite data – acquisition, storage and retrieval.

### **UNIT -IV**

**DATA ANALYSIS :** Visual interpretation, Digital Image Processing – principles, correction, pre-classification processing, classification techniques.

### **UNIT -V**

**GIS-1 :** Introduction to GIS – concepts, different modules – decision making.

### **UNIT -VI**

**GIS-2 :** Exposure to various GIS softwares.

## **UNIT -VII**

### **REMOTE SENSING AND GIS APPLICATIONS-1 :**

Conservation and management of natural resources – Land use/land cover mapping – soil and landform studies – Agricultural use – Forestry studies –Wasteland management – site selection studies - Flood control – Urban and Coastal Zone Management.

## **UNIT -VIII**

### **REMOTE SENSING AND GIS APPLICATIONS-2 :**

Air Pollution – EIA – Detection and identification of pollution sources of surface and ground water – water quality mapping and monitoring.

#### **Text Books :**

1. Lillesand T.M. and Kiefer R.W. “Remote Sensing and Image Interpretation”, John Wiley and Sons, 5<sup>th</sup> Edition , 2008.
2. Peter A Burrough, Principles of Geographical Information systems’, oxford publisher, 1<sup>st</sup> Edition , 1998.
3. M. Anji reddy, Remote Sensing and Geographical Information Systems”, B.S. Publications, 3<sup>rd</sup> Edition , 2006.

#### **References :**

1. K.M. Chandra, S.K. Ghosh, Remote Sensing and Geographical Information System”, Narosa Publishing house, 1<sup>st</sup> Edition, 2007.
2. Bernhardsen, Geographic Information Systems, An Introduction”, John Wiley Sons, 3<sup>rd</sup> Edition, 2006.
3. David P. Paine, Aerial Photography and image Interpretation”, Wiley, Higher Education, 2<sup>nd</sup> Edition , 2006.

\*\*\*



## INDUSTRIAL STRUCTURES

**Course Code : 10CE2104**

**L P C**  
**4 0 4**

### UNIT- I

#### **PLANNING AND FUNCTIONAL REQUIREMENTS:**

Classification of Industrial structures - Choice of site - General requirements of different types of industries for safety, space requirements, services and landplaning for Layout Requirements regarding Lighting, Ventilation and Fire Safety - Protection against noise and vibration - Guidelines from Factories Act. Codes of practice in the design and construction

### UNIT- II

#### **LOADS ON INDUSTRIAL BUILDINGS, VARIOUS**

**CONFIGURATIONS** - Loads on Industrial structures – Gravity load, Live load, wind load and Earthquake load - Configuration of various Industrial buildings, Need for large column free areas - Various types of Floors, Roofs and Roof coverings.

### UNIT- III

**MATERIALS:** Properties of Concrete, Steel, R.C.C, and Pre stressed Concrete, Aluminum, PVC that affect the structural performance – relative merits and demerits – suitability as construction material in Industrial Structures.

### UNIT-IV

**STEEL PORTAL FRAMES:** Introduction to Plastic Analysis - Shape factor – Plastic moment carrying capacity of simple beams and portal frames – Design of steel portal frames with and without Gantry girders.

### UNIT- V

**STEEL TRUSS:** Analysis and Design of different types of Roof Trusses, Tower cranes and Transmission line and Communication towers. Analysis and design of bracing systems in industrial sheds.

## **UNIT- VI**

**INDUSTRIAL FLOORS AND ROOFS:** Classification of plates and shells – principles involved in the analysis and design of plates, shells and cable stayed structures. Approximate analysis and design of single layered and double layered steel grids. Steel – Concrete composite floors. Analysis and design of Grid floors and Flat slabs

## **UNIT- VII**

**BUNKERS, SILOS AND CHIMNEYS:** Analysis and Design of Bunkers, Silos and Chimneys

## **UNIT- VIII**

**PREFABRICATION AND CONSTRUCTION TECHNIQUES:** Pre-casting techniques - Planning, analysis and design considerations suitability for Industrial structures. Handling techniques – Transportation, Storage and erection of structures. Test on precast elements - Quality control - Repairs and economical aspects on prefabrication.

### **Textbooks**

1. Duggal, “S.K., Design of Steel Structures”, Tata McGraw-Hill Publications, 3<sup>rd</sup> Edition, 2006
2. Krishna Raju N. “Advanced Reinforced Concrete Design”, CBS Publishers and Distributors, 2<sup>nd</sup> Edition , 2006
3. Teaching Resource for Structural Steel Design – INSDAG, Kolkatta, 2008

### **References:**

1. IS: 456 – 2000, IS: 800 – 2007, IS: 875 – 1964, BIS, New Delhi
2. Large Panel Prefabricated Constructions, Proc. of Advance Course by SERC, Madras, 2004
3. National Building Code, BIS, New Delhi, 20055.
4. Subrahmanyam, N., “Space Structures”. Wheeler & Co., 1<sup>st</sup> Edition, 1999

## **URBAN HYDROLOGY, STORM DRAINAGE AND MANAGEMENT**

**Course Code : 10CE2105**

**L P C**

**4 0 4**

### **UNIT- I**

**URBAN HYDROLOGIC PROCESS** : Process of urbanization – Water in Urban ecosystem – Urban water subsystems – Urban hydrologic cycle. Impact of urbanization on urban runoff and stream flow quantity – Impact of urbanization on quality of runoff and stream flow – Erosion due to urban runoff.

### **UNIT- II**

**STORMWATER MODELLING** : Analysis of hydrologic changes due to urbanization- Approaches to study – Data collection and analysis – Probabilistic and statistical approaches.

### **UNIT- III**

Modelling of urban water quantity – Types of models – Rainfall, Runoff modeling ; urban watershed modeling (quantity) – Rational Method (or coefficient method), Runoff hydrograph, unit hydrographs – 10 min synthetic unit hydrograph – Linear reservoir model (Viessman) – Chen and Shubinski model – QUURM Model – TVA model. Urban watershed modelling for water quality of runoff and stream water quality.

### **UNIT- IV**

**URBAN DRAINAGE SYSTEMS** : Sanitary and combined sewer systems – components – Design considerations for fixing sewer capacity – Infiltration into and exfiltration from sewers -causes – Infiltration inflow analysis – Field investigations – Control measures.

### **UNIT- V**

Design consideration of the components of the sewer systems – Performance of the sewer system both under dry weather flow condition and under storm water impact - Sewer sediment.

## **UNIT- VI**

**STORM WATER MANAGEMENT** : Urban storm runoff quantity and quality management – Mitigation of damaging effects of urban storm runoff

## **UNIT- VII**

Structural and non-structural control measures – Storm water management models.

## **UNIT- VIII**

**URBAN DRAINAGE SYSTEMS MAINTENANCE** : Maintenance management of UDS and its subsystems – Drainage system – Storm drain conveyance system – Pump stations – Open channel – Illicit connections and discharges – Spill response – Other considerations (limitations and regulations).

### **Text Books :**

1. Stephenson.D, “ Stormwater Hydrology and Drainage “, Elsevier Publications, 2nd Edition, 1981
2. Hall.J.M, “Urban Hydrology”, Elsevier Applied Science Publishing Company, 1st Edition, 1984.
3. Overtens D.E., and Medows M.E., “Storm water Modelling” Academic Press, 2nd Edition. 1976.

### **References :**

1. Grigg, N.S, “Urban Water Infrastructure Planning, Management, and Operations”, John Wiley & Sons, 2nd Edition, 1986.
2. Viessman W.I., Knapp J.W., Lewis G.L., and Henbrough, T.E., “Introduction to Hydrology” Harper and Row Publishing Company, 2nd Edition , 1977.
3. “Manual of Sewerage and Sewage Treatment”, Ministry of works and Housing, Government of India, 2006

\*\*\*

**MANAGEMENT OF HUMAN RESOURCES, SAFETY,  
AND QUALITY IN CONSTRUCTION  
(ELECTIVE – I)**

**Course Code : 10CE2106**

**L P C  
4 0 4**

**UNIT- I**

**HUMAN RESOURCES MANAGEMENT:** Introduction – Concept – Growth – Role and function. Manpower Planning for Construction Companies – Line & Staff function

**UNIT- II**

**HUMAN RESOURCES MANAGEMENT:** Recruitment, selection, placement, Induction and training ; over staffing ; Time office and establishment functions ; wage and salary administration – Discipline –Separation.

**UNIT- III**

**LABOUR LEGISLATION:** Labour laws – Labour law relating to construction industry – Interstate migration- Industrial relations – Collective Bargaining – Worker’s participation in management

**UNIT- IV**

Grievance handling- discipline – role of law enforcing agencies and judiciary – women in construction industry.

**UNIT- V**

**SAFETY MANAGEMENT:** Importance of safety – causes of accidents – responsibility for safety – Role of various parties in safety management – safety benefits – approaches to improve safety in Construction for different works – Measuring safety

## **UNIT- VI**

**SAFETY** : Application of Ergonomics to the construction industry – Prevention of fires at construction site – Safety audit.

## **UNIT- VII**

**QUALITY MANAGEMENT IN CONSTRUCTION**: Importance of quality ; Elements of quality – quality characteristics – design quality – quality conformance, contractor quality control – Importance of specifications – Incentives and penalties in specifications – Workmanship as a mark of quality – Final Inspection.

## **UNIT- VIII**

Quality assurance techniques – Inspection, testing, sampling. Documentation – Organisation for quality control.

### **Text Books :**

1. Arya Ashok, “Human Resources Management – Human Dimensions in Management”, Span Publication, 1st Edition, 2000
2. Arya Ashok, “Essence of Labour Laws”, Span Publication, 2nd Edition, 2003
3. Arya Ashok, “Discipline & Disciplinary procedure”, Span Publication, 2nd Edition, 2003
4. Malik, P.L., “Industrial Law”, Eastern book company, 1st Edition, 2001

### **References :**

1. “Various Bare Acts”, Universal Law Publishing Company Private Limited, G.T.Karnal Road, Delhi, 1st Edition, 2000
2. Josy J. Farrilaro, “Hand Book of Human Resources Administration” Mc.Graw Hill (International Edition), 3rd Edition, 1987.
3. Manoria,C.B., “Personnel Management”, Himalaya Publishing House, 1st Edition., 1992.
4. Dwivedi R.S , “Human Relations and Organisational Behaviour” , 3rd Edition, 1987

5. Corlecon Coulter, Jill Justice Coulter, "The Complete Standard Hand Book of Construction Management", Prentice Hall, 2nd Edition, 1989.
6. Juran Frank, J.M. and Gryna F.M. "Quality Planning and Analysis", Tata Mc Graw Hill, 2nd Edition, 1982.
7. Grant E.L., and Leavens worth, "Statistical Quality Control", Mc Graw Hill, 1st Edition, 1984.
8. James J Obrien, "Construction Inspection Hand Book – Quality Assurance and Quality Control", Van Nostrand, New, 2nd Edition, 1989.
9. "Quality Systems in Construction", Engineering Foundation Conference, California, ASCE, 1971
10. Clough R.H. "Construction Contracting", John Wiley & Sons, 5th Edn, 1986
11. Collier, K "Construction Contracts", Reston publishing co., Reston, 1st Edition , 1979
12. Virmani, B.D., "Compedium of words and phrases used in Building Contracts" Engineering Law Publications of India, , 1st Edition, 1965
13. Sengupta and Guha, "Construction Management and Planning", TMH 2nd Edition, 2002

\*\*\*

## AIRPORT PLANNING (Elective-I)

**Course Code : 10CE2107**

**L P C**  
**4 0 4**

### **UNIT – I**

Air transportation; Classification and size of airports; Aircraft characteristics.

### **UNIT – II**

Air traffic control.

### **UNIT – III**

Airport location and necessary surveys.

### **UNIT – IV**

Planning, layout of Air Port.

### **UNIT – V**

Runways,

### **UNIT – VI**

Taxiways and Aprons.

### **UNIT – VII**

Terminal service facilities - passenger, baggage and cargo handling systems; Lighting, visual aids, airport drainage.

### **UNIT – VIII**

Operations and scheduling; Ground transportation facilities; Airport capacity and delays.



**Text books:**

1. Khanna S.K., Arora M.G., Jain S.S., “Airport Planning & Design”, Nemchand Bros., 1<sup>st</sup> Edition , 1994.
2. Alexander T.Wells, Ed.D & Seth, B. Young, “Airport Planning and Management’, Mc Graw Hill 5<sup>th</sup> Edition, 2008.
3. Robert Horonjeff, Francis McKelvey, William Sproule and Seth Young, “Planning and Design of Airports” Mc Graw Hill 5<sup>th</sup> Edition, 2010.

**References:**

1. Heronjeff, R, Mc Kelvey, F.X, Planning & Design of Airports, Mc Graw Hill Book Co, 2<sup>nd</sup> Edition, 1994.
2. Lynn S. Bezilla, “Practical guide for Planners and Airport Managers, Mc Graw Hill, 2<sup>nd</sup> Edition, 2005.
3. Norman J. Ashford, Saleh Mumayiz and Paul H. Wright, “Planning, Design and Development of 21<sup>st</sup> Century Airports”, Mc Graw Hill 4<sup>th</sup> Edition, 2011

\*\*\*

**POWER PLANT DESIGN  
(ELECTIVE I)**

**Course Code : 10CE2108**

**L P C  
4 0 4**

**UNIT – I**

**Power Plants :** Planning and Layout of different types of Power plants.

**UNIT – II**

**Chimneys:** Analysis and Design of Chimneys. IS codal provisions.

**UNIT – III**

**Cooling Towers :** Induced draught and natural draught cooling towers.

**UNIT – IV**

**Foundation:** Machine foundations & Turbo generator foundations.

**UNIT – V**

**Material Handling Structures:** Silos and Bunkers

**UNIT – VI**

**Intake Towers:** Dams, wells and Intake galleries

**UNIT – VII**

**Storage Structures:** Analysis and Design of ware house structures.

**UNIT – VIII**

**Supporting structures for equipment:** Introduction, Analysis and Design

**Text Books:**

1. Srinivasulu, P and Vaidyanathan, G.V., “Handbook of Machine Foundations”, Tata McGraw Hill, 2<sup>nd</sup> Edition, 1999
2. Vijay K. Puri and Shamsheer Prakash, Foundations for Machines: Analysis and Design (Series in Geotechnical Engineering), John Wiley & Sons, 2<sup>nd</sup> Edition., 2000

**References:**

1. Krishna Raju N. “Advanced Reinforced Concrete Design”, CBS Publishers and Distributors, 2<sup>nd</sup> Edition, 2006
2. Eldey Mc. K., Naxey Brooke K.K. “The Industrial Cooling Tower with special reference to design, construction, operation and maintenance of water cooling tower”. Elsevier Publishing company, 1<sup>st</sup> Ed., 1990

\*\*\*

**GIS LAB****Course Code : 10CE2109****L P C**  
**0 3 2**

1. Rectification, checking rectification accuracy
2. Digitization.
3. Editing of Map elements.
4. Downloading and Opening an image, Importing
5. Attribute Data entry and Manipulation.
6. Classification –supervised & unsupervised
7. Subsetting & mosaicing
8. Modelling with attribute data.
9. Data Analysis – Reclassification, overlay, buffer.
10. DEM Generation and Drapping of Image.
11. Network Analysis.
12. Map Generation with patterns, legends.

**Software :**

1. Arc GIS 9.0
2. ERDAS 8.7
3. Mapinfo 6.5

Any one or Equivalent

**Text Book :**

Albert, C.P.L.O., and Yong, K.W., Concept and Techniques of GIS  
by Prentice Hall Publishers, 1st ed, 2001

\*\*\*

## CONSTRUCTION PLANNING, SCHEDULING AND MANAGEMENT

Course Code : 10CE2110

L P C  
4 0 4

### UNIT- I

Introduction to project planning, scheduling –methods of scheduling – bar chart – mile stone chart – controlling. Job layout work break down structure –LOB technique.

### UNIT- II

Network techniques in construction management – terms and definitions. Events – activities –dummies – types of networks – creating network schedule – rules –advantages of net works.

### UNIT- III

PERT and CPM net works – application to construction problems.

### UNIT- IV

Precedence networks – advantages – Logic or precedence networks – applications.

### UNIT- V

Direct cost, indirect cost and total cost. Cost control in construction – importance of cost control and its objectives

### UNIT- VI

Optimization of cost through network contraction – Linear programming methods for cost optimization : Critical path using L.P. project cost formulation – non-linear cost time trade off.

### UNIT- VII

Resources analysis, smoothing and scheduling.

### UNIT- VIII

Project updating – methods of updating.

**Text Books:**

1. Moder J.J. Philips, C.R. and Davis, E.W. “Project Management with CPM and PERT, and precedence diagramming”, C.B.S. Publishers and distributors, , 1<sup>st</sup> Edition., 1986.
2. Pilcher, R. “Project Cost Control in Construction”, Collins, , 2<sup>nd</sup> Edition., 1992.

**Reference Books:**

1. Brien J.J., CPM in “Construction Management”, Mc. Graw Hill Book Company, Inc., 2<sup>nd</sup> Edition, 1971.
2. S.Seetharaman, “Construction Engineering and Management”, Umesh publications, 4<sup>th</sup> Edition, 1999

\*\*\*

## CONSTRUCTION METHODS AND EQUIPMENT

Course Code : 10CE2111

L P C  
4 0 4

### UNIT- I

**SUBSTRUCTURE** : Digging and excavation of trenches – Grading – Special earth work excavation – Drilling and blasting techniques. Pile driving techniques – sinking wells.

**SUPERSTRUCTURE** : Concrete and reinforced concrete works – forms work – reinforcement – concreting – mechanized methods of erection of Buildings and installations. Cast-in-situ and pre-cast concrete. Concreting below G.L. – wall in situ method for cast in situ and precast concrete – under water concreting design of forms.

### UNIT- II

**ERECTION OF CONSTRUCTION UNITS:** different types – scaffolding . Erection of steel structures – Tunneling techniques. Pre cast and prefabricated construction – need and advantages. Modular co-ordination – I.S. recommendations for modular planning, standardization, mass production and methods of transportation.

### UNIT- III

**CONSTRUCTION EQUIPMENT AND MACHINERY** : Earthmoving Equipment Power shovels, Back hoe, Dragline, Clam shell; Tunneling machine – types.

### UNIT- IV

**EXCAVATING EQUIPMENT** : Scraper, Bulldozer.

**COMPACTING EQUIPMENT** :Smooth wheel roller sheep-foot roller – Pneumatic typed rollers.

### UNIT- V

**CONSTRUCTION EQUIPMENT:** Hoisting equipment – such as hoist winch, hoisting chains, and hooks and slings, various types of cranes –tower crane, mobile crane and derrick crane. Their characteristics, performance and safety in operation.

## **UNIT- VI**

**HAULING EQUIPMENT** : Dump trucks and dumpers.

**CONVEYING EQUIPMENT** : Belt Conveyors, Screw conveyor, Bucket conveyor.

## **AGREEMENT AND CONCRETE PRODUCTION EQUIPMENT**

Concrete mixers, truck mixers, pneumatic concrete placer, concrete vibrators. Pile Driving Equipment - Tunneling and rock drilling equipment – Pumps and dewatering equipment.

## **UNIT- VII**

**TIME AND MOTION STUDIES:** process charts – application of queuing or wait line models management of construction equipment

## **UNIT- VIII**

**MANAGEMENT OF CONSTRUCTION EQUIPMENT:** Need for mechanization of construction – planning and financing construction plant and equipment – Owning and operating equipment versus hiring – planning for infrastructure mechanization equipment management – equipment maintenance and repair.

### **Text Books :**

1. Robert L.P and J.S.Clifford , “Construction planning Equipment methods” Tata Mc Graw Hill., 2<sup>nd</sup> Edition,2003.
2. S.Seetharaman, “Construction Engineering and Management”, Umesh publications, New Delhi, 4<sup>th</sup> Edition, 1999
3. Mahesh varma, , “Construction Equipment and its Palnning and Applications”, Metroplolitan Book Co. Publishers, 5th Edition, 2005

### **References :**

1. Sengupta and Guha, “Construction Management and Planning”, TMH 2nd Edition, 2002
2. Rangwala, S.C., “Construction of Structures and Management of Works” (Charotar publishers), 5th Edition, 2005.



3. Srivatsava, U.K., “Construction Planning and Management “Galgotia Publications Pvt. Ltd., 1st Edition, 1999
4. Peurifoy, R.L., “Construction Planning, Equipment and Methods”, 2nd Edition, 1996
5. “Construction Machinery and Equipment in India”. (A compilation of articles Published in Civil Engineering and Construction Review) Published by Civil Engineering and Construction Review, New Delhi, 1991.
6. Jay P.K. “Hand Book of Construction Management” – Mamillan India Ltd., 1st Edition., 1990.
7. National Building Code, ISI, New Delhi, 2005.
8. Levitt, R.E. and Samelson, N.M. “Construction Safety Management”, Mc. Graw Hill Book Company, Inc., 1st Edition, 1991.
9. Adrian J.J. “Construction Productivity Improvement”, Elsevier, 2nd Edition, 1987.
10. Ghalot P.S. and Dhir B.M., “Construction Management”, Wiley-Eastern, 2nd Edition, 1999

\*\*\*

## ENVIRONMENTAL IMPACT ASSESSMENT AND MANAGEMENT

Course Code : 10CE2112

L P C  
4 0 4

### UNIT – I

Introduction – Environment and its interaction with human activities. Environmental imbalances, basic concepts of E.I.A., Element of E.I.A. Environmental attributes, Indicators – Screening and Scoping Environmental Impact Statement (E.I.S).

### UNIT – II

Environmental Setting – Environmental Inventory, environmental indicators – Parameters, Indicators for terrestrial subsystems, Indicators for aquatic subsystems, socio-economic indicators, indicators for health and nutrition.

### UNIT – III

Environmental Impact Assessment methodologies – Important consideration for choosing a methodology ; categorization of methodologies. Review criteria, Environmental Management Plan (EMP). Step by step procedure for preparing on E.I.A.

### UNIT – IV

Prediction and Assessment of Impacts on the Air Environment, on the surface water environment, on vegetation & wild life.

### UNIT – V

Prediction and Assessment of impacts on soil and groundwater environment ; On the biological environment, on the socio –economic environment.

## **UNIT – VI**

Prediction and Assessment of impacts on the cultural environment.  
Decision methods for evaluation of alternatives, public participation.

## **UNIT – VII**

Environmental Audit – Environmental legislation, objectives  
Environmental Audit, types, audit  
protocol, evaluation of audit data and preparation of audit report.

## **UNIT – VIII**

Preparation of Impact Assessment for some industries and case  
studies – standard and mandatory requirements.

### **Text Books :**

1. Canter L.W. Mc. Graw Hill Publication Publication Co., 1st Edition  
1996
2. Jain, R.K. , Urban, L.V. Stray, G.S. “Environmental Impact  
Analysis” Van Nastrand Reinhold Company, 2nd Edition, 2004
3. Anjaneyulu, Vall Manickam., Environmental Impact Assessment  
Methodologies, B.S. Publications, 1st Edition, 2000

### **Reference Books :**

1. Ran J.G. & Wooten, D.C., Environmental Impact  
Assessment” Mc Graw Hill Publication Company, 2nd  
Edition, 1999
2. Methodologies, Guidelines for the integrated Environmental  
evaluation of water Resources Development,  
UNESCO/UNEP, Paris, 1990.
3. Betty Bowers Mariott, “A Practical Guide on Environment  
Impact Assessment”

\*\*\*

## **GEOTECHNIQUES FOR INFRASTRUCTRE**

**Course Code : 10CE2113**

<b>L</b>	<b>P</b>	<b>C</b>
<b>4</b>	<b>0</b>	<b>4</b>

### **UNIT- I**

#### **BEARING CAPACITY OF SHALLOW FOUNDATIONS**

Factors affecting bearing capacity, effect of size of foundation, shape, depth & Inclination of load, load eccentricity, inclination of base of foundation, footings on sloping ground & stratified soils.

### **UNIT – II**

#### **RAFT FOUNDATIONS**

Types, loads on rafts, stiffness / rigidity of soil structure system ; allowable soil pressures for rafts in cohesionless & cohesive soils, calculation of bearing capacity of raft foundation.

### **UNIT – III**

#### **PILE FOUNDATIONS**

Lateral load carrying capacity, introduction to p-y method and Evans & Duncan's methods. Effect of pile group on lateral load carrying capacity.

### **UNIT – IV**

#### **FOUNDATIONS FOR TRANSMISSION LINE TOWERS & CHIMNEYS**

Behaviour of pad and chimney foundations, geotechnical design of chimney and pad foundation, geotechnical design of foundations for concrete towers and chimneys.

### **UNIT – V**

#### **FOUNDATIONS ON WEAK SOILS**

Soil improvement and foundation techniques for construction on weak and compressible soils. Foundation techniques on expansive soils, estimating heave, typical structural distress patterns.

## **UNIT – VI**

### **REINFORCED EARTH STRUCTURES**

Components of Reinforced Earth Structures, Mechanism, internal and external stability of Reinforced Earth Structures, basics of design of components of Reinforced Earth Structures.

## **UNIT – VII**

### **SHEET PILE WALLS & ANCHORED BULKHEADS**

Materials used, types of sheet pile walls, analysis of cantilever sheet pile walls in cohesionless & cohesive soils, stability analysis of anchored bulkheads by free & fixed earth support methods.

## **UNIT – VIII**

### **DRAINAGE & DEWATERING METHODS**

Requirements of filters used in earth dams, control of seepage through earth structures, open sumps and ditches, well point systems, deep well drainage, vacuum dewatering, electro osmosis methods, design steps for dewatering systems, capacity of pumps required. Types of drains & their components.

### **TEXT BOOKS:**

1. Varghese, P.C., Foundation Engineering, Prentice Hall of India, 2<sup>nd</sup> Edition, 2009
2. Bowles, J.E., Foundation Analysis and Design, Mc Graw Hill, 5<sup>th</sup> Edition, 2006
3. Purushotham Raju, Soil Mechanics and Foundation Engineering, Pearson Education, 2<sup>nd</sup> Edition, 2008

### **REFERENCE BOOKS:**

1. Purushotham Raju, Ground Improvement Techniques University Science Press, 3<sup>rd</sup> Edition, 2002.
2. M.P. Mosely, K.Krish, “Ground Improvement”, Sponpress, 1<sup>st</sup> Edition, 2004.
3. Swami Saran, “Analysis and Design of substructures”, Oxford Publishers, 3<sup>rd</sup> Edition, 2006.

\*\*\*

## URBAN TRANSPORT ALTERNATIVES

Course Code : 10CE2114

L P C  
4 0 4

### UNIT-I

**TRANSPORT PLANNING PROCESS :** Systems approach to transport planning- Land use transport interaction.

### UNIT-II

#### **TRAFFIC SURVEYS AND FORECASTING**

Survey and analysis of existing conditions – Forecast analysis of future conditions and plan synthesis – Transportation surveys analysis and application.

### UNIT-III

#### **STAGES IN TRANSPORT PLANNING :**

Trip generation – theory and modelling techniques – Trip distribution – theory and modelling techniques and methodologies.

### UNIT-IV

#### **STAGES IN TRANSPORT PLANNING**

Trip assignment – theory and modelling techniques and methodologies – Modal split- theory and analytical techniques.

### UNIT-V

**LAND USE TRANSPORT MODELS :** Selection of land use transport models – Systems dynamics principles and application – Model building techniques and validation – Transport modes, technology and selection.

### UNIT-VI

**TRANSPORT ECONOMICS AND ENVIRONMENT :** Economic evaluation of transport plans – Vehicle operating costs – Value of travel time savings and accident costs – Fuel crisis and promotion of public transport. Severance and land consumption.

## **UNIT-VII**

### **ENVIRONMENTAL FACTORS**

Environmental areas – Air and noise pollution standards and abatement techniques.

## **UNIT-VIII**

### **TRANSPORT SYSTEMS :**

Planning and design issues of various transport systems – Bus, Train, Tram, LRT, Waterways – Capacity and space utilization – Containers in transportation – Integrated planning of various transport systems.

### **Text Books :**

1. David Hensher and others (Eds), Proceedings of Seventh World Conference on Transport Research : Volume 1 – Travel Behaviour, Volume 2 – Modelling Transport Systems, Volume 3 – Transport Policy, Volume 4 – Transport Management, Pergamon Press, USA, 1996.
2. John W. Dickey, “Metropolitan Transportation Planning,” Tata McGraw-Hill Publishing Company Ltd, 2<sup>nd</sup> Edition 1980.
3. Michael D. Meyer and Eric J. Miller, Urban Transportation Planning : A Decision Oriented Approach, McGraw-Hill Book Company, 2<sup>nd</sup> Edition, 1984.

### **References:**

1. Thirumurthy A.M., “Environmental Facilities and Urban Development in India –A System Dynamic Model for Developing Countries”, Academic Foundations, 1<sup>st</sup> Edition., 1992.
2. Kadiyali, “Traffic Engineering and Transport Planning”, Khanna Publishers, 12<sup>th</sup> Edition.
3. James H. Banks, “Introduction to Transportation Engineering”, Tata McGraw Hill, 2<sup>nd</sup> Edition.

\*\*\*

## PORTS AND HARBOUR STRUCTURES (ELECTIVE II)

**Course Code : 10CE2115**

**L P C**  
**4 0 4**

### **UNIT-I**

**INTRODUCTION:** Ports and harbours as the interface between the water and land infrastructure – an infrastructure layer between two transport media.

### **UNIT-II**

**THE FUNDAMENTALS:** Wave conditions inside harbour, water circulation; breakwaters, jetties & quay walls; mooring, berthing and ship motion inside the port; cargo handling – bulk material storage & handling.

### **UNIT-III**

**DESIGN ISSUES:** Sea port layout with regards to (1) wave action (2) siltation (3) navigability berthing facilities.

### **UNIT-IV**

**DESIGN OF PORT INFRASTRUCTURES :** Design of port infrastructures with regards to (1) cargo handling (2) cargo storage (3) integrated transport of goods, planning multipurpose port terminals.

### **UNIT-V**

**PORT OPERATIONS:** Allowable wave conditions for cargo handling, wave conditions for human safety on quays and breakwaters, forcecasting/nowcasting of wave & current conditions for port operations, dredging and navigability, hazard scenarios; VTMS & management of computerized container terminal, safety & environment (handling of fire, oil spill, rescue, etc.).



## **UNIT-VI**

**INLAND WATERWAYS AND PORTS:** maintenance of waterways, construction of environmentally engineered banks, dredging, processing and storing of polluted dredged materials, development of river information services.

## **UNIT-VII**

**CONSTRUCTION ASPECTS :** Planning and construction of expansion and renovation of existing Inland Port Infrastructure.

## **UNIT-VIII**

**SUSTAINABILITY:** Global trade and port restructuring/reforms, impact of possible climate change scenarios, sustainable development strategies for cities and ports.

### **Text Books:**

1. Muir Wood, A.M., and Fleming. C.A., “Coastal Hydraulics Sea and Inland Port Structures”, Hallstead Press, 1<sup>st</sup> Ed., 2002
2. Ozha & Ozha, “Dock and Harbour Engineering”, Charotar Books, Anand., 1<sup>st</sup> Ed., 1990

### **References:**

1. S.Seetharaman, “Construction Engineering and Management”, Umesh publications, New Delhi, 4<sup>th</sup> Edition, 1999
2. Richard L. Silister, “Coastal Engineering Volume I & II, Elsevier Publishers, 2000
3. Pera Brunn, “Port Engineering”, Gulf Publishing Company, 1<sup>st</sup> Ed., 2001

\*\*\*

**PAVEMENT EVALUATION AND MANAGEMENT  
(ELECTIVE – II)**

**Course Code : 10CE2116**

**L P C  
4 0 4**

**UNIT – I**

**PAVEMENT SURFACE CONDITION & ITS EVALUATION:**

Various Aspects of Surface and their Importance; Causes, Factors Affecting, Deterioration and Measures to Reduce:

**UNIT – II**

**RIDING QUALITY** : Measurement of Skid Resistance, Unevenness, Ruts and Cracks. Pavement Surface Condition Evaluation by Physical Measurements, by Riding Comfort and Other Methods; their Applications. Surface unevenness-Bump Integrator

**UNIT – III**

**PAVEMENT STRUCTURE & ITS EVALUATION-I:** Factors affecting Structural Condition of Flexible and Rigid Pavements; Effects of Subgrade Soil, Moisture, Pavement Layers, Temperature, Environment and Traffic on Structural Stability, Pavement Deterioration.

**UNIT – IV**

**PAVEMENT STRUCTURE & ITS EVALUATION-II:** Evaluation by Non-Destructive Tests such as FWD, Benkelman Beam Rebound Deflection, Plate Load Test, Wave Propagation and other methods of Load Tests; Evaluation by Destructive Test Methods, and Specimen Testing

**UNIT – V**

**PAVEMENT OVERLAYS & DESIGN-I** : Pavement Overlays, Design of Flexible Overlay over Flexible Pavement by Benkelman Beam Deflection and other Methods.

## **UNIT – VI**

**PAVEMENT OVERLAYS & DESIGN-I :** Flexible Overlays and Rigid Overlays over Rigid Pavements, Use of Geosynthetics in Pavement Overlays.

## **UNIT – VII**

**PAVEMENT MANAGEMENT SYSTEM:** Concepts of pavement management systems, pavement performance prediction – concepts, modeling techniques, structural conditional deterioration models. HDM.

## **UNIT – VIII**

**MODELS AND OPTIMISATION METHODOLOGIES:** Mechanistic & empirical models, functional condition deterioration models, unevenness deterioration models and other models, ranking and optimization methodologies.

### **Text Books:**

1. Yoder E.J. and Witzak, Principles of Pavement Design, John Wiley and Sons, 2<sup>nd</sup> Ed., 1975.
2. Shahin, M Y, Pavement Management for Airport, Roads and Parking lots, Chapman and Hall, 1<sup>st</sup> Ed., 1994
3. Huang, Yang H., Pavement Analysis and Design, Prentice Hall, 3<sup>rd</sup> Ed., 2009

### **Reference Books:**

1. Babkov, Road Conditions and Traffic Safety, Mir Publications, 1<sup>st</sup> Ed., 1975
2. Woods, K.B., Highway Engineering Hand Book, McGraw Hill Book Co., 1<sup>st</sup> Edition, 1960
3. David Croney, The Design and Performance of Road Pavements, HMSO Publications, 2<sup>nd</sup> Edition, 1991
4. Haas and Hudson, Pavement Management System, McGraw Hill Book Co., New York, 2<sup>nd</sup> Edition, 1978
5. Per Ullitz, Pavement Analysis, Elsevier, Amsterdam, 1<sup>st</sup> Edition, 1987
6. HRB/TRB/IRC/International Conference on Structural Design of Asphalt Pavements, 2000

## **IRRIGATION WATER DISTRIBUTION SYSTEMS (ELECTIVE II)**

**Course Code : 10CE2117**

**L P C  
4 0 4**

### **UNIT- I**

**INTRODUCTION** : Irrigation development in India – type of irrigation system – method of distribution – RWS, Warabandi, Shejpati and localisation.

### **UNIT- II**

**DISTRIBUTION WORKS** : Types of Head works – Classification of Channels – Regulations

### **UNIT- III**

Drops Canal escapes – Sluices – Sand vent – Tail dams – Syphons.

### **UNIT- IV**

**Canal** : Design of erodible – non-erodible channels – division box – diversion box – outlet – proportional diviers – bed dam –

### **UNIT- V**

block / chak design – commandability – realignment of block – operation and maintenance.

### **UNIT- VI**

**CLOSED CONDUIT DISTRIBUTION** : Drip – Sprinkler – Underground pipe design – Layout – Evaluation – Operation and Maintenance.

### **UNIT- VII**

**FLOW MEASUREMENTS** : Flow measuring structures – Flumes Weirs – Orifices –

## **UNIT- VIII**

Dilution Techniques –Channel transitions – Canal losses –  
Measurement of losses.

### **Reference Books:**

1. Varshney R.S., Gupta S.C. and Gupta R.L., “Theory and Design of Irrigation Structures”, Nemchand & Brothers, Roorkee, 2nd edition, 1992.
2. Michael A.M., “Irrigation Theory and Practice”, Vikas Publishing House Pvt. Ltd., 2nd edition, 1995.
3. Sharma R.K., “Irrigation Engineering and Hydraulic Structures”, Oxford and IBH Publishing Co., New Delhi, 1st ed, 1984.

### **Reference Books:**

1. Ellis H.W., “College of Engineering Irrigation Manual”, Government of Tamil Nadu, 1973
2. Richard H. Cuneca, “Irrigation Systems Design (An Engineering Approach) Prentice Hall Inc., 1st ed, 1989

**PROJECT MANAGEMENT LAB****Course Code : 10CE2118****L P C  
0 3 2****EXPERIMENTS :**

1. Creation, saving, opening layouts.
2. Working with activities.
3. Defining relationships – Editing and selecting relationships.
4. Calculating a schedule, usage of date and float constraints.
5. Defining resource calendars.
6. Breaking down project components.
7. Defining custom data items.
8. Planning resources and costs.
9. Resource leveling.

**Reference Books :**

1. Harris P.E., Project Management using Primavera, Eastern Harris Publications, 2<sup>nd</sup> Edition, 2008.
2. M.S. Project – Microsoft Press, 1<sup>st</sup> Edition, 2003

\*\*\*

