

## Scheme of Teaching and Examination for VI Semester DIPLOMA in CIVIL (RURAL) ENGINEERING

### THEORY

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME		EXAMINATION - SCHEME					
			Periods per Week	Periods in one Session (Year)	Hours of Exam.	Terminal Exam. (A) Marks	Final Exam. (B) Marks	Total Marks (A+B)	Pass Marks Final Exam.	Pass Marks in the Subject
1.	Professional Studies & Entrepreneurship	00601	06	60	03	20	80	100	26	36
2.	R.C.C. Structure	15602	06	60	03	20	80	100	26	36
3.	Environmental Engineering	15603	06	60	03	20	80	100	26	36
4.	Agricultural Engg. & Ext. Services	16604	06	60	03	20	80	100	26	36
5.	Elective*		06	60	03	20	80	100	26	36
	Earthquake resistant design & Construction	15605A								
	Village Industries and Services Organization	16605B								
	Rural resource Management	16605C								
	Horticulture & social forestry	16605D								
	Micro Level Planning and Water Resource Project	16605E								
Total :-			30		500					

### PRACTICAL

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME		EXAMINATION – SCHEME					
			Periods per Week	Periods in one Session (Year)	Hours of Exam.	Marks of Internal Exam (A)	Marks of External Exam (B)	Total Marks (A+B)	Pass Marks Final Exam.	Pass Marks in the Subject
6.	Civil Engineering Lab.	16606	04	50	03	10	40	50	16	21
Total :-			04		50					

### SESSIONAL

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME		EXAMINATION - SCHEME			
			Periods per Week	Periods in One Session (Year)	Marks of Internal Examiner (X)	Marks of External Examiner (Y)	Total Marks (X+Y)	Pass Marks in the Subject
7.	Professional Studies & Entrepreneurship	00607	04	50	20	30	50	25
8.	Civil Engineering Lab.	16608	04	50	20	30	50	25
9.	Project Work & Its Presentation in Seminar	16609	—		40	60	100	50
Total:-			08		200			

<b>Total Periods per Week</b>	<b>42</b>	<b>Total Marks = 750</b>
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## PROFESSIONAL STUDIES & ENTREPRENEURSHIP

<b>Subject Code 00601</b>	<b>Theory</b>			<b>No of Period in one session : 60</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>100</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>	<b>:</b>	<b>80</b>
	<b>06</b>	<b>-</b>	<b>-</b>	<b>Internal Exam.</b>	<b>:</b>	<b>20</b>

### Rationale:

The paper has been introduced to achieve dual purpose for the students. Firstly, this course provides the basics of Professional management and secondly it also prepares the student to develop self reliance by becoming an entrepreneur.

This makes them conversant with their duties and responsibility to make them successful in their career building by developing profession expertise.

### Objectives:

With the input provided in this paper, the students will be able to:-

- Acquire basic knowledge of management.
- Understand the various area of management such as human resources, marketing, finance and commercial aspect, production & material management etc.
- Understand the benefit of becoming an entrepreneur.
- Handle a project efficiently and independently.
- To avail subsidies / grants / loan etc. from various of agencies.

### PART-I: PROFESSIONAL STUDIES

#### TOPIC:

#### 01 – INTRODUCTION:

01.01	Professional Ethics: Definition, Objective, Right & Wrong, Duty & Obligation	[05]
01.02	Management: Definition, Function and Objectives.	[05]
01.03	Leadership: Definition, Types – Autocratic, Democratic and Laissez – faire, Functions and Characteristics of Leadership.	[05]
01.04	Motivation : Definition, Types and Importance / Benefits	[05]
01.05	Forms of Business organization: Sole proprietorship, Partnership, Joint Stock company and Co-operative Societies.	[05]
01.06	Supervisor's/Technician's role: Concept of supervisory management, career needs, Role of Technicians in an organization.	[05]

### PART-II: ENTREPRENEURSHIP

#### TOPIC:

#### 02 – INTRODUCTION:

02.01	Entrepreneurship: Concept, Characteristics of a successful entrepreneurship, basic ingredients of entrepreneurship: 1. Finance 2. Technology 3. Sales and Marketing	[10]
02.02	Project Report: Meaning, Project Identification, Project Selection, Contents of a project Report, Techno-Economic Feasibility Report ( TEFRR), Market Survey.	[10]

02.03 Sources of Finance: [05]  
Government, Commercial Banks, Financial institutions:  
SIDBI – Small Industries development Bank of India  
SFC – State Financial Corporations  
IDBI – Industrial Development Bank of India  
IFCI – Industrial Finance Corporation of India  
ICICI – Industrial Credit Investment Corporation of India

02.04 Acts : [05]  
Indian factories Act 1948 ( Main Provision Only)  
Consumers Protection Act 1986 ( Main Provision Only)

**03 – PROJECT WORK:**

As elaborated in Sessional Paper (00607).

**Books Recommended :**

1. Essential of Management, Tata McGraw Hill, Publishing Company Ltd., New Delhi. - Herald Koonz & Cyril O' Donnel.
2. Business Organization and Management, S. C. Chand and Company (Pvt.) Ltd., Ram Nagar, New Delhi - M. C. Shukla.
3. Managerial Economics, Sultan Chand & Sons, New Delhi - R. L. Vashney & K. L. Maheshwari
4. Project Appraisal and Follow up, Govind Prakashan, Mumbai. - D. P. Sharda
5. Modern Marketing Management, Progressive Corporation Pvt. Ltd., P51, Mahatma Gandhi Road, Bombay-400 001 - Dr. Rustam S. Davar
6. A hand book for new entrepreneurs (with special reference to science and technology target group) - Entrepreneurship Development Institute of India, 83-A, Swastic Society Navrangpura, Ahmedabad, PIN-380 009.

**Reference Books :**

1. Leadership in Organisation - Published by I.S.T.E. Mysore
2. Motivation - Published by I.S.T.E. Mysore
3. Motivation - I.I.T. Kanpur - Published by I.S.T.E. Mysore
4. A Hand book on Project Appraisal and follow up, Govind Prakashan, 204, Saraswati Kunj, 90, S. V. Road, Goregoan, Bombay-400 062. - D. P. Sarda
5. Bihar Industrial Policy - Government of Bihar, Department of Industries.
6. Entrepreneurship Guide - Bihar State Financial Corporation, Fraser Road, Patna-800 001.

# R.C.C. STRUCTURE

<b>Subject Code 15602</b>	<b>Theory</b>			<b>No of Period in one session : 60</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>100</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>	<b>:</b>	<b>80</b>
	<b>06</b>	<b>-</b>	<b>-</b>	<b>Internal Exam.</b>	<b>:</b>	<b>20</b>

### Rationale & Objective:

The subject forms an important part of Civil Engineering curriculum. Concrete and steel are the most useful and versatile modern building materials.

A Civil Engineering Technician must have a sound knowledge of the subject so that he may be able to execute economical and sound design of structures by limit state design method based on specifications laid down in IS code 456-2000 in conjunction with seismic ductility detailing as per IS code 13920 and IS 4326.

<u>S.No.</u>	<u>Topics</u>	<u>Periods</u>
01	Loads and Stresses in R. C. C. structures	(04)
02	R. C. C. Beams(Single Reinforced)	(10)
03	R. C. C. Beams(Double Reinforced)	(06)
04	R. C. C. Flanged Beams (T & L Beams)	(05)
05	R. C. C. Slabs Spanning in one direction	(04)
06	R. C. C. Slabs Spanning in two direction	(05)
07	R. C. C. Columns-Axial and Bi-Axial moment	(10)
08	R. C. C. Footings and Foundation	(08)
09	Pre-stressed Concrete	(04)
10	Working Stress Method Design	(04)
<b>Total:</b>		<b>(60)</b>

### CONTENTS:

#### **TOPIC: 01 – LOADS AND STRESSES IN R. C. C. STRUCTURES :** **[04]**

- 01.01 Dead Load. Live Loads. Wind Loads.
- 01.02 Seismic Loads, Calculation of Design Seismic force and their distribution as per IS 1893:2002
- 01.03 Elementary idea about effect of temperature, shrinkage and creep on R. C. C. structures, Types of reinforcements and grades of concrete, their properties and permissible stresses
- 01.04 Method of design of R. C. C. Sections, Assumption in Limit State method, Stress-Strain relationship for steel and Concrete, Limit state of collapse in flexure.

#### **TOPIC: 02 – R. C. C. BEAMS (SINGLE REINFORCEMENT) [L.S.]:** **[10]**

- 02.01 Bending strength of singly Reinforced Beams.
- 02.02 Calculation of stresses developed in steel and concrete.
- 02.03 Design of Singly reinforced beam section. Control of deflection and slenderness Limits for Beams.
- 02.04 Shear strength of R. C. C. beams, R. C. C. beams with vertical stirrups with bent up bars and with inclined bars (Stirrups), Functions of shear reinforcement, Design of shear Reinforcement, Seismic hooks.
- 02.05 Bond in R. C. C. beams, Bond stresses, Development length of reinforced bars in Tension.
- 02.06 Acquaintance with IS-provisions for curtailment of Tension. Reinforcement in beams, condition for curtailment of flexural reinforcement in tension zone, special requirement near points of zero moment for curtailment of tension Reinforcement, Bar splices.

**TOPIC: 03 – R. C. C. BEAMS (DOUBLY REINFORCED) :** [06]

- 03.01 Necessity of Double Reinforced Section, location of Natural axis, Bending strength of Doubly reinforced beams.
- 03.02 Calculation of stresses developed in concrete and steel of Doubly reinforced beams.
- 03.03 Design of Doubly reinforced beam
- 03.04 Shear stresses in doubly reinforced beams
- 03.05 Acquaintance with IS provisions for curtailment of Tension. Reinforcement in beams, condition for curtailment of flexural reinforcement in tension moment for curtailment of tension Reinforcement, Bar splices.

**TOPIC: 04 – R. C. C. FLANGED BEAMS (T & L BEAMS) [L.S.]:** [05]

- 04.01 Effective width of flange, Location of Natural axis, Lever arm for T and L sections.
- 04.02 Bending strength of T Beam and L Beam.
- 04.03 Calculation of stresses developed in concrete and steel of T-Beams and L-Beams.

**TOPIC: 05 – R. C. C. SLAB SPANNING IN ONE DIRECTION [L.S.] :** [04]

- 05.01 Design of simply supported slab and continuous slab as per IS provision.
- 05.02 Design of Cantilever slabs, sunshade

**TOPIC: 06 – R. C. C. SLAB SPANNING IN TWO DIRECTION [L.S.]:** [05]

- 06.01 Behaviour of slabs spanning in two directions with corners not held down by Grass hoff-Rankine Method.
- 06.02 Restrained slab with corners held down as per IS 456-1978.
- 06.03 Shear in Two way slab, provision of corner reinforcement, idea about different end conditions and their B. M. coefficient.

**TOPIC: 07 – R. C. C. COLUMNS- AXIAL AND BI-AXIAL MOMENT [L.S.] :** [05]

- 07.01 Effective length of compression members, equivalent sectional area of columns. Radius of Gyration of column section, Slenderness Ratio of compression members, I. S. criteria for eccentricity.
- 07.02 Strength of long and short columns (Square, Rectangular and Circular columns).
- 07.03 Design of long and short columns(Square, Rectangular and Circular column with helical Re-inforcement).
- 07.04 Beam Column joints and their seismic ductile detailing as per IS Code-13920(latest revision)

**TOPIC: 08 – R. C. C. FOOTING AND FOUNDATION [L.S.] :** [08]

- 08.01 Types of independent footing, Depth of foundation, thickness of edge of footing, Liquefaction, Mitigation of Liquefaction.
- 08.02 Shear force in Footing.
- 08.03 Design of footing for masonry and concrete wall.
- 08.04 Design of footing for a square and rectangular column.

**TOPIC: 09 – PRE STRESSED CONCRETE:** [04]

- 09.01 Basic principle, assumption and stress diagram.
- 09.02 Methods of prestressing.
- 09.03 Advantages and disadvantages of prestressing.
- 09.04 General idea about losses in prestressing.

**TOPIC: 10 – WORKING STRESS METHOD OF DESIGN:** [04]

- 10.01 Introduction and definition.
- 10.02 Basic assumptions.
- 10.03 Analysis of rectangular singly reinforced section.

## Books Recommended:

### Text Books

1. R. C. C.
  2. प्रबलित कंक्रीट अभिकल्पन
  3. प्रबलित सीमेंट कंक्रीट
  4. R. C. C.
  5. R. C. C.
  6. Concrete Structure for Diploma Holders
  7. R. C. C. Structure Volume I
  8. Plain Reinforced Concrete
  9. R. C. C. Design
  10. R. C. C. Theory & Design
  11. R. C. C.
  12. Text Book of Concrete Technology
  13. Concrete Technology
  14. Concrete Technology
  15. R. C. Structure
  16. Prestressed Concrete
  17. Limit State Design
  18. çcfyr lhesaV daØhV
- J. Jha
  - भिनोचा एवं द्विवेदी
  - बी. एन. झा
  - Agrawal
  - Rama Ruthan
  - Vaziranil Ratwani
  - B. C. Punamia
  - Jain
  - Patwardhan
  - Sah & Kale
  - Malick & Gupta
  - B. L. Gupta
  - Vaziraw & Chando
  - Gambhir
  - I. C. Syal
  - Vaziraw & Chando
  - A. K. Jain
  - xq;pj.k flag

# ENVIRONMENTAL ENGINEERING

<b>Subject Code 15603</b>	<b>Theory</b>			<b>No of Period in one session : 60</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>100</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>	<b>:</b>	<b>80</b>
	<b>06</b>	<b>-</b>	<b>-</b>	<b>Internal Exam.</b>	<b>:</b>	<b>20</b>

## Rationale and Objective:

Environmental Engineering is the only Subject of Civil Engineering which directly related to the human health and therefore it is known as Public Health Engineering. It is also utilized to control the environment for the protection of health and comfort of all living beings on this earth as well as human being. No life can exist without water or it can be said that water is an essential for life as air is. With the rapid industrialization and abrupt growth in population increases water quantity demand and also affects its quality. The standard quality of water or portable water can not be imagined without proper sanitation. As this problem is related to the community, the environment around our society can not be untouched in Technician Education System of developing country like India in general and our State, Bihar in particular. Therefore, this subject has been divided into three groups as:-

- (A) Water Supply Engineering,
- (B) Sanitation Engineering, and
- (C) Environmental Engineering.

The following topics with contents are capable in generating the knowledge, skill and proper attitude of technicians to provide potable water as it is not replicable and they will be able to motivate the users for adoption of Sanitary practices which will create hygienic environment.

<u>S.No.</u>	<u>Topics</u>	<u>Periods</u>
<b>Group-A : Water Supply Engineering</b>		
		<b>30</b>
01	Water Sources	(02)
02	Quantity of Water	(03)
03	Quality of Water	(04)
04	Treatment of Water	(11)
05	Conveyance & Distribution of Water	(10)
<b>Group-B : Sanitation Engineering</b>		
		<b>21</b>
06	Sewage Disposal	(02)
07	Drains & Sewers	(02)
08	Sewer Appurtenances	(03)
09	Characteristics & Examination of Sewage	(04)
10	Sewage Treatment & Disposal	(10)
<b>Group-C : Environmental Engineering</b>		
		<b>{09}</b>
11	Ecosystem Ecological Balance of Nature	(09)
<b>Total :</b>		<b>60</b>

## CONTENTS:

### TOPIC: 01 – WATER SOURCES : [02]

01.01 Need for protected water sources.

01.02 Types of water sources(Surface sources & Under ground water sources).

01.03 Factors affecting choice of water supply sources.

### TOPIC: 02 – QUANTITY OF WATER: [03]

02.01 Water Requirement for different purpose & B. I. S. Standards for per capita consumption of water.

02.02 Factors affecting the rate of water demand.

02.03 Different methods for estimation of population and Numerical problems associated with it.

**TOPIC: 03 –QUALITY OF WATER:** [04]

03.01 Methods & Precautions in collecting water samples.

03.02 Water Analysis (Laboratory Method).

03.02.01 Physical Analysis.

03.02.02 Chemical Analysis.

03.02.03 Bacteriological Analysis.

03.03 Water Borne Diseases.

03.04 B.I.S. & WHO standards of potable water.

**TOPIC: 04 –TREATMENT OF WATER:** [11]

04.01 Different types of impurities in water.

04.02 Objectives of water treatment.

04.03 Water treatment processes.

04.03.01 Sedimentation (Principle & types of sedimentation Tanks only)

04.03.02 Sedimentation with coagulation.

(Necessity, principle, common coagulants and choice of Coagulant, Optimum coagulant, Dose determination, Coagulation process and its limitations only)

04.03.03 Filtration

(Objects, theory and classification of filtration, comparison between slow sand Filters & Rapid sand Filters and Washing Methods of Filters only)

04.03.04 Disinfection

(Objective, criteria for a good disinfectant, Methods of disinfection, Different Forms and classification of chlorination only)

04.03.05 Typical Layout of a water Treatment plant.

**TOPIC: 05 –CONVEYANCE & DISTRIBUTION OF WATER:** [10]

05.01 Intake (types and selection of site only)

05.02 Different types of pipes.

05.03 Use of valve (sluice valve, Pressure Relief Valves, Check Valves, Air Relief Valves & Drain Valves).

05.04 Description & Working Principle of Fire Hydrant.

05.05 Distribution System of Water.

(Gravity, Pumping & Dual System)

05.06 Methods of Distribution.

(Dead End, Grid Iron, Radial and Ring System).

05.07 Types of Reservoirs.

(Earth Reservoir, Masonry & R. C. C. Reservoir, Elevated Reservoirs-Stand pipes & Elevated tanks.)

05.08 General Layout of water supply arrangements for Residential Building only.

**TOPIC: 06 –SEWAGE DISPOSAL:** [02]

06.01 Common Technical Terms used in Sanitary Engg.

06.02 Methods of Disposal Sewage.

(Conservancy system, Water Carriage System and their comparison)

06.03 Sewerage System

(Comparison among combined, separate & Partially separate system only)

**TOPIC: 07 –DRAINS & SEWERS:** [02]

07.01 Common sections of drains and sewers.

07.02 Types of Sewers & Cleaning of Sewers.

07.03 Minimum, Maximum & Self Cleaning Velocity for design of Sewers.

**TOPIC: 08 –SEWERS APPURTENANCES:** [03]

08.01 Locations, functions & construction of Manholes, Drop hole, Street inlet, Catch Basins, Flushing Tanks, inverted syphons & Regulators.

**TOPIC: 09 –CHARACTERISTICS & EXAMINATION OF SEWAGE:** [04]

09.01 Methods of Sampling of Sewage.

09.02 Physical, Chemical and Biological Properties.

09.03 Aerobic and Anaerobic Decomposition.

09.04 B.O.D. and C.O.D. tests.

**TOPIC: 10 –SEWAGE TREATMENT & DISPOSAL:** [10]

10.01 Objectives of Sewage Treatment.

10.02 Classification of Treatment Processes

(Preliminary, Primary & Secondary treatment including Disinfection).



- 10.03 Principle Description advantages & disadvantages of intermittent Sand Filters & trickling filters.  
 10.04 Activated Sludge Process  
 (Concept, Operation, Advantages & Disadvantages only).  
 10.04.01 Methods of aeration and aerator.  
 10.04.02 Simple methods of sludge Disposal.  
 10.05 Sewage Disposal  
 (Natural & Artificial methods).  
 10.06 Miscellaneous Treatment of Sewage  
 (Oxidation Pond, Aerated Lagoons, Oxidation Ditch & Anaerobic Lagoons.)  
 10.07 Sanitary Latrine.  
 10.07.01 Various Flushing Systems.  
 10.07.02 Principle, Working and Design of Septic Tank including numerical problems related to the design of septic tank for different numbers of users.  
 10.08 Construction, Operation & Maintenance of Bio-gas Plant.

**TOPIC: 11 –ECO-SYSTEM & ECOLOGICAL BALANCE OF NATURE:**

[09]

- 11.01 Definition of common technical terms related to Environmental Pollution.  
 11.02 Water Pollution (Cause & its effects)  
 11.03 Air Pollution (brief idea, Classification, sources & its effect)  
 11.04 Noise Pollution (concept and effects on human health)

**Books Recommended:**

- |   |   |                             |
|---|---|-----------------------------|
| 1. Water Supply & Sanitary Engg. (Environmental Engg.), Charotar Publishiing House, Anand-388001            | - | S. C. Rangwala              |
| 2. Water Supply Engg., Khanna Publishers, New Delhi-110006  | - | S. K. Garg                  |
| 3. Sewage Disposed & Air Pollution Engg., Khanna Publishers, New Delhi-110006                               | - | S. K. Garg                  |
| 4. Environmental Engg., Khanna Publishers, New Delhi-110006   | - | Dr. B. Kapoor               |
| 5. Water Supply waste Disposal & Environmental Engg., Standard Pub., Delhi-110006                           | - | A. K. Chatterjee            |
| 6. Water Supply & Sanitary Engg., Standard Pub., Delhi-110006   | - | Gurucharan Singh            |
| 7. जल सम्भरण, सफाई एवं पर्यावरण इंजीनियरी   | - | Gurucharan Singh            |
| 8. Water Supply and Sanitary Engineering including Environmental Engg., Dhanpat Rai Pub. Company, New Delhi | - | G. S. Birdie & J. S. Birdia |
| 9. Public Health Engg., Styra Prakashan, New Delhi-110006   | - | S. K. Hussain               |

**Reference Books :**

- |  |   |                                |
|--|---|--------------------------------|
| 1. Environmental Engg., Tata McGraw Hill Com., New Delhi-110002                                  | - | A. Kamala                      |
| 2. Ground Water, Scitech Pub., Chennai-600017  | - | Ramkrishnan                    |
| 3. Pollution Prevention Technology Hand Book, Standard Pub., Delhi-110006                        | - | Robert Noyes                   |
| 4. lkslk;Vh ,oa i;kZoj.k vfHk;kaf=dh] Standard Pub., Delhi-110006                                | - | K. N. Vyas                     |
| 5. Water Supply & Waste Water Engg., S. K. Kataria & Sons Pub., Ludhiana, Delhi                  | - | A. K. Upadhyay                 |
| 6. Relevent B. I. S. Code, B.I.S.  | - |                                |
| 7. Environmental Health & Technology, Pragati Prakashan, Meerut                                  | - | Khudesia V. P. & Khudesia Ritu |
| 8. Water Pollution, Pragati Prakashan, Meerut  |   | Khudesia V. P.                 |
| 9. Air Pollution, Pragati Prakashan, Meerut  |   | Khudesia V. P.                 |
| 10. Physio-chemical Examination of Waste Sewage & Industrial Effluent, Pragati Prakashan, Meerut |   | Manivasakam N.                 |
| 11. The Water & Air Pollution Acts.  |   |                                |

# AGRICULTURAL ENGINEERING & EXTENSION SERVICES

<b>Subject Code</b> <b>15603</b>	<b>Theory</b>			<b>No of Period in one session : 60</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>100</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>	<b>:</b>	<b>80</b>
	<b>06</b>	<b>-</b>	<b>-</b>	<b>Internal Exam.</b>	<b>:</b>	<b>20</b>

## Rationale and Objective:

A Rural Engineering Diploma holder have to perform his duty in rural mass to deal with modern & scientific methods of Agricultural production from cultivation to food processing with special emphasis on the machinery, implements and sources of power, operation & its maintenance etc. used in Agricultural Sector.

The present syllabus has been prepared, keeping in view the above objectives and its fulfillment:-

<u>S.No.</u>	<u>Topics</u>	<u>Periods</u>
01	Farm Machinery & Equipments.	(10)
02	Farm Energy Sources.	(12)
03	Farm Processing Machinery.	(06)
04	Farm Buildings.	(06)
05	Irrigation & Drainage.	(06)
06	Soil & Water Conversion Engineering.	(06)
07	Concept & Philosophy of Rural Development and Extension Services.	(04)
08	Existing Infrastructure for Rural Extension.	(04)
09	Role of Voluntary Agencies in Rural Extension.	(04)
10	Financing Institution for Rural Development.	(02)
<b>Total :</b>		<b>(60)</b>

## CONTENTS:

### TOPIC: 01 – FARM MACHINERY & EQUIPMENTS : [10]

- 01.01 Status of Farm Engineering and its utilisation in Indian Agriculture.
- 01.02 Scope of Mechanisation in India.
- 01.03 Tillage & Tillage equipments.
- 01.04 Purpose of tillage, primary and secondary tillage equipments.
- 01.05 Details of farm equipments-plough, machines & other equipments used in India.
- 01.06 Their role in Agricultural practices with respect to conventional modern and scientific methods of agriculture.

### TOPIC: 02 –FARM ENERGY SOURCES: [12]

- 02.01 Energy sources and internal combustion engine.
- 02.02 Power Tiller and Mini Tractors.
- 02.03 Tractors and their different systems (in brief.).
- 02.04 Selection of Agricultural machines, Tractors and other equipments for various categories of land holding.
- 02.05 Land levelling techniques field layout and machine operation maintenance.
- 02.06 Dry Farming.
- 02.07 Plant protection equipments and machinery.

### TOPIC: 03 –FARM PROCESSING MACHINERY: [06]

- 03.01 Seed treatment and planting equipments.
- 03.02 Harvesting threshing cleaning, grading, processing machine; their description, operation, maintenance and repair arrangements, availability of parts.

### TOPIC: 04 – FARM BUILDINGS: [06]

- 04.01 Farm threshing floor, farm implements seed, farm working repair and maintenance cell, farm pump house, channel construction of farm manager/engineer office, dairy barn system housing, poultry housing piggery, grain and fodder storage systems & their space requirement, desing and construction of water supply and drainage resources.
- 04.02 Rural Sanitation.
- 04.03 Rural and farm electric machines its installation.
- 04.04 Bio/Gobar Gas plants, details of including its construction.

**TOPIC: 05 – IRRIGATION & DRAINAGE:****[06]**

- 05.01 Water Requirement of plant, duty, delta, base period, munga factor and water distribution systems, water utilization, efficiency, command area.
- 05.02 Irrigation methods.
- 05.03 Drainage systems.
- 05.04 Well, Tube well, Wind mill, Pump Unit, installation methods, constructions, pump details, repair and maintenance in brief.

**TOPIC: 06 –SOIL & WATER CONSERVATION:****[06]**

- 06.01 Soil erosion, its agencies and types.
- 06.02 Water erosion-conservation systems.
- 06.03 Wind erosion-conservation system including agronomical management system.
- 06.04 Quality of water for drinking and irrigation purposes.
- 06.05 Pollution of water and soil and its prevention control system, tree plantation etc.

**TOPIC: 07 –CONCEPT AND PHILOSOPHY OF RURAL DEVELOPMENT AND EXTENSION SERVICES:****[04]**

- 07.01 History of Rural Development in India, brief account of various efforts made by official and non-official agencies changing emphasis on rural development policies and programme during five year plans, comparative achievements of five year plans, extension efforts during various plans.

**TOPIC: 08 –EXISTING INFRASTRUCTURE FOR RURAL EXTENSION:****[04]**

- 08.01 Existing organisational set up and infrastructure of Rural Development and other allied departments engaged in village developments work viz. Agriculture, Animal Husbandry, Social Forestry, Irrigation, Education, Health, Sanitation, Public Work Department, Public Health, Housing Panchayat D.R.D.A., and others.

**TOPIC: 09 –ROLE OF VOLUNTARY AGENCIES IN RURAL EXTENSION.****[04]**

- 09.01 Rural development and extension activities covered by financial institutions, their infrastructure and effectiveness.

**TOPIC: 10 –MISCELLANEOUS TOPICS:****[02]**

- 10.01 Rate of Financing Institution for Rural Development like CAPART, SIDA(Sweedish International Development Agency), Agha Khan Foundation, Rajiv Gandhi Foundation and others.

**Books Recommended:**

1. Principle of Agricultural Engineering Vol. I & II, Jain Brothers, New Delhi - A. Micheal and T. O. Ojha
2. A text book of soil and water conservation Engineering, Std. Publishers & Distributors, Delhi-6. - Prof. R. Suresh
3. Krishi Utpad Sansadhan ke Sidhyant, Std. Publishers & Distributors, Delhi-6. - Dr. P. H. Pandey
4. Bij Sansadhan, G. B. Panta Agri. & Tech. University, Pant Nagar.(U.P.) - Ram Prakash Saxena
5. Krishi Abhdiyantrik, G. B. Panta Agri. & Tech. University, Pant Nagar.(U.P.) - Dr. H. R. Chauhan

# EARTHQUAKE RESISTANT DESIGN & CONSTRUCTION

<b>Subject Code 15605A</b>	<b>Theory</b>			<b>No of Period in one session : 60</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>		<b>: 100</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>		<b>: 80</b>
	<b>06</b>	<b>-</b>	<b>-</b>	<b>Internal Exam.</b>		<b>: 20</b>

**Rationale & Objectives:**

<u>S.No.</u>	<u>Topics</u>	<u>Periods</u>
01	The Earthquakes	(06)
02	Vibrations of Single Degree of freedom System	(20)
03	Vibration of Multiple Degrees of Freedom System	(08)
04	Earthquake Motion & Reponse	(06)
05	Aseismic Design of Structures	(20)
<b>Total :</b>		<b>(60)</b>

**CONTENTS:**

**TOPIC: 01 – THE EARTHQUAKES [06]**

- 01.01 Earthquakes
- 01.02 Epicentre, hypocentre and earthquake waves
- 01.03 Measurement of Ground Motion
- 01.04 Cause of Earthquake (Plate tectonic)
- 01.05 Intensity and Isoleismals of an earthquake
- 01.06 Magnitude and Energy of an earthquake
- 01.07 Relationship of fault length, affected area and duration with magnitude
- 01.08 Consequences of earthquakes
- 01.09 Sesimic Zoning
- 01.10 Risk Maps
- 01.11 Strong Ground Motion Arrays

**TOPIC: 02 – VIBRATIONS OF SINGLE DEGREE OF FREEDOM SYSTEM : [20]**

- 02.01 Types of Vibrations
- 02.02 Degrees of Freedom
- 02.03 Spring action and damping
- 02.04 Equation of motion of single degree of freedom
- 02.05 Free Vibrations of Undamped systems having single degree of freedom
- 02.06 Combination of stiffnesses
- 02.07 Vibration of Damped System having single degree of freedom
- 02.08 Dry Friction Damping
- 02.09 Negative Damping
- 02.10 Forced Vibration of a Undamped System
- 02.11 Forced vibrations of a damped system
- 02.12 Equivalent viscous damping
- 02.13 Vibration isolation
- 02.14 Vibration Measuring Instruments
- 02.15 System subjected to transient forces

**TOPIC: 03 – VIBRATION OF MULTIPLE DEGREES OF FREEDOM SYSTEMS:** [08]

- 03.01 Introduction
- 03.02 Two Degrees of freedom
- 03.03 Many degrees of freedom
- 03.04 Forced vibration – earthquake excitation

**TOPIC: 04 – EARTHQUAKE MOTION AND RESPONSE:** [06]

- 04.01 Introduction
- 04.02 Strong motion earthquakes
- 04.03 Numerical method for spectra
- 04.04 Elastic spectra
- 04.05 Ground velocity and displacement
- 04.06 Inelastic spectra

**TOPIC: 05 – ASEISMIC DESIGN OF STRUCTURES:** [06]

- 05.01 Design data and philosophy of design
- 05.02 Multistory Buildings(G+2) Design-Analysis Design
- 05.03 Earthquake resistant construction of buildings
- 05.04 Ductility provisions in reinforced concrete construction
- 05.05 Base Isolation
- 05.06 Capacity building Design and Pushover Analysis
- 05.07 Retrofitting of Buildings

**Books Recommended:**

- 1. Earthquake Resistant Design & Analysis - Jai Krishna.
- 2. Dynamic of Structures - Mario Paz.
- 3. Dynamic of Structures - A. K. Chopra.
- 4. IS : 1893-2002; IS : 13920-1993; IS : 13828-1993, IS : 4326-1993 -
- 5. Theory of Structures - Farzard Naim.
- 6. Dynamics of Structures - Clough & Penzien.

# VILLAGE INDUSTRIES AND SERVICES ORGANISATIONS

<b>Subject Code 16605B</b>	<b>Theory</b>			<b>No of Period in one session : 60</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>		<b>: 100</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>		<b>: 80</b>
	<b>06</b>	<b>-</b>	<b>-</b>	<b>Internal Exam.</b>		<b>: 20</b>

## Rationale and Objective:

Management of small scale industry and services organisations:-

<u>S.No.</u>	<u>Topics</u>	<u>Periods</u>
01	Place of small scale industry.	(12)
02	Assisting Organisation.	(15)
03	Procedure to get loan.	(15)
04	Source of Finance.	(04)
05	Market Analysis.	(04)
06	Preparation of TEFR.	(04)
07	Availability of Raw Material.	(04)
08	Basic Concepts of Marketing.	(02)
<b>Total :</b>		<b>(60)</b>

## CONTENTS:

### TOPIC: 01 – PLACE OF SMALL SCALE INDUSTRY : [12]

- 01.01 Definition of S. S. Industry, Cottage Industry and Ancillary Unit.  
Scope of S. S. Industry. Current Industrial Policy resolution relating to cottage and small scale industry.
- 01.02 Procedure for setting up a small scale industry.
  - 01.02.01 A list of certain items having a good market, early to manufacture, labour intensive and requiring less space.
  - 01.02.02 Steps for organising the industry (project profile, feasibility report, concept and its format study).

### TOPIC: 02 – ASSISTING ORGANISATIONS: [15]

- 02.01 **A. CENTRAL LEVEL.**
  - (a) Small Scale Industry Development Corporation, Cottage Industries Services Institute.
  - (b) Khadi Village Industries Commission.
  - (c) Central Small Scale Industries Board.
  - (d) National Small Industries Corporation.
  - (e) Small Industries Services Institute.

**B. STATE LEVEL**

- (a) State Industries Directorate.
- (b) State Financial Corporation.
- (c) Banks.
- (d) State Industrial Co-operative Banks.

**TOPIC: 03 – PROCEDURE TO GET LOAN:**

[15]

- 03.01 Industrial Estate-Objectives.
- 03.02 Facilities available.
- 03.03 Short notes on facilities available like Hire purchase of machinery, procurement of raw materials, utility services, market assistance etc.
- 03.03.01 **Selection of Site:-**Availability of land, road, electricity, raw materials, labour, machinery.
- 03.03.02 **Financial Analysis:-**Fixed capital, working capital, cost analysis of product, break even print.
- 03.03.03 Preparation of project profile, feasibility report, concept & its format study.

**TOPIC: 04 – SOURCE OF FINANCE:**

[04]

- 04.01 Name of Financial Institution.
- 04.02 Procedure to obtain Finance.
- 04.03 Limitation to be provided by financial institution.

**TOPIC: 05 – RECLAMATION PROGRAMME:**

[04]

- 05.01 **Market Analysis:-**Market survey for demand and available sources of supply of product to be produced.

**TOPIC: 06 –PREPARATION OF TEFR:**

[04]

- 06.01 Preparation of TEFR(Technical Economical Feasibility Report).

**TOPIC: 07 –AVAILABILITY OF RAW MATERIAL:**

[04]

- 07.01 Availability of Raw Materials in Rural Area, its uses of exports.

**TOPIC: 08 –BASIC CONCEPT OF MARKETING:**

[02]

- 08.01 Basic concepts of marketing, Sales promotion and motivation.

**Books Recommended:**

# RURAL RESOURCE MANAGEMENT

<b>Subject Code 16605C</b>	<b>Theory</b>			<b>No of Period in one session : 60</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>		<b>:</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>		<b>:</b>
	<b>06</b>	<b>-</b>	<b>-</b>	<b>Internal Exam.</b>		<b>:</b>
					<b>100</b>	
					<b>80</b>	
					<b>20</b>	

**Rationale and Objective:**

<u>S.No.</u>	<u>Topics</u>	<u>Periods</u>
01	Principles of Management.	(10)
02	Rural Financial Management.	(10)
03	Personal Management.	(10)
04	Staff Structures of Different Rural Organisations.	(30)
<b>Total :</b>		<b>(60)</b>

**CONTENTS:**

**TOPIC: 01 –PRINCIPLES OF MANAGEMENT: [10]**

- 01.01 Role of management in rural development.
- 01.02 Preference of rural organisations.

**TOPIC: 02 –RURAL FINANCIAL MANAGEMENT: [10]**

- 02.01 Role of Banking organisations in Banks of rural areas.
- 02.02 Meaning and significance of long term and short term loans.

**TOPIC: 03 –PERSONAL MANAGEMENT: [10]**

- 03.01 Concepts of personnel management, aims and objectives.
- 03.02 Characteristics of good personnel policy.

**TOPIC: 04 –STAFF STRUCTURES OF DIFFERENT RURAL ORGANISATIONS: [30]**

- 04.01 Staff structures of different rural nodal organisations working in rural area such as Block offices, Panchayat Samity, Gram Panchayat Office, Krishi Vigyan Integrated Children Development Scheme (I.C.D.S.), Non-Governmental Organisations (N.G.O.) etc.
- 04.02 Selection technique, different procedures, Job Description, Application Forms, Employment Tests, Interviewing, Physical Examinations, Induction and Orientation.
- 04.03 Training objectives, need for training, methods of training concept of Good Housekeeping and its necessity, advantages and procedure.
- 04.04 Multi-disciplinary management programme and organisation farm as business w. r. t.
  - (i) Engineering Management,
  - (ii) Agronomical Engineering,
  - (iii) Economical,
  - (iv) Social,
 Environmental.
- 04.04.01 Principles and theories applied to farm Economics.
- 04.04.02 Cost concept and cost of cultivation and production economics and tools of farm management, Analysis and planning.



# HORTICULTURE AND SOCIAL FORESTRY

<b>Subject Code 16605D</b>	<b>Theory</b>			<b>No of Period in one session : 60</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>100</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>	<b>:</b>	<b>80</b>
	<b>06</b>	<b>-</b>	<b>-</b>	<b>Internal Exam.</b>	<b>:</b>	<b>20</b>

**Rationale and Objective:**

Agriculture commission has stated that the country has reached a stage which land needed for agricultural purposes could not be used for afforestation. Likewise the forest land could not be diverted for agricultural purposes. Social forestry could meet this challenge. Hence we have no alternative but to shift to the so called waste lands through massive social forestry programmes.

The rural technician are expected to work in rural area. They should be aware of horticulture & social forestry systems, science & technology involved in horticulture and social forestry. The rural technician should be able to appreciate input of science & technology in farm sector and the village.

<u>S.No.</u>	<u>Topics</u>	<u>Periods</u>
01	Economical and Nutritional importance of fruits and vegetables.	(02)
02	Vegetable Growing.	(10)
03	Fruit Growing.	(10)
04	Kitchen Gardening.	(04)
05	General Plant Protection.	(04)
06	Importance of trees and forests.	(05)
07	Social forestry	(10)
08	Management of nurseries for social forestry.	(03)
09	Community plantation.	(04)
10	Policy frame work for social forestry programme.	(05)
11	Non-Governmental Organisation.	(03)
<b>Total :</b>		<b>(60)</b>

**TOPIC: 01 – ECONOMICAL AND NUTRITIONAL IMPORTANCE OF FRUITS AND VEGETABLES.** [02]

**TOPIC: 02 – VEGETABLE GROWING:** [10]

02.01 Types of vegetable farming, Nursery management and transplanting of vegetable, classification of vegetable, improved methods of cultivation of major vegetable crops, potatoes, chillis, brinjal, cauliflower, cabbage, onion garlic, ladies fingers, spinach, beans & peas, mushroom etc.

**TOPIC: 03 – FRUIT GROWING:** [10]

03.01 Fruit Growing:- Classification of fruits, establishment of an orchard layout propagation, digging of pits, pit manuring planting, planting distances, pruning soil management of orchards plant harvesting and marketing of fruits, Improved methods of cultivation of major fruit crops, Mango, Guava, Citrus fruits, papaya, grapewine, Banana, Jack fruit etc.

03.01.01 Non-seasonal growing of vegetables.

**TOPIC: 04 – KITCHEN GARDENING:** [04]

04.01 Kitchen gardening, Biodynamic system of growing vegetable crops.

**TOPIC: 05 – GENERAL PLANT PROTECTION:** [04]

05.01 General Plant Protection measures for fruit and vegetable crops.

05.01.01 Vegetable and fruit preservation.

**TOPIC: 06 –IMPORTANCE OF TREES AND FORESTS:** [05]

06.01 Economical cultural and social importances of trees and forests in India and their relationship with rural development.

**TOPIC: 07 –SOCIAL FORESTRY:** [10]

07.01 Concept of social forestry and its usefulness for rural masses. Selection of suitable plants for different purposes and areas, importance of lucena (Subahool) and eucalyptus in social forestry.

**TOPIC: 08 – MANAGEMENT OF NURSERIES FOR SOCIAL FORESTRY.** [03]

**TOPIC: 09 –COMMUNITY PLANTATION** [04]

09.01 Planning, Management and Utilization.

**TOPIC: 10 – POLICY FRAME WORK FOR SOCIAL FORESTRY PROGRAMME:** [05]

10.01 Policy frame work for social forestry programme. Facilities made available by the Government for this purposes. (05)

**TOPIC: 11 – NON-GOVERNMENTAL ORGANISATION:** [03]

11.01 Non-Governmental Organisation and people's participation in social forestry programmes. (03)

**Books Recommended:**

1. Science & Technology for rural development, S. Chand & - B. C. Chottopadhyay Company Ltd.
2. Role of Agro-forestry in improving environment Indian - G. B. Singh Farming
3. Hand Book of Agriculture, Indian Council of Agricultural - Research, New Delhi

# MICRO-LEVEL PLANNING OF WATER RESOURCE PROJECT

<b>Subject Code 16605D</b>	<b>Theory</b>			<b>No of Period in one session : 60</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>		<b>: 100</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>		<b>: 80</b>
	<b>06</b>	<b>-</b>	<b>-</b>	<b>Internal Exam.</b>		<b>: 20</b>

**Rationale:**

Since independence, vast tracts of land have been brought under irrigation command in Bihar. But the utilization of entire irrigation potential has remained much below the expectation. One of the principal reasons for poor utilization has been identified as the absence of suitable micro level planning below outlet, Socio-cultural, economic status and technical competency of the farmers have restricted them from constructing suitable micro-distribution system. Therefore, the technicians, working in the water resource department should be able to investigate, plan design and construct a micro-distribution system.

**Objective:**

The broad objectives of this paper are the following:-

1. Students should be able to assess the crop water requirement based on climatological approach modified penman method.
2. They should be able to know the important crops of Bihar. Their duration and stages of growth etc.
3. They should be able to determine the delivery rate for a particular set of cropping pattern.
4. They should be able to investigate, plan and design the micro level network of water-distribution system.
5. They should know the scientific water distribution system e.g. warabandi, RWS, Tatil and Satta system etc.

<u>S.No.</u>	<u>Topics</u>	<u>Periods</u>
01	Crop-Water requirement.	(10)
02	Basic Concepts of Soil Science.	(06)
03	Micro Level Planning.	(06)
04	Water Distribution Methods.	(03)
05	Survey and Farm Roads.	(05)
06	Water Application Methods and their efficiencies.	(03)
07	Land Leveliing and Land consolidation.	(04)
08	Basics of Agronomy.	(04)
09	Drainage of Irrigated Agriculture.	(06)
10	Farmer's Participation.	(03)
11	Miscellaneous Topics.	(10)
<b>Total :</b>		<b>(60)</b>

**CONTENTS:**

**TOPIC: 01 –CROP-WATER REQUIREMENT:**

[10]

- 01.01 Importance of study of soil-water-plant relationship.
- 01.02 Water requirement of crops various methods including duty delta concept.
- 01.03 Consumptive and evapo-transpiration
- 01.04 Modified penman method of calculating reference crop evapo-transpiration with an example.
- 01.05 Cropping pattern and cropping intensity.

- 01.06 Crop evapo-transpiration
- 01.07 Effective Rainfall.
- 01.08 Net Irrigation Requirement (NIR), Field Irrigation Requirement (FIR) and Gross Irrigation Requirement (GIR).
- 01.09 Evolving Delivery Schedules.

**TOPIC: 02 – BASIC CONCEPT OF SOIL SCIENCE:** [06]

- 02.01 Soil characteristics for agricultural purposes.
- 02.02 Various soil moisture conditions such as temporary and permanent wilting points, Field capacity and management allowed deficit.
- 02.03 Irrigation scheduling and canal operation strategies.
- 02.04 Infiltration characteristics.
- 02.05 Soil survey for irrigation purposes.
- 02.06 Soil and land irrigability classification.
- 02.07 Soil texture, texture classes and application of soil texture in water and land management

**TOPIC: 03 –MICRO LEVEL PLANNING:** [06]

- 03.01 Micro Level Planning-concept layout of chaks, sub-chaks, Water courses, field channels, field drains, farm roads and Turnouts.
- 03.02 Structures in water course water measurement devices V-notch and cut-throat flumes.

**TOPIC: 04 –WATER DISTRIBUTION METHODS:** [03]

- 04.01 Rotational Water Distribution System.
- 04.02 Warabandi System.
- 04.03 Tantil System.
- 04.04 Satta System.

**TOPIC: 05 –SURVEY AND FARM ROADS:** [05]

- 05.01 Topographical Survey, Aerial Survey, Grid Survey, Field to-field grid survey.
- 05.02 Farm roads planning design and specification link roads planning, design and specification other roads-planning, design and specification.

**TOPIC: 06 –WATER APPLICATION METHODS AND THEIR EFFICIENCIES:** [03]

**TOPIC: 07 –LAND LEVELLING AND LAND CONSOLIDATION:** [04]

**TOPIC: 08 –BASICS OF AGRONOMY:** [05]

Important irrigated agricultural crops in Bihar and Comprehensive description of their agronomical aspects such as

- 08.01 Seeds.
- 08.02 Fertilisers and manures.
- 08.03 Pesticides, insecticides and weedicides.
- 08.04 Crop Calendar and cropping pattern.
- 08.05 Root zone of crops.
- 08.06 Critical stages of Crop growth.
- 08.07 Irrigation requirement (data not methodology)

**TOPIC: 09 – DRAINAGE OF IRRIGATED AGRICULTURE:** [06]

- 09.01 Introduction of farm drainage system, soil salinity, water logging.
- 09.02 Classification of drainage methods.
- 09.03 Investigation, planning, construction and maintenance of farm drainage system (including both surface and sub-surface drains).

**TOPIC: 10 –FARMER’S PARTICIPATION:** [03]

- 10.01 Motivation of farmers for better water and land management.
- 10.02 Farmers organisation for better water use and farmer’s participation.

**TOPIC: 11 –MISCELLANEOUS:** [10]

- 11.01 Types of outlets.
- 11.02 Flow measurement.
- 11.03 Seepage loss study.
- 11.04 System and conveyance efficiency.
- 11.05 Watershed Management.
- 11.06 Drip Irrigation.
- 11.07 Sprinkler Irrigation.
- 11.08 Conjunctive use of Water.

**Books Recommended:**

1. A guide to survey, Investigation Design of Micro-Distribution Network, Subernrekha Multipurpose Project WRD, Government of Bihar, Published from Jamshedpur. -
2. Special course on Diagnostic, Analysis of minor irrigation schemes, Publication no. 11, WALMI, Aurangabad(M.S.) -
3. On Farm Development work including Micro-Distribution, Publication no, 12, WALMI, Aurangabad(M.S.) -
4. Crop Water Requirement WALMI, Aurangabad(M.S.), Publication no. 30. -
5. Irrigation-Theory & Practice, Vikash Publication, New Delhi. - A. M. Michel

# CIVIL ENGINEERING LAB

<b>Subject Code 16606</b>	<b>Practical</b>			<b>No of Period in one session : 50</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>50</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>	<b>:</b>	<b>40</b>
	<b>-</b>	<b>-</b>	<b>04</b>	<b>Internal Exam.</b>	<b>:</b>	<b>10</b>

## Rationale and Objectives:

The civil engineering laboratory is a subject which will help student to understand the theory that he has studied by performing experiments and verifying results.

Besides the above the objective of the course are to develop measuring skills, skill to observe experimental data, put the data in a tabular form, draw graphs, read the graph and analyse the result. It will bring confidence in a student.

## CONTENTS:

Preparation of Journal based on any eight experiments of the following:-

- 01 Determination of fineness modular of fine aggregate.
- 02 Determination of fineness modular of coarse aggregate.
- 03 Determination of bulking the sand.
- 04 Determination of Thickness index and elongation index of aggregate.
- 05 Determination of Normal consistency of cement.
- 06 Determination of Initial setting time of cement.
- 07 Determination of Final setting time of cement.
- 08 Determination of Soundness of cement.
- 09 Determination of tensile strength of cement after 3 days & after 7 days curing.
- 10 Determination of compressive strength of concrete after 7 days; 14 days & 28 days of curing of M 15 grade of concrete.
- 11 Slump test.
- 12 Determination of turbidity of water.
- 13 Determination of PH value of water.
- 14 Determination of flash point of bitumen by a bell's flash point apparatus or by pensky master apparatus.
- 15 Determination of softening point of bituminous material by Ring and Bell apparatus.
- 16 Determination of consistency of bituminous material by penetration test.
- 17 Abrasion test of road material.

## Books Recommended:

1. Lab manual for soil mechanics, material testing, standard - Water & Bitumen. publishers & distributors Delhi.
2. Material testing lab manuals. - Kanshik.
3. Strength of materials. - T.T.T.I. Madras.

## PROFESSIONAL STUDIES & ENTREPRENEURSHIP

<b>Subject Code</b> <b>00607</b>	<b>Sessional</b>			<b>No of Period in one session : 50</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>50</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>	<b>:</b>	<b>30</b>
	<b>-</b>	<b>-</b>	<b>04</b>	<b>Internal Exam.</b>	<b>:</b>	<b>20</b>

### Rationale:

The paper has been introduced to achieve dual purpose for the students.

Firstly, this course provides the basics of Professional management and secondly it also prepares the student to undertake independent venture by becoming an entrepreneur.

This makes them conversant with their duties and responsibility to make them successful in their career building.

### Objectives:

With the input provided in this paper, the students will be able to :-

- Acquire basic knowledge of management.
- Understand the area of management such as human resources, marketing, finance and commercial aspect.
- Understand the benefit of becoming an entrepreneur.
- Handle a project efficiently and in dependently.

**To prepare a Project Report on any of the followings:**

<u>S.No.</u>	<u>Topics</u>
01	Project Identification and formulation Report.
02	Project Profile/Pre-feasibility Report.
03	Techno-economical Feasibility Report (TEFR).
04	Market Survey Report.

### CONTENTS

<u>S.NO.</u>	<u>TOPICS</u>
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#### TOPIC – 01 : PROJECT IDENTIFICATION AND FORMULATION REPORT:

- ◆ Introduction.
- ◆ Collection of Data.
- ◆ Compilation of Data.
- ◆ Analysis and Assimilation of Data.
- ◆ Product Selection.
- ◆ Report Finalisation and Report Writing.

#### TOPIC - 02 : PROJECT PROFILE/PRE-FEASIBILITY REPORT :

- ◆ Introduction of the product.
- ◆ Market.
- ◆ Man Power (Personnel Required).
- ◆ Manufacturing Process.
- ◆ Plant and Machinery.
- ◆ Cost of Project.

- ◆ Means of Finance.
- ◆ Cost of Production.
- ◆ Annual Turnover.
- ◆ Profit.
- ◆ Profit on Investment.

**TOPIC – 03: TECHNO-ECONOMICAL FEASIBILITY REPORT (TEFR).**

- ◆ Introduction on product.
- ◆ Market Prospects and Marketing.
- ◆ Location.
- ◆ Manufacturing Programme and Annual Turnover.
- ◆ Manufacturing Process.
- ◆ Cost of Project.
- ◆ Means of Finance.
- ◆ Requirement of Raw materials, Consumables, Utilities and Working Capital.
- ◆ Organisational Structure, Management and Man Power.
- ◆ Project Implementation Schedule.
- ◆ Profitability and Cash Flow.

**TOPIC - 04 : MARKET SURVEY REPORT:**

- ◆ Data Collection & Processing through Primary & Secondary Sources- Questionnaire method, e-mail, by post, by phone.
- ◆ Present Status.
- ◆ Growth of the Industry.
- ◆ Import and Export.
- ◆ Present market Demand.
- ◆ Forecast.
- ◆ Future Prospect/Scope.
- ◆ Market Segmentation.

**Books Recommended:**

1. Essential of Management, Tata McGraw Hill, - Herald Koonz & Cyril O' Donnel. Publishing Company Ltd., New Delhi.
2. Business Organisation and Management, S. C. Chand - M. C. Shukla and Company (Pvt.) Ltd., Ram Nagar, New Delhi
3. Managerial Economics, Sultan Chand & Sons, New - R. L. Vashney & K. L. Maheshwari Delhi
4. Project Appraisal and Follow up, Govind Prakashan, - D. P. Sharda Mumbai.
5. Modern Marketing Management, Progressive - Dr. Rustam S. Davar Corporation Pvt. Ltd., P51, Mahatma Gandhi Road, Bombay-400 001



6. A hand book for new entrepreneurs (with special reference to science and technology target group) - Entrepreneurship Development Institute of India, 83-A, Swastic Society Navrangpura, Ahmedabad, PIN-380 009.
7. Student discipline - Published by I.S.T.E. Mysore
8. Communication Skill - Published by I.S.T.E. Mysore
9. Decision Making - Published by I.S.T.E. Mysore
10. Pollution Control in Industry - Published by I.S.T.E. Mysore
11. S.S.M. in Environmental Engineering - Published by I.S.T.E. Mysore
12. Leadership in Organisation - Published by I.S.T.E. Mysore
13. Small Enterprise Management - Published by I.S.T.E. Mysore
14. Motivation - Published by I.S.T.E. Mysore
15. Fundamentals of Environmental Pollution - Krishnan and Kannan
16. Enviromental Engineering, T.T.T.I., Madras - Tata Mcgraw Hill
17. Motivation I.I.T. Kanpur - Published by I.S.T.E. Mysore
18. Mine Management - V.N. Singh, Bangle Prining Press Ranchi
19. Hand book on Project Appraisal and follow up, Govind Prakashan, 204, Saraswati Kunj, 90, S. V. Road, Goregoan, Bombay-400 062. - D. P. Sarda
20. Bihar Industrial Policy - Government of Bihar, Department of Industries.
21. Entrepreneurship Guide - Bihar State Financial Corporation, Fraser Road, Patna-800 001.
22. Management Economics, S. Chand & Sons, 4792/23, Dariaganj, New Delhi-110 002. - R. L. Varshney & G. L. Maheshwari
23. Management Principles & Practices, S. Chand & Sons, 4792/23, Dariaganj, New Delhi-110002. - L. Prasad & S. S. Gulshan

## CIVIL ENGINEERING LAB

Subject Code 16608	Sessional			No of Period in one session : 50		
	No. of Periods Per Week			Full Marks	:	100
	L	T	P/S	Annual Exam.	:	60
	-	-	04	Internal Exam.	:	40

### Rationale and Objectives:

The civil engineering laboratory is a subject which will help student to understand the theory that he has studied by performing experiments and verifying results.

Besides the above the objective of the course are to develop measuring skills, skill to observe experimental data, put the data in a tabular form, draw graphs, read the graph and analyse the result. It will bring confidence in a student.

### CONTENTS:

Preparation of Journal based on any eight experiments of the following:-

- 01 Determination of fineness modular of fine aggregate.
- 02 Determination of fineness modular of coarse aggregate.
- 03 Determination of bulking the sand.
- 04 Determination of Thickness index and elongation index of aggregate.
- 05 Determination of Normal consistency of cement.
- 06 Determination of Initial setting time of cement.
- 07 Determination of Final setting time of cement.
- 08 Determination of Soundness of cement.
- 09 Determination of tensile strength of cement after 3 days & after 7 days curing.
- 10 Determination of compressive strength of concrete after 7 days; 14 days & 28 days of curing of M 15 grade of concrete.
- 11 Slump test.
- 12 Determination of turbidity of water.
- 13 Determination of PH value of water.
- 14 Determination of flash point of bitumen by a bell's flash point apparatus or by Pensky master apparatus.
- 15 Determination of softening point of bituminous material by Ring and Ball apparatus.
- 16 Determination of consistency of bituminous material by penetration test.
- 17 Abrasion test of road material.

### Books Recommended:

1. Lab manual for soil mechanics, material testing, standard - Water & Bitumen. publishers & distributors Delhi.
2. Material testing lab manuals. - Kanchik.
3. Strength of materials. - T.T.T.I. Madras.

## PROJECT WORK AND ITS PRESENTATION IN SEMINAR

<b>Subject Code</b> <b>16609</b>	<b>Sessional</b>			<b>No of Period in one session :</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>100</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>	<b>:</b>	<b>60</b>
	<b>-</b>	<b>-</b>	<b>-</b>	<b>Internal Exam.</b>	<b>:</b>	<b>40</b>

**Rationale :**

Projects are intended to provide students with an ability to tackle new problems with inquisitiveness. The project is included in the course to develop skill to plan, organize, conduct survey, investigate, collect relevant course and will also provided an opportunity to develop skill to integrate knowledge and skill gained while going through other subjects.

**Objective:**

The students will be able to develop skill to :

- Plan.
- Organise.
- Conduct survey.
- Investigate.
- Collect relevant data.
- Take decision.
- Prepare a project or technical report.
- Present the report before a seminar.

<u>S.No.</u>	<u>Topics</u>
01	Road project.
02	Other project.

**CONTENTS**

**TOPIC: 01- ROAD PROJECT :**

01.01            ½ Kilometer length :  
The road project (Rural areas) will be allotted to the student by the faculty in charge of the project.

**TOPIC 02 : -OTHER PROJECT (ANY ONE FROM THE FOLLOWING) :**

- 02.01            Bridge Project (S. L. R. bridge).
- 02.02            Irrigation project (Barrage project/Dam project/Canal project Tube well project).
- 02.03            Drainage project (one village / command of one outlet/ small chour 100 hectares).
- 02.04            Water supply scheme – one village (minimum ten houses).
- 02.05            Sanitary engineering scheme one village (minimum ten houses).

The above mentioned Project Report will include the following :

1. Location survey.
2. Reconnaissance survey.
3. Investigation & survey work.
4. Design and Office work (generally based on studies in theory subjects. (In case of design work beyond the syllabus.).
5. Preparing working drawing, estimating materials, Drawing section, layout plans, Schematic diagrams plans and elevations, other details.
6. Estimating and counting.
7. Construction planning.
8. Technical Project Report.

Project work/ project report should be presented in the form of a seminar for developing confidence and communication skill among the students.

**NOTE:-**

For completion of Project Work a duration of two weeks at a stretch will be provided.

Project work will be allotted to the students just in the beginning of the session. Each student will be given a separate work under the supervision of a teacher. Total number of students may be divided among the number of teachers available. The teacher concerned will select separate problem for each student under him and allot it to him at the beginning of the session. Problems selected should preferably conform to the syllabus. If it is outside of the syllabus then it must be within the field of Civil (Rural) engineering.

**References :**

1. I. S. codes and manuals.
2. Text Books of concerned subjects.