< Sri Krishna Institute of Technology, Bangalore>



COURSE PLAN

Academic Year 2019

Program:	B E – Electrical and Electronics Engineering
Semester:	5
Course Code:	17EE553
CourseTitle:	Estimation and Costing
Credit / L-T-P:	4/4-0-0
Total Contact Hours:	50
Course Plan Author:	Shweta B

Academic Evaluation and Monitoring Cell

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Note: Remove "Table of Content" before including in CP Book Each Course Plan shall be printed and made into a book with cover page Blooms Level in all sections match with A.2, only if you plan to teach / learn at higher levels

17EE553 : Electrical estimation and costing

A. COURSE INFORMATION1. Course Overview

Degree:	BE	Program:	EE
Year / Semester :	5	Academic Year:	2019-20
Course Title:	Electrical estimation and costing	Course Code:	17EE553
Credit / L-T-P:	3/6-2-0	SEE Duration:	180 Minutes
Total Contact Hours:	50	SEE Marks:	80 Marks
CIA Marks:	20	Assignment	1/Module
Course Plan Author:	Shweta B	Sign	Dt:
Checked By:		Sign	Dt:

2. Course Content

	Madula Contant	Topobina	Module	Dloops
Modul	Module Content	Teaching		Blooms
е	Dringiples of Estimation, Introduction to Estimation	Hours	Concepts	Level
	Principles of Estimation: Introduction to Estimation and Costing, Electrical Schedule, Catalogues Recording of Estimates, Labor Conditions, Purchase System, Purchase Enquiry and Selection of Appropriate Purchase Mode, Purchase Orders, Payment Of Bills, Tender Form, General Idea about IE Rule, Indian Electricity(IE) Act and IE Rules -29,30,45,46,47,50,51,54,55,77 and79 Determination of Required Quantity of Material, Determination of Cost Material and labor, Contingencies, Overhead Charges, Profit, Market Survey and Source Selection, Comparative Statement	10	Assessment of material quantities surveying	
2	Wiring: Introduction, Distribution of energy in a Building, Desirabilities of Wiring. Multi Strand Cables, Voltage Grading and Specification of Cables Main Switch and Distribution Board, Conduits and its accessories and Fittings. Lighting Accessories and Fittings, Types of Fuses, Earthing Conductor. PVC Casing and Capping, Conduit Wiring, Types of cables used in Internal Wiring, Internal Wiring: General rules for wiring, Design of Lighting Points (Refer to Seventh Chapter of the Textbook), Number of Points, Main Switch and Distribution Board and Size of Conductor. Current Density, Layout.	12	Distribution of Energy 2.lighting points	L4
3	Service Mains: Introduction, Types, Estimation of Underground and Overhead Service Connections. Design and Estimation of Power Circuits: Introduction, Important Considerations Regarding Motor Installation Wiring, Input Power, Input Current to Motors, Rating of Cables, Rating of Fuse, Size of Condit, Distribution Board Main Switch and Starter.	10	1.service connection 2.power circuits	L3
4	Estimation of Overhead Transmission and Distribution Lines: , Dead End Clamps, Positioning of Conductors and Attachment to Insulators, Jumpers, Tee-Offs, Earthing of Transmission Lines, Guarding of Overhead Lines, Clearances of Conductor From Ground, Spacing Between Conductors, Important Specifications, Estimation problems, Repairing and Jointing of Conductors.	12	1. Power lines 2.Erection	L4
5	Estimation of Substations: Main Electrical connection, Graphical Symbols for Various Types of Apparatus and Circuit Elements on Substation main Connection Diagram, equipment for Substation, Substation Auxiliaries Supply, Substation earthing, Single Line Diagram of Typical Substations.	12	1.Substation elements 2.single line diagram	L3

3. Course Material

Modul	Details	Available
е		
1	Text books	
	A course in Electrical installation estimation and costing- J B Guptha	In Lib, In dept
2	Reference books	
a	Electrical estimation,Management and economics- P M	In Lib,In dept
	Chandrashekharaiah	
b	Electrical wiring and estimation- Raghavendra rao	In Lib
	Electrical estimation and costing- Gangadhar Rao	
3	Others (Web, Video, Simulation, Notes etc.)	
	Prepared notes, Video	Available

4. Course Prerequisites

SNo	Course	Cour	se Name	Module / Topic / Description	Sem	Remarks	Blooms
	Code						Level
1		Basic	electrical	wiring	1		L3
		and					
		electro	nics				
2		Dc ma	chines	motors	3		L3

Note: If prerequisites are not taught earlier, GAP in curriculum needs to be addressed. Include in Remarks and implement in B.5.

B. OBE PARAMETERS

1. Course Outcomes

Module	COs	Teach.	Concept	Instr	Assessment	
# 17EE550.1	Understanding the purpose of	Hours	Assessment	Method Lecture	Method	Level
1/5553.1	Understanding the purpose of estimation and costing	05	of material	Lecture	Assignment and seminar	
	estimation and costing		quantities		CIA	Onderstand
17EE553.2	Analysis of market survey	05	Surveying	Lecture	Assignment	L4
					and seminar	Analyze
					CIA	
17EE553.3	List the methods of wiring and cables	04	Methods	Lecture	Assignment	L2
				PPT	and seminar	
17EE553.4	Explain the design of lighting points	08	Lighting	Lecture	Assignment	L3
	and circuits		points	/ PPT	211	Apply
17EE553.5			Service	Lecture	CIA	L3
	underground and overhead service mains		mains			Apply
175555	Analysis of design and estimation of	06	Power	ecture	Assignment	L4
1/22553.0	motor installation	00	cicuits	and	and	Analyze
	inotor instattation		Cicuits	Tutorial	CIA	Anatyze
17FF553.7	Analyze the estimation of overhead	06	Power lines	Lecture	Assignment	L4
-, ==555.7	transmission and distribution lines			PPT	and	Analyze
					CIA	,acy_0
17EE553.8	Examine the erection, repairing and	06	Repair	Lecture	Assignment	L4
	jointing of power lines				and	Analyze
					CIA	
17EE553.9	List out the substation symbols and	06	Symbols	Lecture	Assignment	L2
	electrical connections			PPT	and	Understand
					CIA	
17EE553.1		06	Single line	Lecture	Assignment	
0	equipments of substation		diagram	PPT	and	Analyze

L						CIA	
	-	Total	56	_	-	-	_

Note: Identify a max of 2 Concepts per Module. Write 1 CO per concept.

2. Course Applications

SNo	Application Area	CO	Level
1	Management of time and reduction of wastage of material in estimation	CO1	L3
2	Understanding market rates and comparing rates of materials	CO2	L4
3	Selection of methods of wiring and cables	CO3	L2
4	Determine lighting points and number of circuits	CO4	L3
5	Selection of service mains	CO5	L3
6	Determination of required rated inputs to the motor installation	CO6	L4
7	Erection of transmission and distribution lines	CO7	L4
	Cable jointing and repairing	CO8	L4
9	Understanding symbols required in substation installation	CO9	L2
10	Analysis of single line diagram of substation	CO10	L4

Note: Write 1 or 2 applications per CO.

3. Articulation Matrix

(CO - PO MAPPING)

module	Course Outcomes	Program Outcomes												
#	COs	PO1	РО	PO1	PO1	PO1	Level							
			2	3	4	5	6	7	8	9	0	1	2	
17EE553.1	Understanding the purpose of estimation and costing	Х												L2
17EE553.2	Analysis of market survey	Х	Х											L2
17EE553.3	List the methods of wiring and cables	X	X											L2
17EE553.4	Explain the design of lighting points and circuits	X	X	Х	Х	X								L3
17EE553.5	Develop the estimation of underground and overhead service mains		X	X	X	X			Х					L2
17EE553.6	Analysis of design and estimation of motor installation	X	×	X					×					L2
17EE553.7	Analyze the estimation of overhead transmission and distribution lines	X	X	X										L3
17EE553.8	Examine the erection, repairing and jointing of power lines				Х				Х					L2
17EE553.9	List out the substation symbols and electrical connections	X												L2
	Analysis of single line diagram, equipments of substation ion the mapping strength as 1, 2				Х				Х					L2

4. Mapping Justification

Mapping		Justification					
			Level				
CO	РО		L2				
CO1	PO1	Understanding the basic fundamentals of estimation and cositng	L2				
CO2	PO1	Undestanding the procedure of survey	L2				
CO2	PO2	Analysisng the market survey	L2				
CO3	PO1	Undestanding the types of cable and methods	L2				
CO3	PO2	Usage of suitable cable for particular current rating	L2				
CO4	PO1	Understanding the method of wiring for different case with standards	L3				
CO4	PO2	Analysis of wiring	L3				
CO4	PO3	Designing suitable wiring connection for different case	L3				
CO4	PO4	Finding the solution for complex wiring connections	L3				

CO ₄	PO5	Finding the cost effective method of wiring modern technique	L3
CO ₅	PO1	Knowledge of OV and UG transmission cables	L2
CO5	PO2	Analysing the method for transmission cable laying area	L2
CO5	PO3	Devolpment of transmission system according to requirement	L2
CO ₅	PO4	Using the knowlwdege of OV ang UG transmission cable estimating and costing is done	L2
CO ₅	PO5	Selecting appropriate standard cable to resolve the complexity implementation	L2
CO ₅	P08	Selecting and implementing appropriate method of service mains to maintain the beauty of city	L2
CO6	PO1	Understanding the basic fundamentals of motors and motor installation standards	L2
CO6	PO2	Analysing the complexity of installation of motors	L2
CO6	PO3	Design and estimating the motor installation pattern	L2
CO6	P08	Devolpment of motor intallation wiring diagrams accoerding to standards by maintaing precautionary measures	L2
CO7	PO1	Knowledge of over head transmission line and Distribution transmission line	L3
CO7	PO2	Analyze the estimation of overhead transmission and distribution lines	L3
CO7	PO3	Devolpment of overhead transmission and distribution lines	L3
CO8	PO4	Using the knowledge erection, repairing and jointing of power lines	L2
CO8	PO8	erecting, repairing and jointing of power lines using precautionary measures	L2
CO9	PO1	Basic knowledge of substaion components	L2
CO10	PO4	Analysing the complexity in single line diagram, equipments of substation by estimation	L2
CO10	P08	Using the standards estimating the substaion and selection of apropraite site	L2

Note: Write justification for each CO-PO mapping.

5. Curricular Gap and Content

SNo	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping

Note: Write Gap topics from A.4 and add others also.

Understanding symbols required in substation installation
Analysis of single line diagram of substation

6. Content beyond Syllabus

S No	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping

Note: Anything not covered above is included here.

C. COURSE ASSESSMENT

1. Course Coverage

Modul	Title	Teaching			f quest		Exam		CO	Levels
e#		Hours	CIA-1	CIA-2	CIA-3	Asg	Extra	SEE		
							Asg			
1	Principle of estimation	10	2	-	-	1	1	2	CO1,	L2, L3,
									CO2	L4
2	Internal wiring	12	2	-	-	1	1	2	CO3,	L2, L3
									CO4	
3	Service mains, Design and	10	-	2	-	1	1	2	CO5,	L3, L4
	estimation of power circuits								CO6	
4	Estimation of overhead	12	-	2	-	1	1	2	CO7,	L4
	transmission and distribution lines								C08	
5	Estimation of substation	12	-	-	4	1	1	2	CO9,	L2, L3,
									CO10	L4
-	Total	56	4	4	4	5	5	10	-	-

Note: Distinct assignment for each student. 1 Assignment per chapter per student. 1 seminar per test per student.

2.Continuous Internal Assessment (CIA)

Evaluation	Weightage in Marks	CO	Levels
CIA Exam – 1	15	CO1, CO2, CO3, CO4	L2, l3, l4, l2
CIA Exam – 2	15	CO5, CO6, CO7, C08	L3, L4, L4, L4
CIA Exam – 3	15	CO9, CO10	L2,L3, L4
Assignment - 1	05	CO1, CO2, CO3, CO4	L2, l3, l4, l2
Assignment - 2	05	CO5, CO6, CO7, CO8	L3, L4, L4, L4
Assignment - 3	05	CO9, CO10	L2,L3, L4
Seminar - 1			
Seminar - 2			
Seminar - 3			
Other Activities - define -		CO1 to Co9	L2, L3, L4
Slip test			
Final CIA Marks	20	-	_

Note: Blooms Level in last column shall match with A.2 above.

D1. TEACHING PLAN - 1

Divide and Conquer	Appr	16 Hrs
	Time:	
Course Outcomes	-	Blooms
The student should be able to:	-	Level
Understand the purpose of estimation and costing	CO1	L2
Survey of market rates and material quantities	CO2	L3, L4
Course Schedule	-	-
Module Content Covered	СО	Level
Introduction to Subject, course objectives and outcomes	C01	L2
Principles of Estimation: Introduction to Estimation and Costing,	C01	L2
Electrical Schedule	C01	L2
Catalogues, Recording of Estimates	C01	L2
Labor Conditions, Purchase System	C01	L2
Purchase Enquiry and Selection of Appropriate Purchase Mode,	C01	L2
Purchase Orders	C01	L2
Payment Of Bills	C01	L2
Tender Form	C01	L2
	Course Outcomes The student should be able to: Understand the purpose of estimation and costing Survey of market rates and material quantities Course Schedule Module Content Covered Introduction to Subject, course objectives and outcomes Principles of Estimation: Introduction to Estimation and Costing, Electrical Schedule Catalogues, Recording of Estimates Labor Conditions, Purchase System Purchase Enquiry and Selection of Appropriate Purchase Mode, Purchase Orders Payment Of Bills	Course Outcomes The student should be able to: Understand the purpose of estimation and costing Course Schedule Course Schedule Introduction to Subject, course objectives and outcomes Col Principles of Estimation: Introduction to Estimation and Costing, Col Catalogues, Recording of Estimates Col Purchase Enquiry and Selection of Appropriate Purchase Mode, Purchase Orders Col Payment Of Bills Col

10	General Idea about IE Rule	C01	L2
11	Indian Electricity(IE) Act and IE Rules	C01	L2
	-29,30,45,46,47,50,51,54,55,77 and79		
12	Determination of Required Quantity of Material	CO2	L3
13	Determination of Cost Material and labor	CO2	L3
14	Contingencies Charges	CO2	L2
15	Overhead Charges, Profit	CO2	L2
16	Market Survey and Source Selection	CO2	L4
17	Comparative Statement	CO2	L4
С	Application Areas	СО	Level
1	Management of time and reduction of wastage of material in estimation	CO1	L3
2	Understanding market rates and comparing rates of materials	CO2	L4
d	Review Questions	-	-
1	Define estimation?	CO1	L2
2	What is electrical schedule?	CO1	L2
3	How will you record estimation?	CO1	L2
4	What are skills estimator should have?	CO1	L2
5	List out the different types of purchase mode.	CO1	L2
6	What do you mean by contingencies charges?	CO ₂	L2
7	What are overhead charges?	CO ₂	L2
8	Define profit?	CO2	L2
9	What is market survey?	CO2	L4
_	F a stick a second		
е	Experiences	-	-
1		CO1	L2
2			
3		600	1.0
4		CO3	L3
5			

Title:	Divide and Conquer	Appr	10 Hrs
		Time:	
a	Course Outcomes	-	Blooms
-	The student should be able to:	-	Level
1	List the methods of wiring and cables	CO3	L2
2	Explain the design of lighting points and circuits	CO4	L3
b	Course Schedule	-	-
Class No	Module Content Covered	СО	Level
1	Wiring: Introduction	CO3	L2
2	Distribution of energy in a Building	CO3	L2
3	Desirabilities of Wiring	CO3	L2
4	Multi Strand Cables	CO3	L2
5	Voltage Grading and Specification of Cables, Main Switch and Distribution Board	CO3	L2
6	Conduits and its accessories and Fittings	CO3	L2
7	Lighting Accessories and Fittings	CO3	L2
8	Types of Fuses, Earthing Conductor	CO3	L2
9	PVC Casing and Capping, Conduit Wiring	CO3	L2
10	Types of cables used in Internal Wiring	CO4	L3
11	Internal Wiring: General rules for wiring	CO4	L3
12	Design of Lighting Points	CO4	L3
13	Number of Points	CO4	L3
14	Main Switch and Distribution Board and Size of Conductor. Current Density, Layout.	CO ₄	L3

С	Application Areas	СО	Level
1	Selection of methods of wiring and cables	CO3	L2
2	Determine lighting points and number of circuits	CO ₄	L2
	3 3.	•	L2
d	Review Questions	-	L2
1	What is wiring?	CO3	L2
2	What are the desirabilities of wiring?	CO3	L2
3	What is Voltage Grading and Specification of Cables.	CO3	L2
4	How will you select Main Switch and Distribution Board?	CO3	L2
5	Mention conduit accessories.	CO3	L2
6	List the types of fuses.	CO3	L2
7	List out the types of cables.	CO3	L2
8	Mention few general rules for electrical wiring.	CO4	L3
9	How will you design lighting points?	CO4	L3
10	Discuss size of conductor and ratings of main switch and distribution board.	CO4	L3
е	Experiences	-	-
1		CO1	L2
2			
3			
4		CO3	L3
5			

E1. CIA EXAM – 1

a. Model Question Paper - 1

Crs Cod	e:	17EE553	Sem:	5	Marks:	15	Time:	75	minute	S	
Cou	rse:	Electrical	Estimatior	n and Cost	ing						
-	-	Note: Ans	wer any 3	question	s, each carry e	qual ma	rks.		Marks	СО	Level
1	a				s purpose. Stat preparing an ir		portant facts, wl iring estimate.	hich	5	CO1	L1
	b		nates are				to record estima	ates	5	CO1	L2
	С	Explain dit	ferent mo	des of ten	nderina.				5	CO1	L3
					OR						
2	a				g diagram for a r, main switch a		installation shov oution board.	ving	6	CO3	L2
	b	Draw the electric circuit and estimate the quantity of material and total cost for PVC wiring system used in hall of 15m X 6m X 4.5m height. The hall is to be fitted with fan points and light points. Make your own assumptions for the number of fan and light points and other missing data's.					The own	9	CO4	L3	
3	a	Write sho		on a) Cont	ingencies b) G	uidelines	s for inviting ter	nder	5	CO1	L1
	b	Explain th		20 30 15 16	6 47 50				5	CO ₄	L2
	C	Explain co							5	CO2	L1
					OR				Ŭ		
4	а	What are	the gener	al rules to	be followed fo	r internal	l wiring.		5	CO ₄	L3
	b	b) The pla installation phase, 240 2.(b).Comp single lind Calculate cable. ii)	n of a res n in PVC OV, 50 Hz pany's me e diagran i) Total la Determina	idential bu wiring sys supply. ter will be n for ligh pad, Curre e the qua	uilding which is stem suitable e located in th ting and heat ent, length of	to be pr for conn e front \ ing circu casing & rials for	ovided with election to an AC Verandah. Draw uits on the ske cable, and size lighting. Assum	the etch.	10	CO4	L3

b. Assignment -1

Note: A distinct assignment to be assigned to each student.

Cris Code 17EE553 Sem S Marks \$ / 10 Times 90 - 120 minutes Course: Electrical Estimation and Costing Marks \$ / 10 Times 90 - 120 minutes Course: Electrical Estimation and Costing Marks \$ / 10 Marks \$ / 10	note.	A distinct assi	gnment to be assigned to each student. Model Assignment Questions			
Course Electrical Estimation and Costing Note Each Student to answer 2-3 assignments. Each assignment carries equal mark SNo USN	Crs C	ode: 17FF552	Model Assignment Questions Sem:	00 - 120 I	minute	
Note Sach student to answer 2-3 assignments Sach assignment carries equal mark.				0 1201	Tilliate	<u> </u>
SNO Signature			<u> </u>	rk		
1 IXT15EE003 Define estimation and state its purpose. 2 1KT15EE003 Explain different modes of tendering. 3 IXT15EE005 State the important facts, which an estimator should know for preparing an internal wiring estimate. 4 IXT15EE006 How estimates are recorded? Why is it convenient to record 5 CO1 L2 estimates on loose sheets? 5 1XT15EE019 Draw and explain neat wiring diagram for a house installation 5 CO4 L4 showing connections for energy meter, main switch and distribution board. 6 1XT15EE019 Write short notes on a) Contingencies b) Guidelines for inviting tender 7 1XT16EE001 Write short notes on a) Purchase order b) purchase objectives 5 CO1 L2 inviting tender 8 1XT16EE001 Explain how is quantity of material required for internal wiring 5 CO3 L4 determined? 9 1XT16EE001 Explain by giving examples the following terms 5 CO1 L2 involved what is meant by electrical schedule? 10 1XT16EE003 What is meant by global tendering, limited tendering and 5 CO1 L2 injure tendering? 11 1XT16EE004 What is meant by global tendering, limited tendering and 5 CO1 L2 Single tendering? 12 1XT16EE005 Side the objectives. functions and setup of a organisation 5 CO1 L2 1XT16EE005 Draw and explain neat wiring diagram for a house installation showing connections for energy meter, main switch and distribution board. 15 1XT16EE006 Explain the IE rules 29,30.45.46.47.50. 5 CO1 L2 1XT16EE006 Explain the IE rules 29,30.45.46.47.50. 5 CO1 L2 1XT16EE001 Explain the IE rules 45,46.47.50. 5 CO1 L2 1XT16EE001 Explain the IE rules 45,46.47.50. 5 CO1 L2 1XT16EE001 Explain the IE rules 45,46.47.50. 5 CO1 L2 1XT16EE001 Explain the IE rules 45,46.47.50. 5 CO1 L2 1XT16EE001 Explain the University of the processor of the inviting tender oppurphase enquiry and selection of appropriate pour board of the purchase order in the tender form in tender form in the processor of the purchase order in the purchase enquiry and selection of appropriate purchase mode 10 tender form in the purchase enquiry and selection of appropriate purchase mode 10 tender form in th	=				CO	Level
AKT16EE006 Explain different modes of tendering. 5 CO1 L3	-	<u> </u>		+		
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22 1KT16EE011 Explain by giving examples the following terms 1) purchase order 23 1KT16EE013 Explain purchase enquiry and selection of appropriate 5	20	1KT16EE008	Explain the IE rules ,45,46,47,50.	5	CO1	L2
1) purchase order ii) tender form iii) profit 23 1KT16EE013 Explain purchase enquiry and selection of appropriate 5 CO1 L2 purchase mode 24 1KT16EE013 Explain system of wiring. 5 CO3 L2 25 1KT16EE014 Give the objectives, functions and setup of a organization. 5 CO1 L2 26 1KT16EE014 Explain Guidelines for inviting tender. 5 CO1 L2 27 1KT16EE016 What are the factors to be considered for choice of wiring 5 CO3 L2 28 1KT16EE016 State the rules to be observed while inviting tenders. 5 CO1 L2 29 1KT16EE017 What is meant by spot tendering, open tendering and proprietary tendering? 30 1KT16EE017 What are the advantages and disadvantages of conduit 5 CO3 L2 Wiring? 31 1KT16EE018 State the important facts, which an estimator should know for 5 CO3 L2	21	1KT16EE011		5	CO1	L2
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iii) profit 23 1KT16EE013 Explain purchase enquiry and selection of appropriate purchase mode 24 1KT16EE013 Explain system of wiring. 25 1KT16EE014 Give the objectives, functions and setup of a organization. 26 1KT16EE014 Explain Guidelines for inviting tender. 27 1KT16EE016 What are the factors to be considered for choice of wiring system? 28 1KT16EE016 State the rules to be observed while inviting tenders. 29 1KT16EE017 What is meant by spot tendering, open tendering and proprietary tendering? 30 1KT16EE017 What are the advantages and disadvantages of conduit wiring? 31 1KT16EE018 State the important facts, which an estimator should know for 5 CO3 L2						
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25 1KT16EE014 Give the objectives, functions and setup of a organization. 5 CO1 L2 26 1KT16EE014 Explain Guidelines for inviting tender. 5 CO1 L2 27 1KT16EE016 What are the factors to be considered for choice of wiring 5 System? 28 1KT16EE016 State the rules to be observed while inviting tenders. 5 CO1 L2 29 1KT16EE017 What is meant by spot tendering, open tendering and 5 CO1 L2 30 1KT16EE017 What are the advantages and disadvantages of conduit 5 CO3 L2 31 1KT16EE018 State the important facts, which an estimator should know for 5 CO3 L2	24	1/T16EE012			CO2	La
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29 1KT16EE017 What is meant by spot tendering, open tendering and 5 CO1 L2 proprietary tendering? 30 1KT16EE017 What are the advantages and disadvantages of conduit 5 CO3 L2 wiring? 31 1KT16EE018 State the important facts, which an estimator should know for 5 CO3 L2	28	1KT16EE016		5	CO1	L2
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31 1KT16EE018 State the important facts, which an estimator should know for 5 CO3 L2			1		J	
preparing an internal wiring estimate.	31	1KT16EE018	State the important facts, which an estimator should know fo	5	CO3	L2
			preparing an internal wiring estimate.			

32	1KT16EE018	Draw and explain neat wiring diagram for a house installation showing connections for energy meter, main switch and distribution board.	5	CO3	L2
33	1KT16EE019	Explain comparative price statement.	5	CO2	L4
34	1KT16EE019	What is meant by spot tendering, open tendering and proprietary tendering?	5	CO1	L2
35	1KT16EE020	What is meant by global tendering, limited tendering and single tendering?	5	CO1	L2
36	1KT16EE020	What are the advantages and disadvantages of cleat wiring?	5	CO3	L2
37	1KT16EE021	State the rules to be observed while inviting tenders.	5	CO3	L2
38	1KT16EE021	Give the objectives, functions and setup of a organization.	5	CO1	L2
39	1KT16EE023	Explain different system of wiring.	5	CO3	L2
40	1KT16EE023	Write short notes on Contingencies, Guidelines for inviting tender, purchase order	5	CO1	L2
41	1KT16EE025	What are the important points to be considered while determining the size of conductor for internal wiring?	5	CO3	L2
42	1KT16EE025	What are the advantages and disadvantages of PVC casing and capping wiring?	5	CO3	L2
43	1KT16EE026	Explain the different types of electrical wiring.	5	CO3	L2
44	1KT16EE026	Explain the positioning of wiring accessories in the house.	5	CO3	L2
45	1KT17EE401	Give the objectives, functions and setup of a organization.	5	CO2	L2
46	1KT17EE401	How will you determine the number of points?	5	CO4	L4
47	1KT17EE403	Explain how is quantity of material required for internal wiring determined?	5	CO4	L4
48	1KT17EE403	What is meant by global tendering and single tendering?	5	CO1	L2

D2. TEACHING PLAN - 2

- 3		
Divide and Conquer	Appr Time:	16 Hrs
Course Outcomes	-	Blooms
The student should be able to:	-	Level
Develop the estimation of underground and overhead service mains	CO5	L2
Analysis of design and estimation of motor installation	CO6	L4
Course Schedule		
Module Content Covered	CO	Level
Introduction to Subject, course objectives and outcomes	CO5	L2
Service Mains: Introduction	CO5	L2
Types, Estimation of Underground and Overhead Service Connections.	CO5	L2
Design and Estimation of Power Circuits: Introduction	CO6	L4
Important Considerations Regarding Motor Installation Wiring	CO6	L4
Input Power	CO6	L4
	CO6	L4
	CO6	L4
		L4
		L4
Distribution Board Main Switch and Starter.	CO6	L4
Application Areas	СО	Level
Selection of service mains	CO5	L2
Determination of required rated inputs to the motor installation	CO6	L4
Review Questions		
List the types of service mains.	CO5	L2
	CO ₅	L2
What is overhead service connection?	CO5	L2
	Course Outcomes The student should be able to: Develop the estimation of underground and overhead service mains Analysis of design and estimation of motor installation Course Schedule Module Content Covered Introduction to Subject, course objectives and outcomes Service Mains: Introduction Types, Estimation of Underground and Overhead Service Connections. Design and Estimation of Power Circuits: Introduction Important Considerations Regarding Motor Installation Wiring Input Power Input Current to Motors Rating of Cables Rating of Fuse Size of Condit Distribution Board Main Switch and Starter. Application Areas Selection of service mains Determination of required rated inputs to the motor installation Review Questions List the types of service mains. What is underground service connection?	Divide and Conquer Course Outcomes The student should be able to: Develop the estimation of underground and overhead service mains CO5 Analysis of design and estimation of motor installation CO6 Course Schedule Module Content Covered Introduction to Subject, course objectives and outcomes CO5 Service Mains: Introduction CO6 Types, Estimation of Underground and Overhead Service Connections. Design and Estimation of Power Circuits: Introduction CO6 Important Considerations Regarding Motor Installation Wiring CO6 Input Power CO6 Rating of Cables CO6 Rating of Fuse CO6 Size of Condit CO6 Distribution Board Main Switch and Starter. CO6 Application Areas CO Selection of service mains CO5 Review Questions List the types of service mains. CO5 What is underground service connection? CO5 CO5 CO5 CO5 CO5 CO5 CO5 CO5

4	List out important considerations regarding motor installation.	CO6	L4
5	How will you determine the input power to a motor of given output and	CO6	L4
	efficiency?		
6	How will you determine the input current to a motor?	CO6	L4
7	Why the conduit enclosing PVC cables are usually run on surface rather	CO6	L4
	laying them in covered trenches?		
8	How the size of conduit for motor wiring is determined?	CO6	L4
9	How the rating of distribution board in motor installation is decided?	CO6	L4
10	How the current rating of main switch used in motor installation is	CO6	L4
	determined?		
е	Experiences	-	-
1			
2			
3			
4			
5			

D3. TEACHING PLAN - 3

Title:	Divide and Conquer	Appr	16 Hrs
		Time:	
a	Course Outcomes	-	Blooms
_	The student should be able to:	-	Level
1	List out the substation symbols and electrical connections	CO9	L2
2	Analysis of single line diagram, equipments of substation	CO10	L4
b	Course Schedule		
	Module Content Covered	СО	Level
1	Introduction to Subject, course objectives and outcomes	CO9	L2
2	Estimation of Substations	CO9	L2
3	Main Electrical connection	CO9	L2
4	Graphical Symbols for Various Types of Apparatus andCircuit Elements on Substation main Connection Diagram	CO9	L2
5	equipment for Substation	CO9	L2
6	Substation Auxiliaries Supply	CO9	L2
7	Substation earthing	CO9	L2
8	Single Line Diagram of Typical Substations.	CO10	L4
С	Application Areas	СО	Level
1	Understanding symbols required in substation installation	CO10	L3
2	Analysis of single line diagram of substation	CO9	L4
d	Review Questions	_	_
1	State any four types of substations according to the service.	CO10	L1
2	State the relative merits of indoor and outdoor substations.	CO10	L3
3	What are the factors governing the selection of site for substation?	CO9	L2
4	List out the equipment used in a substation.	CO9	L4
5	What are the functions of panels and firefighting equipment in a substation?	CO10	L2
6	What is flexible bus?	CO9	L5
7	Name the inter lockings provided with isolators.	CO9	L2
8	In what way is in isolator different from an air-break switch?	CO9	L3
9	Give the sequence of operation during opening and closing of a circuit.	CO9	L4
10	Why are isolators necessarily provided on the supply side of the circuit breakers?	CO9	L1
11	What is meant by a substation?	CO10	L4

е	Experiences	-	-
1			L2
2			
3			
4		CO9	L3
5			

E3. CIA EXAM – 3

a. Model Question Paper - 3

Crs	, 555								75	minutes		
Code	e:											
Cou	rse:	Electrical E	stimation ar	nd Costing								
-	-	Note: Answ	er any 2 qu	iestions, ead	ch carry equ	ıal maı	rks.			Marks	CO	Level
1	а	What is su	bstation? V	What are th	e functions	oh a s	subst	ation?		5	CO9	L2
	b		Estimate quantity of materials required for adding 132kv bay 132 kv grid substation.									L3
					OR							
2	а	write differe	ent types of	substation. I	Explain briet	ly.				7	CO9	L2
	b		with main	of material and trans	•						CO10	L3
3	а	What are the and explain		onsidered fo	or selection	of the	site fo	or a substati	ion	5	CO9	L2
			•	ired for 33/1 and 6 outp		or subs	tation	and draw k	еу	10	CO10	L3
					OR							
4	a	Give layout of an indoor substation and describe briefly the function each component used.							of	7	CO9	L2
	b	Estimate the quantity of material required and cost of installation of 132/33kv substation with main and transfer bus scheme having 2 X 2 MVA transformers.									CO10	L3

b. Assignment – 3

Note: A distinct assignment to be assigned to each student.

Note: A distinct assignment to be assigned to each student.												
				Model A	Assignment	Questions						
Crs C	ode:	17EE553	Sem:	5	Marks:	5 / 10	Time:	90 – 120	minute:	S		
Cour	se:	Electrica	l Estimation	and Costing								
Note	: Each	student	to answer 2-	3 assignmen	ts. Each assi	gnment car	ries equal m	ark.				
SNo	SNo USN Assignment Description								СО	Level		
1	1 1KT15EE003 What are the functions of a substation? What are the differen							nt 5	CO9	L2		
			types of sub	stations? Wr	ite short not	es on each	of them.					
2	1KT1	5EE003	Classify the	e substatior	is accordir	ng to the	service an	d 5	CO9	L3		
			construction	nal features.								
3	1KT1	5EE006	Compare in	door and out	door substa	tions.			CO9	L2		
4	1KT1	.5EE006		ngle line dia	_			_	CO10	L3		
				l the equipr								
				ne and two (66kv outgo	ing lines ar	nd two powe	er				
			transformer							ļ		
5	1KT:	15EE019	List out the	equipment us	sed in a sub	station.		5	CO9	L2		
6	1KT:	15EE019	What are th	e functions o	f panels and	d firefighting	ı equipment i	n 5	CO9	L2		
			a substation									
7	1KT16	SEE001	Name the in	ıter lockings _l	orovided wit	th isolators.		5	CO9	L2		
8	8 1KT16EE001 Classify the substation on the basis of nature of duties.								CO9	L2		
9 1KT16EE003 Compare indoor and outdoor substations.									CO9	L2		
10	1KT16	SEE003	What is s	substation?	What are	the fun	ctions oh	a 5	CO9	L2		

	1	substation?			
	AL/TACEFOOA	substation?		CO10	1.0
	1KT16EE004	Estimate quantity of materials required for adding 132kv bay at 132 kv grid substation.	5	CO10	L3
	1KT16EE004	Explain pole mounted substations.	5	CO9	L2
13	1KT16EE005	Give layout of an indoor substation and describe briefly the function of each component.	5	CO9	L2
14	1KT16EE005	Differentiate between the functions of an isolator and a circuit breaker.	5	CO9	L2
15	1KT16EE006	Make a list of the main component in a substation. Draw layout of a substation.	5	CO9	L2
16	1KT16EE006	What is necessity of substation in a power system?	5	CO9	L2
	1KT16EE007	Estimate the quantity of material required for the augmentation of 33kv grid substation of 500kva to 1000kva, 33/11kv grid substation.	5	CO10	L3
18	1KT16EE007	Classify the substation on the basis of importance.	5	CO9	L2
	1KT16EE008	Draw a single line diagram of a 220kv/66kv substation showing all the equipments. The station has one 220kv incoming line and two 66kv outgoing lines and two power transformers.	5	CO10	L3
20	1KT16EE008	write different types of substation. Explain briefly.	5	CO9	L2
21	1KT16EE011	Estimate the quantity of material required for installation of 132/33 KV substation with main and transfer bus scheme having 2*40 MVA transformers.	5	CO10	L3
22	1KT16EE011	What are the factors governing the selection of site for substation?	5	CO9	L2
23	1KT16EE013	List out the equipment used in a substation.	5	CO9	L2
24	1KT16EE013	What are the functions of panels and firefighting equipment in a substation?	5	CO9	L2
25	1KT16EE014	What is flexible bus?	5	CO9	L2
	1KT16EE014	Name the inter lockings provided with isolators.	5	CO9	L2
	1KT16EE016	In what way is in isolator different from an air-break switch?	5	CO9	L2
	1KT16EE016	Give the sequence of operation during opening and closing of a circuit.	5	CO9	L2
29	1KT16EE017	Why are isolators necessarily provided on the supply side of the circuit breakers?	5	CO9	L2
	1KT16EE017	What is meant by a substation?	5	CO9	L2
31	1KT16EE018	Classify the substation on the basis of nature of duties.	5	CO9	L2
32	1KT16EE018	List out the equipment used in a substation.	5	CO9	L2
33	1KT16EE019	What are the functions of panels and firefighting equipment in a substation?	5	CO9	L2
34	1KT16EE019	Name the inter lockings provided with isolators.	5	CO9	L2
	1KT16EE020	Classify the substation on the basis of nature of duties.	5	CO9	L2
	1KT16EE020	Estimate the quantity of material and cost for installation of 10MVA, 33/11KV substation.	5		L2
37	1KT16EE021	What are the factors considered for selection of the site for a substation and explain.	5	CO9	L2
38	1KT16EE021	write the material required for 33/11 KV outdoor substation and draw key diagram with one input and 6 output lines.	5	CO10	L3
39	1KT16EE023	Classify the substation on the basis of operating voltage.	5	CO9	L2
40	1KT16EE023	List out the equipment used in a substation.	5	CO9	L2
41	1KT16EE025	What are the functions of panels and firefighting equipment in a substation?	5	CO9	L2
42	1KT16EE025	Classify the substation on the basis of design.	5	CO9	L2
43	1KT16EE026	Classify the substation on the basis of nature of duties.	5	CO9	L2
44		Estimate the quantity of material and cost for installation of 10MVA, 33/11KV substation.	5	CO10	L3
45	1KT17EE401	State any four types of substations according to the service.	5	CO9	L2
	1KT17EE401	State the relative merits of indoor and outdoor substations.	5	CO9	L2
47	1KT17EE403	Give layout of an indoor substation and describe briefly the		CO9	L2
		function of each component used.			

48	1KT17EE403	Estimate	the	quantity	of	material	required	and	cost of	5	CO10	L3
		installatio	n of :	132/33kv	sub	station wit	th main an	ıd trar	nsfer bus			
		scheme h	aving	g 2 X 40 M	IVA	transform	ers.					

F. EXAM PREPARATION

1. University Model Question Paper

Cou	rse:	Electrical Estin	nation and					Month	/ Year	May ,	/2018
Crs (17EE553	Sem:	5		Marks:	100	Time:		180 minu	
-	Note	Answer all FIV	E full ques	tions. All	questic	ns carry	equal marks.		Marks	СО	Leve
1	а	what is the pur which an est estimate.	rpose of es	stimating	and co	sting? Sta	ate the impor	tant facts,	6	CO1	
	b	Briefly explain	the Purch	ase Funct	tions ar	nd Purcha	ise objective	S.	5		
	С	Write short r selection.	notes on	a) catalo	gues l	o) marke	t survey ar	nd source	5	CO2	
					OR						
-	а	Define tender.	Explain me	odes of te	enderin	g.			16 / 20	CO1	
	b	Write short no	tes on a) C	ontingen	cies b)	Guideline	s for inviting	tender.		CO2	
	С	Explain the IE	rules 29,30	,45,46,47,	,50.						
2	a	What are the g	general rule	es to be f	ollowe	d for inte	rnal wiring.		16 / 20	C03	
	b	The plan of a installation in phase, 240 V, (2.(b).Company single line dia Calculate i) Total load, C ii) Determine the Assume i) Hea	PVC wiring PVC wiring PVC wiring PVC wips with the second point of the second pvc wiring	g system bly is show vill be loc lighting gth of cas v of mater	n suitak wn in fig cated ir and h sing & c rials for	ole for conditions of the from	onnection to nt Verandah. ircuits on th I size of cable	an AC 1- Draw the ne sketch. e.			
_	<u>а</u>	Explain the diff	ferent type	s of wirin					16 / 20	CO ₃	
	<u>u</u>	Write a short r							10 / 20	CO ₄	
	C	Fig Q2(b) show with casing an the wiring plar (iii) find the ler cost.	vs the plar nd capping n (ii) propos	of reside wiring sy se load ca	ential b ystem o alculatio	calculate on	the followin	g: (i) show			
3	а	what are the disadvantages	•	pes of se	ervice d	connectio	n, list advan	tages and	16 / 20	CO ₅	
	b	Three ac, 3 ph in a workshop shown in fig.5(installed on th 1. Make a nead diagram indica used. Prepare 2. Calculate Lo Cable required efficiency 85%	The rated by The Parket by Star-de wall. It sketch of also a list cangth of Fed for each	d outputs elta starte the wiring e wiring c of materia IG condu motor, to	s of the ers supposed of the s	motors blied with with the num full specific for each	and their local each motor the help of short and size factions. motor, leng	ations are are to be single line of cables th of PVC			
					OR						
_	a b	List any 10 cor Find the mate located 10 me load = 3000 W	rial require eters away	ed for 1-P from po	hase o' le with	verhead : followin	service line d			CO ₅	

4	а	write the main components of overhead lines.	16 / 20	CO7	
	b	Estimate the quantity of material required and cost of 1km of overhead			
		11kV 50 Hz line using steel pole of 11meter and ACSR conductor of			
		6/1*2.59 mm with an average span of 120m.			
		OR			
-	а	Estimate quantity of materials required for adding 132kv bay at 132 kv	16 / 20	CO7	
		grid substation.			
	b	explain the testing and commissioning of over head distribution line.		CO8	
5	а	write different types of substation.	16 / 20	CO9	
	b	Estimate the quantity of material required for installation of 132/33 KV		CO1	
		substation with main and transfer bus scheme having 2*40 MVA		0	
		transformers.			
		OR			
	а	What are the factors considered for selection of the site for a substation	16 / 20	CO9	
		and explain.			
	р	write the material required for 33/11 KV outdoor substation and draw			
		key diagram with one input and 6 output lines.			

2. SEE Important Questions

Course) :	Electrical Estimation and Costing Month			
Crs Co		17EE553 Sem: 5 Marks: 80 Time:		180 m	inutes
		Answer all FIVE full questions. All questions carry equal marks.		-	
Modul e	Qno.	Important Question	Marks	СО	Year
1	1	what is the purpose of estimating and costing? State the important facts, which an estimator should know for preparing an internal wiring estimate.		CO1	2017
	2	Briefly explain the Purchase Functions and Purchase objectives.		CO1	2017
	3	Write short notes on a) catalogues b) market survey and source selection.		CO2	2017
	4	Explain the IE rules 29,30,45,46,47,50.		CO1	2017
	5	Define tender. Explain modes of tendering.		CO1	2017
		Write short notes on a) Contingencies b) Guidelines for inviting tender.		CO1	2017
2	1	What are the general rules to be followed for internal wiring.	16 / 20	CO3	2017
	2	The plan of a residential building which is to be provided with electric installation in PVC wiring system suitable for connection to an AC 1-phase, 240 V, 50 Hz supply is shown in fig 2.(b).Company's meter will be located in the front Verandah. Draw the single line diagram for lighting and heating circuits on the sketch. Calculate i) Total load, Current, length of casing & cable, and size of cable. ii) Determine the quantity of materials for lighting. Assume i) Heating load 2500 Watts. ii) Height of ceiling as 3.6 metres.		CO4	2017
	3	Explain the different types of wiring.		CO3	2017
	4	Write a short note on a)Fuse b) Cables		CO3	2017
		The plan of residential building which has to be wire up with casing and capping wiring system calculate the following: (i) show the wiring plan (ii) propose load calculation (iii) find the length of wire for wiring (iv) list the materials and find total cost.		CO4	2017
3	1	what are the different types of service connection, list advantages and disadvantages?	16 / 20	CO3	2017
	2	Three ac, 3 phase, 415 V, 50 Hz squirrel cage motors are to be installed in a workshop. The rated outputs of the motors and their locations are shown in fig.5(b). Star-delta starters supplied with each motor are to be installed on the wall. 1. Make a neat sketch of the wiring scheme with the help of single line		CO6	2017

		diagram indicating on the wiring diagram the number and size of cables used. Prepare also a list of material with full specifications. 2. Calculate Length of HG conduit pipe for each motor, length of PVC Cable required for each motor, total earth wire required. Assume motor efficiency 85% and power factor 0.8			
	3	List any 10 considerations regarding motor installation wiring.		CO5	2017
	4	Find the material required for 1-Phase overhead service line of a house located 10 meters away from pole with following loads: Light and fan load = 3000 Watts. (Assume missing data)		CO6	2017
					2017
4	1	write the main components of overhead lines.	16 / 20	CO7	2017
	2	Estimate the quantity of material required and cost of 1km of overhead 11kV 50 Hz line using steel pole of 11meter and ACSR conductor of 6/1*2.59 mm with an average span of 120m.		CO8	2017
	3	Estimate quantity of materials required for adding 132kv bay at 132 kv grid substation.		CO8	2017
	4	explain the testing and commissioning of over head distribution line.		CO7	2017
					2017
5	1	write different types of substation.	16 / 20	CO9	2017
	2	Estimate the quantity of material required for installation of 132/33 KV substation with main and transfer bus scheme having 2*40 MVA transformers.		CO10	2017
	3	What are the factors considered for selection of the site for a substation and explain.		CO9	2017
	4	write the material required for 33/11 KV outdoor substation and draw key diagram with one input and 6 output lines.		CO10	2017

G. Content to Course Outcomes

1. TLPA Parameters

Table: TLPA - Example Course

Mc							Assessmen
du	(Split module content into 2 parts which have						t Methods
e-	similar concepts)	g Hours		ı			to Measure
#			for	Leve	Learning	Learning	Learning
			Content	l			
Α	В	С	D	Ε	F	G	Н
1	1 Principles of Estimation:	3	- L1	L2		-	-Unit Test
	Introduction to Estimation and		- L2		Rememb		
	Costing, Electrical Schedule,				ering		Assignment
	Catalogues Recording of Estimates,				- 		
	Labor Conditions, Purchase System,				Explainin		
	Purchase Enquiry and Selection of				9		
	Appropriate Purchase Mode,						
	Purchase Orders, Payment Of Bills,						
	Tender Form,						
1	General Idea about IE Rule, Indian	11	- L1	L2	_	_	-Unit Test
	Electricity(IE) Act and IE Rules		- L2		Rememb	Lecture	-
	-29,30,45,46,47,50,51,54,55,77				ering		Assignment
	and79 Determination of Required				-		
	Quantity of Material, Determination of				Explainin		
	Cost Material and labor,				g		
	Contingencies, Overhead Charges,						
	Profit, Market Survey and Source						
	Selection, Comparative Statement						
2	Wiring: Introduction, Distribution of	6	- L2	L3	_	_	-Unit Test
-	energy in a Building, Desirabilities of		- L3	_3	Understa	Lecture	-
	energy in a building, Desirabilities of		_5		o naciota		

	Wiring. Multi Strand Cables, Voltage				nding		Assignment
	Grading and Specification of Cables				- -		, toolgriiniene
	Main Switch and Distribution Board,				Calculate		
	Conduits and its accessories and						
	Fittings. Lighting Accessories and						
	Fittings, Types of Fuses, Earthing						
	Conductor. PVC Casing and Capping,						
	Conduit Wiring, ypes of cables used in Internal Wiring,		- L2	10			-Unit Test
	lnternal Wiring: General rules for	5	- L2 - L3	L3	- Understa	l ecture	-Onit rest
	wiring, Design of Lighting Points				nding	-	Assignment
	(Refer to Seventh Chapter of the				-		
	Textbook), Number of Points, Main				Calculate		
	Switch and Distribution Board and						
	Size of Conductor. Current Density,						
	Layout.	0		1 .			1 1.a.'t T - a.t
3	3 Service Mains: Introduction.	8	- L2 - L4	L4	- Understa	- Lectura	-Unit Test
	Types, Estimation of Underground				nding	-	Assignment
	and Overhead Service Connections.				-		
	Design and Estimation of Power				Explainin		
	Circuits: Introduction, Important				9 &analyzi		
	Considerations Regarding Motor				ng		
	Installation Wiring, Input Power, Input Current to Motors,	4	- L2		_	_	-Unit Test
	Rating of Cables, Rating of Fuse, Size	4	- L2 - L4	L4	_ Understa	Lecture	
	of Condit, Distribution Board Main				nding	-	Assignment
	Switch and Starter.				-		
					Explainin		
					9 &analyzi		
					ng		
4	Estimation of Overhead Transmission	4	- L1 - L2	L2	- Rememb	l octuro	-Unit Test
	and Distribution Lines:, Dead End				ering	Lecture	Assignment
	Clamps, Positioning of Conductors				-		
	and Attachment to Insulators,				Explainin		
	Jumpers, Tee-Offs, Earthing of				g		
	Transmission Lines,			1 .			11
4		8	- L2 - L4	L4	- Understa	l ecture	-Unit Test
	Guarding of Overhead Lines,				nding		Assignment
	Clearances of Conductor From				-		
	Ground, Spacing Between				Explainin		
	Conductors, Important Specifications,				9		
	Estimation problems, Repairing and						
5	Jointing of Conductors.	6	- L2	<u>L4</u>	-	_	-Unit Test
		-	- L4	- т	Understa	Lecture	-
					nding	-	Assignment
	Estimation of Substations: Main				- Explainin	-	
	Electrical connection, Graphical Symbols for Various Types of				g		
	Symbols for Various Types of Apparatus andCircuit Elements on						
	Substation main Connection Diagram						
5	equipment for Substation, Substation	04	- L1	L2	-	-	-Unit Test
	Auxiliaries Supply, Substation		- L2		Rememb	Lecture	-

earthing, Single Line	Diagram	of	ering	_	Assignment
Typical Substations.			- Explainin	_	
			g		

2. Concepts and Outcomes:

Table: Concept to Outcome - Example Course

	Table : Concept to Outcome - Example Course									
Mo dul	Learning orOutcome	Identified Concepts	Final Concept	Concept Justification	CO Components (1.Action Verb,	Course Outcome				
e-	fromstudy of	from		(What allLearning	2.Knowledge,					
#	the Content	Content								
#		Content		Happened from the		Student Should be				
	or Syllabus			study of Content /	Methodology,	able to				
				Syllabus. Ashort	4.Benchmark)					
				word for learning or						
	,	,		outcome)						
Α	<u> </u>	J Colodo	K	L Data adiable as C	M	N				
1		Catalogue	Tender Form,			.Contingencies,				
	Estimation:	S "	General Idea			Overhead Charges,				
			about IE Rule,	of Material,		Profit, Market				
	to Estimation		Indian			Survey and Source				
			Electricity(IE)			Selection,				
		Labor	Act and IE			Comparative				
	Schedule,	Condition	Rules			Statement				
		S,	-29,30,45,46,4							
		Purchase	7,50,51,54,55,							
		System,	77 and79							
2	Wiring:		Conduits and		- Design of Lighting					
		Desirabilit	its	Capping, Conduit		Main Switch and				
	Distribution of	ies of	accessories		Seventh Chapter of	Distribution Board				
	energy in a	Wiring.	and Fittings.	cables used in	the Textbook),	and Size of				
	Building,	Multi	Lighting	Internal Wiring,		Conductor. Current				
		Strand	Accessories	Internal Wiring:		Density, Layout.				
		Cables,	and Fittings,	General rules for						
		Voltage	Types of -	wiring,						
		Grading	Fuses,							
		and	Earthing							
			Conductor.							
		on of								
		Cables								
		Main								
		Switch								
		and								
		Distributio								
		n Board,								
3	Service		Performance	Estimation of	Design and	Input Current to				
				Underground and	Estimation of Power					
				Overhead Service		Cables, Rating of				
				Connections.		Fuse, Size of Condit,				
	/ '	Overhead				Distribution Board				
		Service				Main Switch and				
		Connectio				Starter.				
		ns.			Installation Wiring,					
		113,			Input Power,					
1	Estimation		Performance	Earthing of		Important				
4		Dead	of	_		Specifications,				
	of	End	Transmission			Estimation				
	Overnead			Overhead Lines,		problems, Repairing				
	1141131111331	Clamps, Positionin	ui ICS	overneau Lines,		. 9				
						and Jointing of Conductors.				
	Distribution	y 01				Conductors.				
					i					

	Lines:,	Conducto					
		rs and					
		Attachme					
		nt to					
		Insulators,					
		Jumpers,					
		Tee-Offs,					
5	Estimation of	Graphical	andCircuit	main Connection	Substation	Single Line	Diagram
	Substations:	Symbols	Elements on	Diagram,	Auxiliaries Supply,	of	Typical
	Main	for	Substation	equipment for	Substation earthing,	Substations	i.
	Electrical	Various		Substation,			
	connection,	Types of					
		Apparatus					