



S J P N Trust's

Hirasugar Institute of Technology, Nidasoshi.

Inculcating Values, Promoting Prosperity

Approved by AICTE, New Delhi, Permanently Affiliated to VTU, Belagavi

Recognized under 2(f) & 12B of UGC Act, 1956

Accredited at 'A' Grade by NAAC & Programmes Accredited by NBA: CSE & ECE

Civil Engg. Dept

Academic
Course Plan

2023-24 (Odd)

Rev: 00

INSTITUTE VISION

“To be a preferred institution in Engineering Education by achieving excellence in teaching and research and to remain as a source of pride for its commitment to holistic development of individual and society”

INSTITUTE MISSION

“To continuously strive for the overall development of students by educating them in a state-of-the-art- infrastructure, by retaining the best practices, faculties and inspire them to imbibe real-time problem-solving skills, leadership qualities, human values and societal commitments, so that they emerge as competent professionals”.

DEPARTMENT VISION

"To be the centre of excellence in providing education in the field of Civil Engineering to produce technically competent and socially responsible engineering graduates."

DEPARTMENT MISSION

"Educating students to prepare them for professional competencies in the broader areas of the Civil Engineering field by inculcating analytical skills, research abilities and encouraging culture of continuous learning for solving real time problems using modern tools."

PROGRAM EDUCATIONAL OBJECTIVES (PEO's):

- 1. Pursue a successful career in various domains of Civil Engineering Profession by acquiring knowledge in mathematical, scientific and engineering fundamentals.*
- 2. Analyze and design Civil Engineering systems with social awareness and responsibility.*
- 3. Exhibit professionalism, ethical approach, communication skills & teamwork in their profession and adapt to modern trends by engaging in lifelong learning.*



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PROGRAM OUTCOMES (PO's):

- 1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. Problem analysis:** Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
- 6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- 11. Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- 12. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSO's):


PSO1: *Inculcating in students practical knowledge and experimental skills to tackle Civil Engineering problems using technical and management skills, exhibiting professional ethics to meet the societal needs.*

PSO2: *Provide solutions related to Civil Engineering built environment through a multidisciplinary approach.*




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1.0	Student Help Desk
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Sl. No.	Purpose	Contact Person	
		Faculty	Instructor
01	HOD, Academics, Attestations, Exam forms signature	Prof. S.M.Chandrakanth	NA
02	Research Center Co-Ordinator,	Prof. S.M.Chandrakanth	NA
03	Industry-Institute-Interaction, Technical Magazine Coordinator (MoU, Ind. Visit etc.)	Prof. Shreedevi S B	NA
04	EMS / ED Cell coordinator, TP Cell officer	Prof. Preethi. R.Patil	NA
05	Project Coordinator, KSCST, IEEE coordinator, Smart India Hackathon, Scholarship, LIC	Prof. Preethi. R.Patil	NA
06	FACE / Website Coordinator	Prof. Sudarshan V Jore	NA
07	Civil/ IT Maintenance, Feedback / Publicity, Department News Letter, NSS, Student Welfare	Prof. Vishwanath I Patil	NA
08	GATE Coaching Coordinator	Prof. Sudarshan V Jore	NA
09	ISTE / E-Shikshana / E-learning / Internship	Prof. Vishwanath I Patil	NA
10	Women Empower cell, Conference, FDP, Workshop	Prof. Shreedevi S B	NA
11	IA Coordinator / Alumni coordinator	Prof. Shreedevi S B	NA
Institute Level			
		Faculty	Contact
12	Student Welfare Convener	Sri. M. G. Huddar	8217056798
13	TP Cell Coordinator	Sri. Pramod. Patil	9731104059
14	Anti-Ragging Committee Member	Sri. K.M.Akkoli	9739114856
15	Anti Raging Squad Convener	Sri. K.M.Akkoli	9739114856
16	Internal Complaint Committee Convener	Smt. S. S. Kamte	9008696825
17	Grievance redressal Convener	Sri. S. S. Tabhaj	9901398134
18	Sports and Cultural / Extra-Curricular Activities Convener	Sri. S.B. Sarawadi	9739109383

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2.0 Departmental Resources

Department of Civil Engineering was established in the year 2020 and is housed in a total area of 858 Sq. Mtrs.

2.1 Faculty Position

Sl.No.	Category	No. in Position	Average experience (in years)
01.	Teaching faculty	05	13
02.	Technical Supporting Staff	00	00
03.	Helper staff	02	21

2.2 Major Laboratories

Sl.No.	Name of the laboratory	Area in Sq. Mtrs	Amount Invested (Rs. in Lakhs)
01.	Computer Aided Building Planning & Drawing	66	14.37
02.	Building Materials Testing Laboratory	149	11.02
03.	Geology Laboratory	76	0.75
04.	Fluid Mechanics & Hydraulic Machines Laboratory	72	7.76
05.	Surveying Practice	76	0.70
06.	Concrete and Highway Materials Laboratory	72	1.30
07.	Geotechnical Engineering Laboratory	73	0.70
08.	Environmental Engineering Laboratory	200	New Setup Under Process

Total Investment in the Department

Rs. 36.60 Lakhs

3.0 Teaching Faculty Details

Sl. No.	Name	Designation	Qualification	Specialization	Professional Membership	Teaching Exp (In yrs.)	Phone No.
01	Prof. S.M.Chandrakanth	Asst. Prof./HOD	M. Tech. (PhD)	Highway Engineering	IAENG 220815	12	8867814854
02	Prof. Preethi R. Patil	Asst. Prof.	M. Tech.	Structures	--	04	9606557280
03	Prof. Vishwanath I Patil	Asst. Prof.	M. Tech	Structures	--	05	9975499979
04	Prof. Sudarshan V Jore	Asst. Prof.	M. Tech.	CT & M	--	02	9535459918
05	Prof. Shreedevi S B	Asst. Prof.	M. Tech.	WWMH&SE	--	02	7760429556



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4.0

Institute Academic Calendar

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AY:2023-24 (Odd)

Rev: 01

ACADEMIC CALENDAR OF EVENTS-01 (CoE-01) OF I & VII SEM FOR THE AY: 2023-24

Ref: 1. VTU CoE Notification No.: VTU/BGM/ACA/2023-24/2668, Dated 25th Aug. 2023
2. HSIT/NDS/HOD-Meeting-23/2022-23, Dated: 20th Sept. 2023

Calendar	Date	Events & Holidays																																																	
<p>September -2023</p> <table border="1"> <tr><td>Sun</td><td>Mon</td><td>Tue</td><td>Wed</td><td>Thu</td><td>Fri</td><td>Sat</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td>1</td><td>2</td></tr> <tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td></tr> <tr><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td></tr> <tr><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td></tr> <tr><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td></tr> </table>	Sun	Mon	Tue	Wed	Thu	Fri	Sat						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	14 th Aug.-9 th Sept.2023	One Month Internship for VI Semester completed students							
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	4 th -14 th Sept. 2023	Commencement of I Semester & 11 days Students Induction Program (SIP)																																																	
	11th Sept.2023	Commencement of VII Semester Classes																																																	
	15th Sept.2023	Commencement of I Semester Classes																																																	
	19th Sept.2023	GH: Varasiddhi Vinayaka Vrata																																																	
	21st Sept. 2023	LH: Mahadasoha of Shri Math Nidasoshi																																																	
	28th Sept.2023	GH: Eid-Milad																																																	
	2nd Oct. 2023	GH: Gandhi Jayanthi																																																	
	19th -21st Oct.2023	1st IA Test																																																	
	21 st Oct. 2023	1 st Feedback on Teaching-Learning (I & VII Sems.)																																																	
	23rd -24th Oct. 2023	GH: Mahanavami, Ayudhapooja, Vijayadasami																																																	
	26 th Oct. 2023	Display of 1 st IA Test Marks																																																	
	1st Nov. 2023	GH: Kannada Rajyothsava																																																	
	10 th -11 th Nov. 2023	Lab IA Test-I (2021 & 2022 Scheme)																																																	
	14th Nov. 2023	GH: Balipadyami, Deepavali																																																	
	23rd -25th Nov. 2023	2nd IA Test																																																	
	25 th Nov. 2023	2 nd Feedback on Teaching-Learning (I & VII Sems.)																																																	
	29 th Nov. 2023	Display of 2 nd IA Test Marks																																																	
	30th Nov. 2023	GH: Kanakadasa Jayanti																																																	
	8th-9th Dec. 2023	International Conference																																																	
	25th Dec. 2023	GH: Christmas																																																	
	1st -3rd Jan. 2024	3rd IA Test																																																	
	5 th Jan. 2024	Display of 3 rd IA Test Marks																																																	
	4 th -6 th Jan. 2024	Lab IA Test-II (2018, 2021 & 2022 Scheme)																																																	
	6th Jan. 2024	Last Working Day of the I & VII Semesters																																																	
	8th - 19th Jan. 2024	VTU Practical Exams																																																	
	12 th Jan. 2024	National Youth Day																																																	
	26th Jan. 2024	Republic Day																																																	
	22 nd Jan. 2024	Commencement of VTU SEE																																																	
	13 th Feb.2024	Commencement of II Semester																																																	
	19 th Feb. 2024	Commencement of VIII Semester																																																	
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GH: General Holiday, LH: Local Holiday

Dr.S.N.Topannavar
IQAC Coordinator & Dean (Academics)



Dr.S.C.Kamate
Principal

Nidasoshi, Taq: Hukkeri, Dist: Belgaum, Karnataka - 591 236
Phone:+91-8333-278887, Fax:278886, Web:www.hsit.ac.in, Mail:principal@hsit.ac.in



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5.0 Scheme of Teaching & Examination

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

Scheme of Teaching and Examination 2018 – 19

Choice Based Credit System (CBCS) and Outcome Based Education (OBE)

(Effective from the academic year 2018 – 19)

VII Semester

B.E: Civil Engineering

Sl. No	Course and Course code		Course Title	Teaching Department	Teaching Hour/Week			Examination			Credits	
					Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks		Total Marks
1	PCC	18CV71	Quality Surveying and Contract Management	Civil Engg.	3	–	–	03	40	60	100	3
2	PCC	18CV72	Design of RCC and Steel Structures	Civil Engg.	3	–	–	03	40	60	100	3
3	PEC	18CV73X	Professional Elective - 2	Civil Engg.	3	–	–	03	40	60	100	3
4	PEC	18CV74X	Professional Elective - 3	Civil Engg.	3	–	–	03	40	60	100	3
5	OEC	18CV75X	Open Elective -B	Civil Engg.	3	–	–	03	40	60	100	3
6	PCC	18CVL76	Computer Aided Detailing of Structures	Civil Engg.	–	2	2	03	40	60	100	2
7	PCC	18CVL77	Geotechnical Engineering Laboratory	Civil Engg.	–	2	2	03	40	60	100	2
8	Project	18CVP78	Project Work Phase - 1		–	–	2	–	100	–	100	1
9	Internship	–	Internship	(If not completed during the vacation of VI and VII semesters, it shall be carried out during the vacation of VII and VIII semesters)								
TOTAL					15	04	06	21	380	420	00	20

Note: PCC: Professional core, PEC: Professional Elective.

Professional Elective - 2

Course code under 18CV73X	Course Title
18CV731	Theory of Elasticity
18CV732	Air Pollution and Control
18CV733	Pavement Materials & Construction
18CV734	Ground Water Hydraulics
18CV735	Masonry Structures

Professional Electives - 3

Course code under 18CV74X	Course Title
18CV741	Earthquake Engineering
18CV742	Design Concepts of Building Services
18CV743	Reinforced Earth Structures
18CV744	Design of Hydraulic Structures
18CV745	Urban Transport Planning

Open Elective -B

Course code under 18CV75X	Course Title
18CV751	Finite Element Method
18CV752	Numerical Methods and Applications
18CV753	Environmental Protection and Management

Students can select any one of the open electives offered by other Departments except those that are offered by the parent Department (Please refer to the list of open electives under 18XX75X).

Selection of an open elective shall not be allowed if,

- The candidate has studied the same course during the previous semesters of the programme.
- The syllabus content of open elective is similar to that of the Departmental core courses or professional electives.
- A similar course, under any category, is prescribed in the higher semesters of the programme.

Registration to electives shall be documented under the guidance of Programme Coordinator/ Advisor/Mentor.

Project work:

Based on the ability/abilities of the student/s and recommendations of the mentor, a single discipline or a multidisciplinary project can be assigned to an individual student or to a group having not more than 4 students. In extraordinary cases, like the funded projects requiring students from different disciplines, the project student strength can be 5 or 6.

CIE procedure for Project Work Phase - 1:

(i) **Single discipline:** The CIE marks shall be awarded by a committee consisting of the Head of the concerned Department and two senior faculty members of the Department, one of whom shall be the Guide.

The CIE marks awarded for the project work phase -1, shall be based on the evaluation of the project work phase -1 Report (covering Literature Survey, Problem identification, Objectives and Methodology), project presentation skill and question and answer session in the ratio 50:25:25. The marks awarded for the Project report shall be the same for all the batch mates.

(ii) **Interdisciplinary:** Continuous Internal Evaluation shall be group wise at the college level with the participation of all guides of the college. Participation of external guide/s, if any, is desirable.

The CIE marks awarded for the project work phase -1, shall be based on the evaluation of project work phase -1 Report (covering Literature Survey, Problem identification, Objectives and Methodology), project presentation skill and question and answer session in the ratio 50:25:25. The marks awarded for the project report shall be the same for all the batch mates.

Internship: All the students admitted to III year of BE/B. Tech shall have to undergo mandatory internship of 4 weeks during the vacation of VI and VII semesters and /or VII and VIII semesters. A University examination shall be conducted during VIII semester and the prescribed credit shall be included in VIII semester. Internship shall be considered as a head of passing and shall be considered for the award of degree. Those, who do not take-up/complete the internship shall be declared fail and shall have to complete during subsequent University examination after satisfying the internship requirements.

AICTE activity Points: In case students fail to earn the prescribed activity Points, Eighth semester Grade Card shall be issued only after earning the required activity Points. Students shall be admitted for the award of degree only after the release of the Eighth semester Grade Card.



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Dept of Civil
Engg.

Academic
Course Plan

2023-24 (Odd-
Sem)

Subject Title	QUANTITY SURVEYING AND CONTRACT MANAGEMENT		
Subject Code	18CV71	CIE Marks	40
Number of Lecture Hrs /	(3:0:0)	SEE Marks	60
Total Number of Lecture Hrs	40	Exam Hours	03
CREDITS – 03			

FACULTY DETAILS:		
Name: Prof. V.I.Patil	Designation: Asst. Professor	Experience: 05 Years
No. of times course taught: Nil	Specialization: Structural Engineer	

1.0 Prerequisite Subjects:

Sl.No	Branch	Semester	Subject
01	Civil Engineering	II	Building Material and Construction
02	Civil Engineering	III	Geodetic Engineering
03	Civil Engineering	V	Construction Management

2.0 Course Objectives

This course will enable students to:

1. Estimate the quantities of work, develop the bill of quantities and arrive at the Cost of civil engineering Project.
2. Understand and apply the concept of Valuation for Properties.
3. Understand Apply and Create the Tender and Contract document.

3.0 Course Outcomes

After studying this course, students will be able to:

Sl.No	Course Outcome	RBT Level	POs
C401.1	Taking out quantities and work out the cost and preparation of abstract for the estimated cost for various civil engineering works.	L1,L2,L3,L4	1,2,3,5,6,8,12
C401.2	Prepare detailed and abstract estimates for various road works, structural works and water supply and sanitary works.	L1,L2,L3,L4	1,2,3,5,6,8,12



C401.3	Prepare the specifications and analyze the rates for various items of work.	L1,L2,L3,L4	1,2,3,5,6,8,12
C401.4	Assess contract and tender documents for various construction works.	L1,L2,L3,L4	1,2,3,5,6,8,12
C401.5	Prepare valuation reports of buildings.	L1,L2,L3,L4	1,2,3,5,6,8,12
Total Hours of instruction			40

4.0 Course Content

Module-1

Quantity Estimation for Building: Study of various drawing attached with estimates, important terms, units of measurements, abstract, Types of estimates. Estimation of building by Short wall and long wall method - centre line method.

Estimate of R.C.C structures including Slab, beam, column, footings.

Module-2

Estimate of Steel truss, manhole and septic tanks and slab culvert.

Quantity Estimation for Roads: Computation of volume of earthwork fully in banking, cutting, partly cutting and partly Filling by mid-section, trapezoidal and Prismoidal Methods.

Module-3

Specification for Civil Engineering Works: Objective of writing specifications essentials in specifications, general and detail specifications of different items of works in buildings and roads.

Analysis of Rates : Factors Affecting Cost of Civil Works , Concept of Direct Cost , Indirect Cost and Project Cost. Rate analysis and preparation of bills, Data analysis of rates for various items of Works, Sub-structure components, Rate analysis for R.C.C. slabs, columns and beams.

Module-4

Contract Management-Tender and its Process: Invitation to tender, Prequalification, administrative approval & Technical sanction. Bid submission and Evaluation process. Contract Formulation: Letter of intent, Award of contract, letter of acceptance and notice to proceed. Features / elements of standard Tender document (source: PWD / CPWD / International Competitive Bidding – NHAI / NHEPC / NPC).

Law of Contract as per Indian Contract act 1872, Types of Contract, Joint venture.

Contract Forms: FIDIC contract Forms, CPWD, NHAI, NTPC, NHEPC.



Module-5

Contract Management-Post award : Basic understanding on definitions, Performance security, Mobilization and equipment advances, Secured Advance, Suspension of work, Time limit for completion, Liquidated damages and bonus, measurement and payment, additions and alterations or variations and deviations, breach of contract, Escalation, settlement of account or final payment, claims, Delay's and Compensation, Disputes & its resolution mechanism, Contract management and administration.

Valuation: Definitions of terms used in valuation process, Purpose of valuation, Cost, Estimate, Value and its relationship, Capitalized value. Freehold and lease hold and easement, Sinking fund, depreciation– methods of estimating depreciation, Outgoings, Process and methods of valuation: Rent fixation, valuation for mortgage, valuation of land.

5.0 Relevance to future subjects

Sl No	Semester	Subject	Topics
1.	---	Project Work	Construction Project

6.0 Relevance to Real World

Sl No	Real World Mapping
01	Mega Construction Project Planning and Scheduling

7.0 Gap Analysis and Mitigation

Sl No	Delivery Type	Details
01	Tenders	Topic: Government and Private process

8.0 Books Used and Recommended to Students

Text Books

1. Datta B.N., “Estimating and costing”, UBSPD Publishing House, New Delhi.
2. B.S. Patil, “Civil Engineering Contracts and Estimates”, Universities Press.
3. M. Chakraborti; “Estimation, Costing and Specifications”, Laxmi Publications.
4. MORTH Specification for Roads and Bridge Works – IRC New Delhi.

Reference Books

1. Kohli D.D and Kohli R.C, “Estimating and Costing”, 12 th Edition, S.Chand Publishers, 2014.
2. Vazirani V.N and Chandola S.P, “Estimating and costing”, Khanna Publishers, 2015.
3. Rangwala, C. "Estimating, Costing and Valuation", Charotar Publishing House Pvt. Ltd., 2015.
4. Duncan Cartlidge , "Quantity Surveyor's Pocket Book", Routledge Publishers, 2012.
5. Martin Brook, "Estimating and Tendering for Construction Work", A Butterworth-Heinemann publishers, 2008.
6. Robert L Peurifoy , Garold D. Oberlender , “ Estimating Construction Costs” – 5ed Tata McGraw-Hill New Delhi.
7. David Pratt, “Fundamentals of Construction Estimating” – 3ed, Edition.
8. PWD Data Book, CPWD Schedule of Rates (SoR). and NH SoR – Karnataka FIDIC Contract forms.
9. B.S. Ramaswamy “Contracts and their Management” 3ed, Lexis Nexis(a division of Reed Elsevier India Pvt Ltd).



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Course Plan

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Sem)

Additional Study material & e-Books

Class notes and VTU notes

9.0

Relevant Websites (Reputed Universities & Others) for Notes/Animation/Videos Recommended

Website and Internet Contents References

<https://en.m.wikipedia.org>

10.0

Magazines/Journals used and Recommended to Students

Sl.No	Magazines/Journals	Website
1	International Journal	www.contractmanagement.com

11.0

Examination Note

Scheme of Evaluation for CIE (40 Marks)

➤ **Internal Assessment:** 30 Marks

Total of Three Internal Assessment tests will be conducted for 30 Marks each. Average of three tests is scaled down to 30 Marks.

➤ **Assignment:** 10 Marks

Scheme of examination: 100 Marks, scaled down to 60 in VTU result sheet.

The question paper will have ten questions.

- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of three sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module.

12.0

Course Delivery Plan

Module	Lecture No.	Content of Lecturer	% of Portion
Module 1	1	Quantity Estimation for Building: Study of various drawing attached with estimates.	20
	2	Important terms, units of measurements	
	3	Types of estimates.	
	4	Estimation of building by Short and long wall method.	
	5	Estimation of building by centre line method.	
	6	Estimate of R.C.C structures Slab.	
	7	Estimate of R.C.C structures beam.	
	8	Estimate of R.C.C structures column, footings.	
Module 2	9	Estimate of Steel truss.	20
	10	Estimate of manhole.	
	11	Estimate of septic tanks.	
	12	Estimate of slab culvert.	
	13	Quantity Estimation for Roads: Computation of volume of earthwork fully in banking cutting, partly cutting and partly Filling.	
	14	Quantity Estimation for Roads: Computation of volume of earthwork fully in banking cutting, partly cutting and partly Filling by mid-section Methods.	



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	15	Quantity Estimation for Roads: Computation of volume of earthwork fully in banking cutting, partly cutting and partly Filling by trapezoidal Methods.	
	16	Quantity Estimation for Roads: Computation of volume of earthwork fully in banking cutting, partly cutting and partly Filling by Prismoidal Methods.	
Module 3	17	Specification for Civil Engineering Works.	20
	18	Objective of writing specifications essentials in specifications.	
	19	General and detail specifications of different items of works in buildings and roads.	
	20	Analysis of Rates: Factors Affecting Cost of Civil Works.	
	21	Concept of Direct Cost, Indirect Cost and Project Cost.	
	22	Rate analysis and preparation of bills.	
	23	Data analysis of rates for various items of Works, Sub-structure components.	
	24	Rate analysis for R.C.C. slabs, columns and beams.	
Module 4	25	Contract Management-Tender and its Process: Invitation to tender, Prequalification.	20
	26	Administrative approval & Technical sanction.	
	27	Bid submission and Evaluation process.	
	28	Contract Formulation: Letter of intent, Award of contract.	
	29	Letter of acceptance and notice to proceed. Features / elements of standard Tender document (source: PWD / CPWD)	
	30	International Competitive Bidding – NHAI / NHEPC / NPC).	
	31	Law of Contract as per Indian Contract act 1872, Types of Contract, Joint venture.	
	32	Contract Forms: FIDIC contract Forms, CPWD, NHAI, NTPC, NHEPC.	
Module 5	33	Contract Management-Post award: Basic understanding on definitions, Performance security Mobilization and equipment advances, Secured Advance.	20
	34	Suspension of work, Time limit for completion, Liquidated damages and bonus, measurement and payment.	
	35	Additions and alterations or variations and deviations, breach of contract, Escalation, settlement of account or final payment, claims.	
	36	Delay's and Compensation, Disputes & its resolution mechanism, Contract management and administration.	
	37	Valuation: Definitions of terms used in valuation process, Purpose of valuation, Cost, Estimate.	
	38	Value and its relationship, Capitalized value. Freehold and lease hold and easement, Sinking fund.	
	39	Depreciation–methods of estimating depreciation, Outgoings.	
	40	Process and methods of valuation: Rent fixation, valuation for mortgage, valuation of land.	

13.0 Assignments, Pop Quiz, Mini Project, Seminars

Sl.No	Title	Outcome expected	Allied study	Week No.	Individual / Group activity	Reference: book/website /Paper
1	Assignment 1: Questions on module 1	Students study work out the cost and preparation of abstract for the estimated cost for various Civil engineering works.	Module 1 of the syllabus	3	Individual Activity.	Text 1 Ref Book 2
2	Assignment 2: Questions	Students study Prepare detailed and abstract estimates for various road works, structural works and	Module 2 of the syllabus	5	Individual Activity.	Text 1,3 Ref Book 1,3



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	on module 2	water supply and sanitary works.				
3	Assignment 3: Questions on module 3	Students study Prepare the specifications and analyze the rates for various items of work.	Module 3 of the syllabus	8	Individual Activity.	Text 1,3 Ref Book 1,3
4	Assignment 4: Questions on module 4	Student study the contract and tender documents for various construction works	Module 4 of the syllabus	10	Individual Activity.	Text 1,3 Ref Book 1,5,9
5	Assignment 5: Questions on module 5	Students Study Prepare valuation reports of buildings.	Module 5 of the syllabus	12	Individual Activity.	Text 1,3 Ref Book 1,3

14.0 VTU QUESTION PAPERS

CBGS SCHEME

USN

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17CV81

**Eighth Semester B.E. Degree Examination, July/August 2022
Quantity Surveying and Contracts Management**

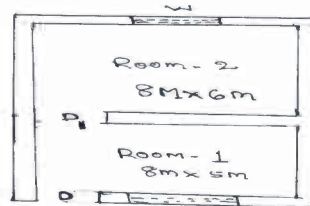
Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 The details of Residential building is as shown in Fig. Q1. Estimate and cost of each item of work.
- Earth work excavation for foundation in ordinary soil at Rs. 300/m³
 - Cement concrete bed 1 : 4 : 8 for wall foundations at Rs. 2500/m³
 - S.S.M [Size Stone Masonry] 1 : 8 for footings and basement foundations Rs. 2000/m³
 - First class BBM (Burnt Brick Masonry) work for super structure in cm 1 : 6 at Rs. 2000/m³.



INDEX

D - Door	1.2 m x 1 m
D ₁ - Door	1.0 m x 2.1 m
W - Window	1.1 m x 1.2 m

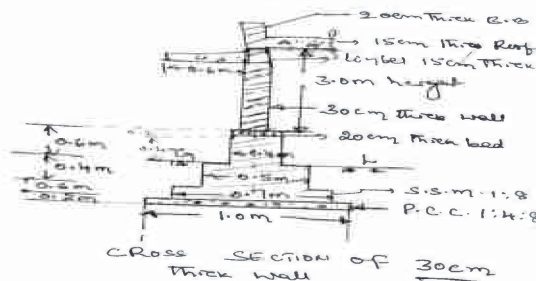


Fig. Q1

(20 Marks)

OR

- What are the different types of estimates? Explain any two types of estimation.
- What is meant by Estimation? List the purpose of Estimation

(10 Marks)

(10 Marks)

Important Note: 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. Q2-8 = 50, will be treated as malpractice.



17CV81

Module-2

- 3 The details of a septic tank is as shown in Fig.Q3. Estimate the quantities for the following items of work.
- Earth work excavation in foundation
 - Cement concrete 1:3:6 floor and foundation.
 - First class brick work with cement mortar 1:4
 - 12mm Thick cement plaster.

(05 Marks)
 (05 Marks)
 (05 Marks)
 (05 Marks)

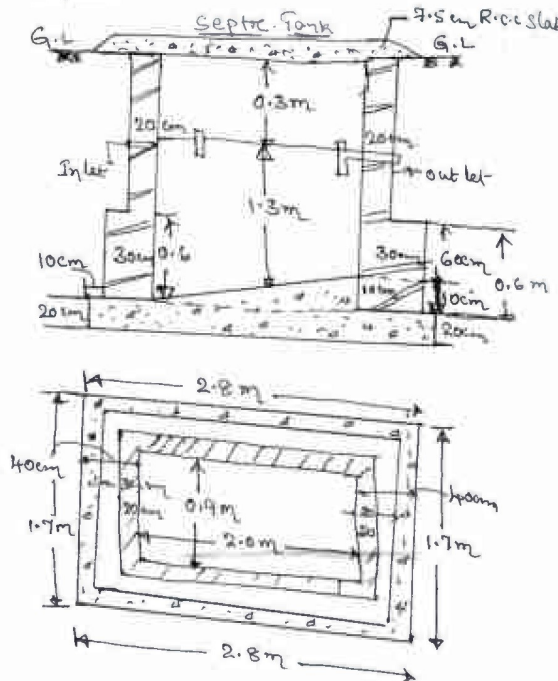


Fig.Q3

OR

- 4 Estimate the cost of Earth work embankment for the portion of road 300m long from the following data. Cost of earth work Rs. 80.00/m³.

Formation Levels	106.8	← Down gradient 1 in 100 →					
RL of Ground	105.42	104.3	104.8	104	102.9	102	102.6
Distance in meter	0	50	100	150	200	250	300

Formation width : 10 m

Side slopes in Embankment : 2:1

(20 Marks)

Module-3

- 5 Write the detailed technical specification for the following :
- Earth work excavation for foundation
 - Burnt Brick Masonry in CM 1:6
 - Plastering in CM 1:6 to interior surfaces
 - Painting for inside walls.

(20 Marks)



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OR

- 6 Carry out the rate analysis of the following items:
- First class brick work in C.M 1:4 for super structure
 - Cement concrete for foundation 1:4:8 bedding
 - 2.5 cm thick cement concrete 1:2:4 for floor
 - 12mm thick cement plastering 1:6 on new brick work.

(20 Marks)

Module-4

- 7 a. What is tender? How tenders are invited?
b. Explain briefly types of contract.

(06 Marks)
(14 Marks)

OR

- 8 a. What are the terms and conditions of contract?
b. Explain briefly :
(i) Administrative Approval
(ii) Technical Sanction

(10 Marks)
(10 Marks)

Module-5

- 9 a. What is valuation? What are the purpose of valuation?
b. What is Depreciation? What are the methods of calculating depreciation?

(10 Marks)
(10 Marks)

OR





- 10 a. Explain the methods of valuation.
b. Explain the following :
i) Gross income
ii) Net income
iii) Capitalized value
iv) Sinking Fund

(10 Marks)

(10 Marks)

* * * * *

3 of 3

Prepared by	Checked by		
		HOD	Principal



Subject Title	Design of RCC & Steel Structures		
Subject Code	18CV72	CIE Marks	40
Number of Lecture Hrs / Week	(3:0:0)	SEE Marks	60
Total Number of Lecture Hrs	40	Exam Hours	03
CREDITS – 03			

FACULTY DETAILS:		
Name: Prof. Preethi R. Patil	Designation: Asst. Professor	Experience: 4 Years
No. of times course taught: 01	Specialization: Structural Engineer	

1.0 Prerequisite Subjects:

Sl.No	Branch	Semester	Subject
01	Civil Engineering	I	Elements of civil engineering
02	Civil Engineering	III	Strength of Materials
03	Civil Engineering	V	Design of RC structural elements
04	Civil Engineering	VI	Design of steel structures

2.0 Course Objectives

1. Provide basic knowledge in the areas of limit state method and concept of design of RC and steel structures
2. Identify, formulate and solve engineering problems in RC and steel structures
3. Provide factual knowledge on analysis and design of RC Structural elements, who can participate and succeed in competitive examinations.

3.0 Course Outcomes

Having successfully completed this course, the student will be able to:

Sl.No	Course Outcome	RBT Level	POs
C702.1	acquire the basic knowledge in design of RCC & Steel structures.	L1,L2,L3,L4	1,2,3,5,6,8,12
C702.2	Have the ability to follow design procedures as per codal provisions and skills to arrive at structurally safe RC & Steel members.	L1,L2,L3,L4	1,2,3,5,6,8,12
Total Hours of instruction			40



4.0 Course Content

Module-1

Footings: Design of rectangular slab, slab-beam type combined footing. Retaining Walls: Design of cantilever Retaining wall and counter fort retaining wall.

Water Tanks: Design of circular water tanks resting on ground (Rigid and Flexible base). Design of rectangular water tanks resting on ground. **As per IS: 3370 (Part IV).** Design of portal frames with fixed and hinged based supports.

Module-2

Roof Truss: Design of roof truss for different cases of loading, forces in members to given.

Plate Girder: Design of welded plate girder with intermediate stiffener, bearing stiffener and necessary checks

Gantry Girder: Design of gantry girder with all necessary checks.

5.0 Relevance to future subjects

Sl No	Semester	Subject	Topics
1.	VIII	Design of pre stressed concrete	Pre tensioned bars 7& post tensioned bars

6.0 Relevance to Real World

Sl No	Real World Mapping
01	Detailing of steel structures & RCC design

7.0 Gap Analysis and Mitigation

Sl No	Delivery Type	Details
01	Tutorial	Topic: Gantry girder

8.0 Books Used and Recommended to Students

Text Books

1. N Krishna Raju, "Structural Design and Drawing of Reinforced Concrete and Steel", University Press
2. Subramanian N, "Design of Steel Structures", Oxford university Press, New Delhi
3. K S Duggal, "Design of Steel Structures", Tata McGraw Hill, New Delhi

Reference Books

1. Charles E Salman, Johnson & Mathas, "Steel Structure Design and Behavior", Pearson Publications
2. Nether Cot, et.al, "Behavior and Design of Steel Structures to EC -III", CRC Press
3. P C Verghese, "Limit State Design of Reinforced Concrete", PHI Publications, New Delhi
4. S N Sinha, "Reinforced Concrete Design", McGraw Hill Publication.

Additional Study material & e-Books

Class notes and vtu notes

9.0 Relevant Websites (Reputed Universities & Others) for Notes/Animation/Videos Recommended

Website and Internet Contents References

<https://en.m.wikipedia.org>

10.0 Magazines/Journals used and Recommended to Students

Sl.No	Magazines/Journals	Website
1	International Journal of MAT	www.matjournals.com

11.0 Examination Note

Scheme of Evaluation for CIE (40 Marks)



➤ **Internal Assessment: 30 Marks**

Total of Three Internal Assessment tests will be conducted for 50 Marks each. Average of three tests is scaled down to 30 Marks.

➤ **Assignment: 10 Marks**

SCHEME OF EXAMINATION: 100 Marks, scaled down to 60 in VTU result sheet.

The question paper will have ten questions.

- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of three sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module.

12.0 Course Delivery Plan

Module	Lecture No.	Content of Lecturer	% of Portion
Module 1	1	Footings :Design of rectangular slab	20
	2	Numerical problems	
	3	Design of slab beam type	
	4	Numerical problems	
	5	Design of combined footing	
	6	Numerical problems	
	7	Design of retaining walls	
	8	Numerical problems	
	9	Design of cantilever retaining wall	
	10	Numerical problems	
	11	Design of counter fort retaining wall	
	12	Numerical problems	
	13	Water tanks : design of circular water tanks resting on ground rigid base	
	14	Numerical problems	
	15	design of circular water tanks resting on ground flexible base	
	16	Numerical problems	
	17	design of circular water tanks resting on ground	
	18	Numerical problems	
	19	Design of portal frames with fixed base supports	
	20	Design of portal frames with hinged base supports	
Module 2	21	Roof truss :Design of roof truss for differential cases of loading	20
	22	Numerical problems	
	23	Numerical problems	
	24	Design of roof truss for differential cases of forces in members	
	25	Numerical problems	
	26	Numerical problems	
	27	Plate girder :Design of welded plate girder with intermediate stiffener	
	28	Numerical problems	
	29	Design of welded plate girder with bearing stiffener	
	30	Numerical problems	
	31	Numerical problems	
	32	Design of welded plate girder with necessary checks	
	33	Numerical problems	
	34	Numerical problems	
	35	Introduction to Gantry Girder	
	36	Numerical problems	
	37	Design of gantry girder	
	38	Numerical problems	
	39	Design of gantry girder with all necessary checks	
	40	Numerical problems	



13.0 Assignments, Pop Quiz, Mini Project, Seminars

Sl.No	Title	Outcome expected	Allied study	Week No.	Individual / Group activity	Reference: book/website /Paper
1	Assignment 1: Questions on module 1	Basic knowledge and problem solving skill, design solving skill	Module 1 of the syllabus	3	Individual Activity.	Text 1 Ref Book 2
2	Assignment 2: Questions on module 2	Design roof truss, gantry girder	Module 2 of the syllabus	5	Individual Activity.	Text 1 Ref Book 3

14.0 QUESTION BANK

MODULE 1

- Design a combined footing slab beam type for two rcc column A & B separated by a distance of 4m/c. column A is 500 x 500mm & carries a load of 1250 KN. Column B is 600 x 600 mm carries a load of 1600KN. Take SBC of soil is 200KN/m². Use M20 concrete and Fe415 steel. draw the sectional elevation.
- Design a cantilever retaining wall to retain earth embankment 5m high above ground level. The density of earth is 18KN/m³. & its angle of repose is 30 degree. The embankment is horizontal at its top. the SBC of may be taken as 200 KN/m³. The co efficient of friction b/n soil & concrete is 0.5 adopt M20 grade concrete and Fe -415 steel. draw the sectional elevation.

MODULE 2

- Design a simply supported gantry girder to carry an electrically operated travelling crane with the following details;
 - span of the crane bridge= 25m
 - span of the gantry girder =8m
 - wheel base=3.5m
 - crane capacity=200KN
 - weight of crane bridge=150KN
 - weight of crab=75KN
 - Minimum book distance= 1.0m
 - weight of rail=0.30KN/m
 - height of rail=105mm
 draw neatly cross section of gantry girder showing all details.also draw side view.

Prepared by	Checked by		
Prof. Preethi.R.Patil	Prof. V.I.Patil	HOD	Principal



Subject Title	AIR POLLUTION AND CONTROL		
Subject Code	18CV732	CIE Marks	40
Number of Lecture Hrs / Week	(3:0:0)	SEE Marks	60
Total Number of Lecture Hrs	40	Exam Hours	03
CREDITS – 03			

FACULTY DETAILS:		
Name: Prof. S.S.Beesanakoppa	Designation: Asst. Professor	Experience: 2 Years
No. of times course taught: 1	Specialization: Wastewater management	

1.0 Prerequisite Subjects:

SL.No	Branch	Semester	Subject
01	Civil Engineering	I	Environmental science

2.0 Course Objectives

1. Study the sources and effects of air pollution
2. Learn the meteorological factors influencing air pollution.
3. Analyze air pollutant dispersion models
4. Illustrate particular and gaseous pollution control methods.

3.0 Course Outcomes

Having successfully completed this course, the student will be able to:

SL.No	Course Outcome	RBT Level	POs
C403.1	Identify the major sources of air pollution and understand their effects on health and environment.	L1,L2,L3,L4	1,2,3,5,6,8,12
C403.2	Evaluate the dispersion of air pollutants in the atmosphere and to develop air quality models.	L1,L2,L3,L4	1,2,3,5,6,8,12
C403.3	Ascertain and evaluate sampling techniques for atmospheric and stack pollutants.	L1,L2,L3,L4	1,2,3,5,6,8,12
C403.4	Choose and design control techniques for particulate and gaseous emissions.	L1,L2,L3,L4	1,2,3,5,6,8,12
Total Hours of instruction			40

Module-1

Introduction: Definition, Sources, classification and characterization of air pollutants. Effects of air pollution on health, vegetation & materials. Types of inversion, photochemical smog.

Module-2

Meteorology: Temperature lapse rate & stability, wind velocity & turbulence, plume behavior, measurement of meteorological variables, wind rose diagrams, Plume Rise, estimation of effective stack height and mixing depths.

Module-3

Sampling: Sampling of particulate and gaseous pollutants (Stack, Ambient & indoor air pollution), Monitoring and analysis of air pollutants (PM2.5, PM10, SOX, NOX, CO, NH3). Development of air quality models-Gaussian dispersion model-Including Numerical problems.



Module-4

Control Techniques: Particulate matter and gaseous pollutants- settling chambers, cyclone separators, scrubbers, filters & ESP - Including Numerical problems. Site selection for industrial plant location.

Module-5

Air pollution due to automobiles, standards and control methods. Noise pollution- causes, effects and control, noise standards. Environmental issues, global episodes. Environmental laws and acts.

5.0 Relevance to future subjects

Sl No	Semester	Subject	Topics
1.	V	Air pollution and climate change	Biological Impact

6.0 Relevance to Real World

Sl No	Real World Mapping
01	High Resolution air pollution mapping

7.0 Gap Analysis and Mitigation

Sl No	Delivery Type	Details
01	Urban Air Pollution	Global Environmental Monitoring

8.0 Books Used and Recommended to Students

Text Books

1. M. N. Rao and H V N Rao, "Air pollution", Tata Mc-G raw Hill Publication.
2. H. C. Perkins, "Air pollution". Tata McGraw Hill Publication.
3. Mackenzie Davis and David Cornwell, "Introduction t o Environmental Engineering" McGraw-Hill Co.

Reference Books

1. Noel De Nevers, "Air Pollution Control Engineering", Waveland Pr Inc.
2. Anjaneyulu Y, "Text book of Air Pollution and Control Technologies", Allied Publishers.

Additional Study material & e-Books

Class notes and vtu notes

E-Learning Resources :

EL1: <http://nptel.ac.in/courses/105104099/3>

EL2: <http://nptel.ac.in/courses/105102089/3>

9.0 Relevant Websites (Reputed Universities & Others) for Notes/Animation/Videos Recommended

Website and Internet Contents References

<https://en.m.wikipedia.org>

10.0 Magazines/Journals used and Recommended to Students

Sl.No	Magazines/Journals	Website
1	International Journal	www.constuctionmanagement.com

11.0 Examination Note

Scheme of Evaluation for CIE (40 Marks)

➤ **Internal Assessment: 30 Marks**

Total of Three Internal Assessment tests will be conducted for 30 Marks each. Average of three tests is scaled downed to 30 Marks.



➤ **Assignment: 10 Marks**

SCHEME OF EXAMINATION: 100 Marks, scaled down to 60 in VTU result sheet.

The question paper will have ten questions.

- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of three sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module.

12.0 Course Delivery Plan

Module	Lecture No.	Content of Lecturer	% of Portion
Module 1	1	Introduction: Air pollution	20
	2	Definition of Air pollution	
	3	Sources	
	4	Classification and characterization of air pollutants	
	5	Effects of air pollution on health	
	6	Vegetation & materials	
	7	Types of inversion	
	8	Photochemical smog	
Module 2	9	Meteorology: Temperature lapse rate & stability	20
	10	wind velocity & turbulence	
	11	plume behavior	
	12	measurement of meteorological variables	
	13	wind rose diagrams	
	14	Plume Rise	
	15	Estimation of effective stack height.	
	16	stack height and mixing depths.	
Module 3	17	Introduction Sampling: Sampling of particulate and gaseous pollutants	20
	18	Stack, Ambient & indoor air pollution	
	19	Monitoring and analysis of air pollutants	
	20	PM2.5, PM10, SOX, NOX, CO, NH3	
	21	Development of air quality	
	22	Development of air quality models-Gaussian dispersion	
	23	Development of air quality models-Gaussian dispersion model	
	24	Numerical problems on Gaussian dispersion model	
Module 4	25	Introduction: Control Techniques	20
	26	Particulate matter and gaseous pollutants	
	27	Settling chambers	
	28	Cyclone separators	
	29	Scrubbers	
	30	Filters & ESP	
	31	Filters & ESP - Including Numerical problems	
	32	Site selection for industrial plant location.	
Module 5	33	Air pollution due to automobiles	20
	34	standards and control methods	
	35	Noise pollution	
	36	Causes of Noise pollution, Noise pollution effects and control	
	37	Noise standards	
	38	Environmental issues	
	39	global episodes	
	40	Environmental laws and acts	



13.0 Assignments, Pop Quiz, Mini Project, Seminars

Sl.No	Title	Outcome expected	Allied study	Week No.	Individual / Group activity	Reference: book/website /Paper
1	Assignment 1: Questions on module 1	Students study Identify the major sources of air pollution and understand their effects on health and environment	Module 1 of the syllabus	3	Individual Activity.	Text 1 Ref Book 2
2	Assignment 2: Questions on module 2	Students study the Evaluate the dispersion of air pollutants in the atmosphere and to develop air quality models	Module 2 of the syllabus	5	Individual Activity.	Text 1 Ref Book 2
3	Assignment 3: Questions on module 3	Students study Ascertain and evaluate sampling techniques for atmospheric and stack pollutants	Module 3 of the syllabus	8	Individual Activity.	Text 1 Ref Book 2
4	Assignment 4: Questions on module 4	Student study the Choose and design control techniques	Module 4 of the syllabus	10	Individual Activity.	Text 1 Ref Book 2
5	Assignment 5: Questions on module 5	Students Study the particulate and gaseous emissions of noise pollution	Module 5 of the syllabus	12	Individual Activity.	Text 1 Ref Book 3

14.0 QUESTION BANK

MODULE 1

1. What is an air pollutant?
2. What are the units of measurement for air pollutants?
3. List out the common air pollutants we face in our day-to-day life.
4. What is a toxic air pollutant?
5. Differentiate with examples (i) Primary and Secondary air pollutants (ii) Criteria and hazardous air pollutants.
6. Explain the formation of ozone in the atmosphere as a secondary pollutant.
7. Explain the effect of air pollutants on human beings.
8. Discuss the effect of air pollutant on the vegetation.
8. Discuss the effect of air pollutant on the materials.

MODULE 2

1. What are the applications of dispersion model?
2. What is meant wind rose diagram and its types?
3. Define Wind Rose
4. What is the principle of Electrostatic Precipitator?
5. List out types of scrubbers

MODULE 3

1. Explain the purpose of ambient air sampling and stack gas sampling.
2. How will you classify the sampling methods used for the study of air pollution?
3. How the location of sampling site and sampling period are decided?
4. Write a difference between spot and continuous sampling.
5. Briefly discuss the following collection techniques and sampling devices for gaseous air pollutants:
1. Absorption sampling 2. Condensation sampling.
6. What are the general and specific devices used for sampling gaseous pollutants from ambient air?
7. What are the devices used for sampling gaseous pollutants from ambient air?
8. Bring out the assumptions made in the gaussian dispersion model of air pollutants.

MODULE 4





1. Discuss the various biological air pollution control techniques.
2. Discuss importance of Air Quality Index and its evaluation.



3. Explain working of an electrostatic precipitator as an air pollution control device.
4. A cement plant has a 12 channel electrostatic precipitator to handle 20,000m³/hr of flue gas. The velocity of the particle is 0.1m/s and plate height 2m with a spacing 0.18m. Determine the plate length required or an efficiency of 90%.
5. A factory is emitting sulphur dioxide from a stack of effective height 250m at a rate of 500 g/s on a sunny day with moderate wind speed, 6 m/s at stack altitude. Estimate the total sulphur dioxide concentration at a point 1km downwind, 50m away from the centre line and 20m above the ground. Assume $\sigma_y = 151$ and $\sigma_z = 108$.
Discuss plume behavior and meteorological parameters which affects its pattern in detail.

MODULE 5

1. Write effect of noise pollution on the human health.
2. Identify the primary sources of environmental noise
3. Discuss the Global Warming- pollutants, their sources and impacts.
4. Discuss the role of legislation in noise control

Prepared by	Checked by		
			
Prof. S.S. Bessanakoppa	Prof. Preeti. R. Patil	HOD	Principal



Subject Title	ALTERNATE BUILDING MATERIALS		
Subject Code	18CV745	IA Marks	40
Number of Lecture Hrs / Week	3:0:0	Exam Marks	60
Total Number of Lecture Hrs	40	Exam Hours	03
			Credits: 3

FACULTY DETAILS:		
Name: Prof. S. M. Chandrakanth	Designation: Asst. Prof. / HOD	Experience: 13 Years
No. of times course taught: 05		Specialization: Urban Transp; Planning

1.0 Prerequisite Subjects:

Sl.No	Branch	Semester	Subject
01	Civil Engineering	I/II	Elements of Civil Engineering and Mechanics
05	Civil Engineering	VI	Highway Engineering

2.0 Course Objectives

This course will enable students to;

1. Understand and apply basic concepts and methods of urban transportation planning.
2. Apprise about the methods of designing, conducting and administering surveys to provide the data required for transportation planning.
3. Understand the process of developing an organized mathematical modelling approach to solve select urban transportation planning problem.
4. Excel in use of various types of models used for travel forecasting, prediction of future travel patterns.

3.0 Course Outcomes

Having successfully completed this course, the student will be able to.

CO	Course Outcome	Cognitive Level	POs
C404.1	Design, conduct and administer surveys to provide the data required for transportation planning.	L1, L2, L3, L4	1,2,3,4,6,8,12
C404.2	Supervise the process of data collection about travel behavior and analyze the data for use in transport planning.	L1, L2, L3, L4	1,2,3,4,6,8,12
C404.3	Develop and calibrate modal split, trip generation rates for specific types of land use developments.	L1, L2, L3, L4	1,2,3,4,6,8,12
C404.4	Adopt steps that are necessary to complete a long-term transportation plan.	L1, L2, L3, L4	1,2,3,4,5,6,8,12
Total Hours of Instruction			40



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Accredited at 'A' Grade by NAAC & Programmes Accredited by NBA: CSE & ECE

Civil Engg. Dept**Academic
Course Plan****2023 - 24 (Odd)****Rev: 00****4.0****Course Content****Module-1**

Urban transport planning: Urbanization, urban class groups, transportation problems and identification, impacts of transportation, urban transport system planning process, modeling techniques in planning. Urban mass transportation systems: urban transit problems, travel demand, types of transit systems, public, private, para-transit transport, mass and rapid transit systems, BRTS and Metro rails, capacity, merits and comparison of systems, coordination, types of coordination.

Module-2

Data Collection And Inventories: Collection of data – Organisation of surveys and Analysis, Study Area, Zoning, Types and Sources of Data, Road Side Interviews, Home Interview Surveys, Commercial Vehicle Surveys, Sampling Techniques, Expansion Factors, Accuracy Checks, Use of Secondary Sources, Economic data – Income – Population – Employment – Vehicle Owner Ship.

Module-3

Trip Generation & Distribution: UTPS Approach, Trip Generation Analysis: Zonal Models, Category Analysis, Household Models, Trip Attraction models, Commercial Trip Rates; Trip Distribution by Growth Factor Methods. Problems on above.

Module-4

Trip Distribution: Gravity Models, Opportunity Models, Time Function Iteration Models. Travel demand modeling: gravity model, opportunity models, Desire line diagram. Modal split analysis. Problems on above.

Module-5

Traffic Assignment: Diversion Curves; Basic Elements of Transport Networks, Coding, Route Properties, Path Building Criteria, Skimming Tree, All-or-Nothing Assignment, Capacity Restraint Techniques, Reallocation of Assigned Volumes, Equilibrium Assignment. Numerical problems on Traffic Assignment. Introduction to land use planning models, land use and transportation interaction.

6.0**Relevance to Real World**

Sl. No	Real World Mapping
01	To Understand Urbanization and its classes, Describe the Inter dependency of land use and traffic flow.
02	To Understand Scope of UTP and its impacts, Organize Coordination from types of coordination.
03	To Elaborate Modeling techniques of Transport Planning, Understand surveys and database to be collected for UTP analysis.
04	To Define Study Area and how zoning is carried out for selected study area
05	To Understand how inventories are collected and compiled according to IRC, Understand the use of Sampling Techniques, Expansion Factors and Accuracy Checks, Describe the use of Secondary Sources
06	To Define UTPS Approach, Describe Trip Generation Analysis, Trip Generation Analysis, Understand Trip Attraction models
07	To Describe and Solve problems of Trip Distribution by Growth Factor Methods
08	To Understand Gravity Models, Opportunity Models used for trip distribution, Describe Time Function Iteration Models, Understand Travel demand modeling for gravity, Opportunity models & Desire line diagram, Explain Modal split analysis for collected trip database
09	To Understand Basic Elements of Transport Networks, Describe Diversion Curves, Explain and Understand different Trip Assignment techniques
10	To Compare Land use and transportation interaction, Prepare land use planning models, Understand Basic Elements of Transport Networks



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Civil Engg. Dept**Academic
Course Plan****2023 - 24 (Odd)****Rev: 00****7.0 Gap Analysis and Mitigation**

Sl. No	Delivery Type	Details
01	Tutorial	Topic: Urban Land use And Transportation Planning
02	NPTEL	Urban Land use And Transportation Planning

8.0 Books Used and Recommended to Students**Text Books**

1. Kadiyali. L. R., 'Traffic Engineering and Transportation Planning', Khanna Publishers, New Delhi.
2. Hutchinson, B.G, 'Introduction to Urban System Planning', McGraw Hill.
3. Khisty C.J., 'Transportation Engineering – An Introduction' Prentice Hall.
4. Papacostas, 'Fundamentals of Transportation Planning', Tata McGraw Hill.

Reference Books

1. Mayer M and Miller E, 'Urban Transportation Planning: A decision oriented Approach', McGraw Hill.
2. Bruton M.J., 'Introduction to Transportation Planning', Hutchinson of London.
3. Dicky, J.W., 'Metropolitan Transportation Planning', Tata McGraw Hill.

Additional Study Material & e-Books

1. NPTEL notes and Videos
2. VTU online notes.

9.0 Relevant Websites (Reputed Universities and Others) for Notes/Animation/Videos Recommended**Website and Internet Contents References**

- 01) <https://archive.nptel.ac.in/courses/105/105/105105208/>

10.0 Magazines/Journals Used and Recommended to Students

Sl. No	Magazines/Journals	Website
01	Public Transport: Planning & Operations	https://www.springer.com/journal/12469
02	Journal of Urban Mobility	https://www.sciencedirect.com/journal/journal-of-urban-mobility

11.0 Examination Note**Scheme of Evaluation for CIE (40 Marks)****Internal Assessment: 30 Marks**

Total of Three Internal Assessment tests will be conducted for 50 Marks each.

Average of three tests is scaled down to 30 Marks.

Assignment: 10 Marks**SCHEME OF EXAMINATION: 100 Marks, scaled down to 60 in VTU result sheet.**

The question paper will have ten questions.

- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of three sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module.



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Civil Engg. Dept


Academic
Course Plan

2023 - 24 (Odd)

Rev: 00

12.0 Course Delivery Plan

Module	Lecture No.	Content of Lecture	% of portion
1	1	Urbanization, urban class groups	20%
	2	Transportation problems and identification	
	3	Impacts of transportation, urban transport system planning process	
	4	Modeling techniques in planning.	
	5	Urban mass transportation systems: urban transit problems, travel demand	
	6	Urban mass transportation systems: types of transit systems, public, private, para-transit transport, mass and rapid transit systems,	
	7	BRTS and Metro rails, capacity, merits and comparison of systems	
	8	Coordination, types of coordination.	
2	9	Collection of data – Organization of surveys and Analysis,	20%
	10	Study Area, Zoning,	
	11	Types and Sources of Data,	
	12	Road Side Interviews, Home Interview Surveys,	
	13	Commercial Vehicle Surveys,	
	14	Sampling Techniques, Expansion Factors, Accuracy Checks,	
	15	Use of Secondary Sources, Economic data – Income – Population –	
3	16	Employment – Vehicle Owner Ship.	20%
	17	UTPS Approach,	
	18	Trip Generation Analysis: Zonal Models,	
	19	Category Analysis, Household Models,	
	20	Trip Attraction models, Commercial Trip Rates;	
	21	Trip Distribution by Growth Factor Methods. Problems	
	22	Growth Factor Methods: Problems	
	23	Synthetic Methods: Problems	
4	24	Synthetic Methods: Problems	20%
	25	Gravity Models, Opportunity Models	
	26	Time Function Iteration Models	
	27	Travel demand modeling: gravity model	
	28	Opportunity models,	
	29	Desire line diagram	
	30	Modal split analysis.	
	31	Problems on above	
5	32	Problems on above	20%
	33	Diversion Curves.	
	34	Basic Elements of Transport Networks, Coding,	
	35	Route Properties, Path Building Criteria,	
	36	Skimming Tree, All-or-Nothing Assignment,	
	37	Capacity Restraint Techniques, Reallocation of Assigned Volumes,	
	38	Equilibrium Assignment	
	39	Introduction to land use planning models	
40	Land use and transportation interaction.		

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13.0 Assignments, Pop Quiz, Mini Project, Seminars

Sl. No.	Title	Outcome expected	Allied study	Week No.	Individual / Group activity	Reference: book/website /Paper
1	Assignment 1: Questions on module 1	Students study the Topics and write the Answers. Get practice to solve numerical of university question papers.	Module 1 of the syllabus	3	Individual Activity. Printed solution expected.	Book 1, 2 & 1, 2, 3, 4 & 5 of the reference list.
2	Assignment 2: Questions on module 2	Students study the Topics and write the Answers. Get practice to solve numerical of university question papers.	Module 2 of the syllabus	5	Individual Activity. Printed solution expected.	Book 1, 2 & 1, 2, 3, 4 & 5 of the reference list.
3	Assignment 3: Questions on module 3	Students study the Topics and write the Answers. Get practice to solve numerical of university question papers.	Module 3 of the syllabus	8	Individual Activity. Printed solution expected.	Book 1, 2 & 1, 2, 3, 4 & 5 of the reference list.
4	Assignment 4: Questions on module 4	Students study the Topics and write the Answers. Get practice to solve numerical of university question papers.	Module 4 of the syllabus	10	Individual Activity. Printed solution expected.	Book 1, 2 & 1, 2, 3, 4 & 5 of the reference list.
5	Assignment 5: Questions on module 5	Students study the Topics and write the Answers. Get practice to solve numerical of university question papers.	Module 5 of the syllabus	12	Individual Activity. Printed solution expected.	Book 1, 2 & 1, 2, 3, 4 & 5 of the reference list.

14.0 QUESTION BANK

MODULE – 1

1. With a help of a flow chart briefly explain the system approach to urban transport planning.
2. Define Urbanization and list urban class groups
3. What are the causes of Urbanization?
4. What are the impacts of Transportation?
5. Explain Transportation problems and their identification
6. Explain urban transport system planning process
7. List and Explain Urban mass transportation systems
8. List types of coordination and How Coordination is done with various types of coordination in Urban transport planning
9. Describe briefly any two Urban mass transportation systems: para-transit transport, mass and rapid transit systems, BRTS and Metro rails
10. Elaborate Modeling techniques of Transport Planning.



MODULE – 2

1. Define the study area of transportation facilities.
2. Define “external cordon line” & explain factors considered in selection of “external cordon line”.
3. Define Zone. Mention the different factors considered in selection of zones.
4. Write a note on study area & zoning. List out factors affecting in selecting Zoning.
5. What are the various surveys to be carried out in transport planning process? Explain each of them in detail.
6. What are the importance points kept in view while dividing the area into zones?
7. Write short notes on:
 - a. Expansion of data from sample.
 - b. Road side interview survey.
 - c. Home-interview survey.
 - d. Public transport survey.

MODULE – 3

1. Which are the factors governing Trip generation rates.
2. Explain the assumptions of MLR analysis in trip generation.
3. Mention any two advantages and disadvantages of category analysis technique.
4. Classify the category analysis stating the assumptions.
5. Write short notes on:
 - a. Trip generation.
 - b. Trip purpose.
 - c. Home based and non-home-based trips.
6. Define ‘Trip Distribution’, List methods available for TD estimation for future.
7. Explain in detail about Synthetic methods
8. The total trips produced in and attracted to the three zones A, B, and C of a survey area in the design year are tabulated as: It is known that the trips between two zones are inversely proportional to the second power of the travel time between zones, which is uniformly 20 minutes. If the trip interchange between zones B and C is known to be 600, calculate the trip interchange between A and B, B and A, C and B.

Zone	Trip produced	Trip attracted
A	2000	3000
B	3000	4000
C	4000	2000

9. The total trips produced in and attracted to the three zones A, B, and C of a survey area in the design year are tabulated as: It is known that the trips between two zones are inversely proportional to the second power of the travel time between zones, which is uniformly 25 minutes. If the trip interchange between zones B and C is known to be 600, calculate trip interchange between A & B, B and A, C & B.

Zone	Trip produced	Trip attracted
A	2500	4000
B	3500	5000
C	4500	3000



10. Define trip distribution. Briefly explain uniform factor method of trip distribution. Mention disadvantage of the method.

11. List the methods available for trip distribution for future. Explain Furness method of obtaining future trips.

12. Define Trip-distribution. Explain in detail the various methods involved in Trip-distribution.

13. Explain: i. Tanner's model. ii. Opportunity model.

14. Obtain the future trip table by:

a. Uniform growth factor method.

b. Average growth factor method.

The future trips generated in zones 1, 2 and 3 are expected to be and 3120 respectively.

O/D	1	2	3
1	60	100	200
2	100	20	300
3	200	300	20

360, 1260


MODULE - 4

1. List and briefly explain the various factors affecting modal split.
2. Explain briefly the various developments in modal split analysis.
3. Explain with flow diagram of trip interchange modal split procedure.
4. What is pre-distribution modal split procedure? List the advantages & disadvantages.
5. "Log it analysis, a technique of model split". Discuss on the statement.
6. Define Gravity Models and Opportunity Models
7. Explain Time Function Iteration Models

MODULE -5

1. Define; state the purpose and various applications of Trip Assignment?
2. Sketch the minimum path tree method commonly employed in assignment technique.
3. Sketch the use of Lowry land use transport model for urban structure analysis.
4. What are the considerations kept in mind while selecting land use transport model.
5. Explain i) Grain-Lowry model ii) All-or-nothing assignment. iii) diversion curves
6. Sketch the fundamental structure of Lowry Model and explain in detail about need of traffic forecasting.
7. Discuss selection of Land use transport model.
8. What are factors that govern the planning process for small & medium cities? How those factors are taken care?

Prepared by	Checked by		
Prof. S.M.Chandrakanth	Prof. Preethi R Patil	HOD	PRINCIPAL
		Civil Engineering	HIT, Nidasoshi
S.J.P.N.T's, HIT, Nidasoshi			

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			Academics
			Course Plan
			AY:2023-24 ODD SEM.

3Subject Title	ENERGY AND ENVIRONMENT		
Subject Code	18ME751	IA Marks	40
No of Lecture Hrs + Tutorial Hrs / Week	03	Exam Marks	60
Total No of Lecture + Tutorial Hrs	40	Exam Hours	03
CREDITS – 03			

FACULTY DETAILS:		
Name: Dr. M. M. Shivashimpi	Designation: Associate Professor	Experience: 16 Years
No. of times course taught: 02		Specialization: Thermal Power Engineering

1.0 Prerequisite Subjects:

Sl. No	Branch	Semester	Subject
1	Common to all	I/II	Chemistry
2	Common to all	I/II	Physics
3	Common to all	V	Environmental Studies


2.0 Course Objectives

1. To understand the fundamentals of energy sources, energy use, energy efficiency, and resulting environmental implications of various energy supplies.
2. To learn about methods of energy storage, energy management and economic analysis
3. To understand the causes and remedies related to social issues like global warming, ozone layer depletion, climate change etc.
4. To understand environment and its ecosystems.
5. To introduce various aspects of environmental pollution and its control. To introduce various acts related to prevention and control of pollution of water and air, forest protection act, wild life protection act etc.

3.0 Course Outcomes

The student, after successful completion of the course, will be able to

CO	Course Outcome	RBT level	POs
C413.1	Summarize the basic concepts of energy, its distribution and general Scenario.	L1,12	PO1, PO2, PO3, PO4, PO6, PO7, PO8, PO9, PO12
C413.2	Explain different energy storage systems, energy management, audit and economic analysis.	L1,12, 13	PO1, PO2, PO3, PO4, PO6, PO7, PO8, PO9, PO12
C413.3	Summarize the environment eco system and its need for awareness.	L1,12	PO1, PO2, PO3, PO4, PO6, PO7, PO8, PO9, PO12
C413.4	Identify the various types of environment pollution and their effects.	L1,12	PO1, PO2, PO3, PO4, PO6, PO7, PO8, PO9, PO12
C413.5	Discuss the social issues of the environment with associated acts.	L1,12	PO1, PO2, PO3, PO4, PO6, PO7, PO8, PO9, PO12
Total Hours of instruction			40

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		Academics
		Course Plan
		AY:2023-24 ODD SEM.

4.0 Course Content

Module-1: Basic Introduction to Energy: Energy and power, forms of energy, primary energy sources, energy flows, world energy production and consumption, Key energy trends in India: Demand, Electricity, Access to modern energy, Energy production and trade, Factors affecting India's energy development: Economy and demographics Policy and institutional framework, Energy prices and affordability, Social and environmental aspects, Investment. (8 Hours)

Module-2: Energy storage systems: Thermal energy storage methods, Energy saving, Thermal energy storage systems Energy Management: Principles of Energy Management, Energy demand estimation, Energy pricing Energy Audit: Purpose, Methodology with respect to process Industries, Characteristic method employed in Certain Energy Intensive Industries. (8 Hours)

Module-3: Environment: Introduction, Multidisciplinary nature of environmental studies- Definition, scope and importance, Need for public awareness. Ecosystem: Concept, Energy flow, Structure and function of an ecosystem. Food chains, food webs and ecological pyramids, Forest ecosystem, Grassland ecosystem, Desert ecosystem and Aquatic ecosystems, Ecological succession.

Module-4: Environmental Pollution: Definition, Cause, effects and control measures of - Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution and Nuclear hazards, Solid waste Management, Disaster management Role of an individual in prevention of pollution, Pollution case studies. (8 Hours)

Module-5: Social Issues and the Environment: Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. Wasteland reclamation, Consumerism and waste products, Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation. Group assignments: Assignments related to e-waste management; Municipal solid waste management; Air pollution control systems; Water treatment systems; Wastewater treatment plants; Solar heating systems; Solar power plants; Thermal power plants; Hydroelectric power plants; Bio-fuels; Environmental status assessments; Energy status assessments etc. (8 Hours)

5.0 Relevance to future subjects/Career


SL. No	Semester	Subject	Topics / Relevance
01	VII & VIII	Project Phase-1 & Pahse-2	All modules
02	After graduation	Energy and Pollution Analysis and resolving related problems	All modules

6.0 Relevance to Real World

SL. No	Real World Mapping
01	Electrical Engineering and Automobile Engineering
02	Power plant engineering, thermal power plant
03	Environmental Science

7.0 Gap Analysis and Mitigation

Sl. No	Delivery Type	Details
01	nptel.ac.in	E- Learning

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		Academics
		Course Plan
		AY:2023-24 ODD SEM.

02	VTU, E- learning	E- Learning
03	Open courseware	E- Learning

8.0 Books Used and Recommended to Students

Text Books

1. Textbook for Environmental Studies For Undergraduate Courses of all Branches of Higher Education by University grant commission and Bharathi Vidyapeeth Institute of environment education and Research ,Pune
2. De, B. K., Energy Management audit & Conservation, 2nd Edition, Vrinda Publication, 2010.

Reference Books

1. Turner, W. C., Doty, S. and Truner, W. C., Energy Management Hand book, 7th edition, Fairmont Press, 2009.
2. Murphy, W. R., Energy Management, Elsevier, 2007.
3. Smith, C. B., Energy Management Principles, Pergamum, 2007
4. Environment pollution control Engineering by C S rao, New Age International, 2006, reprint 2015, 2nd edition
5. Environmental studies, by Benny Joseph, Tata McGraw Hill, 2008, 2nd edition.

Additional Study material & e-Books

- Nptel.ac.in
- VTU, E- learning
- India Energy Outlook 2015(www.iea.org/.../IndiaEnergyOutlook_WEO2015.pdf)
- Open courseware

9.0 Relevant Websites (Reputed Universities and Others) for Notes/Animation/Videos Recommended

Website and Internet Contents References

1. <http://www.nptel.ac.in>
2. www.iea.org

10.0 Magazines/Journals Used and Recommended to Students

Sl.No	Magazines/Journals	website
1	Elsevier	https://www.journals.elsevier.com/renewable-energy
2	Environmental Sciences Journals	https://www.omicsonline.org/environmental-sciences-journals

11.0 Examination Note

Internal Assessment: 40 Marks


Theoretical aspects as well as relevant sketches should be drawn neatly for questions asked in Internal Assessments

Scheme of Evaluation for Internal Assessment

Internal Assessment test in the same pattern as that of the main examination (Better of the two Tests):40marks.


SCHEME OF EXAMINATION:

- There are five modules two questions from each module
- Student has to answer any five question choosing at least one questions from each module.
- Max. Marks: 60Marks

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		Academics
		Course Plan
		AY:2023-24 ODD SEM.

12.0 Course Delivery Plan

Module No.	Lecture No.	Content of Lecture	% of Portion
1		Basic Introduction to Energy:	20
	1	Energy and power, forms of energy, primary energy sources	
	2	Energy flows, world energy production and consumption	
	4	Key energy trends in India: Demand	
	5	Electricity, Access to modern energy,	
	6	Energy production and trade, Factors affecting India's energy development	
	7	Economy and demographics Policy and institutional framework	
	8	Energy prices and affordability, Social and environmental aspects, Investment	
2		Energy storage systems, Energy Management, Energy Audit, Economic Analysis	20
	1	Thermal energy storage methods,	
	2	Energy saving, Thermal energy, storage systems	
	3	Principles of Energy Management, Energy demand.	
	4	Energy estimation, Energy pricing, Energy Audit: Purpose	
	5	Methodology with respect to process Industries,	
	6	Characteristic method employed in Certain Energy Intensive Industries	
	7	Economic Analysis: Scope	
3		Environment, Ecosystem:	20
	1	Environment: Introduction, Multidisciplinary nature of environmental studies- Definition, scope and importance.	
	2	Need for public awareness.	
	3	Ecosystem: Concept, Energy flow Structure and function of an ecosystem.	
	4	Food chains, food webs and ecological pyramids	
	5	Forest ecosystem, Grassland ecosystem,	
	6	Desert ecosystem and Aquatic ecosystems,	
	7	Desert ecosystem and Aquatic ecosystems	
8	Ecological succession		
4		Environmental Pollution:	20
	1	Environmental Pollution definition, Cause and effects	
	2	Control measures of - Air pollution,	
	3	Water pollution, Soil pollution,	
	4	Marine pollution, Noise pollution.	
	5	Thermal pollution and Nuclear hazards ,	
	6	Solid waste Management, Disaster management	
	7	Role of an individual in prevention of pollution	
8	Pollution case studies		
5		Social Issues and the Environment:	20
	1	Climate change, global warming, acid rain, ozone layer depletion	
	2	Nuclear accidents and holocaust. Case Studies.	

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		Academics
		Course Plan
		AY:2023-24 ODD SEM.


3	Wasteland reclamation, Consumerism and waste products
4	Environment Protection Act
5	Air (Prevention and Control of Pollution) Act
6	Water (Prevention and control of Pollution) Act, Wildlife Protection Act,
7	Forest Conservation Act,
8	Issues involved in enforcement of environmental legislation

13.0 Assignments, Pop Quiz, Mini Project, Seminars

Sl. No.	Title	Outcome expected	Allied study	Week No.	Individual / Group activity	Reference: book/website /Paper
1	Assignment 1: University Questions	Students study the Topics and write the Answers. Get practice to solve university questions.	Module 1 syllabus	3	Individual Activity and submission of hard copy.	Book 1 and all the reference book
2	Assignment 2: University Questions	Students study the Topics and write the Answers. Get practice to solve university questions.	Module 2 syllabus	6	Individual Activity and submission of hard copy.	Book 1 and all the reference book
3	Assignment 3: University Questions	Students study the Topics and write the Answers. Get practice to solve university questions.	Module 3 syllabus	9	Individual Activity and submission of hard copy.	Book 1 and all the reference book
4	Assignment 3: University Questions	Students study the Topics and write the Answers. Get practice to solve university questions.	Module 4 syllabus	12	Individual Activity and submission of hard copy.	Book 1 and all the reference book
5	Assignment 3: University Questions	Students study the Topics and write the Answers. Get practice to solve university questions.	Module 5 syllabus	15	Individual Activity and submission of hard copy.	Book 1 and all the reference book

14.0 QUESTION BANK

Sl. No	Questions
Module-I	1. Interpret World Energy Scenario with respect to production and consumption using relevant statistics 2. Define Energy and Power. Differentiate the same. 3. Outline the factors that affect India's energy development. 4. Explain the various key energy trends in India. 5. With relevant statistics, enumerate the primary energy production trend for India.
Module-II	1. Explain in the detail the various phases of energy audit methodology. 2. List the various thermal energy storage methods. Explain sensible heat and latent heat storage methods. 3. Define Energy audit. Explain the need for energy audit.

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		Academics
		Course Plan
		AY:2023-24 ODD SEM.

	4. Write a short note on energy demand estimation. 5. Calculate the cost of generation per kWh for a power station having the following data: Installed capacity of the plant = 200 MW , Capital cost = Rs 400 crores ,Rate of interest and depreciation = 12% , Annual cost of fuel, salaries and taxation = Rs 5 crores Load factor = 50% Also estimate the saving in cost per kWh if the annual load factor is raised to 60%. 6. Explain in the detail the various phases of energy audit methodology 7. Elaborate the benefits of thermal energy storage.
Module- III	1. What is an ecosystem? Discuss forest ecosystem. Explain how conservation of forest can be done. 2. Discuss how oxygen cycle is utilized in the ecosystem. 3. Write a short note on (i) ecological succession (ii) food chain, food web and ecological pyramid. 4. Elaborate how the nitrogen cycle ecosystem operates. 5. Enumerate the utilization of carbon in ecosystem. 6. Describe grassland ecosystem. What are its types? How conservation of grassland can be made 7. Discuss how oxygen cycle is utilized in the ecosystem 8. Define Environment. Mention its scope. Discuss the need for public awareness
Module- IV	1. Discuss briefly the causes, effects and control measures of air pollution. 2. Discuss Solid Waste Management techniques. 3. Elaborate the causes, effects and control measures of (i) Soil Pollution (ii) Noise Pollution (iii) Thermal Pollution 4. Enumerate the role of an individual in prevention of pollution. 5. Enumerate the water pollution causes and its effects. Mention the control measures that can be initiated for mitigating the same. 6. Discuss any two case studies related to pollution of environment in detail. 7. Elaborate the causes, effects and control measures of (i) Soil Pollution (ii) Noise Pollution (iii) Thermal Pollution 8. Discuss Solid Waste Management techniques.
Module- V	1. What is acid rain? What are its effects? 2. Explain the salient features of Air Pollution act. 3. Explain about Environment Impact Assessment (EIA). 4. Discuss (i) Wildlife Protection act (ii) Forest Conservation act 5. Write a note on ozone layer depletion. 6. Express the need for reclaiming the wasteland and its development 7. What are the regulations governing water pollution prevention act? 8. Enumerate the impact of global warming on our mother nature.

15.0 University Result

Year	S, A, B (FCD)	C (FC)	C,D,E (SC)	%age of passing
January / February 2023 (CSE)	41	05	05	100
January / February 2023 (ECE)	25	03	01	100
January / February 2023 (EEE)	01	00	00	100

Prepared by	Checked by		
Dr. M. M. Shivashimpi	Dr.K.M. Akkoli	HOD	Principal



Subject Title	COMPUTER AIDED DETAILING OF STRUCTURES		
Subject Code	18CVL76	CIE Marks	40
Number of Lecture Hrs / Week	(0:2:2)	SEE Marks	60
Total Number of Lecture Hrs	2	Exam Hours	03
CREDITS – 02			

FACULTY DETAILS:		
Name: Prof. P.R.Patil	Designation: Asst. Professor	Experience: 5 Years
No. of times course taught: 01	Specialization: Structural engineering	

1.0 Prerequisite Subjects:

Sl.No	Branch	Semester	Subject
01	Civil Engineering	III	Computer aided engineering drawing

2.0 Course Objectives

1. Be aware of the scale factors, sections of drawings,
2. Draft the detailing of RC and steel structural member.

3.0 Course Outcomes

Having successfully completed this course, the student will be able to:

Sl.No	Course Outcome	RBT Level	POs
CO1	use software skills in a professional set up to automate the work and thereby reduce cycle time for completion of the work	L1,L2,L3,L4	1,2,3,5,6,8,12

4.0 Course Content


Module -1 Detailing of RCC Structures

Beams – Simply supported, Cantilever and Continuous.

1. Slab – One way, Two way and One-way continuous.
2. Staircase – Doglegged
3. Cantilever Retaining wall
4. Counter Fort Retaining wall
5. Circular Water Tank, Rectangular Water Tank

Module -2 Detailing of Steel Structures

1. Connections – Beam to beam, Beam to Column by Bolted and Welded Connections.
2. Built-up Columns with lacings and battens
3. Column bases and Gusseted bases with bolted and welded connections.
4. Roof Truss – Welded and Bolted
5. Welded Plate girder
6. Gantry Girder

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		Academic Course Plan
		2023-24 (Even)

5.0 Relevance to future subjects

Sl No	Semester	Subject	Topics
1.	VII	Computer Aided Drawing	Building planning

6.0 Relevance to Real World

Sl No	Real World Mapping
01	Building planning design and load combination

7.0 Books Used and Recommended to Students

Reference Books	
1.	IS code 800
2.	IS Code 875 part 1 – 5
3.	IS code -456
Additional Study material & e-Books	
Class notes and vtu notes	

8.0 Relevant Websites (Reputed Universities & Others) for Notes/Animation/Videos Recommended

Website and Internet Contents References
https://en.m.wikipedia.org

9.0 Magazines/Journals used and Recommended to Students

Sl.No	Magazines/Journals	Website
1	International Journal of MAT	www.matjournals.com

10.0 Examination Note

Scheme of Evaluation for CIE (40 Marks)

CIE marks:

Theoretical aspects as well as relevant circuits should be drawn neatly for questions asked in Internal Assessment.

Scheme of Evaluation for CIE (40 Marks)

- (a) Continuous Assessment: **24 marks**
- (b) Internal Assessment test in the same pattern as that of the main examination: **16 marks.**
 - Write up- 4 marks
 - Conduction and Result- 10 marks
 - Viva Voce- 2 marks

Conduct of Practical SEE:

1. Students can pick one experiment from the questions lot prepared by the examiners.
2. Change of experiment is allowed only once and 15% Marks allotted to the procedure part to be made zero.







11.0 Course Delivery Plan

Expt No	Name of the Experiment	% of Portion
1	Beams – Simply supported, Cantilever and Continuous	8
2	Slab – One way, Two way and One-way continuous	8
3	Staircase – Doglegged	8
4	Cantilever Retaining wall	8
5	Counter Fort Retaining wall	8
6	Circular Water Tank, Rectangular Water Tank	8
7	Connections – Beam to beam, Beam to Column by Bolted and Welded Connections	8
8	Built-up Columns with lacings and battens	8
9	Column bases and Gusseted bases with bolted and welded connections	9
10	Roof Truss – Welded and Bolted	9
11	Welded Plate girder	9
12	Gantry Girder	9

12.0 QUESTION BANK

1. Types of trusses
2. Advantages of software
3. Future scope of software
4. Who introduced Bentley?
5. What is single reinforced beam?
6. What is doubly reinforced beam?
7. What is effective cover of beam?
8. What is the effective cover of column?

Prepared by	Checked by		
			
Prof. Preethi.R.Patil	Prof. V.I.Patil	HOD	Principal



Subject Title	GEOTECHNICAL ENGINEERING LABORATORY		
Subject Code	18CVL77	CIE Marks	40
Number of Lecture Hrs /	0:2:2	SEE Marks	60
Total Number of Lecture Hrs	2	Exam Hours	03
CREDITS – 02			

FACULTY DETAILS:		
Name: Prof. S. V. Jore	Designation: Asst. Professor	Experience: 2 Years
No. of times course taught: 01	Specialization: Construction Technology and Management	

1.0 Prerequisite Subjects:

Sl.No	Branch	Semester	Subject
01	Civil Engineering	V	Basic Geotechnical Engineering
02	Civil Engineering	VI	Applied Geotechnical Engineering

2.0 Course Objectives

Course Learning Objectives:

This course will enable students to:

1. To carry out laboratory tests and to identify soil as per IS codal procedures
2. To perform laboratory tests to determine index properties of soil
3. To perform tests to determine shear strength and consolidation characteristics of soils

3.0 Course Outcomes

Having successfully completed this course, the student will be able to:

Sl.No	Course Outcome	RBT Level	POs
CO1	Physical and index properties of the soil	L1,L2,L3,L4	1,2,3,5,6,8,12
C02	Classify based on index properties and field identification	L1,L2,L3,L4	1,2,3,5,6,8,12
C03	To determine OMC and MDD, plan and assess field compaction program	L1,L2,L3,L4	1,2,3,5,6,8,12
CO4	Shear strength and consolidation parameters to assess strength and deformation characteristics	L1,L2,L3,L4	1,2,3,5,6,8,12
CO5	In-situ shear strength characteristics(SPT-Demonstration)	L1,L2,L3,L4	1,2,3,5,6,8,12



4.0 Course Content

1. Field identification of soil, Specific gravity test (pycnometer and density bottle method). Water content determination by oven drying and Pycnometer method, rapid moisture meter method.
2. Grain size analysis
 - i. Sieve analysis
 - ii. Hydro meter analysis
3. In-situ density tests
 - i. Core-cutter method
 - ii. Sand replacement method
4. Consistency limits
 - i. Liquid limit test(by Casagrande's and cone penetration method)
 - ii. Plastic limit test
 - iii. Shrinkage limit test
5. Standard compaction test (light and heavy compaction)
6. Co-efficient of permeability test
 - i. Constant head test
 - ii. Variable head test
7. Shear strength tests
 - i. Unconfined compression test
 - ii. Direct shear test
 - iii. Triaxial test (unconsolidated undrained test only)
8. Consolidation test : To determine pre consolidation pressure only(half an hour per loading-test).
9. Laboratory vane shear test
10. Demonstration of Swell pressure test, Standard penetration test and boring equipment

5.0 Relevance to future subjects

Sl No	Semester	Subject	Topics
1.	VIII	Advanced Foundation Engineering	Geotechnical engineering, permeability , shear strength

6.0 Relevance to Real World

Sl No	Real World Mapping
01	Students will be able to conduct appropriate laboratory/field experiments and interpret the results to determine

7.0 Books Used and Recommended to Students

Reference Books
<ul style="list-style-type: none">• Punmia B C, Soil Mechanics and Foundation Engineering-(2017),16th Edition, Laxmi Publications co., New Delhi.• Lambe T.W., “Soil Testing for Engineers”, Wiley Eastern Ltd., New Delhi.



- Head K.H., “Manual of Soil Laboratory Testing” Vol. I, II, III, Princeton Press
 - Bowles J.E., “Engineering Properties of Soil and Their Measurements”, -McGraw Hill Book Co. New York.
- Relevant BIS Codes of Practice: IS-2720 series

Additional Study material & e-Books

Class notes and vtu notes

8.0 Relevant Websites (Reputed Universities & Others) for Notes/Animation/Videos Recommended

Website and Internet Contents References

<https://en.m.wikipedia.org>

9.0 Magazines/Journals used and Recommended to Students

Sl.No	Magazines/Journals	Website
1	International Journal of MAT	www.matjournals.com

10.0 Examination Note

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 60% and for Semester End Exam (SEE) is 40%. All experiments are to be included in the examination except demonstration exercises. Candidate to perform experiment assigned to him. Marks are to be allotted as per the split up of marks shown on the cover page of answer script

11.0 Course Delivery Plan

Expt No	Name of the Experiment	% of Portion
1	Field identification of soil, Specific gravity test (pycnometer and density bottle method). Water content determination by oven drying and Pycnometer method, rapid moisture meter method.	10
2	Grain size analysis i. Sieve analysis ii. Hydro meter analysis	10
3	In-situ density tests i. Core-cutter method ii. Sand replacement method	10
4	Consistency limits i. Liquid limit test (by Casagrande's and cone penetration method) ii. Plastic limit test iii. Shrinkage limit test	10
5	Standard compaction test (light and heavy compaction)	10
6	Co-efficient of permeability test i. Constant head test ii. Variable head test	10



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7	Shear strength tests i. Unconfined compression test ii. Direct shear test iii. Triaxial test (unconsolidated undrained test only)	10
8	Consolidation test :To determine pre consolidation pressure only(half an hour per loading-test)	10
9	Laboratory vane shear test	10
10	Demonstration of Swell pressure test, Standard penetration test and boring equipment	10

12.0 QUESTION BANK

- 1) List 'k' values for different types of soils.
- 2) How permeability test is done in the field?
- 3) Mention other permeability tests that can be done in the lab.
- 4) What is the application of permeability of soils?
- 5) Derive the expression for 'k' by falling head method.
- 6) Is hydraulic gradient constant in variable head test? Why?
- 7) How will you reduce observed permeability to permeability at standard temperature?
- 8) What is the necessity of two methods for determination of 'k' in lab?
- 9) Estimate discharge velocity in constant head test conducted. What is seepage velocity?
- 10) Time interval for flow from h1 to h0 should be same as that from h0 to h2 Why?
- 11) Depth of hole made in field is limited to 15 cm. Why?
- 12) Explain core cutter method for determination of in-situ density of soil.
- 13) Explain the significance of in-situ density soil density determination.
- 14) What is the approximate value of degree of saturation at OMC?
- 15) How does amount of compaction affect maximum dry density and OMC?
- 16) What is the procedure for conducting modified proctor test?
- 17) What is the use of proctor's needle? How is it used for compaction control in the field?
- 18) Explain how soil compaction is achieved?
- 19) How correction for initial concavity is done in load-penetration curve?
- 20) What is the application of CBR test results?
- 21) Write the procedure to find expansion ratios for a soaked test.
- 22) What is the need for adding surcharge weights?
- 23) Draw plasticity chart and mark the soil tested and classify soil.
- 24) What is activity number?
- 25) Why clay exhibit plasticity while silt does not?
- 26) Indicate engineering uses of IP, IT, IL and IC
- 27) Is soil fully saturated at shrinkage limit?
- 28) Explain the one point method for liquid limit determination.
- 29) If the plastic limit is greater than or equal to liquid limit, how will you report IP of the soil?
- 30) If plastic limit can't be determined for sandy soil, how will you report plasticity index?
- 31) Whether oven drying of sample before test is permitted? If not why?
- 32) Find compression index of given normally sensitive clay. What is the use of it?
- 33) How will you differentiate organic and inorganic soil using liquid limit test?
- 34) What is the use of Cv? When it is used?
- 35) Can permeability be determined from consolidation test indirectly?
- 36) Which type of permeability test can be done directly? Explain.
- 37) What result do you expect if a consolidation test is conducted on sand?
- 38) Suppose loading pad is placed such that it touches the sides of the ring. What will happen?
- 39) If entrapped air is not removed completely, how will it affect the value of G of soil solids?



- 40) Specify the range for the specific gravity of soil solids.
- 41) What is the practical application of specific gravity of soil solids?
- 42) What are the limitations of this test?
- 43) Draw mohr's circle for failure for a direct shear test and mark the failure plane, major and minor principal plane.
- 44) If test is done under normal stress of 40 N/cm², find the shear load at which this soil will fail.
- 45) What is the procedure for determination of shear strength parameters of clay using direct shear test?
- 46) Pour dry sand on horizontal surface and find angle of repose. Compare this angle with angle of shearing resistance.
- 47) What are the advantages of triaxial test over direct shear test?
- 48) What is the practical significance of cell pressure in this test?
- 49) Explain the changes to be incorporated for a drained test, in the procedure for undrained test.
- 50) Explain the stress conditions at the time of failure by drawing mohr's circle.
- 51) What do you mean by sensitivity of clay?
- 52) Draw mohr's circle for state of stress at failure in an unconfined compression test.
- 53) This test is used only for cohesive soils. Why?
- 54) Explain the relation between consistency and UCC value of clay.
- 55) Explain the terms sensitivity and thixotropy.
- 56) What type of soil yield dependable results by vane shear test? Why?
- 57) Why are different sizes of blades used in field vane shear test?
- 58) Why this test is an undrained test?
- 59) Is it possible to determine the effective shear strength parameters in vane shear test?

Prepared by	Checked by		
			
Prof S V Jore	Prof P R Patil	HOD	Principal