

# MAHARASHTRA INSTITUTE OF TECHNOLOGY, AURANGABAD

An Autonomous Institute Affiliated to

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, Maharashtra (India)

Third Year B.Tech. Syllabus (Civil Engineering) 2023-24



			T.Y.B.Tech. Syl	labusSt	ructi	rew.e.	£2023-24							
			Civ	il Engi	neeri	ng	-							
Sr. No	Course Category	Course Code	Course Title	L	Т	P	Contact Hr/Wk	Credits	MSE-I	MSE-II	CIE	TA	ESE/ Oral	Total
			Orientation Program (1 Day)											
1.1	HSMC	HSM301	Engineering Economics & Financial Management	3		-	3	3	15	15	10	10	50	100
1.2	PC	CED301	Estimating and Costing	3			3	3	15	15	10	10	50	100
1.3	PC	CED302	Geotechnical Engineering	3	5	2	3	3	15	15	10	10	50	100
1.4	PC	CED303	Design of Steel Structures	3		-	3	3	15	15	10	10	50	100
1.5	PC	CED304	Hydrology and Water Resources Engineering	3			3	3	15	15	10	10	50	100
1.6	PC	CED321	Lab-I: Estimating and Costing	-	-	2	2	1	-	-	-	25	-	25
1.7	PC	CED322	Lab-II: Geotechnical Engineering	-	-	2	2	1	-	-	-	-	25	25
1.8	PC	CED323	Lab-III: Design of Steel Structures			2	2	1	-	-		7.	25	25
1.9	PRO	CED324	Lab-IV: Seminar	-		2	2	1	-	-	-76		25	25
1.10	PRO	CED325	Lab-V: Experience-based learning	-	÷	2	2	1	-	-		25	-	25
1.11	PC	CED326	Lab-VI: Development of Skills (Computatitional) STADD-PRO	-		2	2	1	-	-	-	25		25
S5				15	0	12	27	21	75	75	50	125	325	650

10			1	Semest	er-VI					_				
Sr. No	Course Category	Course Code	Course Title	L	Т	P	Contact Hr/Wk	Credits	MSE-I	MSE-II	CIE	TA	ESE/Oral	Total
2.1	PC	CED351	Environmental Engineering	3	-	-	3	3	15	15	10	10	50	100
2.2	PC	CED352	Highway Engineering	3	-	5:	3	3	15	15	10	10	50	100
2.3	PC	CED353	Design of Reinforced Cement Concrete	3	-	-	3	3	15	15	10	10	50	100
2.4	PC	CED354	Construction Management	3	-		3	3	15	15	10	10	50	100
2.5	OE	CED391	Solid Waste Management	3	-	-	3	3	15	15	10	10	50	100
2.6	PC	CED371	Lab-I: Environmental Engineering	-		2	2	1	-	-	-	25		25
2.7	PC	CED372	Lab-II: Highway Engineering			2	2	1			-	25	3.50	25
2.8	, PC	CED373	Lab-III: Design of Reinforced Cement Concrete	1.5	-	2	2	1			•		25	25
2.9	PC	CED374	Lab-IV: Non-Destructive Testing	-	-	2	2	1	-		-		25	25
2.10	PRO	CED375	Lab-V: Major Project-I	-	-	4	4	2	-	-	-	25	25	50
S6				15	0	12	27	21	75	75	50	125	325	650
		MSE- N	Mid Semester Exam, ESE- End Semes	ster Ex	amina	tion, T	H-Theory	OR-O	ral, TA	-Teach	er Asse	essment.	TW- Te	rm

MSE- Mid Semester Exam, ESE- End Semester Examination, TH-Theory, OR- Oral, TA-Teacher Assessment, TW- Term Work, PR- Practical, Tut- Tutorial, CIE-Continuous Internal Evaluation

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#### TY OPEN ELECTIVE-III (ALL)

DEPARTMENT OFFERED	COURSE CODE	COURSE TITLE
Agricultural Engineering	AED391	Fundamentals of Bioenergy
Civil Engineering	CED391	Solid Waste Management
Computer Science and Engineering	CSE391	RHCSA (RedHat Certified System Administration)
Computer Science and Engineering	CSE392	Digital Marketing
Electronics and Computer Engineering	ECE391	Data Science
Electronics and Computer Engineering	ECE392	Control Systems
Electrical Engineering	EED391	Special Purpose Electric Machines
Emerging Science and Technology	AID391	Business Intelligence
Mechanical Engineering	MED391	Industry 4.0
Mechanical Engineering	MED392	Operations Research
Plastic and Polymer Engineering	PPE391	Waste Management and Circular Economy

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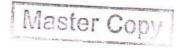
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	(Faculty of S	Science & Technology)			
	Syllabus of T. Y. B. Te	ch. (Civil Engineering) Semester V			
Course Code:	HSM301	Credits: 3-0-0			
Course: Engin	eering Economics & Financial	Mid Semester Examination-I: 15 Marks Mid			
Mana	gement	Semester Examination-II:15Marks			
Teaching Sch	eme:	Continuous Internal Evaluation: 10Marks			
Theory: 3 Hrs	week	TeacherAssessment:10 Marks			
		End Semester Examination: 50 Marks			
		End Semester Examination (Duration): 02 Hrs			
Prerequisite	Basic knowledge of concepts of e	economics.			
Objectives	The objectives of the course a	are			
	Understanding the principal	ples of economics.			
	<ol> <li>Analyzing cost-benefit analysis.</li> <li>Recognizing the role of markets and competition.</li> </ol>				
	Understand decision make	ting in uncertainty.			
	5. Getting introduced to Ind	lian taxing system.			
	Introduction to Engineering E				
Unit-I	analysis and its role in project i	ortance and scope of economics in engineering, Economic management, Overview of economicprinciples and ng, Micro - and macro- economics, economics of growth supply analysis.			
	*	(6 Hrs)			
Unit-II	Money discounting, Present value and future value analysis, Cash Flow – Diagrams, Categories & Computation, ge Value, Annual Cash Flow Analysis, Analysis, Calculating lysis.  (6 Hrs				
Unit-III	Analysis, Capital Budgeting, A	mics les, Types of Costs, Lifecycle costs, Budgets, Break eve application of Linear Programming. Investment Analysis by, Depreciation, Time value of money (present and future worth			

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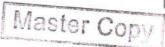
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	Rate a	nalysis and Tendering nalysis - Purpose, importance a utput from different equipmen	and necessity of the same, it	actors affecting,	task work,					
Unit-IV	Tende relative	Tendering - Preparation of tender documents, importance of inviting tenders, contract types relative merits, prequalification. general and special conditions, termination of contracts penalty and liquidated charges, Settlement of disputes. Bid conditions, alternative specifications, Alternative Bids, Bid process management.								
					(3 Hrs)					
	Probab	on-making under Risk and U oility and risk assessment in a s, Decision trees and expected	engineering projects, Sens	itivity analysis is analysis.	andscenario					
	Depre	niotion			(3 Hrs)					
Unit-V	Basic Propert	Aspects, Deterioration & ( y, Depreciation Calculation ls, Straight-Line Depreciation	Fundamentals, Deprecia	tion And Capi	tal Allowance					
	Percon	al Financial Management	\*		(3 Hrs)					
Unit-VI	Insuran options Introdu derivati Indian Types	ce, Investment, Insurance Vs.i., lumpsum, SIP, STP, Comction to Stock market, fundives, Trading awareness.  Taxing System of tax: Direct and indirection, Income Tax calculations	amental and technical and texts taxation in India, Ex-	estment, Investi alysis, Derivati	ment analysis, ves, Types of (3 Hrs)					
Textbooks /	Sr. No.	Title	Author	Publication	Edition					
Reference Books	1.	Economics for Engineers	James L.Riggs, David D. Bedworth, Sabah U. Randhawa	McGraw-Hill	Fourth					
	2.	Engineering Economics Analysis	Donald Newnan, Ted Eschembach, Jerome Lavelle		1 <sup>st</sup>					
	2	Principle of Engineering								
	3.	Economic Analysis	E. Case, David B. Pratt	John Wiley	1 <sup>st</sup>					
	4.	Engineering Economics	R. Paneerseelvam	PHI	1 st					
	5.	Engineering Economics Analysis	Michael RLindeburg	Professional Pub	1 st					
ii.	6.	Managerial Economics	V. Mote, S. Paul, G. Gupta	Tata McGraw Hill	2004					
	7.	Principles of Economics	Mankiw Gregory N.	Thompson	2002					

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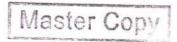
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		(Faculty	of Science &	& Technology	7)			
	Syllabi	us of T. Y. B.	Гесh. (Civil	Engineering	Semester V			
Course: Estima Teaching Sche	Course Code: CED301 Course: Estimating and Costing Teaching Scheme: Theory: 3 Hrs/week			Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks End Semester Examination (Duration): 2 Hrs				
Prerequisite	Basics of I	Building Constru	action, Buildi	ng Materials, S	urveying.			
Objectives	2. To unde	erstand what Est erstand the vario	us activities i	nvolved in cons		, L		
Unit-I  Introduction: Importance and I.S.1200. Items of work and D technical sanction, preliminary estimates in road, hill roads and earthwork.				ion of items of nates. objective	f work, administrates, and its method	tive approvals, ods Earthwork		
Unit-II	Detailed es		bearing and		Methods of deta es. Calculation of re	iled estimates, einforcing steel		
Unit-III	tender, ess		ct, type of co	ontracts, contrac	orks, tender notice, et documents, land on.	acquisition act,		
Unit-IV	Specifications: IS 1200 Introduction, Purpose and principles of specifications writing Types of specifications, writing and developing detailed specifications of Importation items of building and road work.  Cost Accounting: Various methods, classification of cost, direct and indirect charged distribution of overheads, issue rates and stores Account.					cations writing, s of Important		
Unit-V	of rates,		es from Na	tional Building	of CSR, Factors aff g Organization, m work.	fecting analysis		
Unit-VI	Value. Rea	l Estate, Tenure	of land, Free	e hold and lease	property price and e hold, sinking fund ation, Net & Gross	cost, Types of I, Depreciation,		
References	Sr No	Title		Author	Publication	Edition		

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V-2 (2017) (1) (1) (1)	1	Estimating and Costing	B.N. Dutta	UBS Publishers' Distributors Ltd	27 <sup>th</sup> Revised edition
	2	Estimating & Costing by	M. Chakraborty	Chakraborty Publishers'	3rd edition
	3	Valuation	Roshan Namavati	Namavati Publishers'	1st edition
	4	Philosophy of Valuation.	S. S. Rathore.	Allied Publishers Pvt. Ltd	1 <sup>st</sup> edition

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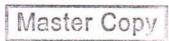
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	(Faculty of Sc	ience & Technology)	
	Syllabus of T. Y. B. Tech.	. (Civil Engineering) Semester V	
Course Code: CED302 Course: Geotechnical Engineering Teaching Scheme: Theory: 3 Hrs/week		Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks End Semester Examination (Duration): 2 Hrs	
Prerequisite			
Objectives	behavior of soils under difficulties characteristics, methods of class 2. Students will understand the	is to introduce the civil engineering students to the ferent loading conditions. It explores the natural ification and testing of soils as an engineering material. concept of bearing capacity and settlement related to ad related permissible Criteria of B.I.S. Codes.	
Unit-I  Introduction and Properties of soil: Origin of soil, scope of "Geotech Engineering', soil Minerals, Mechanical composition of soil, Properties of soil interrelationships, moisture content, grain size analysis, mechanical and sediment analysis, consistency limits, soil texture and structure, elementary ideas about swe sensitivity and thixotropy.  (4			
Unit-II	Highway Research Board Class	oisture and Permeability: Particle size classification, sification, IS Classification and Unified Classification, eepage and flow net, Inverted Filters.  (8 Hrs)	
Unit-III		sinesq's equation for point load, vertical pressure under ally distributed Load, preparation and use of Newmark's (4Hrs)	
Unit-IV	Comparison of standard and compressibility of soil, conce	on: Proctor density and optimum moisture content, modified proctor test factor, affecting compaction, ept of consolidation spring analogy, Terzaghis one ndary compression, square root of time fitting method.  (6 Hrs)	
Unit-V	soils and composite soils, gene	esses, Mohr's envelops for cohesive and non-cohesive eral principle of drained, Consolidated un-drained and shear strength by direct, unconfined, tri-axial and vane  (8 Hrs)	
Unit-VI	slope. Friction circle method, Ta		

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	test.				(6 Hrs)
	Sr. No.	Title	Author	Publication	Edition
	1	Soil Mechanics and Foundation Engineering	B. C. Punmia	Laxmi Publications	2005
References	2	Soil Mechanics and Foundation Engineering	Dr. K. R. Arora	A. K. Jain for standard publisher's distributers	2008
	3	Basic and applied soil mechanics	Gopal Ranjan and A. S. R. Rao	New age international publishers	1991
	4	Foundation Engineering	B.J. Kasmalkar	Pune Vidyarthi Griha	2012

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### (Faculty of Science & Technology)

### Syllabus of T. Y. B. Tech. (Civil Engineering) Semester V

Course Code: CED303
Course: Design of Steel Structure.
Teaching Scheme:
Theory: 3Hrs/week
Practical: 2 Hrs/week

Credits: 3-0-0
Mid Semester Examination-I: 15 Marks
Mid Semester Examination-II: 15 Marks
Teacher Assessment: 10 Marks
Continuous Internal Evaluation: 10 Marks
End Semester Examination: 50 Marks
End Semester Examination (Duration): 3 Hrs

	and definition (Duranton). 3 This
Prerequisite	Strength of Materials, Engineering Mechanics
Objectives	<ol> <li>Students will have a comprehensive understanding of</li> <li>Structural design principles, limit state design, steel structures and its basic components</li> <li>Various connection types, Structural steel fasteners like welding and bolting.</li> <li>Design of tension and compression members, design of beams and plate girders, roofing system design, and an introduction to cold-formed steel.</li> </ol>
Unit-I	Introduction to structural design: Structural systems, Roll of the designer, Advantages & Disadvantages of steel as a structural material, Types of structural steel, various rolled steel sections & structural pipe (tube) sections and their properties, Codes and specifications.  Introduction to Limit state design: Design philosophies & analysis procedures, Design requirements, Loads & load combinations, Types of limit states (limit state of strength, limit state of serviceability).
Unit-II	Connections: i) Bolted connections: Classification, Behavior of bolted joints. Design strength of ordinary black bolts, Design of simple connections, Analysis of Bolt Group, beam to beam, beam to column, framed connections.  ii) Welded connections: Advantages and disadvantages, types and properties of welds, specification for weld, types of joints, Design of simple connections, Beam to beam, beam to column, framed connections.  (6 Hrs)
Unit-III	Design of Tension members: Types of tension members, Behavior of tension members, Modes of failure, Design of sections for tension, tension member splice, and lug angles.  (6 Hrs)
Unit-IV	Design of Compression Members: Behavior of compression members, Modes of failure, Classification of cross section, Effective length of compression members, Design strength, Compression members in trusses, Design of columns subjected to axial loads, Laced and Battened columns. Column bases: Slab base and Gusseted base.  (6 Hrs)

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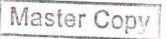
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Unit-V	Desi	Design of beams: Laterally restrained and unrestrained simply-supported beams.  Design of compound beams.  Design of plate girder: Economical depth, shear buckling resistance of web, end panel design, anchor forces, design of plate girder with stiffeners.						
Unit-VI	truss Intro Bries Cold buck	ding on roof trusses, ees. duction to Cold form f history of cold-form formed steel (Geom	ned steel usage, Manufacteric imperfections and rous design codes for CFS	gn of various members eturing Processes, speci- residual stesses). Differ	al issues in			
	Sr no	Title	Author	Publication	Edition			
	1.	Design of Steel Structures	Dr. N. Subramanian	Oxford University Press.	2010			
References	2.	Comprehensive Design of Steel Structures	Dr. B C Punmia& A K Jain	Laxmi Pub.	2 <sup>nd</sup> 2005			
	3.	Design of Steel Structures.	Mr. S K Duggal	Tata McGraw Hill Publishing Company Ltd.	3 <sup>rd</sup>			
	4.	Design of Steel Structures	Mr. S.S. Bhavikatti	International Publishing House Pvt. Ltd.	2009			

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	(Faculty of Science & Technology)			
	Syllabus of T. Y. B. Tech. (Civil Engineering) Semester V			
Course Code: Course: Hydro Engineering Teaching Sche Theory: 3 Hrs/	Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks Continuous Internal Evaluation: 10 Marks			
Prerequisite	Fluid Mechanics, Basics of structural analysis and strength of materials.			
Objectives	This is the basic course to introduce water resources, their occurrences, distribution, and application.     This course acts as a foundation for design of various dam and irrigation structures.			
Unit-I	Water requirements of crops: Factors affecting crop water requirement, irrigation water standards, types of soils and water available in various classes, permanent wilting point, crop period, base period, optimum use of Irrigation water, delta, duty and their relationship, evapo-transpiration, field capacity, Irrigation seasons, principal crops and crop rotation, design and frequency of Irrigation, Necessity, Advantages and ill-effects of irrigation, techniques of water distribution in farms.  (6 Hrs)			
Hydrology: Introduction, Hydrological cycle, precipitation and its form measurement of rainfall, rain guage network, presentation of rainfall data frequency, Characteristics of a rain storm (rain hyetograph, mass curve of rain recurrence interval, DAD curve), computation of average rainfall over a basevaporation, reduction in evaporation, evaporimeters, Infiltration its measurem IC-Curve, factors affecting runoff, Concept of Hydrograph and factor affect Unit hydrograph.  Ground Water Hydrology: aquifers and its parameters, , specific yield of water Theim's and Dupuit's theory for wells in confined and unconfined aquirecharge of groundwater. Various methods and their suitability.				
Canal Irrigation System: Canal classification, factors affecting the alignment of can Design of Canals by Kennedy and Lacey's silt theories and their applications, longitude section and cross section of an irrigation channel. Losses in canals, Advantages disadvantages and types of lining  Canal Regulation Works and Cross Drainage Works: Types, purpose, selection suitable type of C. D. Work, Design of transitions. Canal Regulation works: Introduct to canal falls, head and cross regulators, canal escapes, outlets and their types.  Diversion Head Works: Layout, Site selection, component, Types of weirs and Barricauses of failure, design of weir by Bligh and Khosla's theory.				

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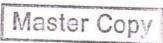
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Unit-IV	determing Dams: Standam Gravity in gravit	g of Reservoirs: Concept of nation of storage capacity of reser Site Selection and various types of Dams: Various forces acting on ty dams, Design of Low and high d crack control in gravity dams.	voir by mass curve ar of dams with relative gravity dams, modes	nalysis, life of res merits, economic of failure, princip	ervoirs, c height of ole stresses	
Unit-V	Earth Dams: Types of earth dams, components and their functions, causes of failure, design criteria. Design of filters, rock toe and pitching, seepage control Arch and Buttress Dams: Types and suitability, different forces acting, stability criteria Spillways: Types, suitability under different conditions, spillways gates, and energy dissipation in spillways.					
Unit-VI	Watershed Management: Concept and Necessity of Watershed Management steps involved in watershed management, ridge line and drainage line treatment.  Minor Irrigation Works and Practices: isolated tanks and tanks in series, tank weirs or surplus escaping weirs, tank outlets or sluices, introduction to Maharashtra Irrigation Act. Methods of water charge assessment, CADA and participatory irrigation.  (6 Hrs.)					
a)	Sr No	Title	Author	Publication	Edition	
	1	Irrigation and Hydraulic structures	Santoshkumar Garg	Khanna Publishers	19th	
References	2	Irrigation and Water power Engineering	Punmia and Pande	Standard Publishers	5 th	
	3	Engineering Hydrology	K. Subramanya	Tata McGraw Hill	4 th	
	4	Hydrology for Engineers	Linsley, Kohler	TMH Publications	1 st	

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#### (Faculty of Science & Technology)

Syllabus of T. Y. B. Tech. (Civil Engineering) Semester V

Course Code: CED321

Course: Lab I: Estimating and Costing

Teaching Scheme:

Practical

Credits: 0-0-1

Techers Assessment: 25 Marks

Practical: 2 Hrs/week

#### PRACTICAL - Minimum 8 practical assignment based on

- 1. Preliminary estimate using Plinth area method.
- 2. Detailed estimate of Load bearing structure
- 3. Detailed estimate of Frame structure.

#### List of Practical

- 4. Calculation of steel with Bar bending Schedule.
- 5. Detailed estimate of earthwork of road for Approximate 1km length.
- 6. Draft Detailed specification for 8 major items.
- 7. Analysis the unit rate of 8 major items of work contained.
- 8. Draft a short tender notice for proposed work.
- 9. Calculation of annual and total Depreciation and book value of the end of each year.
- 10. Fixation of standard rent of property.
- 11. Market survey for material and labour rates for various items.

The assessment of term work shall be done on the basis of the following.

- Continuous assessment
- · Performing the experiments in the laboratory
- · Oral examination conducted on the syllabus and term work mentioned above.

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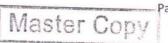
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		(Faculty of Sci	ence & Technology)
		Syllabus of T. Y. B. Tech.	(Civil Engineering) Semester V
Course Code	: CE	D322	Credits: 0-0-1
Course: Lab	II: C	Geotechnical Engineering	Practical/Oral: 25 Marks
Teaching Scl Practical: 2 H			
Objectives	:	to the behavior of soils u	urse is to introduce the civil engineering students nder ds of classification and testing of soils as an fferent loading conditions. It explores the natural
List of Practical		mentioned below:  1. Determination of speci 2. Field density test 3. Determination of partic 4. Determination of Atter 5. Permeability test-varial 6. Standard proctor composition 7. Direct shear test 8. Unconfined compression 9. Tri-axial shear test 10. Consolidation test 11. Static cone penetration 12. Standard Penetration test	ele size distribution of soil berg's Limits ble or constant head method action test on test est ents should be carried out, out of 8, 9, 10, 11 and

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(Faculty of Sci	ence & Technology)		
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D323	Credits: 0-0-1		
Design of Steel Structure	Practical/Oral: 25 Marks		
e:			
eek			
	et is that the students should be able to analyse and el Structural elements related to Structural		
Manual Design of an indus	trial building which should include the following:		
3. Design of connections.			
6. Design of Base.			
7. Design of Beam to beam and beam to column connections.			
8. Detail design report			
<ol> <li>Shop drawing and structural detailing of the above elements on half imperial drawing sheets.</li> </ol>			
10. Report of a site visit mentioning structural details sketches of structural connections.			
	Syllabus of T. Y. B. Tech.  D323  Design of Steel Structure  e: eek  The objective of this subject design various types of Ste Engineering's.  Manual Design of an indus  1. Design of roof truss  2. Design of Purlins.  3. Design of Connection  4. Design of Beams.  5. Design of Beams.  5. Design of Beam to  8. Detail design report  9. Shop drawing and simperial drawing shall.  10. Report of a site visit		

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(Faculty of Science & Technology)

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Course Code: CED324

Credits: 0-0-1

Course: Lab-IV: Seminar

Practical/Oral: 25 Marks

Teaching Scheme:

Practical: 2 Hrs/week

#### Objectives

- To encourage the students to study advanced engineering developments.
- To develop skills in doing literature survey, technical presentation and reportpreparation.
- To prepare and present technical reports.
- To encourage the students to use various teaching aids such as power pointpresentation and demonstrative models.

#### Guidelines

Each student shall identify a topic of current relevance in his/her branch of engineering, get approval of faculty concerned. To encourage and motivate the students to read and collect recent and reliable information about their area of interest confined to the relevant discipline, from technical publications including peer reviewed journals, conferences, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by a team of faculty members comprising Academic coordinator for that program, seminar coordinator and seminar guide based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the report. A Faculty guide is to be allotted and he / she will guide and monitor the progress of the student and maintain attendance also.

#### Evaluation

Distribution of marks for the seminar is as follows: i. Topic Selection and Technical Contents: 30 % ii. Presentation: 20%, iii. Ability to answer questions: 20% & iv. Report: 30%). Evaluation is based on rubrics prepared based on above guidelines.

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#### (Faculty of Science & Technology)

### Syllabus of T. Y. B. Tech. (Civil Engineering) Semester V

Course Code: CED325

Credits: 0-0-1

Course: Lab-V: Experience Based Learning

Teacher Assessment: 25 Marks

Teaching Scheme: Practical: 2 Hrs/week

### Objectives

- 1. To promote professional skills and knowledge through hands on experience.
- 2. To inculcate independent learning by problem solving with social context.

The following attributes are necessary in some combination,

- The goal of experience-based learning involves something personally significant or meaningful to the students.
- Students should be personally engaged.

#### Attributes

- Reflective thought and opportunities for students to write or discuss their experiences should be ongoing throughout the process.
- The whole person is involved, meaning not just their intellect but also their senses, their feelings and their personalities.
- Students should be recognised for prior learning they bring into the process.

#### 4 Stages of Experiential Learning Cycle

#### 1. Concrete Experience:

It describes the hands-on experiences that it is learn from. It's here that to try new things, face problems and step out of our comfort zone.

#### 2. Reflective Observation

Next, it is needed to reflect to learn from the experiences. The 'reflective observation' phase of the experiential learning cycle is all about reflection on the experiences which include both action and feelings. It is a stage get to reflect on what went right and what could be improved? It's also a chance to observe how it could have been done differently and to learn from each other.

#### 3. Abstract Conceptualization

Once it has been identified and understood the defining characteristics of an experience, it can decide on what can be done differently next time. This is a time for planning and brainstorming

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steps for success.

Active Experimentation

The active experimentation phase of the learning cycle is where the experimentation with the ideas is done. It's time to put the plan of action to the test in the real world.

The active experimentation phase of the learning cycle is where there is need to experiment with the ideas. It's time to put plan of action to the test in the real world.

Following activities may be performed under experience-based learning.

- Role Play
- · Case Studies
- · Field Visits
- · Undergraduate Research
- · Question generating activity
- Fishbowl
- · Make a Mnemonic
- · Peer Group Learning
- · Group 'Change' Projects
- · Creative Problem-Solving

#### Assessment:

Assessment will be done through following ways.

- · Creating a reflective journal or a portfolio
- Essay, report, or presentation (could be arts-based, multimedia or oral) on what has been learnt
- · Short answers to questions of a 'why' or 'explain' nature
- · One-on-one oral assessments with the instructor
- A project that develops ideas further (individually or in small groups)
- · Self-evaluation and/or group evaluation of a task performed

Rubrics shall be prepared for the activities in which the performance is to be evaluated. During process of monitoring and continuous assessment and evaluation the individual and team performance is to be measured. EBL is monitored and continuous assessment is done by mentor and authorities.

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### (Faculty of Science & Technology)

### Syllabus of T. Y. B. Tech. (Civil Engineering) Semester V

Course Code: CED326 Credits: 0-0-1

Course: Lab-VI-Development of Skills Teachers Assessment: 25 Marks

(Computational) STAAD PRO

Teaching Scheme: Practical: 2 Hrs/week

Objectives	: Student will be able to handle STAADPro which is the most popular structural engineering software product for 3D model generation, analysis, and design. It has an intuitive, user-friendly GUI, visualization tools, powerful analysis, and design facilities
List of Practical	<ol> <li>1. Elements of the STAADPro Screen.</li> <li>2. Starting a New Project/Importing CAD Models.</li> <li>3. Defining Structure Geometry/ Modelling.</li> <li>4. Setting the Project Units.</li> <li>5. Assigning Member Specifications.</li> <li>6. How to specify member releases, Additional Member.</li> <li>7. Specifications.</li> <li>8. Assigning Supports and Loads (Nodal Load and Member Load)</li> <li>9. Creating the Load Cases (Seismic Load Case and Wind Load Case)</li> <li>10. Creating the Combination Load Case.</li> <li>11. Performing the Analysis.</li> <li>12. Design of Steel Structure</li> <li>13. Design Viewing the Output File</li> <li>14. Case study of Residential Building (G+3)</li> </ol>
e.	The assessment of term work shall be done on the basis of the following.  Continuous assessment  Performing the experiments in the laboratory  Oral examination conducted on the syllabus and term work mentioned above.

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### (Faculty of Science & Technology)

### Syllabus of T. Y. B. Tech. (Civil Engineering) Semester VI

	Syllabus of 1. Y. B.	Teen. (Civil Engineering) Semester VI	
Course Code: CED351 Course: Environmental Engineering Teaching Scheme: Theory: 3 Hrs/week		Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks End Semester Examination (Duration): 2 Hrs	
Prerequisite	Fluid Mechanics, Basic	s of water resources engineering.	
Objectives	Knowledge of Environmental Engineering helps the engineers to analyse, think lo and pursue the engineering approach for the benefits of society and therefore desire an integral part of engineering education and training. This course acts as a foundat water supply and sanitation engineering.		
Unit-I	Water demand & quantify: Introduction to Water Supply Scheme, Different of Components of Water Supply Scheme, Water Demands, its Variation, Different of affecting Water Demand, Design of Components, Population Forecasting Me Numerical.  Quality of water & its analysis: Wholesome water, potable water, contaminated Impurities in water. Analysis of water-physical, chemical & biological Microorganism in water and Water Borne Diseases. IS standards.		
Unit-II	Water treatment and softening process: Layout of WTP, Screening, Aeration, P settling, Coagulation & flocculation, sand filters, disinfection, methods of disinfe boiling, chlorination, forms of chlorination chlorine demand & its estimation, break chlorination, Design of various components of Water Treatment Plant. Examples, softening Methods, removal of colors, odors & tastes, treatment with activated or removal of Heavy metals, Fluoridation &De-fluoridation.		
Unit-III	removal of Heavy metals, Fluoridation & De-fluoridation.		

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Unit-IV	Wastewater Terminology: Terminology in Waste Water-Sewage, Storm Water, Sullage, Sewer, Sewerage. Components of sewerage system, system of sanitation. Sewer System-Types, Layouts, Patterns of Collection System, Appurtenances.  Quality and Characteristics of Wastewater: Physical, Chemical and Biological Parameters, BOD and COD, first and second stage BOD, limitations of BOD, Numerical on BOD.  (6 Hrs)					
Unit-V	Natural Methods of Wastewater Disposal: Methods of disposal, disposal by dilution, self-purification & Zones of Pollution in streams, Oxygen Sag Curve, Disposal on Land, Comparison Of Disposal Methods, Inline-Offline Flow Equalization.  Wastewater Treatment process and its Design: Layout of STP, Screen, grit chambers, Settling Tanks, Activated Sludge Process, sludge disposal methods, design of various components of Wastewater Treatment Plant.  (6 Hrs)					
	T Dland	goon stabilization	Design: Objective	Hon, Numerican		
Unit-VI	Advance Waste	ewater System: Nitr solved Inorganic Sub	ification and Den	ntrincation, Filospii	(6 Hrs)	
Unit-VI	Advance Waste Removal of Dis	ewater System: Nitr	Author	Publication	(6 Hrs)	
Unit-VI	Advance Waste Removal of Dis	Title  Water supply	Author Santoshkumar	ntrincation, Filospii	(6 Hrs)	
Unit-VI	Advance Waste Removal of Dis Sr. No.	Title  Water supply Engineering Water Supply & Sanitary	Author Santoshkumar	Publication  Khanna	(6 Hrs)	
Unit-VI Reference	Advance Waste Removal of Dis	Title  Water supply Engineering Water Supply &	Author Santoshkumar Garg G.S. Birdie, J. S.	Publication  Khanna Publishers Dhanpat Rai Publishing Company	(6 Hrs)  Edition	
	Advance Waste Removal of Dis	Title  Water supply Engineering Water Supply & Sanitary Engineering Water supply Engineering Sewage Disposal and Air	Author  Santoshkumar Garg  G.S. Birdie, J. S. Birdie  B. C. Punmia, Ashok Jain, Arun	Publication  Khanna Publishers Dhanpat Rai Publishing Company Laxmi	(6 Hrs)  Edition  34 <sup>th</sup>	
	Advance Waste Removal of Dis	Title  Water supply Engineering Water Supply & Sanitary Engineering Water supply Engineering Sanitary Engineering Water supply Engineering Sewage Disposal	Author  Santoshkumar Garg  G.S. Birdie, J. S. Birdie  B. C. Punmia, Ashok Jain, Arun Jain	Publication  Khanna Publishers Dhanpat Rai Publishing Company Laxmi Publications  Khanna publishers	(6 Hrs)  Edition  34 <sup>th</sup> 4 <sup>th</sup>	

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	(Faculty	of Science & Technology)	
	Syllabus of T. Y. B. T	Tech. (Civil Engineering) Semester VI	
Course Code: CED352 Course: Highway Engineering Teaching Scheme: Theory: 3 Hrs/week Practical: 2 Hrs/week		Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks End Semester Examination (Duration): 2 Hrs	
Pre-requisites			
Objectives	Engineering like  To present the related Highway Engine To give an expeare applied in fite To involve the	perience in the implementation of Engineering concepts which field of Transportation Engineering.  The application of scientific and technological principles of sis, design, and management to highway engineering.  The and Planning:	
Unit-I	patterns, Engineering su	rvey in highway alignment.  1, Aggregates, Bitumen, Futuristic Pavement Materials.  (6 Hours)	
Unit-II	Geometric Design of Highway: Cross sectional elements, Camber, Gradient, and Sight distance, PIEV Theorem Horizontal Alignment, Super elevation, Extra widening, transition curves, Set bat distance. Vertical Alignment, Design of summit & valley curves.  (6 Hour		
Unit-III	Design of Flexible Pavement:  Design factors. ESWL for dual wheels. Tire and contact pressure. Group incomethod, CBR method, Bossiness's & Burmister's method. Marshall Mix Design.  (6 Hou		
Unit-IV	Design of Rigid Pavement:  Westergaard's stress equation for wheel load & Temperature stresses in rig pavement, Combination of stresses, Design of Joints. WBM & WMM roads.  (6 Hour		
Unit-V	Traffic Engineering: Road user characteristics, vehicular characteristics, traffic flow characteristics, sp		
Unit-VI	Highway Construction	n Machinery:	

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	Earth moving equipment's, application, and specification: Backhoe loader, Crawler Excavator, Motor Grader, Road Rollers machine, tippers, Cranes and Hydra machine, Paver machine and its type, Asphalt Mixing Plants.  (6 Hours)				
19	Sr.	Title	Author	Publication	Edition
	ce 2 Traffi			Nem Chand &	1991
		Highway Engineering	S.K. Khanna and Justo	Sons Publisher	1991
Réference			affic Engineering and L. R. Kadiyali	Khanna	2017
Reference		Traffic Engineering and		Publishers	2017
		Transport Planning		McGraw Hill	1968
	3	Traffic Flow Theory & Control	Drew, D.R		1900

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#### (Faculty of Science & Technology) Syllabus of T. Y. B. Tech. (Civil Engineering) Semester VI Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Course Code: CED353 Mid Semester Examination-II: 15 Marks Course: Design of RCC structures Teacher Assessment: 10 Marks Teaching Scheme: Continuous Internal Evaluation: 10 Marks Theory: 3 Hrs/week End Semester Examination: 50 Marks End Semester Examination (Duration): 2 Hrs Prerequisite Strength of materials and Design of steel structure Student will be able to perform analysis and design of reinforced concrete members and connections. Objectives 2. Student will be able to identify and interpret the appropriate relevant industry design Introduction- Stress strain behavior of concrete and steel, Behavior of RCC, Permissible stresses in steel and concrete, Different design philosophies, various limits Unit-I states, Characteristic strength and characteristic load, Load factor, Partial safety factors. Limit state of collapse (flexure): Analysis and Design of Singly and Doubly Reinforced rectangular sections, singly reinforced T and L beams. Unit-II (6Hrs) Limit state of collapse (shear and bond): Shear failure, Types of Shear reinforcement, Design of Shear reinforcement, Bond-types, Factors affecting bond Resistance, Check Unit-III for development length. b) Limit state of serviceability: Significance of deflection, IS recommendations, Cracking-classification and Types of Cracks, Causes. (6 Hrs) Design of slabs: Cantilever Slab, simply supported one-way slab, Two-way slab with different support conditions as per IS:456-2000. Unit-IV Design of staircase: Simply Supported single flight and Doglegged. Design of Column: Analysis and Design of axially and eccentrically (uni-axial) loaded rectangular columns, Interaction diagram, Design of Circular column with helical Unit-V reinforcement. Design of Footing: Design of isolated rectangular column footing with constant depth and slops at ends subjected to axial load. Unit-VI (4Hrs) Sr. No. Title Author Publication Edition References NEM chand. 1 Design of R. C. Dr. A. K. Jain 2015 Roorkee structure

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SALE guara per Egophilina	2	Design of R. C. structure	Dr. Shah & Karve	Structures publishers, pune	2017
	3	Design of R. C.	Ramamurtham	Dhanpat Rai & Sons	2016
	4	R.C. C.	Dr. B. C. Punmia	Laxmi	2015
	5	Designs 1S:4562000 and SP-16.	Bureau of Indian Standards	Bureau of Indian Standards	2000

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		Science & Technology)			
	Syllabus of T. V. B. Tecl	h. (Civil Engineering) Semester VI			
Course Code: CED354 Course: Construction Management Teaching Scheme: Theory: 3 Hrs/week		Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Continuous Internal Evaluation: 10 Marks Teacher Assessment: 10 Marks End Semester Examination: 50 Marks End Semester Examination (Duration): 02 Hrs			
Prerequisite	Basics of analysis of construct	tion site and quality of materials.			
Objectives	Learn various basic community Management.     Understand important various networking to Precedence networks.     Apply various material. Understand economic	al management theories like ABC, EOQ, HML etc. c analysis and financial management concepts to know			
Unit-I	Time Management: Introduction, steps in Project Management — work treak deviations structure, Bar Chart, Mile stone chart, Gantt Chart, Activity on Arrow and Activity Conode. Introduction to PERT: Concept of probability, normal and Beta Distribution, Centrolimit theorem. Time estimates and calculations of project duration, critical path, slace probability of project completion.				
Unit-II	Network Analysis: Precedence network, Critical Path Method (CPM): Introduction, To estimates, floats, critical path, Network compression – Least Cost and optimum durate updating of networks – needs, steps, project duration, calculation for updated network.  (6 I				
Unit-III	Material Management- defi management. Objectives, forecasting. Inventory Cont safety stocks, Material Evalu	Human Resource allocation – smoothening and levelling nition by international federation of purchasing and materia Role Functions, Qualities of material manager materia rol- Necessity, Techniques such as ABC and EOQ lead-time uation using differential indices.  (6 Hrs			
Unit-IV	Financial Management: Introduction to Engineering economics, importance, demand as supply, types of costs, Types of interest such as – simple, compound, continuous, effective Value of Money – time and equivalence, tangible and intangible factors, introduction inflation.  (6 Here)				
Unit- V	Economic Analysis: Economic comparisons, Discounting methods: Present worth method equivalent annual cost method, capitalized cost method, net present value, and internal of return.  (61)				
Unit- VI	Safety Engineering: Site construction projects, Im-	e layout, Factors affecting, Typical layout of few major portance of Safety, Classification of Accidents, Causes			

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	Accidents, Safety Policy, Safety Organization, Safety Plan, Safety Training, Various Safety Equipment used on site.  (6 Hrs)				
	Sr. No.	Title	Author	Publication	Edition
	1	Construction Project Management	Jha K. N.	Pearson's publication.	3rd edition
	2	Construction Management and Planning	Sengupta, B. and Guha H.	Tata McGraw Hill Publication.	3rd edition
References	3	PERT &CPM: Principles and Applications	Srinath. L. S	Affiliated East West Press, Delhi	1st edition
See as a	4	Project Planning and Control with PERT and CPM	B. C. Punmia,	Laxmi Publications (P) Ltd.	1st edition
	5	Industrial Engineering & management	O. P. Khanna	Dhanpat Rai Publications.	3rd edition

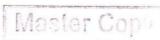
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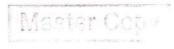
### Syllabus of T. Y. B. Tech. (Civil Engineering) Semester VI

Course Code: AED391	Credits: 3-0-0 Mid Semester Examination-I: 15 Marks
Course: Open Elective-III: (Fundamentals of	Mid Semester Examination-II: 15Marks
Bioenergy)	Teacher Assessment: 10 Marks Continuous Internal Evaluation: 10 Marks
Teaching Scheme: Theory: 3 Hrs./week	End Semester Examination: 50 Marks End Semester Examination (Duration): 2 Hrs.

			End Semester Examinat	ion (Duration). 2 11	
Prerequisit	Basic kno	wledge of Bioenergy sources a	and biomass utilization		
2				margin appliancion re	tes for
Objectives	Anaerobio	tand bioenergy technologies, p c Digestion, gasification, pyrol what constitutes a suitable feed	lysis (fast, intermediate a	lications	Stion
Unit-I	Introduc How Bion Biomass selection	tion to bioenergy- Introduction mass Formed on the Earth, Ba Production: Wastelands, class of species, methods of field pr	sic Biomass Technology sification and their use reparation and transplant	(Resources and Protein through energy plang.	antation (6 Hrs
1	D's Alban	ol- Biofuels: Introduction,	Ethanol production pro	ocess, Biodiesel pr	oduction
Unit-II	process, l	Environmental Benefits, Bio-o	il: Pyrolysis or Destructi	ve distillation.	(6 Hrs
Unit-III	biogas pl of biogas	Biogas: Introduction, process ant, Classification & Popular of plant, advantages, disadvanta I- Biodiesel production proces	ges.	ctors considered for	(6 Hrs
Unit-IV	Environn	nental permitting and safety co	onsiderations for biodiese	er production.	(6 Hrs
Unit-V	gasificat difference		raft Gasifier, downdraft,	cross drait, applicat	(6 Hrs
Unit-VI	Biomass cubing),	utilization: Biomass dens environmental aspect of bio-e	sification technique (br nergy, waste to energy c	riquetting, pelletiza onversion.	(6 Hr
	Sr. No.	Title	Author	Publication	Editio
	1	Introduction to Bioenergy (Energy and the Environment)	Vaughn C. Nelson, Kenneth L. Starcher	CRC Press	1 st
References	2	Bioenergy: Biomass to Biofuels	Anju Dahiya	Elsevier Science	2 <sup>nd</sup>
	3	Bioenergy: Principles and Applications	Yebo Li and Samir Kumar Khanal	Wiley	2 <sup>nd</sup>

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#### (Faculty of Science & Technology)

#### Syllabus of T. Y. B. Tech. (Civil Engineering) Semester VI

	Synabus of 1. 1. B. Teen. (	eivii Engineering) Semester vi
Course Code: C Course: Open I Management Teaching Scher Theory: 3 Hrs/	Elective III – Solid Waste	Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks End Semester Examination (Duration): 2 Hrs
Prerequisite	Environmental Science	
Objectives	solid waste and different waste ma	ion, collection and management of the various types of magement techniques.
Unit-I	Management Hierarchy, Function	Management (SWM): Need and Objectives, Waste al elements, Environmental impact of mismanagement. position, Quantities, Physical, chemical and Biological (6 Hrs)
Unit-II	considerations for waste storage a	actors affecting. Storage and collection: General t source, Types of collection Systems, Transfer station: ion of solid waste: Means and Methods, Routing of
Unit-III		ery: Objectives, Stages of segregation, sorting for materials recovery, E waste management,  (6 Hrs)
Unit-IV	technologies incineration, treatmet waste: Parameters affecting energy	chnologies: Composting, thermal conversion int of biomedical wastes. Energy recovery from solid y recovery, Bio-methanation, Fundamentals of thermal in, Advantages and disadvantages of various (6 Hrs)
Unit-V		action, Definition, Essential components, Site selection, analysis and landfill gas management, treatment &
Unit-VI	biomedical and industrial waste), Legislations on management and l	HWM): Types of hazardous waste (such as nuclear, problems and issues related to HWM, Need for HWM, nandling of HW, Hazardous Characteristics, reduction if reuse, labeling and handling of hazardous wastes,

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	Sr. No.	Title	Author	Publication	Edition
	1	Integrated Solid Waste Management	Hilary Theisen and Samuel A, , Vigil, George Tchobanoglous	McGraw- Hill, New York	1993
9	2	CPHEEO, Manual on Municipal Solid waste management,	Central Public Health and Environmental Engineering Organization	Government of India	2000
References	3	Environmental Resources Management, , Hazardous waste Management	Michael D. LaGrega, Philip L Buckingham Jeffrey C. E vans	Mc-Graw Hill International edition	2001
	4	Solid waste Engineering	Vesilind P.A., Worrell W and Reinhart	Thomson Learning Inc., Singapore	2002
egan de	5	Hazardous Waste Management	Charles A. Wentz	McGraw Hill International Edition,New York	2 <sup>nd</sup>

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### (Faculty of Science & Technology) Syllabus of T. Y. B. Tech. (Civil Engineering) Semester VI Credits: 3-0-0 Mid Semester Examination-I: 15 Marks Mid Semester Course Code: CSE391 Examination-II: 15 Marks Continuous Internal Course: Open Elective-III: RHCSA (RedHat Certified System Evaluation: 10 Marks Administration) Teacher Assessment: 10 Marks End Semester Examination: 50 Marks Teaching Scheme: End Semester Examination (Duration): 2Hrs Theory: 3 Hrs/week This course has prerequisites like previous system administration experienceon other Prerequisites operating systems is beneficial. Fundamental knowledge of Operating System. 1. Develop a strong understanding of the command-line interface (CLI) and become proficient in using essential command-line tools and utilities for Objectives system administration tasks. 2. Understanding fundamental system administration tasks, such as managing file systems, users, and groups. 3. Ability to Install, update, and remove software packages using package management tools and service management. 4. Ability to identify and resolve common system issues, perform system analysis, and troubleshoot problems related to hardware, software. 5. Ability to configure and troubleshoot network interfaces and handlingsystem security. 6. Ability to manage storage devices and file systems and utilize containerization tools like Podman. Introduction to Red Hat Enterprise Linux (RHEL), Filesystem and File Permissions Overview of RHEL and its features. Installation and deployment of RHEL, Unit-I Filesystem hierarchy standard (FHS), Managing files and directories. (6 Hrs) User and Group Administration Unit-II

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				-t Deserved nell	niac and				
	authentication	n methods, User and	and group manageme group quotas user blicies and file permi	and group-level	security				
	integrity.	ucii as password po	A A	,	(6 Hrs)				
	Package Ma	nagement, System In	itialization						
	Package in	stallation, removal, a	nd verification Mana	aging software rep	ositories,				
Unit-III	Dependency resolution and package querying, Boot process and run levels Managing								
The Control of the Co		daemons, Systemd and							
					(7 Hrs)				
	System Mai	ntenance, Troublesho	ooting and System Rec	covery					
			rnel management, Ma		d system				
Unit-IV			g methodologies, Reso						
		configuration and trou							
	Door loader	comigation and			(7 Hrs)				
	Network Co	onfiguration							
Unit-V			igurations, IP addre	essing and routin	ig, DNS				
	configuration. configuring firewalls, securing SSH access, and implementing SELinux policies to protect the system from unauthorized access and potential								
	threats.	one to provide							
	meas.				(7 Hrs				
	Storage Ad	ministration & Run	containers						
				Manager (LVM), I	Filesysten				
Unit-VI	Disk partitioning and formatting, Logical Volume Manager (LVM), Filesystem creation and mounting, Deploy Container, Manage Container Storage and								
	Network Resources, Manage Containers as System Services.								
*	Network	coomices, manage com			(7 Hrs				
	C. No	Title	Author	Publication	Edition				
	Sr. No.	Linux System		O'Reilly,	2:				
	1.	Programming	Robert Love	SPD	10 <sup>th</sup>				
		UNIX Network	W.R. Stevens	McGraw-Hill	-1				
	2.	Programming			5 <sup>th</sup>				
		Frogramming							

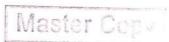
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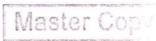
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Textbooks / Reference Books	3.	Linux Command Lineand Shell Scripting Bible	Richard Blum and Christine Bresnahan	McGraw Hill	6 <sup>th</sup>
DOVAS	4.	UNIX and Linux System Administration Handbook	Evi Nemeth, Garth Snyder, Trent R. Hein	Ben Whaley	3rd
a	5.	RHCSA/RHCE Red Hat Linux Certification Study Guide	RedHat Student Guide	RedHat	9th

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### Syllabus of T. Y. B. Tech. (Civil Engineering) Semester VI Credits: 3-0-0 Course Code: CSE392 Mid Semester Examination-I: 15 Marks Mid Course: Open Elective-III: Semester Examination-II: 15 Marks Digital Marketing Continuous Internal Evaluation: 10 Marks Teaching Scheme: Teacher Assessment: 10 Marks Theory: 3 Hrs/week End Semester Examination: 50 Marks End Semester Examination (Duration): 2 Hrs Basic Understanding of Digital Marketing Prerequisites 1. To understand the basic concept of digital marketing Objectives 2. To understand the concept of search engine optimization. Implement Social Media Optimization 4. Discuss the concept of google advertising Digital Marketing Introduction Concept of Digital Marketing, Use of Digital Marketing, Digital Marketing Platform, Digital Marketing Strategy, Types of Digital Marketing - Organic & Unit-I Paid, Digital Marketing VS Traditional Marketing. How is it different from traditional marketing, ROI between Digital and traditional Marketing. (7 Hrs)

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Syllabus of Third Year B.Tech. 2023-24

Marketing, Promotional Techniques, Integration Techniques, Analytics.

Competition Analysis, Google Algorithms and Updates.

Search Engine Optimization (SEO)

Social Media Optimization (SMO)

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Unit-III

Unit-II



Introduction of SEO, Search Engine working, SEO Tools Web positionAnalysis,

Facebook - Profile Creations, Creating groups and pages, Tips and Guides, Posts And promotions, Events Creations, Video Marketing, Promotional Techniques, Integration Techniques. Twitter -Set-up and usage Tips, Promoted Tweets, Video

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(6 Hrs)



	Linke	dIn-Profile	Creations, Co	mpany P	age Crea	ations	s, Tips ar	d Guide	es, LinkedIn
			promotions L						
	1		tegration Tec						Techniques,
		otional Tech		1		4			
3	1101110	rional 100.	andere.						(5 Hrs)
	Intro	luction to	SEM						
C USA BAY ISBBE	Same proper		s, Search Adv	ertising.	Display	Adve	ertising, l	Mobile .	Advertising,
Unit-IV	250		ng, Shopping						
			Google Mappir			0		,	
	Lxprc	55, 50tup, C	Joogie Happii	15 / 1405.					(6 Hrs)
14	200	37							()
Unit-V	1		anagement				.1		
CHILEY			an online p						ict keyword
	resear	ch, product	pricing, posit	ive review	ws, and c	ustor	mer reten	tion	
			1 0/1		,		nor roton	tion.	
			7 071				nor roton		(6 Hrs)
		l Marketin		90 100 E BUE STOOTS I	,				(6 Hrs)
Unit-VI	Email	l Marketin							
Unit-VI	Email How	l Marketin	g	nct-based	emails	in bu			(6 Hrs)
	Email How	l Marketin	g nd send produ	nct-based	emails	in bu			
Unit-VI	Email How	I Marketin to create a s have a go	g nd send produ	nct-based	emails	in bu	ilk and e		(6 Hrs)
	Email How emails	I Marketin to create a s have a go	g nd send produ od open rate a	nct-based	emails i	in bu	ilk and e	nsure th	(6 Hrs)
Unit-VI	Emails How emails Sr. No.	I Marketin to create a s have a go	nd send produ od open rate a Title	nct-based nd conve	emails i	in bu	Publ	nsure th	(6 Hrs)
Unit-VI Textbooks /	Emails How emails Sr. No.	I Marketin to create a s have a go	nd send produ od open rate a Title	Ryan Russ	emails in rate without Deiss	in bu	Publ	ication	(6 Hrs)
Unit-VI  Textbooks / Reference	Emails How emails Sr. No.	Digital For Dumi	nd send produced of open rate and an arrangement of the marketing mies	Ryan Russ	emails in rate withor  Deiss Hennebe	in bu	Publ	ication	(6 Hrs)
Unit-VI  Textbooks / Reference	Emails How emails Sr. No.	Digital For Dumi	nd send produced of open rate and open rate	Ryan Russ	emails in rate withor  Deiss Hennebe	in bu	Publ Tata Mo	ication	(6 Hrs)  Edition  6th
Unit-VI  Textbooks / Reference	Emails How emails Sr. No.	Digital For Dumr Social Marketing	nd send produced of open rate and the send produced	Ryan Russ	emails in rate without Deiss Hennebe merman, th Ng	in bu	Publ Tata Mo	nsure the lication of the control of	(6 Hrs)  Edition  6th

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	(Faculty of Science & Technology)
Sy	villabus of T. Y. B. Tech. (Civil Engineering) Semester VI
Course Code: EC Course: Data Sci Feaching Schen Lectures: 3 H	Credits: 3 – 0 – 0  Mid Semester Examination-I: 15 Marks  Mid Semester Examination-II: 15 Marks  Mid Semester Examination-II: 15 Marks  Teacher Assessment: 10 Marks  Continuous Internal Evaluation: 10 Marks  End Semester Examination: 50 Marks  End Semester Examination (Duration): 02
Prerequisites	Programming Concepts, Data Structure, Basic Linear Algebra, Basic Probability and Statistics.
Objectives	The objectives of the course are Give an introduction to data science and its applications.  Understand use of statistics in data science Use data science to analyze large and unstructured data with different tools
Course Outcomes	At the end of the course the student will be able to  1. Demonstrate the fundamental concepts and principles of data science.  2. Apply data preprocessing techniques to clean and prepare data for analysis.  3. Perform statistical analysis and interpret the results.  4. Implement and evaluate machine learning algorithms for data prediction and classification.
Unit-I	Introduction to Data Science:  Overview of Data science and its terminologies, Applications of Data Science.  Role of Data science in emerging technologies. Data types and Data sources.  Data preprocessing techniques, Statistical concepts for Data Science.  (6 Hrs.)
Unit-II	Machine Learning for Data Science:  Introduction to machine learning algorithms, Supervised learning: linear regression, logistic regression, decision trees, and random forests Unsupervised learning: clustering algorithms, dimensionality reduction Feature generation and selection using Machine learning (6 Hrs.)

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	D. J. Viene	lization and Commu	inication:	1 is using	visual
Unit-III	Principles techniques Tools and I Mining So discoveries neighborho	of data visualization ibraries for data visua cial Networks: Social s of communities in a cood pro	lization. Networks graphs, graphs, analyze the perties	clustering of graphs e portioning of grap of	, direct
Unit-IV	Big Data Introduction framework concept (6 Hrs.)		rk, Big data proc nputing for	essing and analysis data	for Data
Unit-V	Science, science.	ming Languages and Python libraries for d Implementation e	examples in Py	thon and R 1	anguage.
	Ethical Considerations in Data Science:  Privacy, security, and ethical considerations in data science, Bias, fairner and interpretability in machine learning algorithms, Legal and regulate aspects  of data science, Bias, fairner and interpretability in machine learning algorithms, Legal and regulate aspects  (6 Hrs.)				Talliness,
Unit-VI	and inte	erpretability in macin of	ine learning algor	ata	science.
Unit-VI	and inte	of Title	Author	Publication	Science.
Unit-VI	and integrated aspects (6 Hrs.)	Title  Python for Data	Author Wes McKinney	ata	egulatory science.  Edition  2nd
	and interest aspects (6 Hrs.) Sr. No.	of Title	Author	Publication	Science.
References	and interest aspects (6 Hrs.)  Sr. No.  1.	Title  Python for Data Analysis  The Elements of Statistical Learning  Data Science for	Author  Wes McKinney  Trevor Hastie, Robert Tibshirani, Jerome	Publication O'Reilly Media	Edition 2nd
	and interest aspects (6 Hrs.)  Sr. No.  1.	Title  Python for Data Analysis  The Elements of Statistical Learning	Author  Wes McKinney  Trevor Hastie, Robert Tibshirani, Jerome Friedman  Foster Provost, Tom Fawcett  Aurélien Géron	Publication O'Reilly Media Springer	Edition 2nd 2nd

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### (Faculty of Science & Technology) Syllabus of T. Y. B. Tech. (Civil Engineering) Semester VI

Sy	llabus of T. Y. B. Tech. (Civil Engineering) Schlester
Course Code: ECE Course: Control S Teaching Scheme Lectures: 3 Hrs Tutorial: - Hr./	Mid Semester Examination II: 15 Marks  Mid Semester Examination II: 15 Marks  Teacher Assessment: 10 Marks  Continuous Internal Evaluation: 10 Marks  End Semester Examination: 50 Marks  End Semester Examination (Duration): 02 Hrs.
Prerequisites	Linear algebra and calculus
Objectives	<ul> <li>The objectives of the course are</li> <li>The objective of this course is to introduce students to the fundamental concepts and principles of control systems.</li> <li>Students will develop an understanding of the analysis and design of control systems, including time-domain and frequency-domain techniques.</li> </ul>
Course Outcomes	At the end of the course the student will be able to  1. Understand the basic concepts and terminology of control systems.  2. Analyze linear time-invariant (LTI) systems using Laplace transforms and transfer functions.  3. Design and analyze feedback control systems using time-domain techniques.  4. Analyze control system stability using Routh-Hurwitz and Nyquist criteria.
Unit-I	Introduction to Control Systems  Definition and classification of control systems, Feedback and feedforward control, Open-loop System, closed-loop control and their examples.  Distinguish between open and close system. Laplace transforms.  (6 Hrs.)
Unit-II	Mathematical Modeling of Dynamic Systems  Differential equations and transfer functions, Advantages, Disadvantages and Properties of Transfer function, transfer function representation, Block diagrams and signal flow graphs, State-space representation.  (6 Hrs.)
Unit-III	Time-Domain Analysis  Time response analysis, Step response analysis. Time constant and system behavior. Transient and steady-state response, Second-order system characteristics: Step response analysis. Natural frequency and damping ratio. Undamped, underdamped, critically damped, and overdamped systems

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	Performa overshoo analysis.	nce specifications: I t. Steady-state error	Rise time, settling tin r and error constant	ne, peak time, a ts. Introduction (6 Hrs.)	to error	
Unit-IV	Definition Application Nyquist stability.	ion of the Routh-F stability criterion, Ap (6 H		analyze system	Stability.	
Unit-V	Frequence	Frequency-Domain Analysis: Frequency response analysis, Relationship between time-domain and frequency-domain representations, Bode plots, Nyquist stability criterion, Stability margins, gain margin and phase margin.				
	Controller Design: Sensors and actuators, Sampling and discrete-time control systems, Proportional-Integral-Derivative (PID) controllers, Frequency response design (lead, lag, and lead-lag compensation), Digital controllers and hardware implementation. (6 Hrs.)					
Unit-VI	(lead, la	g, and lead-lag comp	ensation), Digital cont	rollers and hardw	are	
Unit-VI	(lead, la implem	g, and lead-lag comp	ensation), Digital cont	rollers and hardw	Tare	
Unit-VI	(lead, la	g, and lead-lag comp entation.	(6 Hrs.)  Author  Katsuhiko Ogata	rollers and nardw	Tare	
	(lead, la implem	g, and lead-lag compentation.  Title  Modern Control	Author  Katsuhiko Ogata  Norman S. Nise	Publication	Tare	
References	Sr. No.	g, and lead-lag compentation.  Title  Modern Control Engineering Control Systems	(6 Hrs.)  Author  Katsuhiko Ogata	Publication	Edition	

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	(Faculty of Scien	ce & Technology)	
	Syllabus of T. Y. B. Tech. (Ci	ivil Engineering) Semester VI	
Course Code: I	EED391	Credits: 3-0-0	
Course Title: S	pecial Purpose Electric Machines	Mid Semester Examination-I: 15 Marks	
		Mid Semester Examination-II: 15 Marks	
Teaching Scheme: Continuous Internal Evaluation: 10 Marks			
Theory: 3 Hrs / week Teacher Assessment: 10 Marks			
		End Semester Examination: 50 Marks	
		End Semester Examination (Duration): 2 Hrs	
Prerequisite	Basic electrical Engineering, magnetic	circuit, conventional electrical machines	
4	To understand different types o	f motors for particular application	
	2. To examine behaviour of mach	ines for specific applications	
Objectives	<ol> <li>To compare different machines</li> </ol>		
	4. To develop knowledge in regar	ds of control and use of machines	
	Induction Generators		
Unit-I	Construction, operating principle, type	es, operating characteristics, Applications.	
		(6 Hrs)	
	Doubly fed induction Machines		
Unit-II	Construction, operating principle, t connected wind and mini/micro hydel	ypes, operating characteristics, Applications to grid systems.	
		(6 Hrs)	
	Switched Reluctance Motor:		
	Construction, operating performance, c	ontrol and applications.	
Unit-III	Variable reluctance stepper motor:		
	Construction, operating performance, c		
ž s		(6 Hrs)	
02	Linear Machines:		
Unit-IV	Linear Induction Machines and Lin	near Synchronous Machines: Construction, operation,	
CHICA	performance, control and applications		
The same of the sa		(6 Hrs)	

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Unit-V	Cons	C Machine: truction, magnetic materials upopments in BLDC motors.	used, types of motors, co	ontrol and applications.	Recent (6 Hrs)
Unit-VI	Constr	nent Magnet Machines: uction, magnetic materials us ne, control and applications. I			onous (6 Hrs)
40	Sr. No.	Title	Author	Publication	Edition
	1	Switched Reluctance motor drives'	R.Krishnan,	CRC press, 2001	1st Edition
	2	Permanent magnet and Brushless DC motors'	T.Kenjo and S.Nagamori	Clarendon press. London, 1988	1st Edition
References	3	Special Electrical Machines	Simmi P Burman	S.K. Kataria& Sons	2 <sup>nd</sup> Edition
	4	Permanent Magnet Synchronous and Brushless DC Motor Drives	R. Krishnan.	New Delhi, Prentice, Hall of India, 2009	2 <sup>nd</sup> Edition
	5	Special Electrical Machines	Venkataratnam	Taylor and Francis, 2009	1 <sup>st</sup> Edition

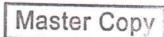
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partition Comme	(Frankright)	Science & Technology)			
		h. (Civil Engineering) Semester VI			
Course Code: Al	ID391	Credits: 3-0-0			
Course: Business Intelligence In Semester Examination-I: 15 Marks					
<b>Teaching Scher</b>	ne:	In Semester Examination-II: 15 Marks			
Theory: 03 Hrs/	/week	Continuous In-semester Evaluation: 10 Marks			
		Teacher Assessment: 10 Marks			
		End Semester Examination: 50 Marks			
	End Semester Examination (Duration): 02 Hrs				
Prerequisites	No Prerequisites				
		n fundamental concepts of Business Intelligence.			
Objectives	2. To learn analytics framework to support decision making in business				
4	intelligence.				
	Understanding Business Intelligence				
** **	The Challenge of Decision Making, What Is Business Intelligence?, The				
Unit-I	Business Intelligence Value Proposition, The Combination of Business and				
	Technology	(6 Hrs)			
	Business Intelligence	Technology Counterparts			
	Data Warehousing: What Is a Data Warehouse?, Data Marts and Analytical				
	Data, Organization of the Data Warehouse				
Unit-II	Enterprise Resource Planning: Distributing the Enterprise, First ERP, then				
Ont-H	Business Intelligence, The Current State of Affairs				
	Customer Relationship Management: CRM, ERP, and Business Intelligence				
	Customer Decisions, I	Decisions About Customers, Business Intelligence and			
	Financial Information	(6 Hrs)			
N N	The Spectrum of Bus	siness Intelligence			
y.	Enterprise and Depart	tmental Business Intelligence, Strategic and Tactical			
Unit-III	Business Intelligence	e, Power and Usability in Business Intelligence,			
	Finding the Right Sp	oot on the Continuum, Business Intelligence: Art or			
-	Science?	(6 Hrs)			

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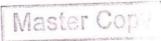




	Busines	s Intelligence User Int	erfaces		
Unit-IV	Queryin Approach Reports Access, Push-O	ng and Reporting, R ches: Building Ad-Hoo o, Enhancing and Mo	eporting and Queries, Building difying, Data Acashboards: EIS Is to	cess: Pull-Oriented	1 Data
	On-Li	ne Analytical Processi	ng (OLAP)		
Unit-V	Approx Thinki Drillin MOLA	COLAP and OLTP, Operation of the Application of the Color	ons and Functio o Dimensions, W AP Architecture: ng	nality, Multi-Dim hat Are the Possil	oilities?,
Unit-VI	Visua Busin	lization, Guided Analy lization: The Basics, I ess Intelligence Two- uctured Data	Unconstrained Vie	ws, Guided Analy	sis: The Handling (6 Hrs)
	Sr.	Title	Author	Publication	Edition
Textbooks / Reference		Decision Support and Business Intelligence Systems	Efraim Turban, Ramesh Sharda, Jay Aronson, David King	Pearson Education, 2009.	9 <sup>th</sup>
Books	2	The Savy Manager's Guide Getting Onboard with Emerging IT,	David Loshin, Business Intelligence	Morgan Kaufmann Publishers.	2009

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	(Faculty of Science & Technology)					
	Syllabus of T. Y. B. T	ech. (Civil Engineering) Semester VI				
Course Code:	MED391	Credits: 3-0-0				
Course: Open	Elective III (Industry 4.0)	Mid Semester Examination-I: 15 Marks				
Teaching Sch	ieme:	Mid Semester Examination-II: 15 Marks				
Theory: 3 Hrs	/week	Continuous Internal Evaluation: 10 Marks				
40		Teacher Assessment: 10 Marks				
		End Semester Examination: 50 Marks				
	End Semester Examination (Duration): 2 Hrs					
Course	1. To make students aware	of the structure and role of Industry 4.0, in current evolving				
Objectives	industrial environment.					
Objectives	2. To give learners overview	v of Industry 4.0 technologies and their integration.				
	Introduction- Four industria	I revolutions, Digital transformation of Industry and the fourth				
Unit I	industrial revolution, Scope of Industry 4.0, Automation pyramid and Industry 4.0,					
, cant i	Principles of Industry 4.0.					
		(6 Hrs)				
	Internet of Things (IoT)- Concept of IoT, IoT Architecture - Sensing layer, Network					
Unit II	layer, Data processing layer	, Application layer, Applications of IoT - for automobiles,				
	homes, etc. Internet of Service (IoS), Internet of Energy (IoE).					
		(6 Hrs)				
		.0 (1)- Augmented reality and Virtual Reality, 3D Printing,				
Unit III	Collaborative robots, Smart m	naterial handling, Smart sensors, Concept of smart products.				
		(6 Hrs)				
9		4.0 (2)- Machine learning, Introduction to Cyber Physical				
Unit IV		of Cyber Physical Systems, Digital twins, Machine vision,				
Character and a final barries are	Smart factory, Artificial intell	igence.				
		(6 Hrs)				
52722 9 5745 7424/		Data, Data Mining, Data Analytics, Cloud computing, Data -				
Unit V		n, Data analysis for optimal decision making, Digitalization of				
	the entire value chain.					

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Unit VI	Real-tin	ntions of Industry 4.0- In the supply-chain optimiza	tion, Digital performan		
3	consum	ption, Challenges in imple	menting Industry 4.0.		(6 Hrs)
49:	Sr. No.	Title	Author	Publication	Edition
	1	Industry 4.0 - the Industrial Internet of Things	Industry 4.0_ the Industrial Internet of Things	Industry 4.0_ the Industrial Internet of Things	.=
Textbook/	2	Industry 4.0-Managing The Digital Transformation	Alp Ustundag, Emre 'Cevikcan	Springer	1 <sup>st</sup>
Books	3	Automated  Manufacturing System	Hugh Jack	Lulu.com	7 <sup>th</sup>
	4	Industry 4.0- Opportunities Behind The Challenge	Dr. Mirjana Stankovic, Ravi Gupta and Dr. Juan E. Figueroa	UNIDO General Conference 2017	-
	5	Handbook of Ind.  Automation	Richard L. Shell Ernest L. Hall	CRC Press	1st

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#### (Faculty of Science & Technology) Syllabus of T. Y. B. Tech. (Civil Engineering) Semester VI Mid Semester Examination-I: 15 Marks Course Code: MED392 Mid Semester Examination-II: 15 Marks Course: OE-III Operations Research Continues Internal Evaluation: 10 Marks Teaching Scheme: Teacher Assessment: 10 Marks Theory: 03 Hrs/week End Semester Examination: 50 Marks End Semester Examination (Duration): 2 Hrs Credits: 3-0-0 1. To familiarize the students with formal quantitative approach to problem solving 2. To formulate real life engineering problems 3. To solve engineering problems using various Operations Research Techniques Objectives Introduction to Operations Research: Basics definition, scope, objectives, phases, models, applications and limitations of Operations Research. Unit-I (2 Hrs) Linear Programming Problem: Formulation of LPP, Graphical solution of LPP, Simplex Method, Artificial variables, Big-M method, two-phase method, degeneracy and unbound solutions. Unit-II (8 Hrs) Transportation Model: Transportation Problem: Formulation, solution, unbalanced Transportation problem. Finding basic feasible solutions - Northwest corner rule, least cost method and Vogel's approximation method. Optimality test - the stepping stone method or MODI method. Unit-III Degeneracy in Transportation Problem. (8 Hrs) Assignment Problem: Hungarian Method to solve Assignment Problem, Travelling Salesman as an Extension of Assignment Problem. (4 Hrs) Unit-IV

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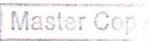




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	Queuing model and Sequencing model:						
Unit-V	Queuing Systems And Structures, Notation Parameters, Single Server and Multi Server						
	Models, Poisson Input, Exponential Service, Constant Rate Service, Infinite Population						
		ng Model: Introduction,					
	1 2	, two jobs through m mach					
	machines	, two joos unough in maci	mics and it jobs unou	gn m maeinnes.	(6 Hrs		
		, , , , , , , , , , , , , , , , , , ,					
	Network	Models: Fulkerson's rule	, concept and types o	f floats, float calcula	tions, CPN		
Unit-VI	and PER	Γ, Crashing cost and crash	ning Network.				
					(8 Hrs		
	Sr. No.	Title	Author	Publication	Edition		
				Prentice Hall Of	Ninth		
	1.	Operations Research	Taha H.A.	India.	Edition		
		Introduction to . Operations Research		Tata McGraw-Hill	Seventh		
	2.				Edition		
		Operations recover			Fourth		
Text Book/	3.	Operations Research	P.K. Gupta, D.S	S. Chand & Co.	Edition		
Reference			Hira				
	4.	Operations Research	Man Mohan, P.	S. Chand & Co.	12 <sup>th</sup>		
Books			K. Gupta, Kanti Swarup		Edition		
		5. Operations Research Principles and Practice	Ravindran, Phillips and	Estat Resilvation and a	Second		
				Mc. WSE Willey	Edition		
		Operations	Solberg		Fourth		
	6.	Research: Applications	Wayne L. Winston, Jeffrey	Thomson Brooks			
		and Algorithms	B. Goldberg		edition		
		Operations Research:	S. D. Sharma,	W. L. M. d. D.	Fourth		
#	7.	Theory, Methods and	Himanshu	Kedar Nath Ram Nath	Edition		
		Applications	Sharma	1 3 3 2 2 3	Third		
	8.	PERT and CPM: Principles and	L. S. Srinath	East-West Press	Constitution of		
		Applications	D. O. Dillium	Private Limited,	Edition		
	0	Project Planning and	Dr. B.C. Punmia	E' 1134 1	Fourth		
	9.	Control with PERT & CPM	& K.K. Khandelwal	Firewall Media	Edition		
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#### (Faculty of Science & Technology) Syllabus of T. Y. B. Tech. (Civil Engineering) Semester VI Credits: 3-0-0 Course Code: PPE391 Mid Semester Examination-I: 15 Marks Course: Open Elective III: Waste Management Mid Semester Examination-II: 15 Marks and Circular Economy Teaching Scheme: Continuous Internal Evaluation: 10 Marks Teacher Assessment: 10 Marks Theory: 3 hrs/week End Semester Examination: 50 Marks End Semester Examination (Duration): 2 Hrs Plastic materials, processing, rheology, basics of polymer technology and designing Prerequisite Objectives It aims to provide students with a comprehensive understanding of sustainable practices and the principles of the circular economy within the context of polymer engineering. Students will explore various strategies, technologies, and policies for achieving sustainability, reducing environmental impact, and promoting circularity in the polymer industry. The course will emphasize the importance of integrating sustainable principles in the design, production, and disposal of polymer materials. Topic Title: Introduction to Waste Management and Circular Economy Unit-I Definition and significance of sustainability in polymers, basics of waste management, principles and goals of the circular economy, environmental, social, and economic dimensions of waste management, life cycle thinking and assessment in plastics (4 Hrs) Topic Title: Waste generation, composition, and management Unit-II Sources and types of plastic and polymer waste, composition analysis and characterization of waste, quantification and assessment of waste generation, waste management and treatment

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methods: MSWM processing and plastics waste management comprising of waste hierarchy

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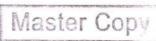


	i.e., 1	prevention, minimization, reus	se, recycling, energy	recovery, and disposal			
					(8 Hrs)		
Unit-III	Topi	ic Title: Sustainable Polyme	r Processing				
	Energy-efficient processing techniques, clean and green manufacturing practices, waste						
	redu	ction and recycling in polyme	er processing, sustain	able additives and proc	essing aids		
					(6 Hrs)		
Unit-IV	Topic Title: Sustainable Waste Management and Disposal						
	Was	te characterization and classis	fication in polymers,	mechanical recycling,	waste-to-energy		
+:	conv	version technologies, biologic	cal treatment method	is for polymer waste,	hazardous waste		
		agement and regulations, sust					
					(6 Hrs)		
Unit-V	Тор	ic Title: Circular Economy	Strategies				
	Desi	ign for recycling and upcy	cling principles, cl	osed-loop supply cha	ins and reverse		
	logis	stics, extended producer re	sponsibility and pr	oduct stewardship, ci	rcular economy		
		ness models and initiatives					
	ecor	nomy strategies					
					(6 Hrs)		
Unit-VI	Тор	ic Title: Policy and Regulat	ory Framework for	Sustainability			
	Inte	rnational and national police	eies promoting susta	ainability in polymers	, Environmenta		
	regu	ilations and standards for t	he polymer industr	y, corporate social re	esponsibility and		
	sust	ainability reporting, challeng	es, and opportunities	s in implementing susta	ainable practices		
	futu	are trends and emerging technic	ologies in sustainable	e polymer engineering			
					(6 Hrs		
Textbooks /	Sr.	Title	Author	Publication	Edition		
Reference	No.						
Books	1.	Waste Management and	OECD	OECD Publishing	1st Edition,		
		the Circular Economy in			2019		
		Selected OECD Countries					
85	2.	Plastics and Sustainability:	Michael Tolinski	Wiley	1st Edition		
w		Towards a Peaceful			2011		
		Coexistence between Bio-					
	4						

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		based and Fossil Fuel- based Plastics			
a e	3.	Plastics and Sustainability: Towards a Deeper Understanding of the Environmental Role of Plastics in Today's World	Conor P Carlin	Wiley-Scrivener	1 <sup>st</sup> Edition 2021
	4.	Strategic Management for the Plastics Industry: Dealing with Globalization and Sustainability	Jones, Roger F.	CRC Press	1st Edition 2013
	5.	Plastics in the Circular Economy	Vincent Voet, Jager, Rudy and Folkersma	De Gruyter	1 <sup>st</sup> Edition 2023
	6.	A Practical Guide to Plastics Sustainability: Concept, Solutions, and Implementation	Michel Biron	William Andrew Publishers	1 <sup>st</sup> Edition, 2020
	7.	Circular Economy and Waste Valorisation: Theory and Practice from an International Perspective	Jingzheng Ren, Long Zhang	Springer	1 <sup>st</sup> Edition, 2022

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#### (Faculty of Science & Technology)

#### Syllabus of T. Y. B. Tech. (Civil Engineering) Semester VI

Course Code: : CED371

Course: Lab: Environmental Engineering

Teaching Scheme: Practical: 02Hrs/week Credits: 0-0-1

Teachers Assessment: 25 Marks

Prerequisite	Fluid Mechanics, Basics of water resources engineering.	
Objectives	Knowledge of Environmental Engineering helps the engineers to analyse, think logically and pursue the engineering approach for the benefits of society and therefore desirable as an integral part of engineering education and training. This course acts as a foundation for water supply and sanitation engineering.	
	List of practical (Any 8):	
	Determination of pH using pH meter.	
	<ol><li>Determination of turbidity of water sample.</li></ol>	
	<ol> <li>Determination of alkalinity of given water sampleby titration method.</li> </ol>	
	<ol> <li>Determination of hardness of given water sampleby titration method.</li> </ol>	
	<ol> <li>Determination of chloride in a given water sampleby titration method.</li> </ol>	
Assigned Work	Visit to water treatment plant.	
	7. Determination of Total solids in sewage sample.	
	8. Determination of SVI.	
	9. Determination of COD and BOD @ 3 days and 5 days for given waste water	
	sample.	
	10. Visit to waste water treatment plant.	
	The assessment of term work shall be done based on the following:  Continuous Assessment.	
	Performing the experiments in the Laboratory.	

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#### (Faculty of Science & Technology)

#### Syllabus of T. Y. B. Tech. (Civil Engineering) Semester VI

Course Code: : CED372

Course: Lab: Highway Engineering

Teaching Scheme: Practical: 02Hrs/week Credits: 0-0-1

Teachers Assessment: 25 Marks

Prerequisite	None	
Objectives	Student would be able to perform various test related to highway engineering as would be able to develop to good highways in future	
Assigned Work	Term work shall be based on the following (any ten):  1. Aggregate Impact Test. 2. Aggregate Crushing Test. 3. Los Angles Abrasion Test. 4. Shape & Size Test: Flakiness Index & Elongation Index. 5. Specific Gravity & Water Absorption. 6. Penetration Test. 7. Softening Point. 8. Ductility Test. 9. Viscosity Test. 10. Flash & Fire Point Test. 11. Marshall Stability Test. 12. CBR Test. 13. Mixed Traffic Volume Study. (Fast and Slow vehicles) 14. Traffic Speed Study.	
	The assessment of term work shall be done based on the following:  Continuous Assessment.  Performing the experiments in the Laboratory.	

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	(Faculty of Science	& Technology)
	Syllabus of T. Y. B. Tech. (Civil	
Course Code Course: Labo Teaching Sci Practical: 2H	oratory of Design of RCC structure	Credits:1-0-0 Oral/Practical:25Marks
Objectives	Student will be able to identify industry design codes.	analysis and design of reinforced concrete
List of Practical	Part A: - TW shall consist of deta planning and designing of R.C.C state method. It shall include analy per IS-456-2000. The drawing imperial size sheets. Part B:-Any of the above two states latest R.C.C design software developed using excel.	residential/ public building (G + 2) by limit ysis and design of all structural members as shall be submitted on at least three full tructural components must be designed by like STAAD etc. or programs may also be ructural details with relevant Pictures of the submitted (If any)

The assessment of termwork shall be done based on the following.

- Continuous assessment
- Performing the experiments in the laboratory
- Oral examination conducted on the syllabus and termwork mentioned above.

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3	(Faculty of Science	& Technology)
	Syllabus of T. Y. B. Tech. (Civ	ril Engineering) Semester VI
Course Code: C Course: Labora Teaching Scher Practical: 2Hrs/	CED374 story Non Destructive Testing me: week	Credits:1-0-0 Oral/Practical:25Marks
Objectives	To understand and demonstrate various non-destructive test techniques and method for quality control of new construction as well as the inspection of existing concrete structures.	
List ofPractical	itscomparison with destr  2. Rebound hammer test to and itscomparison with of 3. Rebound hammer test to existingconcrete structur 4. Rebound hammer test to existing concrete structur core test. 5. Rebound hammer test to 6. UPV test to determine of 7. UPV test to determine of 8. UPV test to determine th 9. Rebar locator test to locate	determine compressive strength of concrete in re and its comparison with results obtained from determine compressive strength of brick.

The assessment of termwork shall be done based on the following.

- · Continuous assessment
- Performing the experiments in the laboratory
- Oral examination conducted on the syllabus and termwork mentioned above.







### (Faculty of Science & Technology)

### Syllabus of T. Y. B. Tech. (Civil Engineering) Semester VI

Course Code: CED375

Credits: 0-0-2

Course: Lab-V: Major Project-I

Teachers Assessment: 25 Marks

**Teaching Scheme:** 

End Semester Examination/Oral: 25 Marks

Practical: 04 H	irs/week	
Objectives	Solve a real life societal problem through research based approaches	
Course Outcome	Upon the completion of this course the students will be expected to:  1. Formulate an analytical model for an engineering problem and obtain its solution with necessary tools.  2. Perform and manage as an individual or as a member of a team with ethical values.  3. Examine the concepts of environment and sustainability.  4. Write effective reports and communicate effectively on civil engineering problems.  5. Present the conclusions in a way to benefit the society.	
Instructions to Students	Solving a real life problem should be the focus of under graduate projects. Facult members should prepare project briefs (giving scope and references) well in advance which should be made available to the students at the departmental level. The project structions	

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The state of the s	(An Autonomous Institute)
garage fractions	the mill goordinate the following.
	The department will appoint a project coordinator who will coordinate the following.
	1. Grouping of students (a maximum of 3/4 in a group)
	2. Allotment of projects and project guides
3	3. Project monitoring at regular intervals.
	All projects allotments are to be completed as given in the Academic Calendar.
	All projects will be monitored at least twice in a semester through students
Guidelines	presentation and will be conducted as per Academic Calendar.
	Distribution of marks for TA shall be as follows:
54	Problem Statement 10; Literature Review 10; Group formation and identification of
	individual responsibility10; Objective of Project activity 10; Knowledge of domain,
	technology and tools being used 10.
	For TA 50 Marks to be converted to 25 Marks.  Distribution of marks for ESE/Oral shall be as follows: Realization of project as per problem statement 10; Design & Testing 30; Documentation and Report Writing 20; Quality of Work 15; Performance in Question & Answers Session 15; Timely Completion of Project work 10  For ESE/Oral – 100 Marks to be converted to 25 Marks.  Efforts be made to carry out industry based/ Societal Projects. Problems can also be invited from the industries/Society to be worked out through undergraduate projects. In case of Interdisciplinary/Multidisciplinary Projects, as per the requirements, a greater number of Guides may be appointed.  A Joint committee of involved departments shall conduct the review of the students.  The students shall aim to promote their project work in project exhibitions/competitions, paper presentation/publication in reputed journals and conferences.  The relevance of project and implementation including details of attainment of POs and PSOs addressed through the projects with justification must be clearly stated.  Phases of Major Project - I:  Phase I: Need Statement, Literature Review, data collection, Problem Statement, Objectives, Scope, Analysis/Framework/ Algorithm  Phase II: Details of Hardware & Software, Methodology, and Implementation plan fo next semester.  Phase III: Submission of report of project work.

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