# Semester- III Professional Core Theory Courses

Program Class, Sei Course C		(Government Hue	a Matomonious Institu			Walchand College of Engineering, Sangli							
Program Class, Ser Course C		AY 2024-25											
Program Class, Ser Course C	Course Information												
Class, Ser Course C	me	B. Tech. Electrica	ll Engineering										
Course C	Class, Semester Second Year B. Tech., Sem. III												
	Code	7EL201											
Course N	lame	DC Machines and	l Transformers										
Desired F	Requisites:	Fundamentals of	Electrical Engineeri	ng									
		1											
Tea	aching Scheme		Examination S	cheme	(Marks)								
Lecture	3 Hrs/week	MSE	ISE	E	SE 50	Total							
Tutorial	-	30	20		50	100							
			Cred	its: 3									
		Course	Objectives										
1 T	his course intends to pr	ovide basic concept	of DC machines at	nd trans	formers								
I II	intends to develop skil	ls to evaluate rating	s of DC machines a	nd trans	sformers for	various							
2   ar	polications.	is to evaluate rating	,5 of DC machines t	ind train	510111015 101	various							
$\frac{u_{\rm P}}{3}$ It	intends to solve proble	ms on DC machine	s and transformers.										
4 TI	his will help students to	o understand applica	ations of special pur	pose m	otors.								
	Course	Outcomes (CO) w	vith Bloom's Taxo	nomy L	evel								
At the end	d of the course, the stud	lents will be able to	,	•									
					Bloom's	Bloom's							
CO	Cours	e Outcome Statement/s			Taxonomy	Taxonomy							
						Description							
CO1 Ex	xplain the Construction nd transformers	n and working prin	ciples of DC mach	nines,	Π	Understanding							
<b>CO2</b> D	Describe the operation o	f special purpose m	achines		II	Understanding							
CO3 So	olve the numerical pro-	blems on DC mac	hines and single p	ohase	Ш	Applying							
tra	ansformers					rippiying							
<b>CO4</b> A	nalyse the performance	e of three phase tran	sformers		IV	Analysing							
Modulo		Madula	Pontonta			Uoung							
Module	DC Machines	Module				nours							
	Constructional Detai	ls: Construction of	DC machines EN	/F equa	ntion nower								
	flow diagram of D.C												
Ŧ	Armature Winding:	0											
1	Armature Reaction:	8											
	armature current and												
	and cross magnetizat	ion ampere turns, pr	inciple of compensation	ation, co	ompensating								
	winding and its use in	n machines.											
	D.C. Motors	6 . 1		1.6									
п	concept of back e.m.	$r_{\rm c}$ , characteristics of $r_{\rm c}$ Machin	D.C. motors, Metho	icionau	Brook tost	0							
11	Swinburn's test Hor	ng of D.C. Machini okinson's test Reta	ardation test Field	test on	DC series	0							
	motor.			test on	D.C. Series								
	Single Phase Transf	ormer											
III	Construction and ty	pe, EMF equation	n phasor diagram,	equiva	lent circuit,	7							
111	efficiency, losses, re	gulation, Experimen	ntal determination of	of equiv	alent circuit	/							
	parameters(O.C./S.C	. test) Voltage regul	ation, parallel operation	ation									
	Transformer Testin	g:		~									
	Testing of transforme	er as per IS, polarity	y test, heat run test,	Sumpn	er's test and								
<b>TT</b> 7	equivalent delta test.	Calculation of effic	iency.	at:E	tronoform	6							
IV		M ADDUCATIONS Re	ecuriter	transformer.	1								
II	<ul> <li>and cross magnetization ampere turns, principle of compensation, compensating winding and its use in machines.</li> <li>D.C. Motors</li> <li>Concept of back e.m.f., characteristics of D.C. motors, Method of speed controls, electro braking testing of D.C. Machines: Losses and efficiency, Break test, Swinburn's test, Hopkinson's test, Retardation test, Field test on D.C. series motor.</li> <li>Single Phase Transformer</li> <li>Construction and type, EMF equation phasor diagram, equivalent circuit, efficiency, losses, regulation, Experimental determination of equivalent circuit parameters(Q C /S C test) Voltage regulation, parallel operation</li> </ul>												

V	<b>Three phase transformer</b> Construction, single phase bank, polarity test, transformer winding, V-V connection and Scott connection, Vector Grouping YD1, YD11, DY1, DY11, DZ0, DZ 6, YZ1, YZ11. Parallel operation of three phase transformer, Three winding transformer.	6						
VI	<b>Special purpose motors</b> Universal motor, DC Servomotors, Permanent magnet DC motors, Stepper motors, Applications.	4						
Textbooks								
1	1 Ashfaq Husain, Haroon Ashfaq " <i>Electric Machines</i> ", Dhanpat Rai and Co, 3rd Edition, 2018.							
2	2 J. B. Gupta, "Theory and Performance of Electrical Machines", S. K. Kataria and Sons, 1st Edition, 2013.							
3	Kothari and Nagrath, "Electric Machines", McGraw Hill, 5th Edition, 2018							
	References							
1	Purkait and Bandyopadhyay "Electrical Machines", Oxford University Press, 1st	Edition, 2017.						
2	2 M. G. Say. " <i>The Performance and Design of Alternating Current Machines</i> ", CBS Publishers, 3rd Edition, 2004							
	Useful Links							
1	https://nptel.ac.in/courses/108/105/108105017/							

https://nptel.ac.in/courses/108/105/108105017/

CO-PO Mapping														
		Programme Outcomes (PO) PSO												
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3												2	
CO2		3												2
CO3		3												2
CO4		2												2
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The strength of mapping is to be written as 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO.

### Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

Syllabus Prepared By	Mr. M.S. Mahagaonkar/ Mr. S. S. Medhekar
Syllabus Checked By	Mrs. S. L. Shaikh

	Walchand College of Engineering, Sangli									
(Government Aidea Autonomous Institute)										
	Course Information									
Progr	Programme B Tech Electrical Engineering									
Class	Somostor		Second Year B T	ech Sem III						
Cours										
Cours	e Nome		Flectrical Circuit	Analysis						
Desire	d Requisi	tes•	Fundamentals of	Flectrical Engineering	σ					
Desire	u Kequisi		1 undamentals of		5					
	Teaching	Scheme		Examination Sch	neme (Marks)					
Lectu	re	3 Hrs/week	MSE	ISE	ESE	Total				
Tutori	ial	1 Hrs/week	30	20	50	100				
				Credit	s: 4					
		1	1							
			Course	Objectives						
1	This cou	rse intends to de	velop an understan	ding of the fundamen	tal laws and elen	nents of electric				
1	circuits.		I	U						
	It will m	ake students to l	earn a number of po	owerful engineering c	vircuit analysis te	chniques such as				
2	nodal and	alysis, mesh ana	lysis, theorems, sou	irce transformation ar	nd several metho	ds of simplifying				
	networks	5.								
3	It will m	ake students to a	nalyze the first and	second order transie	nt and steady stat	te response.				
4	The cour	se intends to int	roduce open circuit	, short circuit, transm	ission, hybrid pa	rameters and their				
-	interrelat	ionship.								
		Course	Outcomes (CO) v	vith Bloom's Taxono	omy Level					
At the	end of the	course, the stud	lents will be able to	,						
				Bloom's						
	O Course Outcome Statement/s Taxonom									
		Cours	se Outcome Staten	nent/s	Taxonom	y Taxonomy				
		KWI 1 Ohr	se Outcome Staten	nent/s	Taxonom Level	y Taxonomy Description				
C01	Use KCI	Cours	se Outcome Staten	nent/s	Taxonom Level	y Taxonomy Description Applying				
C01	Use KCI equivale	L, KVL and Ohn nt circuit for a el	n's law to obtain volectrical circuit.	nent/s oltage, current and	Taxonomy Level	y Taxonomy Description Applying				
CO1 CO2	Use KCI equivaler Use circ	L, KVL and Ohn at circuit for a el cuit theorems	se Outcome Staten n's law to obtain volectrical circuit. to obtain voltage, parameters for a ele	nent/s oltage, current and , current, power,circ	Taxonomy Level III Cuit III	y Taxonomy Description Applying Applying				
CO1 CO2 CO3	Use KCI equivaler Use circ equivaler Identify	L, KVL and Ohn nt circuit for a el cuit theorems nt and electrical	se Outcome Staten n's law to obtain volectrical circuit. to obtain voltage, parameters for a ele ponse of first and s	nent/s oltage, current and , current, power,circ ectrical circuit. econd order circuits	Cuit III	y Taxonomy Description Applying Applying Analyzing				
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CO1 CO2 CO3 CO4 Modu	Use KCI equivaler Use circ equivaler Identify Construc networks	Cours 2, KVL and Ohn at circuit for a el cuit theorems at and electrical the complete res t the parameters 5. Circuits 2's law, Kirchho ches, Loops, Vo	se Outcome Staten n's law to obtain volectrical circuit. to obtain voltage, parameters for a ele ponse of first and s of two port electric <b>Module (</b> off's law, Dependent obtage and current	nent/s oltage, current and , current, power,circ ectrical circuit. econd order circuits. cal circuits and Contents ent and independent division, Wye Delta	Taxonomy       Level       III       cuit     III       IV       IV       IV	y Taxonomy Description Applying Applying Analyzing Analyzing Hours				
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	Power in AC Circuits							
V	Instantaneous and Average Power, Maximum Average Power, RMS Value,	6						
	Apparent Power and Power factor, Complex Power, Mutual inductance, Dot	0						
	convention, Energy in coupled circuits.							
	Two Port Network							
	Impedance parameters, Admittance parameters, Hybrid parameters,							
VI	Transmission parameters, Series connection of two two-port network, Parallel	6						
	connection of two two-port network, Cascade connection of two two-port							
	network.							
	Textbooks							
1	C. K. Alexandar and M.O. Sadiku, "Fundamentals of Electric Circuits", McGraw Hill							
<sup>1</sup> Education, 7 <sup>th</sup> Edition,2022								
2	Hayt, Kemmerly, Durbin, "Engineering Circuit Analysis", TMH, 8th Edition, 201	2.						
2	McGraw Hill,							
<sup>5</sup> 5 <sup>th</sup> Edition, 2017.								
	References							
1	James W. Nilsson and Susan A. Riedel "Electric Circuits" Pearson, 11th Edition,	2018.						
2	L.P. Huelsman, "Basic Circuit Theory", Pearson, 3rd Edition, 2015.							
	Useful Links							
1	https://nptel.ac.in/courses/108/106/108106172/							
2	https://nptel.ac.in/courses/108/105/108105159/							
3	https://nptel.ac.in/courses/108/104/108104139/							

CO-PO Mapping														
	Programme Outcomes (PO)												PS	<b>50</b>
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3													
CO2	3													
CO3		3												
CO4		2												

The strength of mapping is to be written as 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO.

#### Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

Syllabus Prepared By	Mr. N.V. Patel
Syllabus Checked By	Mr. A.B. Patil

Walchand College of Engineering, Sangli						
(Government Aided Autonomous Institute)						
AY 2024-25						
Course Information						
Programme	B. Tech. Electrical Engineering					
Class, Semester Second Year B. Tech., Sem. III						
Course Code	7EL203					
Course Name	Analog and Digital Circuits					
Desired Requisites:	Desired Requisites: Basic Electronics Engineering					

Teaching	Scheme	Examination Scheme (Marks)						
Lecture	3 Hrs/week	MSE	ISE	ESE	Total			
Tutorial	-	30	20	50	100			
		Credits: 3						

Course Objectives						
1	This course aims to introduce students the basic features of operational amplifier.					
2	It intends to provide knowledge and experience for implementing simple electronic circuits to meet					
2	or exceed design specifications.					
3	It is aimed to enable students for implementing combinational logic circuits for various applications.					
4	It intends to provide knowledge for implementation of sequential circuits using flip-flops.					

 Course Outcomes (CO) with Bloom's Taxonomy Level

 At the end of the course, the students will be able to,

СО	Course Outcome Statement/s	Bloom's Taxonomy Level	Bloom's Taxonomy Description
C01	Summarize the fundamental principles underlying analog and digital circuits.	II	Understanding
CO2	Implement analog and digital circuits to meet stated applications	III	Applying
CO3	Construct basic analog filters, combinational and sequential circuits	III	Applying
CO4	Analyze the performance of analog and digital electronic circuits for a given application	IV	Analyzing

Module	Module Contents	Hours
Ι	<b>Fundamentals of Op-Amps</b> Characteristics of Ideal and practical Operational Amplifiers, Block Diagram, op-amp powering, feedback in op-amp circuits, inverting, non-inverting amplifiers, adder, subtractor, voltage comparator, difference amplifier, op-amp parameters & ratings	6
II	Applications of Opamps Instrumentation amplifier, Integrator, Differentiator, Schmitt trigger, Active filters using Opamps, Current to voltage convertor, voltage to current convertor, precision rectifier, peak detector, sample & hold circuit, Logarithmic Amplifier,	7
III	<b>Review of Transistor Configurations, Voltage Regulators and</b> <b>Multivibrators</b> Introduction, Types of Configuration: common base, common emitter and common collector configurations, Voltage regulators, fixed voltage regulators $(\pm 5 \text{ V}, \pm 12 \text{ V})$ , Adjustable voltage regulators, Multivibrators: IC 555 Astable, Monostable and Bistable	7
IV	<b>Combinational Circuits and Sequential Circuits</b> Multiplexer, de-multiplexer, priority encoder, half & full adders, Latches – S- R latch, D latch, flip-flops- D F/F, J-K F/F,T F/F, master slave J-K F/F, conversion of one F/F to another F/F.	7

V	Applications of Sequential circuits Counters: Modulus of Counter, Synchronous and Asynchronous counters, Ripple counters, drawbacks of ripple counters, Ring counters, Twisted Ring Counters, Shift registers, types of shift registers, design of shift registers using D, J-K FFs	б				
VI	<b>Digital to Analog and Analog to Digital Converters</b> Need of Digital to Analog and Analog to Digital Converters, Binary weighted DAC, R-2R ladder DAC, Ramp ADC, dual slope ADC, successive approximation technique, flash ADC, voltage and current measurement(block level treatment only).	б				
	Textbooks					
1	Sergio Franco, "Design with Op-Amps and analog Integrated Circuits", Ta Publication, Third Edition, 2001	ata McGraw-Hill				
2	Allen Mottershead, "Electronic Devices & Circuits: An Introduction", Prentice Hall India, 2010					
3	A. Anand Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, Fourth Edition, 2014					
	References					
1	R.A. Gayakwad, "Op-Amps & Linear Integrated Circuits", Prentice Hall India 2012.	, Fourth Edition,				
2	R. L. Boylestad and Louis Nashelsky, "Electronic Devices & Circuit T Publications, Tenth Edition, 2009.	'heory", Pearson				
3	M. Moris Mano and Michael Ciletti, "Digital Design", Pearson Publications, Fit	Tth Edition, 2013				
	Useful Links					
1	NOC: Analog Electronic Circuits, IIT Delhi https://nptel.ac.in/courses/108/102/1	08102112/				
2	NPTEL Analog Electronic Circuits, IIT Delhi https://nptel.ac.in/courses/108/10	2/108102095/				
3	NOC:Digital Electronic Circuits, IIT Kharagpur https://nptel.ac.in/courses/108/1	05/108105132/				

CO-PO Mapping														
	Programme Outcomes (PO)									PS	50			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3													
CO2			3											
CO3			3											
CO4		3												
The strength of mapping is to be written as 1: Low, 2: Medium, 3: High														
Each CO	- of the c		$\sum_{i=1}^{n} \sum_{j=1}^{n} \sum_{i=1}^{n} \sum_{i$											

Each CO of the course must map to at least one PO.

#### Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

Syllabus Prepared By	Dr. S. S. Karvekar
Syllabus Checked By	Mrs. A. A. Dhamangaonkar

# Professional Core Laboratory Courses

	Walchand College of Engineering, Sangli							
	(Government Aided Autonomous Institute)							
			Cours	e Information				
Prog	ramme		B. Tech. Electric	al Engineering				
Class	, Semester		Second Year B.	Fech., Sem. III				
Cour	se Code		7EL251					
Cour	se Name		DC Machines and	d Transformer Lab				
Desir	ed Requisi	tes:	Fundamentals of	Electrical Engineering	5			
		~ -	1					
D 4	Teaching	Scheme	T A 1	Examination Sci	heme (Mar	ks)	TT 4 1	
Pract		2 Hrs/ Week		LA2 20				
Intera	action	-		30	40		100	
				Creun	.5: 1			
			Cour	se Obiectives				
1	To devel	op skills to dem	onstrate performa	nce operation of DC m	otors.			
2	To devel	op skills to anal	lyze operation and	performance of DC m	achines usin	ng differe	nt tests.	
3	To analy	se the performa	nce of single phase	e transformer by condu	cting differ	rent tests.		
4	To perfo	rm different wi	nding connections	of three phase transfor	mers.			
		Cours	e Outcomes (CO)	with Bloom's Taxon	omy Level			
At the	e end of the	course, the stud	dents will be able t	0,				
GO		G			Bl	oom's	Bloom's	
CO		Cou	rse Outcome State	ement/s	Tax	konomy	Taxonomy	
<u>CO1</u>	Exporim	ant for yorif	Faction of diffe	rant abaractoristics	and	Level	Description	
	performa	ance of DC Mac	chines.	erent characteristics	and	III	Applying	
CO2	Experim	ent to calculat	te efficiency and	losses of DC moto	r by	IV	Analysing	
	conducti	ng different test	s.			1.	7 mary sing	
CO3	Determin	ne circuit paran	neters and voltage	regulation of single p	bhase	IV	Analysing	
CO4	Test the	performance of	three phase transfe	ormer		IV	Analysing	
		•	•		I			
List of Experiments / Lab Activities/Topics								
List of Lab Activities:								
<ol> <li>Speed control of dc snunt motor (1) Armature control method (11) Field control method.</li> <li>Determination of efficiency of DC motor by Swinburne's test</li> </ol>								
<ul> <li>Determination of efficiency of DC motor by Hopkinson's test</li> </ul>								
<ul> <li>4 Brake test on shunt motor to determine its performance and efficiency</li> </ul>								
4. Brake test on shunt motor to determine its performance and efficiency.								
5.	Load test o	n compound motor	otor i) cumulative i	ii) differential.				
5. 6.	Load test o To perform	n compound motor	otor i) cumulative i ad short circuit test	ii) differential. for determining equiv	alent circui	t paramet	ers of a single-	

- 7. Parallel operation of single-phase transformer to demonstrate load sharing.
- 8. Scott connections for converting 3 phase to 2 phase supply.
- 9. Equivalent Delta test or Heat run Test for determination of temperature rise and efficiency of 3 phase transformer.
- 10. Parallel connection of 3 phase DY1 and DY11 transformers to demonstrate load sharing.
- 11. Load test on transformer (single and three phase) to determine losses and efficiency using Sumpner's test.

	Taythooks							
	M. C. Soy, "The Derformance and Design of Alternating Current Machines" CDS Dublishers 2nd							
1	M. G. Say. The renormance and Design of Alternating Current Machines, CBS rubisners, Stu							
	Edition, 2004.							
2	O. E. Taylor, "Performance Design of AC Commutator motors", Wheeler Publisher, 15th Reprint.							
References								

1	Purkaitand Bandyopadhyay "Electrical Machines", Oxford University Press, 1st Edition, 2017.					
2	J. B. Gupta, "Theory and Performance of Electrical Machines", S. K. Kataria and Sons, 1st Edition,					
	2013.					
3	Fitzerald and Kingsley, "Electric Machines", Tata McGraw Hill, 7th Edition, 2007.					
4	Kothari and Nagrath, "Electric Machines", McGraw Hill, 5th Edition, 2018.					
Useful Links						

1

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CO-PO Mapping														
	Programme Outcomes (PO)										PS	50		
	1 2 3 4 5 6 7 8 9 10 11 12									1	2			
CO1			3											
CO2			3											
CO3					3									
CO4					3									
The stre	noth of	manni	na is to	he wri	tten as	$1 2 3 \cdot v$	where 1	· Low	2. Med	lium 3	High			

The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO, and preferably to only one PO.

Assessment								
There are three	There are three components of lab assessment, LA1, LA2 and Lab ESE.							
IMP: Lab ESE	is a separate head	of passing.(min 40 %), LA	1+LA2 should be min 40%					
Assessment Based on Conducted by Typical Schedule Marks								
	Lab activities,		During Week 1 to Week 8					
LA1	attendance,	Lab Course Faculty	Marks Submission at the end of	30				
	journal		Week 8					
	Lab activities,		During Week 9 to Week 16					
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30				
	journal		Week 16					
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19					
Lab ESE	journal/	External Examiner as	Marks Submission at the end of	40				
	performance	applicable	Week 19					
Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing								
experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the								
nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and								
related activitie	es if any.							

Syllabus Prepared By	Mr. M. S. Mahagaonkar
Syllabus Checked By	Mrs. S. L. Shaikh

Walchand College of Engineering, Sangli						
(Government Aided Autonomous Institute)						
AY 2024-25						
Course Information						
Programme	B. Tech. Electrical Engineering					
Class, Semester	Second Year B. Tech., Sem. III					
Course Code	7EL252					
Course Name Electrical Circuit Analysis Lab						
<b>Desired Requisites:</b>	Desired Requisites: Fundamentals of Electrical Engineering Lab					

Teaching	Scheme	Examination Scheme (Marks)						
Practical	2 Hrs/ Week	LA1	LA2	Lab ESE	Total			
Interaction	-	30	30	40	100			
		Credits: 1						

	Course Objectives							
1	This course intends to provide basic practical knowledge of electrical circuit analysis.							
2	It intends to develop skills to demonstrate transient and steady state res	ponse of first a	nd second order					
4	electrical circuit.							
3	It aims to develop an ability to simulate and implement various basic el	ectrical circuit	s.					
4	It will develop skills in students to build simple hardware circuits and a	nalyze it.						
	Course Outcomes (CO) with Bloom's Taxonomy I	Level						
At the	end of the course, the students will be able to,							
		Bloom's	Bloom's					

CO	<b>Course Outcome Statement/s</b>	Bloom's Taxonomy Level	Bloom's Taxonomy Description
CO1	Implement electrical circuits using simulations and hardware in order to obtain current, voltage and equivalent resistance.	III	Applying
CO2	Examine KCL, KVL and circuit theorems by building hardware circuit and simulations.	IV	Analyzing
CO3	Measure response of first order circuit with simulation and hardware.	V	Evaluating
CO4	Measure response of second order circuit with simulation and hardware.	V	Evaluating

### List of Experiments / Lab Activities/Topics

### List of Lab Activities:

- 1. Implementation of electrical circuits in software tool PSpice to measure current and voltage in D.C. circuit.
- 2. Verification of voltage and current division rule using hardware circuit.
- 3. Verification of Superposition Theorem to measure current and voltage in electrical circuit using hardware and validate the result using software tool PSpice.
- 4. Verification of Thevenin's Theorem to obtain equivalent circuit using hardware and validate the result using software tool PSpice.
- 5. Verification of Norton's Theorem to obtain equivalent circuit using hardware and validate the result using software tool PSpice.
- 6. Determine transient and steady state behaviour of a first order circuit (R-C circuit) on hardware and validate the results using software tool PSpice.
- 7. Determine transient and steady state behaviour of a second order circuit (R-L-C circuit) using software tool PSpice.
- 8. Demonstration of transient and steady state(underdamped and overdamped) behaviour of a second order circuit(R-L-C circuit) on hardware.
- 9. Implementation of electrical circuits in software tool PSpice to measure current and voltage in A.C. circuit.
- 10. Determine the active power of a A.C. circuit using software tool PSpice.

Textbooks

1	C. K. Alexandar and M.O. Sadiku, "Fundamentals of Electric Circuits", McGraw Hill Education, 7th Edition, 2022						
2	Hayt, Kemmerly, Durbin, "Engineering Circuit Analysis", TMH, 8th Edition, 2012.						
References							
1	James W. Nilsson and Susan A. Riedel "Electric Circuits" Pearson, 11th Edition, 2018.						
Useful Links							
1	https://nptel.ac.in/courses/108/105/108105153/						
2	https://nptel.ac.in/courses/108/105/108105064/						

	CO-PO Mapping													
	Programme Outcomes (PO)									PS	50			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1				2										
CO2				3										
CO3					2									
<b>CO4</b>					2									
T1		e		1		1 2 2		( T	2. 1.(	1: 2	TT: 1			

The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO, and preferably to only one PO.

		Assessment					
There are three components of lab assessment, LA1, LA2 and Lab ESE.							
IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%							
A	Develop		T				

Assessment	Based on	Conducted by	Typical Schedule	Marks
	Lab activities,		During Week 1 to Week 8	
LA1	attendance,	Lab Course Faculty	Marks Submission at the end of	30
	journal		Week 8	
	Lab activities,		During Week 9 to Week 16	
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30
	journal		Week 16	
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19	
Lab ESE	journal/	External Examiner as	Marks Submission at the end of	40
	performance	applicable	Week 19	

Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.

Syllabus Prepared By	Mr. N. V. Patel
Syllabus Checked By	Mr. A. B. Patil

Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)										
AY 2024-25										
Course Information										
Programme B. Tech. Electrical Engineering										
Class,	Semester		Second Year B. T	ech., Sem. III						
Cours	e Code		7EL253							
Cours	e Name		Analog and Digita	al Circuits Lab						
Desire	ed Requisi	tes:	Basic Electronics	Engineering						
	T 1.	G 1		<b>—</b> • • •	C 1					
	Teaching	Scheme	TAI	Examination	Scheme	(Marks)		TT 4 1		
Practi Intono	<u>cal</u>	2 Hrs/ week	20	LA2 20		ESE		100		
пиега	cuon	-	50		40 adite: 1	)		100		
					euns: 1					
			Cours	se Objectives						
1	This lab	course intends t	to provide basic pra	ctical knowledge	of various	ICs for de	velop	ing linear		
I	integrate	d circuits.	1 1	0			1	8		
2	It intends	s to impart skill	s to implement diffe	erent electronic cir	cuits usin	g operatior	nal an	nplifier.		
3	It aims to	o develop an ab	ility to simulate and	l implement combi	inational a	and sequen	tial ci	ircuits.		
4	This cou	rse will enable s	students to analyze	the characteristics	and beha	vior of ana	log ar	nd digital		
	circuits.	Cours	e Outcomes (CO)	with Bloom's Tax	konomy L	level				
At the	end of the	course, the stud	dents will be able to	о,						
						Bloom'	s	Bloom's		
CO		Cou	rse Outcome State	rse Outcome Statement/s			ny	Taxonomy Description		
CO1	Impleme	nt circuits to g	gain practical expe	rience in assembl	ing and			Applying		
	wiring bo	oth analog and o	ligital circuits	igital circuits						
C02	Illustrate	nt applications	of various analog a	erational amplifier				Applying		
	Develop	the ability to t	or various analog a	ts and accurately	measure			Apprying		
CO4	circuit pa	arameters to ver	rify it with empirica	al data	measure	III		Applying		
			List of Europinon	ta / Lab Astivition	Tonia					
List of	f Lab Acti	vities:	List of Experimen	ts / Lad Activities	/ I opics					
		villes.								
1.	Demonst	tration of the pe	rformance of opam	p in inverting conf	figuration	using opar	mp			
2.	Demonst	tration of the pe	rformance of opam	p in non-inverting	configura	ation and b	uffer	using opamp		
3.	Impleme	ntation of a diff	ference amplifier us	sing operational an	nplifier					
4.	Impleme	ntation of Instr	umentation Amplifi	ier using opamp						
5.	Construc	tion of Schmitt	Trigger using opar	np						
6.	Design o	of Summing, Av	eraging and Scalin	g Amplifier using	opamp					
7.	Design o	f a first order A	ctive Low Pass filt	er using opamp						
8.	Design o	t a first order A	ctive High Pass fill	ter using opamp						
9.	Illustrati	on of op-amp as	s zero crossing dete	ector & peak detect	or.					
10	Design	t half-adder and	d mana atahla mult	ogic gates	7 555					
12	. Design 0	$r_1$ the truth table	of D and IK flip fl	on	. 555					
13	. Demonst	rate the operati	on of decoder using	ор л IC74138						
14	. Demonst	rate the operati	on of multiplexor u	using IC74151						
15	. Construc	t ring and twist	ed ring counter usin	ng D flip-flops.						
			T	extbooks						
1	Sergi	o Franco, "De	sign with Op-Am	ps and analog In	tegrated	Circuits",	Tata	McGraw-Hill		
	Publi	cation, Third E	dition, 2001	erCinovita. A - Tot	no du oti	" Dranding	U_11	India 2010		
2	Allen	iviottershead,	Electronic Devices	s & Circuits: An Int	roauction	, Prentice	Hall	india, 2010		

3	A. Anand Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, Fourth Edition, 2014
	References
1	R.A. Gayakwad, "Op-Amps & Linear Integrated Circuits", Prentice Hall India, Fourth Edition,
1	2012.
C	R. L. Boylestad and Louis Nashelsky, "Electronic Devices & Circuit Theory", Pearson
Z	Publications, Tenth Edition, 2009.
3	M. Moris Mano and Michael Ciletti, "Digital Design", Pearson Publications, Fifth Edition, 2013
	Useful Links
1	NOC: Analog Electronic Circuits, IIT Delhi https://nptel.ac.in/courses/108/102/108102112/
2	NPTEL Analog Electronic Circuits, IIT Delhi https://nptel.ac.in/courses/108/102/108102095/
3	NOC:Digital Electronic Circuits. IIT Kharagpur https://nptel.ac.in/courses/108/105/108105132/

	CO-PO Mapping													
	Programme Outcomes (PO)								PS	<b>50</b>				
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1		3							3					
CO2			3						3					
CO3			3						3					
<b>CO4</b>				3					3					
TT1 /	.1 (	· ·	• ,	1 .		1 0 0		т	2.34	1. 2				

The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO, and preferably to only one PO.

Assessment								
There are three components of lab assessment, LA1, LA2 and Lab ESE.								
IMP: Lab ESE	is a separate head	of passing.(min 40 %), LA	1+LA2 should be min 40%					
Assessment	Based on	Conducted by	Typical Schedule	Marks				
	Lab activities,		During Week 1 to Week 8					
LA1	attendance,	Lab Course Faculty	Marks Submission at the end of	30				
	journal		Week 8					
	Lab activities,		During Week 9 to Week 16					
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30				
	journal		Week 16					
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19					
Lab ESE	journal/	External Examiner as	Marks Submission at the end of	40				
performance applicable Week 19								
Week 1 indicate	es starting week o	f a semester. Lab activities/	Lab performance shall include perfo	rming				
experiments, m	ini-project, presei	ntations, drawings, program	ming, and other suitable activities, a	s per the				

experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.

Syllabus Prepared By	Dr. S. S. Karvekar
Syllabus Checked By	Mrs. A. A. Dhamangaonkar

### **Mandatory Courses**

		Walc	hand College	of Engineering	g, Sangli							
	(Government Aided Autonomous Institute) AY 2024 -25											
			A 1 2 Course I	nformation								
Progre	amme		B Tech Electrics	l Engineering								
Class	Semester		Second Year B T	ech Sem III								
Cours	e Code		7MA203									
Cours	e Name		Mathematics for I	Electrical Engineer	ing							
Desire	d Requis	ites:	Engineering Math	ematics I and Eng	ineering Mathematics II							
	<u> </u>		888									
	Teaching	Scheme		Examination S	cheme (Marks)							
Lectur	re	3 Hrs/week	MSE	ISE	ESE	Total						
Tutori	ial	-	30	20	50	100						
				Crec	lits: 3							
			Course	Objectives								
1	To deve	lop Mathematica	l skills and enhance	e thinking power o	f students.							
2	To intro	duce fundamenta	l concepts of Math	ematics and their a	pplications in engineerin	g fields						
		Course	Outcomes (CO) w	ith Bloom's Taxo	nomy Level							
At the	end of the	e course, the stud	ents will be able to	,								
CO1	Apply the different	he Method of L	aplace transforms	to solve initial-val	lue problems for linear	Applying						
<u> </u>	Constru	tal equations with	for any periodic fur	otion by Fuler's F	ormulae	Applying						
C02	2Construct Found Series for any periodic function by Euler's FormulaeApp03Understand the solution of Nonlinear Partial differential equationUnder											
005	Underst			i unicientiai equat	1011	ding						
CO4	Underst	and the Fourier t	ransform and its pro	operties		Understan						
	Chacist		ansionin and its pro	speriles		ding						
CO5	CO5Use of basic knowledge of Z- transform to solve the problem in Signal systemApplying											
<b>CO6</b>	Apply V	arious probabilit	y distribution to fir	nd the probabilities	•	Applying						
Modu			Madula	Contonts		Hours						
WIUUU	I an	ace Transform	and Its Applicatio	ns		liouis						
	Defi	nition Transform	n of Standard func	tions Properties '	Transform of derivative							
I	and	Integral. Inverse	Laplace Transform	n. Convolution Th	eorem. Applications to	7						
	solve	e linear differenti	al equation									
	Fou	rier Series	1									
	Perio	odic functions, 1	Dirichlet's condition	ons, Definition, D	etermination of Fourier							
II	coef	ficients (Euler's	formulae), Expansi	ion of functions, E	Even and odd functions,	7						
	Char	nge of Interval and	nd functions having	g arbitrary period,	Half range Fourier sine							
	and	cosine series.										
	Part	ial differential e	equations and its A		,. , , ,	-						
	Parti	al differential eq	uations, Four stand	lard forms, applica	ition to one dimensional	6						
	Heat	equation.										
IV	Fou Dofi	ner Transform	ing and Cosing Int	agral Fourier sind	and Cosina transform	6						
1 V	Inve	rse Fourier sine a	and Cosine transfor	m Properties Pars	eval's Identity	0						
	Z-T	ansform		in, 110perires, 1 urs	eval 5 Identity.							
v	Defi	nition. Z- transfo	rm of standard fund	ctions. Properties o	f Z-transform, inverse Z	6						
	trans	form, Applicatio	n to difference equ	ation								
	Prot	ability Distribu	tion									
1/1	Ranc	lom variable,	discrete random	variable, continu	ous random variable,	7						
	prob	ability mass fu	nction, probability	density function	, Poisson distribution,							
	Norr	nal Distribution,	Exponential Distril	oution.								
			Tex	tbooks								
1	Adva	anced Engineerir	g Mathematics, Erv	win Kreyszig, Johr	Wiley& Sons,Inc,10 <sup>th</sup> E	dition,2017.						
2	A Te	ext Book Of App	blied Mathematics,	Vol I and II, P.N	. and J.N. Wartikar, Vid	yarthi Griha						

	Prakashan, Pune, 2010.
3	Higher Engineering Maths, B.S.Grewal, Khanna Publication, 44th Edition, 2017.
4	Fundamental of Mathematical Statistics, Gupta and Kapoor
	References
1	Higher Engineering Mathematics, B.V.Ramanna., Tata McGraw Hill Education Pvt. Ltd, 1 <sup>st</sup> Edition 2007.
2	Advanced Engineering Mathematics, H.K. Dass, S. Chand and company Ltd., 1 <sup>st</sup> Edition 1988.
3	An Introduction to probability and Statistics, V.K Rohatgi, Wiley Publication, 2 <sup>nd</sup> Edition 2008
4	
	Useful Links
1	https://www.youtube.com/watch?v=lkAvgVUvYvY
2	https://www.youtube.com/watch?v=c9NibpoQjDk

						CO-PC	) Mapp	oing						
				I	Program	mme C	utcom	es (PO	)				PS	50
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	1 2													
CO2	2													
CO3	2	2												
CO4	2													
CO5	2													
CO6	CO6 2													
The streng	The strength of mapping is to be written as 1: Low, 2: Medium, 3: High													
Each CO	Each CO of the course must map to at least one PO.													

#### Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

	Wa	alchand Coll	ege of Engineering	, Sangli								
	(Government Aidea Autonomous Institute) AY 2024-25											
		Co	A I 2024-25 urse Information									
Programme		All WCE Progr	amme									
Class. Semest	er	Second Year B.	Tech., Sem, III									
Course Code		7EE201										
Course Name		Understanding	Incubation and Entrepre	neurship								
<b>Desired Requi</b>	isites:		1	1								
Teaching	g Scheme		Examination Sc	heme (Marks)								
Lecture	03Hrs/week	MSE	ISE	ESE	Total							
Tutorial	-	30	20 Constitute 2	50	100							
			Credits: 3									
1	<b>T C</b> 11 1	Course Objectives										
	To familiarize the entrepreneurial framework and the start-up projects which help students to											
2	To develop an	entrepreneurial n	preneurial journey.	ging the journey	of transformation to							
2	convert an idea	10 develop an entrepreneurial mind-set thereby encouraging the journey of transformation to convert an idea or a solution into a business										
3												
	Cou	rse Outcomes (C	O) with Bloom's Taxo	nomy Level								
At the end of the	he course, the st	udents will be abl	e to,	·								
СО		Course Outcome	e Statement/s	Bloom's Taxonomy Level	Bloom's Taxonomy Descriptor							
CO1	Translate created opportunity	ative ideas into	o a sustainable busir	iess II	Understand							
CO2	Apply princip venture plannin	bles and practic ng to assess a bus	e of new entrepreneu iness idea	rial III	Apply							
CO3	Differentiate a	mong types of Bu	siness Models	IV	Analyze							
CO4	Evaluate decis in real life situ	ion making towa ations	rds establishing enterpr	ses V	Evaluate							
Module		Mod	ule Contents		Hours							
Ι	Introduction ( Hand holding Entrepreneuria Exploiting New	to Entrepreneur g for Entrepren l Mind-Set , Corj w Entries	ship neurship GDC start-u porate Entrepreneurship	p stories, The , Generating and	7							
П	<b>Innovation an</b> Methodology Presentation	<b>d Entrepreneur</b> for Innovation,	<b>ship Types</b> Team Building, Pro	olem Statement	6							
III	The Innovation ProcessInnovation and Entrepreneurship, Solar Oven case-study Paradigm shiftfrom Design to Entrepreneurship, Bio- Med Innovation andEntrepreneurship, Healthcare and Innovation, Human CenteredInnovation, Success Stories											
IV	Introduction to Business Mode to SINE Incuba	Introduction to IncubatorsBusiness Model Canvas, Technology led Entrepreneurship, Introduction to SINE Incubator, Lean Model Canvas SINE, Start-up Stories:7										
V	From Corpor Creativity and Network Entre	ate to Entrepren Generating Produ	eurship act Ideas, From Idea to F	roof of Concept,	7							

Textbooks         Textbooks         1       Disciplined Entrepreneurship: 24 Steps to a Successful Startup by Bill Aulet         2       The Essence of Medical Device Innovation by B Ravi         THE FORTUNE AT BOTTOM OF PYRAMID: Eradicating Poverty Through Profits by C.K.Prahalad Stay Hungry         References         1       Stay Foolish by Rashmi Bansal         2       The Entrepreneurial Connection: East Meets West in the Silicon Valley by Gurmeet Naroola         3       Innovation By Design: Lessons from Post Box Design & Development by B. K. Chakravarthy . Janaki Krishnamoorthi         4       Programme Outcomes (PO)       PSO         1       Stay Foolyment Programme Outcomes (PO)       PSO         1       CO-PO Mapping         CO1       1       Programme Outcomes (PO)       PSO         1       CO2       3       3       3       3         1       CO-PO Mapping       PSO         CO1       1       2       2         CO1<		VI Case Study Learning from examples Start up PITCHES Using Lean Canvas Model 6													6	
Textbooks1Disciplined Entrepreneurship: 24 Steps to a Successful Startup by Bill Aulet2The Essence of Medical Device Innovation by B Ravi3THE FORTUNE AT BOTTOM OF PYRAMID: Eradicating Poverty Through Profits by C.K.Prahalad Stay HungryReferences1Stay Foolish by Rashmi Bansal2The Entrepreneurial Connection: East Meets West in the Silicon Valley by Gurmeet Naroola Innovation By Design: Lessons from Post Box Design & Development by B. K. Chakravarthy , Janaki Krishnamoorthi45CO-PO MappingProgramme Outcomes (PO)PSO12345678910111212CO1345678910111212CO13345678910111212CO133333311CO2345678910111212CO13333331112CO2345678910111212CO3333333331The entrept of mapping is to be written as 1: Low, 2: Medium, 3: HighEach CO of the course must map to at least one PO			Lea	arning from examples Start-up PITCHES - Using Lean Canvas Model												
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C.K.Prahalad Stay HungryReferencesI Stay Foolish by Rashmi Bansal2The Entrepreneurial Connection: East Meets West in the Silicon Valley by Gurmeet Naroola3Innovation By Design: Lessons from Post Box Design & Development by B. K. Chakravarthy , Janaki Krishnamoorthi4		3	TH	E FOR	TUNE	AT B	OTTO	M OF	PYRA	MID:	Eradica	ating P	overty	Throug	n Prof	its by
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CO2       3       3       4       5       5       3		<u>CO1</u>		3								ļ				
CO3       3		CO2			3							ļ				
CO4       3       3       3       3       3         The strength of mapping is to be written as 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO.         Assessment         Code of the course must map to at least one PO.         Assessment         There are three components of lab assessment, LA1, LA2 and Lab ESE.         IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%         Assessment         Based on Conducted by Typical Schedule Marks         LA1       Lab activities, attendance, journal       Lab Course Faculty       During Week 1 to Week 8       30         LA2       Lab activities, attendance, journal       Lab Course Faculty       During Week 9 to Week 16       30         Lab ESE       Lab activities, journal       Lab Course Faculty and External performance       During Week 18 to Week 19       40         Lab ESE       Lab activities, journal/ performance       External Examiner as applicable       Marks Submission at the end of Week 19       40         Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any		CO3			3											
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Lab ESE       Lab activities, journal/       Faculty and External       Marks Submission at the end of Week 19       40         Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.				Jouri	181	т	ah Cau	#G.O.	Dumin	~ Weel	r 19 to	Waalt	10			
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			AY 2024-25							
		Со	urse Information							
Programme		All WCE Progr	amme							
Class, Semest	ter	Second Year B.	Fech., Sem. III							
Course Code		7VE201								
Course Name	9	Value Educatio	n							
Desired Requ	iisites:	Open mind and	a willingness to lea	ırn						
		1								
Teaching	g Scheme		Examinatio	on Scheme	e (Marks)					
Lecture	01Hrs/week	LA1	LA2	ES	E	Total				
Tutorial	02 Hrs/week	30	30	40	)	100				
			C	redits: -2						
	Course Objectives									
1	1 Develop holistic personal and professional skills by enhancing communication, emotional intelligence, and resilience to foster positive relationships and sustainable living practices.									
2 Promote ethical and sustainable leadership through the application of integrity, teamwork, and agrowth mindset to navigate success and failure while mastering effective presentation and communication skills.										
3	Empower life criticalthinkin development	elong learning and ng, and committin for addressing gl	l contribution by reand to contribution by reand to continuous sel obal challenges.	flecting on f-assessme	personal va ent and profe	lues, engaging in essional				
	Cou	rse Outcomes (0	CO) with Bloom's T	Гахопоту	v Level					
At the end of	the course, the s	tudents will be at	ole to,							
СО		Course Outcom	e Statement/s		Bloom's Taxonomy Level	Bloom's Taxonomy Descriptor				
C01	Learn effectiv relationship-l	ve communication building skills to pressonal and pro-	n, empathy, and foster positive		Ι	Remembering				
CO2	Incorporate s resiliencethro handle challe stewardship.	ustainable habits ough mindfulness onges and support	into daily life and b and stress manager environmental	wild nent to	Π	Understanding				
CO3	Develop goal manage succe presentations development	-setting and achie ess and failure, ar foroverall person	evement strategies, ad deliver impactful al and professional		III	Applying				
CO4	Strengthen ar solving techn tackle comple	nalytical skills and iques to make inf exissues in variou	d creative problem- formed decisions an as contexts.	ıd	IV	Analyzing				
Modulo		M	dule Contents			Hours				
Mouule	<b>T</b> 4 -	1.11	Suite Contents			110015				
Ι	5									
Π	Sustainable I Introduction to Community In	<b>Living</b> Sustainability, E volvement, Perso	nvironmental Impa nal Action Plan	ct, Sustain	able Practice	-s, 5				

III	<b>Inn</b> Unde Man	er Pea erstand agemen	<b>ce and</b> ing Inn nt, Buil	<b>Resilie</b> er Peac ding Re	e <b>nce</b> e, Min esilienc	dfulnes æ, Posi	s and M tive Mi	Ieditati ndset	on, Stre	ess			5	
IV	<b>The</b> Win Tea	e <b>Art o</b> nning N .mwork	f Winn Aindset and Lo	i <b>ng</b> , Goal eadersh	Setting nip, Cas	, Persev se Studi	verance ies and	and Ao Real-lit	laptabi fe Exan	lity, nples			5	
V	Suc Unc Min	<b>cess ar</b> lerstand ldset, B	n <b>d Fail</b> ding Su Balancir	ure Ma ccess a 1g Succ	anagen nd Fail cess and	<b>ient</b> ure, Le l Failur	earning re, Perso	from Fa	ailure, ( velopn	Growth nent Pla	in		5	
VI	<b>The</b> Intro Ver Imp	e <b>Art o</b> f oduction bal Controverment	<b>f Prese</b> on to Pr mmunic ent	ntatior esentat cation,	<b>1</b> ions, C Practic	ontent e and D	Organiz Delivery	zation, <sup>*</sup> v, Feedt	Verbal back an	and Nc d	on-		5	
Textbooks														
1	Step Edit	ohen R. tion, 20	. Covey )13.	, The 7	' Habits	s of Hig	ghly Eff	ective I	People,	Free P	ress, 25	thAnni	versary	7
2	2 Daniel Goleman, <i>Emotional Intelligence: Why It Can Matter More Than IQ</i> , Bantam Books, 10th Anniversary Edition, 2005.													
3 Carol S. Dweck, <i>Mindset: The New Psychology of Success</i> , Ballantine Books, Updated Edition, 2016.														
4 William McDonough and Michael Braungart, <i>Cradle to Cradle: Remaking the WayWe Make Things</i> , North Point Press, 1st Edition, 2002.														
5 Garr Reynolds, <i>Presentation Zen: Simple Ideas on Presentation Design and Delivery</i> , New Riders, 2nd Edition, 2011.														
References														
1	Cov	ey, S. I	R. (198	9). The	7 Hab	its of H	ighly E	ffective	People	e. Simo	n & Sc	huster.		
2	Ros Pres	enberg ss.	, M. B.	(2015	). Nonv	iolent	Сотти	nicatio	n: A Lo	anguag	e of Lij	fe. Pude	dleDan	cer
3	Car	negie, l	D. (199	8). <i>Ho</i> v	w to Wi	n Frien	nds and	Influen	ce Peo	<i>ple</i> . Sir	non &	Schuste	er.	
4	Cov	ey, S. I	R. (198	9). The	7 Hab	its of H	ighly E	ffective	People	e. Simo	n & Sc	huster.		
5	Ros Pres	enberg ss.	, M. B.	(2015)	. Nonv	iolent C	Commu	nicatior	ı: A La	nguage	of Life	. Puddl	eDance	er
	Use	ful Lin	nks											
1	https:	//ideas.	.ted.cor	n/how-	to-buil	d-close	r-relatio	onships	/					
2	https:	//www	.nation	algeogr	aphic.c	com/env	vironme	ent/artio	cle/sust	ainable	-living			
3	https:	//www	.lexisne	exis.in/	blogs/fa	amily-l	aw-in-i	ndia/						
4	https:	//www	.ncbi.n	m.nih.	gov/pm	c/articl	les/PM0	C89370	19/					
5	https:	//www	.ncbi.n	m.nih.	gov/pm	c/articl	les/PM	C87104	.73/					
					C	)-PO N	Aappin	g						
				]	Progra	mme C	Outcom	es (PO	)				PS	0
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	-	-	-	-	-	-	-	2	2	3	-	2		
CO2	CO2 2 3 2 2 2													
CO3	-	-	-	1	-	1	-	2	3	2	2	2		
CO4	-	-	-	3	2	2	2	2	2	2	3	2		
The strength of	of map	oing is	to be w	ritten a	s 1: Lo	w, 2: N	ledium	, 3: Hig	h	1	1			1
Each CO of th	Each CO of the course must map to at least one PO.													
			-			Assess	ment							

The assessment is based on LA1, LA2 and ESE.

LA1 shall be typically on modules 1 to 3.

LA2 shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be Tests, assignments, oral, seminar etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 30 - 40% weightage on modules 1 to 3 and 60 - 70% weightage on modules 4 to 6.

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)												
			Α	Y 2024-25									
			Cours	se Information									
Progra	amme		Second Year B.	Tech. Electrical									
Class,	Semester		Second Year B.	Fech., Sem III									
Cours	e Code		7CEEL251										
Cours	e Name		Community Eng	agement Project / F	Field Proje	ect							
Desire	d Requisi	tes:	NIL										
r	<b>Feaching</b>	Scheme		Examination	Scheme	(Marks)							
Practi	cal	2 Hrs/ Week	Lab H	ESE	Total								
Intera	ction	-	30	30	40	)	100						
				Cr	edits: 1	·							
			Cour	rse Objectives									
1	To condu	uct thorough co	mmunity needs as	ssessments and ana	lyze data	to identify s	pecific challenges						
1	and oppo	ortunities for en	gineering interven	tions.									
2	To apply	engineering p	principles, techniq	ues, and methodol	ogies effe	ectively to d	evelop innovative						
4	solutions	that address id	entified communit	ty needs.									
		Cours	e Outcomes (CO)	) with Bloom's Ta	xonomy ]	Level							
At the	end of the	course, the stu	dents will be able	to,									
				Bloom's	Bloom's								
CO		Cour	se Outcome State	ement/s		Taxonomy	Taxonomy						
						Level	Description						
CO1	Apply te	echnical knowl	edge and skills to	o develop and imp	Ш	Applying							
	commun	ity service proj	ects.			111	" PPI'J'II'S						
CO2	Identify	and analyze	community need	ls to design app	ropriate	e IV Analyzin							

CO3	Collaborate effectively with team members and community stakeholders to achieve project goals.	V	Evaluating
<b>CO4</b>	Reflect on the ethical, social, and professional implications of engineering projects within the community.	V	Evaluating
	List of Experiments / Lab Activities/Topics		
The C	ommunity Engagement Project/Field Project integrates academic lear	rning with cor	nmunity servic
allowii	ng Electrical Engineering (EE) students to apply their technical skills in	real-world sett	ings. This cour

The Community Engagement Project/Field Project integrates academic learning with community service, allowing Electrical Engineering (EE) students to apply their technical skills in real-world settings. This course aims to provide social responsibility, enhance problem-solving skills, and provide practical experience through direct involvement in community projects.

### List of Community Engagement Project / Field Project Activities:

engineering solutions.

- 1. Solar Power Installation for Community Centres: Design and install solar panels for local schools, libraries, or community centres to provide them with sustainable energy solutions.
- 2. Energy Audits for Local Homes and Businesses: Conduct energy audits to help residents and businesses identify ways to reduce energy consumption and costs.
- 3. Smart Lighting Systems: Develop and install smart lighting solutions for public parks or community areas to enhance energy efficiency and safety.
- 4. Water Purification Systems: Create and implement water purification systems in areas with limited access to clean drinking water.
- 5. Public Wi-Fi Networks: Set up free Wi-Fi hotspots in underserved areas to help bridge the digital divide.
- 6. Electric Vehicle Charging Stations: Design and install EV charging stations in public spaces to encourage the use of electric vehicles.

- 7. Assistive Technology for Disabled Individuals: Create custom electronic devices or systems to aid individuals with disabilities in the community.
- 8. Renewable Energy Workshops: Conduct workshops on building small-scale renewable energy projects, like wind turbines or solar chargers, to educate and empower the community.
- 9. Smart Irrigation Systems: Design and implement smart irrigation systems for community gardens or local farms to optimize water usage and improve crop yields.
- 10. E-Waste Recycling Program: Set up a program to collect and properly recycle electronic waste, educating the community on the importance of e-waste management.
- 11. Home Automation for Elderly: Install simple home automation systems for elderly residents to enhance their safety and convenience.

\*Note- Students must deliver a final presentation and submit a comprehensive report as the end of their project. The final presentation should be a concise, visually engaging slide deck that includes an introduction, methodology, results with data visualizations, discussion, and conclusion, followed by a Q&A session to address audience queries. Concurrently, students must submit a detailed report that documents every aspect of their project from start to finish. This report should adhere to the specified guidelines and include sections such as the title page, abstract, introduction, methodology, results, discussion, and conclusion, providing in-depth information and supporting evidence for the project's findings.

	Textbooks							
1	"The Engineer's Guide to Community Service" by Jim H. Anderson							
2	Teamwork and Project Management" by Karl A. Smith							
3	"Engineering Your Community: The Professional Practice of Engineering in Public Service" by							
5	David T. Wells							
1	Engineering Ethics: Concepts and Cases" by Charles E. Harris, Jr., Michael S. Pritchard, Michael							
4	J. Rabins, Ray W. James, and Elaine E. Englehardt							
	References							
1	Community-Based Participatory Research for Health: From Process to Outcomes" by Meredith							
1	Minkler and Nina Wallerstein							
2	Social Entrepreneurship: What Everyone Needs to Know" by David Bornstein and Susan Davis							
	Useful Links							
1	https://www.globalgiving.org/							
2	https://www.volunteermatch.org/							
3	https://www.councilofnonprofits.org/							

	CO-PO Mapping													
		Programme Outcomes (PO) PSO												
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3		3				3							
CO2		3		3					3					
CO3					3					3				
CO4						3		3			3	3		

The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO, and preferably to only one PO.

	Assessment										
There are three IMP: Lab ESE	There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%										
Assessment	Assessment Based on Conducted by Typical Schedule Marks										
LA1	Lab activities, attendance,	Lab Course Faculty	During Week 1 to Week 8 Marks Submission at the end of	30							
	Journal		Week 8								

	Lab activities,		During Week 9 to Week 16	
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30
	journal		Week 16	
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19	
Lab ESE	journal/	External Examiner as	Marks Submission at the end of	40
	performance	applicable	Week 19	
Week 1 indicate	es starting week o	f a semester. Lab activities/	Lab performance shall include perfor	ming
experiments, m	ini-project, presei	ntations, drawings, program	ming, and other suitable activities, as	s per the
nature and requ	irement of the lab	o course. The experimental l	ab shall have typically 8-10 experim	ents and
related activitie	s if any.			

Syllabus Prepared By	Dr. V. P. Mohale
Syllabus Checked By	Mr. A. N. Inamdar

Walchand College of Engineering, Sangli										
AY 2024-25										
Course Information										
Progra	amme		B. Tech. Electrica	al Engineering						
Class,	Class, Semester Second Year B. Tech., Sem. III									
Course Code 7VSEL251										
Course	e Name		Simulation Lab							
Desire	Desired Requisites: NIL									
r	<b>F</b> 14	~ •		<b>—</b> • •						
Dere ett	leaching s	Scheme	TA1	Examination	Scheme (	Marks)	T-4-1			
<b>Practic</b>		2 Hrs/ week	20	20			10tai			
Lectur	e	1			Hite. 2	)	100			
					unts. 2					
			Cours	se Objectives						
1	This cour	rse intends to pr	rovide basic knowl	edge of MATLAB	software	for developin	ng, modelling and			
	It intends	to impart skill	s to implement diff	erent tool boxes of	MATLA	B Simulink f	or electrical			
2	engineeri	ng application	s to implement uni	erent toor boxes of	.,		or creetiour			
3	To solve	electrical engin	eering problems w	ith different tool be	oxes of M	ATLAB Sin	ulink for			
4	To design	electrical syst	ems with MATLA	R Simulink softwar	re					
	10 design	Cours	e Outcomes (CO)	with Bloom's Tax	conomy L	evel				
At the	end of the	course, the stud	dents will be able to	0,	<b>v</b>					
со		Cou	rse Outcome State	ement/s		Bloom's Taxonomy	Bloom's Taxonomy			
CO1	Grasp the	hasic aspects	of MATLAB progr	amming		II	Understanding			
CO1	Solve sin	nple mathemati	cal equations using	MATLAB			Applying			
CO3	Construc	t MATLAB sof	tware-based project	cts.		IV	Analyzing			
CO4	Formulat	e electrical syst	tems using MATLA	AB.		VI	Creating			
			List of Exporimon	ts / Lab Activitios	/Topies					
List of	Lah Activ	vities·	List of Experimen	its / Lab Activities	/ Topics					
1.	Outline of	of MATLAB Pr	ogramming and Co	omputation of arith	metic, exp	oonential, tri	gonometric and			
	complex	form operation	using MATLB pro	ogramming.						
2.	Demonst	rate simple mat	rix and array mani	pulation using MA	TLAB.					
3.	Basic MA	ATLAB Progra	mming using contr	ol structures.						
4.	Outline t	a program for p MATLABS	nouing various gra	pns ( $2D$ and $5D$ ).						
5. 6	To study	different tool b	numic. oxes of electrical e	engineering						
7.	Solve ele	ectrical circuits	using MATLAB Si	imulink.						
8.	To study	Powergui bloc	k in MATLAB Sin	nulink.						
9.	To build	simple MATL	AB simulations using	ng power systems t	ool box.					
10	. To create	e simple MATL	AB based projects							
	(C) # 1			extbooks	(1. D. 1.1)		1 1. T. 1			
1	,Repr	int :2013	nation using MAT	LAB SIMULINK", W	ney Publi	cation, Dr. S	onaliendra Jain			
			n	oforoncos						
	"Matl	ab programmir	g for Engineers"	Stephen Chapman	Thomson	Learning pu	blication 3rd			
1	Editio	)n.			1 HOHISOII					
2	"Cont Learn	temporary linea	r systems using M.	ATLAB", Robert S	Strum and	Donald Kirl	x, Thomson			

3 "Power System Transient Analysis", Theory and Practice using simulation programs, Power System, Eiichi Haginomori Junichi Arai, WILEY Publication.

### **Useful Links**

MATLAB Programming for Numerical Computation: <u>https://nptel.ac.in/courses/103106118</u>

CO-PO Mapping													
	Programme Outcomes (PO) PS										50		
	1	1 2 3 4 5 6 7 8 9 10 11 12								1	2		
CO1	2				1								
CO2	1	2											
CO3			3		2								2
<b>CO4</b>	3	3		2									

The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO, and preferably to only one PO.

1

Assessment									
There are three components of lab assessment, LA1, LA2 and Lab ESE.									
IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%									
Assessment	Assessment Based on Conducted by Typical Schedule Ma								
	Lab activities,		During Week 1 to Week 8						
LA1	attendance,	Lab Course Faculty	Marks Submission at the end of	30					
	journal		Week 8						
	Lab activities,		During Week 9 to Week 16						
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30					
	journal		Week 16						
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19						
Lab ESE	journal/	External Examiner as	Marks Submission at the end of	40					
	performance	applicable	Week 19						
Week 1 indicate	es starting week o	f a semester. Lab activities/	Lab performance shall include perfo	rming					
experiments, m	ini-project, presei	ntations, drawings, program	ming, and other suitable activities, a	s per the					
nature and requ	irement of the lab	course. The experimental	ab shall have typically 8-10 experim	ents and					
related activitie	s if any.	_							
	·								

Syllabus Prepared By	Mr. S. S. Medhekar
Syllabus Checked By	Dr. R. P. Hasabe

# Semester- IV Professional Core Theory Courses

		Wal	chand College (Government Aided	of Engineering, Sa d Autonomous Institute)	ngli					
	AY 2024-25									
			Course 2	Information						
Progra	Programme B. Tech. Electrical Engineering									
Class,	Semester		Second Year B. T	ech., Sem IV						
Cours	e Code		7EL221							
Cours	e Name		AC Machines							
Desire	d Requisi	ites:	Fundamentals of I	Electrical Engineering, D	C Machines an	d Transformer				
	Teaching	Scheme		Examination Schem	e (Marks)					
Lectur	re	3 Hrs/week	MSE	ISE	ESE	Total				
Tutori	ial	-	30	20	50	100				
			'	Credits: 3	I					
			Course	Objectives						
1	This cou	rse intends to p	provide basic conce	pts of operation and per	formance of as	synchronous and				
2	It intend	s to develop imr	licational skill to or	perate asynchronous and	synchronous m	achines				
3	It intend	s to develop mit s to develop skil	to determine perfo	rmance asynchronous and	d synchronous	machines				
	Applicat	ions which will	be utilized in the	electrical machines with	its performan	ce and theory of				
4	operation	n	be duffized in the	cicculcal machines with	no performant	ee and meory of				
	operation	Course	e Outcomes (CO) w	vith Bloom's Taxonomy	Level					
At the	end of the	course, the stud	lents will be able to.	, ,						
		,			Bloom's	Bloom's				
CO		Cours	e Outcome Statem	ent/s	Taxonomy	Taxonomy				
					Level	Description				
CO1	Explain	the working	orinciple, construct	tion and operation of	п	Understanding				
	I I									
	asynchro	onous and synch	ronous machines			Charlistania				
CO2	asynchro Solve nu	onous and synch merical on asyn	ronous machines chronous and synch	ronous machines.	III	Applying				
CO2 CO3	asynchro Solve nu Analyze	onous and synch merical on asyn the performa	ronous machines chronous and synch nce of synchrono	ronous machines. us and asynchronous	III IV IV	Applying Analyzing				
CO2 CO3 CO4	asynchro Solve nu Analyze machine Assess n	onous and synch merical on asyn the performa s. machines as per j	ronous machines chronous and synch nce of synchrono performance analysi	ronous machines. us and asynchronous s requirement.	III IV V	Applying Analyzing Evaluating				
CO2 CO3 CO4	asynchro Solve nu Analyze machine Assess n	onous and synch merical on asyn the performa s. nachines as per j	ronous machines chronous and synch nce of synchrono performance analysi	aronous machines. us and asynchronous s requirement.	III IV V	Applying Analyzing Evaluating				
CO2 CO3 CO4 Modu	asynchro Solve nu Analyze machine Assess n	onous and synch merical on asyn the performa s. machines as per j	ronous machines chronous and synch nce of synchrono performance analysi Module C	aronous machines. us and asynchronous s requirement.	III IV V	Applying Analyzing Evaluating Hours				
CO2 CO3 CO4 Modu	asynchro Solve nu Analyze machine Assess n Ile	nous and synch merical on asyn the performa s. nachines as per j hronous Gener	ronous machines chronous and synch nce of synchrono performance analysi <u>Module C</u> ator	uronous machines. us and asynchronous s requirement. Contents	III IV V	Applying Analyzing Evaluating Hours				
CO2 CO3 CO4 Modu	asynchro Solve nu Analyze machine Assess n Ile Sync Cons	hronous and synch merical on asyn the performa s. hachines as per j hronous Gener truction, Princi	ronous machines chronous and synch nce of synchrono performance analysi <u>Module C</u> rator ple of operation, d	ronous machines. us and asynchronous s requirement. Contents	III IV V factor, Three	Applying Analyzing Evaluating Hours				
CO2 CO3 CO4 Modu	asynchro Solve nu Analyze machine Assess n Ile Sync Cons Phase	hronous and synch merical on asyn the performa s. hachines as per j hronous Gener truction, Princi e Winding (Sing	ronous machines chronous and synch nce of synchrono performance analysi <u>Module C</u> rator ple of operation, d gle layer, double lay	aronous machines. us and asynchronous s requirement. Contents distribution factor, pitch ver), Elimination of harm	III IV V factor, Three onics voltage,	Applying Analyzing Evaluating Hours 8				
CO2 CO3 CO4 Modu	asynchro Solve nu Analyze machine Assess n Ile Sync Cons Phase EMF	hronous and synch merical on asyn the performa s. hachines as per j hronous Gener truction, Princi e Winding (Sing equation, leaka	ronous machines chronous and synch nce of synchrono performance analysi <b>Module C</b> <b>ator</b> ple of operation, d gle layer, double lay age reactance, arma	ronous machines. us and asynchronous s requirement. Contents Listribution factor, pitch rer), Elimination of harm ture reaction, armature	III IV V factor, Three onics voltage, resistance and	Applying Analyzing Evaluating Hours 8				
CO2 CO3 CO4 Modu	asynchro Solve nu Analyze machine Assess n Ile Sync Cons Phase EMF react	hronous and synch merical on asyn the performa s. hachines as per j hronous Gener truction, Princi e Winding (Sing equation, leaka ance, field excit	ronous machines chronous and synch nce of synchrono performance analysi <b>Module C</b> rator ple of operation, d gle layer, double lay age reactance, arma ation system, dampe	aronous machines. us and asynchronous s requirement. Contents distribution factor, pitch ver), Elimination of harm ture reaction, armature re er winding	III IV V factor, Three onics voltage, resistance and	Applying Analyzing Evaluating Hours 8				
CO2 CO3 CO4 Modu	asynchro Solve nu Analyze machine Assess n Ile Sync Cons Phase EMF react	hronous and synch merical on asyn the performa s. hachines as per p hronous Gener truction, Princi e Winding (Sing equation, leaka ance, field excit	ronous machines chronous and synch nce of synchrono performance analysi Module C ator ple of operation, d gle layer, double lay age reactance, arma ation system, dampe chronous Generat	aronous machines. us and asynchronous s requirement. Contents distribution factor, pitch ver), Elimination of harm ture reaction, armature re- er winding or	III IV V factor, Three onics voltage, resistance and	Applying Analyzing Evaluating Hours 8				
CO2 CO3 CO4 Modu	asynchro Solve nu Analyze machine Assess n Ile Sync Cons Phase EMF react Perfo	hronous and synch merical on asyn the performa s. hachines as per j hronous Gener truction, Princi e Winding (Sing dequation, leaka ance, field excit prmance of Syn ulation of volta	ronous machines chronous and synch nce of synchrono performance analysi Module C rator ple of operation, d gle layer, double lay age reactance, arma ation system, dampe chronous Generate ge regulation by s	aronous machines. us and asynchronous s requirement. Contents distribution factor, pitch ver), Elimination of harm ture reaction, armature re- er winding or ynchronous Impedance	III IV V factor, Three onics voltage, resistance and method, zero	Applying Analyzing Evaluating Hours 8				
CO2 CO3 CO4 Modu	asynchro Solve nu Analyze machine Assess n ile Sync Cons Phase EMF react Perfo Calcu powe	hronous and synch merical on asyn the performa s. hachines as per j hronous Gener truction, Princip e Winding (Sing equation, leaka ance, field excit ormance of Syn ulation of volta	ronous machines chronous and synch nce of synchrono performance analysi <b>Module C</b> rator ple of operation, d gle layer, double lay age reactance, arma ation system, dampe chronous Generate ge regulation by s d, MMF method, e	aronous machines. us and asynchronous as requirement. Contents distribution factor, pitch ver), Elimination of harmature ture reaction, armature re- er winding or synchronous Impedance experimental setup for a	III IV V factor, Three onics voltage, resistance and method, zero bove method,	Applying Analyzing Evaluating Hours 8				
CO2 CO3 CO4 Modu	asynchro Solve nu Analyze machine Assess n Ile Sync Cons Phase EMF react Perfe Calcu power	hronous and synch merical on asyn the performa s. machines as per j hronous Gener truction, Princi e Winding (Sing equation, leaka ance, field excit ormance of Syn ulation of volta er factor methoo g, efficiency an-	ronous machines chronous and synch nce of synchrono performance analysi Module C ator ple of operation, d gle layer, double lay age reactance, arma ation system, damper chronous Generate ge regulation by s d, MMF method, e d losses, method of	aronous machines. us and asynchronous is requirement. Contents distribution factor, pitch ver), Elimination of harm ture reaction, armature re- er winding or synchronous Impedance experimental setup for a f synchronizing, synchron opfinite bus, power angle of	III IV V factor, Three onics voltage, resistance and method, zero bove method, nizing power,	Applying Analyzing Evaluating Hours 8				
CO2 CO3 CO4 Modu I	asynchro Solve nu Analyze machine Assess n Assess n Ile Sync Cons Phase EMF react Perfe Calcu powe ratin hunti	hronous and synch merical on asyn the performa s. machines as per p hronous Gener truction, Princi e Winding (Sing equation, leaka ance, field excit prmance of Syn ulation of volta er factor methoo g, efficiency and ng, damping op	ronous machines chronous and synch nce of synchrono performance analysi Module C ator ple of operation, d gle layer, double lay age reactance, arma ation system, damper chronous Generate ge regulation by s d, MMF method, e d losses, method of eration single and Ir curificance	aronous machines. us and asynchronous s requirement. Contents distribution factor, pitch ver), Elimination of harm ture reaction, armature re- er winding or synchronous Impedance experimental setup for a f synchronizing, synchro- onfinite bus, power angle of	III IV V factor, Three onics voltage, resistance and method, zero bove method, nizing power, equation, short	Applying Analyzing Evaluating Hours 8				
CO2 CO3 CO4 Modu I	asynchro Solve nu Analyze machine Assess n Assess n Cons Phase EMF react Perfe Calcu powe rating hunti circu	hronous and synch merical on asyn the performa s. machines as per p hronous Gener truction, Princip e Winding (Sing e quation, leaka ance, field excit ormance of Syn ulation of volta er factor methoo g, efficiency an- ng, damping op it ratio and its si Reaction Theor	ronous machines chronous and synch nce of synchrono performance analysi Module C rator ple of operation, d gle layer, double lay age reactance, arma ation system, dampe chronous Generata ge regulation by s d, MMF method, e d losses, method of eration single and Ir gnificance.	aronous machines. us and asynchronous as requirement. Contents distribution factor, pitch ver), Elimination of harm iture reaction, armature re- er winding or experimental setup for a f synchronizing, synchro- nfinite bus, power angle cou-	III III IV V factor, Three onics voltage, resistance and method, zero bove method, nizing power, equation, short	Applying Analyzing Evaluating Hours 8				
CO2 CO3 CO4 Modu I	asynchro Solve nu Analyze machine Assess n Ile Sync Cons Phase EMF react Perfe Calcu powe rating hunti circu Two	hronous and synch merical on asyn the performa s. machines as per p hronous Gener truction, Princip e Winding (Sing equation, leaka ance, field excit ormance of Syn ulation of volta er factor methoo g, efficiency an ng, damping op it ratio and its si Reaction Theor	ronous machines chronous and synch nce of synchrono performance analysi Module C ator ple of operation, d gle layer, double lay age reactance, arma ation system, dampe chronous Generata ge regulation by s d, MMF method, e d losses, method of eration single and Ir gnificance. y: Phasor diagram, s	aronous machines. us and asynchronous as requirement. Contents distribution factor, pitch ver), Elimination of harmature ture reaction, armature re- er winding or synchronous Impedance experimental setup for a f synchronizing, synchro- nfinite bus, power angle equi-	III III IV V factor, Three onics voltage, resistance and method, zero bove method, nizing power, equation, short ation, saliency	Applying Analyzing Evaluating Hours 8				
CO2 CO3 CO4 Modu I	asynchro Solve nu Analyze machine Assess n Ile Sync Cons Phase EMF react Perfe Calco powe rating hunti circu Two powe	hronous and synch merical on asyn the performa s. machines as per p hronous Gener truction, Princi e Winding (Sing equation, leaka ance, field excit ormance of Syn ulation of volta er factor methoo g, efficiency an- ng, damping op it ratio and its si Reaction Theory er.	ronous machines chronous and synch nce of synchrono performance analysi Module C ator ple of operation, d gle layer, double lay age reactance, arma ation system, dampe chronous Generate ge regulation by s d, MMF method, e d losses, method of eration single and Ir gnificance. y: Phasor diagram, s	aronous machines. us and asynchronous is requirement. Contents distribution factor, pitch ver), Elimination of harm ture reaction, armature re- er winding or synchronous Impedance experimental setup for a f synchronizing, synchro- offinite bus, power angle equi-	III III IV V factor, Three onics voltage, resistance and method, zero bove method, nizing power, equation, short ation, saliency	Applying Analyzing Evaluating Hours 8				
CO2 CO3 CO4 Modu I II	asynchroi Solve nu Analyze machine Assess n Assess n Cons Phase EMF react Perfe Calcu powe rating hunti circu Two powe	hronous and synch merical on asyn the performa s. machines as per p hronous Gener truction, Princi e Winding (Sing e equation, leaka ance, field excit ormance of Syn ulation of volta er factor methoo g, efficiency an- ng, damping op it ratio and its si Reaction Theory er.	ronous machines chronous and synch nce of synchrono performance analysi Module C ator ple of operation, d gle layer, double lay age reactance, arma ation system, dampe chronous Generate ge regulation by s d, MMF method, e d losses, method of eration single and Ir gnificance. y: Phasor diagram, torg	aronous machines. us and asynchronous s requirement. Contents distribution factor, pitch ver), Elimination of harm ture reaction, armature re- er winding or synchronous Impedance experimental setup for a f synchronizing, synchro- nfinite bus, power angle equi- ue and torque angle equi-	III IV V factor, Three onics voltage, resistance and method, zero bove method, nizing power, equation, short ation, saliency	Applying Analyzing Evaluating Hours 8 6				
CO2 CO3 CO4 Modu I II	asynchroi Solve nu Analyze machine Assess n Assess n Cons Phase EMF react Calco powe rating hunti circu Two powe Sync	hronous and synch merical on asyn the performa s. machines as per p hronous Gener truction, Princi e Winding (Sing e quation, leaka ance, field excit ormance of Syn alation of volta er factor methoo g, efficiency and ng, damping op it ratio and its si Reaction Theory er. hronous Motor	ronous machines chronous and synch nce of synchrono performance analysi <b>Module C</b> ator ple of operation, d gle layer, double lay age reactance, arma ation system, dampe chronous Generate ge regulation by s d, MMF method, e d losses, method of eration single and Ir gnificance. y: Phasor diagram, sor- hasor diagram, torque	aronous machines. us and asynchronous is requirement. Contents distribution factor, pitch ver), Elimination of harmature iture reaction, armature in er winding or synchronous Impedance experimental setup for a f synchronizing, synchron onfinite bus, power angle equa- ue and torque angle equa	III IV V factor, Three onics voltage, resistance and method, zero bove method, nizing power, equation, short ation, saliency	Applying Analyzing Evaluating Hours 8 6 5				

IV	<ul> <li>Three Phase Induction Motor</li> <li>a. Construction, Principle of operation: Phasor diagram, equivalent circuit, analysis based on approximate equivalent circuit, Torque equation, speed equation, speed torque curve,</li> <li>b. Slip ring Induction Motor: Effect of increase in rotor resistance, starting, speed control of motor.</li> <li>c. Speed control of Induction Motor: Change of supply frequency, pole changing, cascading, Injection of EMF in secondary.</li> </ul>	8
	d. Application and Testing: Testing as per I.S.S., Industrial applications of induction motor	
V	<ul> <li>Computations and Classification of Three Phase Induction Motor</li> <li>a. Computations: No load test, Blocked rotor test, and circle diagram, starting and types of starter, ratio of starting torque to full load torque.</li> <li>b. Double Cage Induction Motor (D.C.I.M.): Construction, Characteristics and Equivalent circuit.</li> <li>c. Synchronous Induction Motor: Construction, Circle diagram, Phasor diagram.</li> </ul>	8
VI	<b>Single Phase Induction Motor and, Three Phase Motor Winding</b> Single Phase Induction Motor: Types, Construction, Double revolving field theory, Principle of operation, phasor diagram, equivalent circuit, Experimental determination of parameter, application.	4
1		1076
1	M. G. Say. Performance Design of AC Commutator Motors", Wheeler Publis	1970. her 15th
2	Reprint.	ilei, 15tii
	References	
1	J. Chapman, "Electrical Machine", McGraw Hill, 5th Edition, 2009.	
2	P S Bimbhra, "Electrical Machinery", KHANNA PUBLISHERS, Seventh editio	n, 2021
3	J. B. Gupta, "Electrical Machines", SK Kataria and Sons, 3rd edition, 2011.	
4	Fitzerald and Kingsley,"Electric Machine", Tata McGraw Hill, 2nd Edition, 2000	).
	Useful Links	

1 Electrical Machines 2 NPTEL: <u>https://archive.nptel.ac.in/courses/108/105/108105131/</u>

	CO-PO Manning													
CO-FO Mapping														
		Programme Outcomes (PO) PSO												
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3													
CO2		3												3
CO3				2										3
<b>CO4</b>	3	2												
The stren	gth of r	nappin	g is to l	be writt	en as 1	: Low,	2: Med	ium, 3:	High					

The strength of mapping is to be written as 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO.

### Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

Syllabus Prepared By	Mr. S. S. Medhekar
Syllabus Checked By	Mrs. S. L. Shaikh

Walchand College of Engineering, Sangli						
(Government Aided Autonomous Institute)						
AY 2024-25						
Course Information						
Programme	B. Tech. Electrical Engineering					
Class, Semester	Second Year B. Tech., Sem. IV					
Course Code	7EL222					
Course Name	Electrical Transmission and Distribution					
<b>Desired Requisites:</b>	Electrical Circuit Analysis, D.C. Machine and Transformers					

Teaching	Scheme	Examination Scheme (Marks)							
Lecture	3 Hrs/week MSE		ISE	ESE	Total				
Tutorial	-	30	20	50	100				
		Credits: 3							

	Course Objectives
1	To introduce the students to the general structure of the network for transferring power from
1	generating stations to the consumers
2	This course will introduce the students about the structure and performance analysis of power systems
2	To expose the students to the different electrical & mechanical aspects of the power network along
3	with its environmental and safety constraints.
4	This course will develop analytical skills in the students for investigating issues related to power
4	systems.

Course Outcomes (CO) with bloom s Taxonomy Level	Course Outcomes (CO) with Bloom's Taxonomy Level	
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At the end of the course, the students will be able to,

СО	Course Outcome Statement/s	Bloom's Taxonomy Level	Bloom's Taxonomy Description
CO1	Understand the basic concepts of electrical power supply related to transmission and distribution.	Π	Understanding
CO2	Calculate the transmission line parameters, sag of an overhead transmission line and string efficiency of insulators.	III	Applying
CO3	Analyze the performance of various types of transmission lines and distribution system topologies.	IV	Analyzing
CO4	Scrutinize voltage and power factor control methods for improving performance of transmission and distribution systems.	IV	Analyzing

Module	Module Contents	Hours
I	<b>Structure of Power Systems</b> Generation, transmission, distribution and utilization of electrical power, A.C. and D.C. Transmission, Advantage and limitation of high transmission voltage, Types of lines, Types of conductors, Voltage levels.	5
II	Mechanical aspects of transmission lines Support structures, Electrical clearances, Safety norms, Sag calculations, Effect of wind and ice covering of sag, Types of insulators, String efficiency of insulators.	б
III	<b>Transmission line representation and performance calculation</b> Resistance of transmission line, Skin effect, Inductance of transmission line, Concept of self GMD and mutual GMD, Capacitance of transmission line, Single Line Diagram (SLD), PU quantities, short, medium and long line models, performance calculations, ABCD constants.	8
IV	<b>Distribution Systems and Underground Cables</b> Types of feeders, distributors, AC and DC distribution systems, Sub-stations, UG cables for LT and HT systems.	6

V	<b>Voltage control and Power factor improvement</b> Methods of voltage control, AVRs, Tap changing transformers, Causes of low p.f., Effects of low p.f., Shunt capacitors, Calculation of reactive power injection and p.f. correction.	8				
VI	VIEconomic operation of power systemsVIBasics of Economic load sharing, Incremental fuel cost, Economic dispatch neglecting transmissions losses, Penalty factor, General Loss Formula, optimum load dispatch considering transmissions losses.					
Textbooks						
1	Ashfaq Husain, "Electrical Power Systems", CBS, 5th Edition, 2007.					
2	D Das, "Electrical Power Systems", New Age International, 2016.					
3	V.K. Mehta and Rohit Mehta, "Principles of Power System", S. Chand, 2005					
	References					
1	Nagrath, Kothari, Modern, "Power System Analysis", TMH, 2 <sup>nd</sup> Edition, 2015.					
2	HadiSaadat, "Power System Analysis", TMH, 1st Edition, 2002.					
3 S. Sivanagaraju and S. Satyanarayana, "Electrical Power Transmission and Distribution", Pearson, 2009						
	Useful Links					
1	https://nptel.ac.in/courses/108/105/108105104/					

														_
					(	CO-PC	) Map	oing						
		Programme Outcomes (PO)										P	3	
	1	2	3	4	5	6	7	8	9	10	11	12	1	Ï
CO1	2												2	Î
CO2	3												2	Ĩ
CO3		3											2	Î
CO4			3										2	Ī

2

CO43||The strength of mapping is to be written as 1: Low, 2: Medium, 3: High<br/>Each CO of the course must map to at least one PO.

### Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

Syllabus Prepared By	Mr. N.V. Patel
Syllabus Checked By	Dr. V.P. Mohale

	Walchand College of Engineering, Sangli							
			(Government Aided	d Autonomous Institut	e)			
			AY	2024-25				
			Course	Information				
Progr	amme		B. Tech. Electrica	ll Engineering				
Class,	Semester		Second Year B. T	ech., Sem. IV				
Cours	se Code		7EL223					
Cours	e Name		Power Electronics					
Desire	ed Requisi	tes:	Analog and Digita	al Circuits				
	Taashing	Cabarra		Examination C	hama (Marka)			
Lectur	Teaching	2 Ura/waalt	MCE	Examination So	ESE	Tatal		
Tutor	re ial	5 HIS/Week		15E	<b>ESE</b>	10tai		
Tutor	lai	-	50	20 Cradi	<u> </u>	100		
				Creu				
			Course	Ohiectives				
	To provid	le basic knowled	lge of different pow	ver electronic device	s rectifiers conve	erters inverters and		
1	choppers					siters, inverters and		
2	To impart skills of analysis for different types of converters such as rectifiers, controlled converters,							
	To make	the students a	consinted with des	ion of different ty	pes of converters	such as rectifiers		
3	controlled converters, inverters, choppers and their associated control circuit.							
4	To provid	le foundation fo	r advances in powe	r electronic circuits	and systems.			
		Course	Outcomes (CO) w	vith Bloom's Taxor	omy Level			
At the	end of the	course, the stud	ents will be able to	,				
GO		C		. 1	Bloom's	Bloom's		
CO		Cours	e Outcome Statem	ent/s	Taxonomy	Taxonomy		
	Decerihe	the basics of	amiaan duatan awi	tabaa reatifian aan	trol	Description		
COL	Describe	inverter cho	semiconductor swi	converter and ma	triv II	Understanding		
	converter	circuits	oppers, and cyclo	-converter and ma		Understanding		
	Calculate	the performan	nce of semiconduc	tor switches, rectit	fier.			
CO2	converter	; inverter, cho	oppers, and cyclo	-converter and ma	trix III	Applying		
	converter	circuits.						
	Analyze	the Power Elect	tronic Circuits such	n as rectifier, conver	ter,			
CO3	inverter,	choppers, and	cyclo-converter	and matrix conve	rter IV	Analyzing		
	circuits.							
	Evaluate	the performan	ce of power elect	ronic circuits such	as			
<b>CO4</b>	O4 rectifier, converter, inverter, choppers, and cyclo-converter and V							
	matrix co	onverter circuits.						
	1		N 11 0			TT		
Modu	lle Dorno	n Comison du st	Module C	ontents		Hours		
	Chore	oteristics of id	eal switch VI C	paracteristics Datin	a protection on			
		ng of power se	miconductor device	es such as nower	g, protection and diodes transistor			
I		FET IGRT and	GTO Study of the	driver circuits for t	hyristor GTO and	6		
	IGRT	Introduction to	smart nower mod	ules. Comparative s	udv of MOSFET			
			· · · · · · · · · · · · · · · · · · ·					

	Single Phase and Three Phase AC to DC rectifiers	
п	Single phase half wave and single-phase full wave diode bridge. Three phase	6
11	half wave and three phase full wave diode bridge, Transformer power rating for	0
	above configurations. Source current and output voltage analysis.	

	Phase Controlled AC to DC Converters			
	Classification of converters, Single phase half controlled and fully controlled thyristor converters, three pulse and six pulse controlled converters, operation			
	of converter with freewheeling diode. Effect of source inductance on the			
III	converter such as displacement factor, distortion factor, total harmonic	8		
	distortion, ripple factor and transformer utilization factor. Introduction to 12			
	pulse converter, single phase and three phase dual converter, firing scheme for			
	1 phase and three phase converter, Brief introduction to commutation methods.			
	Introduction to PWM converters.			
	DC to DC Converters			
IV	converter with PLE load step up converter buck boost converter full bridge	6		
	DC to DC converter, concept of multiphase choppers, cuk converter, fun offuge			
	Switch Mode DC – AC Inverters			
	Basic concepts of switch mode inverters, types: VSI and CSI, single phase half			
	bridge and full bridge inverter, three phase six step inverter, 1200 mode of	_		
	conduction, 1800 mode of conduction, three phase PWM Inverter, sinusoidal	7		
	PWM and selective narmonics enmination methods of PWM. Effect of blanking time on output voltage in PWM inverters auto sequentially			
	commutated CSI. Solar Inverters, Introduction to multilevel inverters.			
	Cycloconverters and Matrix Converter			
VI	Introduction to Single phase and three phase cycloconverters. Working and	6		
,,,	topologies of Matrix converter, control methods, performance analysis of	0		
	matrix converter.			
	Textbooks			
1	M. H. Rashid "Power Electronics, Circuits, Devices and Applications", Pearso	n Education Inc.,		
1	4 <sup>th</sup> Edition, November 2017.	,		
2	P. S. Bhimra, "Power Electronics", 3 <sup>rd</sup> Edition, Khanna Publishers, 2002.			
	References			
1	B.K. Bose, "Modern Power Electronics and A.C. Drives", Prentice Hall o	f India Pvt. Ltd.		
	Publication, 2002. Mohan Undeland Debing "Dewar Electronics, Converter Applications and Dec	ian" John Wilow		
2 Ivionan, Undeland Robins, "Power Electronics, Converter Applications and Desig		sign , John whey		
	G K Dubey and Others "Thyristorised Power Controller" New Edge International Publishers			
3	1st Edition Reprint, 2005.	,		
	Useful Links			
	https://nptel.ac.in/courses/108105066			
2	nups://arcnive.npte1.ac.in/courses/108/102/108102145/			

CO-PO Mapping														
		Programme Outcomes (PO) PSO												
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3													
CO2		3												
CO3		3												
CO4		2	2											
The streng	The strength of mapping is to be written as 1: Low, 2: Medium, 3: High													
Each CO	of the c	course 1	nust m	ap to at	least c	ne PO.			-					

Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

Syllabus Prepared By	Dr. D. S. More
Syllabus Checked By	Dr. Mrs. A. S. Karvekar

# Professional Core Laboratory Courses

Course Contents for S. Y. B. Tech. Electrical Engineering Programme, Department of Electrical Engineering, AY 2024-25

Walchand College of Engineering, Sangli									
(Government Aided Autonomous Institute)									
	Course Information								
Progra	Programme B. Tech Electrical Engineering								
Class,	Semester		Second Year B. 7	Fech., Sem. IV					
Cours	e Code		7EL271						
Cours	e Name		AC Machines La	b					
Desire	d Requisi	tes:	Fundamentals of	Electrical Enginee	ring, DC l	Machines and	Transformers		
	Teaching	Scheme		Examination	Scheme	(Marks)			
Practi	cal	2 Hrs/ Week	LA1	LA2	Lab 1	ESE	Total		
Intera	ction	-	30	30	4(	)	100		
				Cr	edits: 1				
			Cours	se Ohiectives					
1	This cou	rse intends to de	emonstrate perform	nance operation of	synchrono	ous and asynch	nronous		
	Inachine	s. s to develop abril	le to analyze oner	tion and performe	nce of asy	nchronous and	levnebronous		
2	machine		ns to analyse opera	and performation	nee or asy	nemonous and	i synchionous		
3	To under	stand the equiv	alent circuit of a sy	unchronous and asy	vnchronou	s machines			
	To obtain	n the characteris	stics of Synchronou	us and Asvnchrono	ous machir	nes by perform	ing suitable		
4	test.		, i i i i j	j i i j		J	8		
		Cours	e Outcomes (CO)	with Bloom's Tax	xonomy L	Level			
At the	end of the	course, the stud	dents will be able to	0,					
						Bloom's	Bloom's		
CO		Cou	rse Outcome State	ement/s		Taxonomy	Taxonomy		
	Domono	moto overonimoo	nt to sconify also	trical abore staries	tion and	Level	Description		
COI	perform	ince of induction	n and synchronous	machines	ues and	III	Applying		
CO2	Analyse	performance of	induction motors a	and synchronous m	achines.	IV	Analysing		
<b>CO3</b>	Estimate	appropriate ra	tings and develop	circuit connection	ns for an	11.7	A		
	experime	ent as a group a	ctivity.			IV	Analysing		
CO4	Design v	vinding diagram	ns as per given spec	cification		VI	Creating		
		]	List of Experimen	nts / Lab Activities	s/Topics				
<ol> <li>No load and Blocked rotor test on induction motor and performance of 3 phase I.M. from circle diagram.</li> <li>Study of A.C. Machines parts.</li> <li>Study of Induction motor starters.</li> <li>Speed control of Induction Motor</li> <li>Parameter calculation of single phase induction motor from No load and Blocked rotor test.</li> <li>Determination of voltage regulation of alternator using Synchronous Impedance method.</li> <li>Determination of voltage regulation of alternator using MMF method.</li> <li>Determination of voltage regulation of alternator using Zero power factor method.</li> <li>Synchronization of alternator with bus bar.</li> <li>V-Curves of Synchronous motor.</li> <li>Study of starting method of synchronous motor.</li> <li>No load and Blocked rotor test on induction motor and performance of 1 phase I.M.</li> </ol>									
13	. Design c	of 3 phase armat	ure winding for sy	nchronous and asy	nchronous	s machines.			
1	MO	Corr "Doufo	T	extbooks	Dublisher	Ath Edition	1076		
	M. G	. Say. "Perform	ance Design of AC	Viacnines", CBS	rublishers	8, 4thEdition,	17/0. Der 15th		
2	Repri	int.	mance Design of A	AC Commutator M	iolors <sup>-</sup> , W	neeler Publish	יוסו, וסנח		

References							
1	J. Chapman, "Electrical Machine", McGraw Hill, 5th Edition, 2009.						
2	P S Bimbhra, "Electrical Machinery", KHANNA PUBLISHERS, Seventh edition, 2021						
3	J. B. Gupta, "Electrical Machines", SK Kataria and Sons, 3rd edition, 2011.						
4	Fitzerald and Kingsley,"Electric Machine", Tata McGraw Hill, 2nd Edition, 2000.						

### Useful Links

Electrical Machines 2 NPTEL: https://archive.nptel.ac.in/courses/108/105/108105131/

CO-PO Mapping														
		Programme Outcomes (PO) PSO												
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3													
CO2		3												
CO3			2											1
CO4	3			2										
- TE1	.1	· ·	• .	1 .		1 0 0	1	. <b>.</b>	2.34	1. 0	TT' 1			

The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO, and preferably to only one PO.

1

Assessment								
There are three	There are three components of lab assessment, LA1, LA2 and Lab ESE.							
IMP: Lab ESE	is a separate head	of passing.(min 40 %), LA	1+LA2 should be min 40%					
Assessment	Assessment Based on Conducted by Typical Schedule Marks							
	Lab activities,		During Week 1 to Week 8					
LA1	attendance,	Lab Course Faculty	Marks Submission at the end of	30				
	journal		Week 8					
	Lab activities,		During Week 9 to Week 16					
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30				
	journal		Week 16					
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19					
Lab ESE	journal/	External Examiner as	Marks Submission at the end of	40				
	performance	applicable	Week 19					
Week 1 indicate	es starting week o	f a semester. Lab activities/	Lab performance shall include performance	rming				
experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the								
nature and requ	irement of the lab	course. The experimental	ab shall have typically 8-10 experim	ents and				
related activitie	es if any.							

Syllabus Prepared By	Mr. S. S. Medhekar
Syllabus Checked By	Mrs. S. L. Shaikh

Walchand College of Engineering, Sangli								
		10	Government Aided Auto	onomous Institute)				
AY 2024-25 Course Information								
Programme B Tech Electrical Engineering								
Class	Semester		Second Year B. Te	ch., Sem, IV				
Cours	se Code		7EL272					
Cours	se Name		Power Electronics	Lab				
Desire	ed Requisite	s:	Analog and Digital	Circuits Lab				
	<b>•</b>							
	Teaching	Scheme		<b>Examination Schem</b>	e (Marks)			
Practi	ical	2 Hrs/ Week	LA1	LA2	Lab ESE	Total		
Intera	action	-	30	30	40	100		
				Credits: 1				
				<b>.</b>				
1	To movido	the prestical linear	Course Obj	ectives				
	To provide	skills of working	g of different por	ver electronics device	s. rter through si	mulation and		
2	experiment	ation	g of unferent pow	ver electronic conve	iter through si	inulation and		
3	To make th	e students acquaint	ed with simulation. a	analysis and design of	power electronic	c converters.		
4	To provide	foundation for adv	ances in power elect	ronic circuits and syst	ems.			
		Course Ou	tcomes (CO) with <b>E</b>	Bloom's Taxonomy L	evel			
At the	end of the c	ourse, the students	will be able to,	L. L				
со		Course C	outcome Statement/	s	Bloom's Taxonomy Level	Bloom's Taxonomy Description		
CO1	Demonstra inverter, an	te experiments on ad Chopper etc.	basics of converte	ers such as rectifier,	III	Applying		
CO2	Construct Chopper w	different types of o	converters such as 1 hniques using simula	ectifier, inverter and	III	Applying		
CO3	Measure th	ne performance of	converters such as r	ectifier, inverter, and	IV	Analysing		
<b>CO4</b>	Design and	l Analyze power co	onverter circuits and	select suitable power	v	Evaluate		
	electronics	devices by assessin	ig the requirements of	of application fields.				
		List	of Exporimonts / Lo	h Activities/Topies				
Listo	f I ah Activi	LISU (	n Experiments / La	D ACUVILIES/ TOPICS				
1. 2. 3.	Verify the input curre Evaluate th Evaluate th	Voltage and curren ent harmonic spectron ne load side perform ne load side perform	t relationship in 3 ph um. hance of single-phase hance of single-phase	ase full wave diode by e full wave half contro e full wave full contro	ridge rectifier an ol converter. l converter.	d evaluate the		
4.	Evaluate th	ne load side perform	nance of three phase	full wave half-control	led converter.			
5.	Evaluate tr	he load side periori	ance of three phase	nhase full wave half	controlled and f	ull controlled		
0.	converters	ie ming angle conti	of scheme for single	phase run wave, nan	controlled and h			
7.	7 Develop the firing angle control scheme for three phase full wave half-controlled converter							
8. Develop the firing angle control scheme for three phase full wave full controlled converter.								
9. Evaluate the performance of MOSFET based buck converter.								
10. Evaluate the performance of MOSFET based boost converter.								
11	11. Develop the control circuit for single phase PWM Inverter.							
12	12. Develop the control circuit for three phase square wave Inverter.							
		1.1.40 51	Textboo		<b>ND D1</b>	,• <u>⊤</u> 4.1		
1	M.H.Ra	shid "Power Electr	onics, Circuits, Dev	ices and Applications	", Pearson Educ	ation Inc., 4th		
<u> </u>	DCDL	imra "Power Fleet	ronics" 2rd Edition	Khanna Dublishara 20	002			
1 4	ום .כ . בן	inna, i owei Elect	romes, 5 Eutuoll,	ixinanna i ublishcis, 20	102.			

	References								
1	B.K. Bose, "Modern Power Electronics and A.C. Drives", Prentice Hall of India Pvt. Ltd. Publication,								
	2002.								
2	Mohan, Undeland and Robins, "Power Electronics, Converter Applications and Design", John Wiley								
	and sons (Asia) Pvt. Ltd., 3rd Edition, 2010.								
2	G. K. Dubey and Others "Thyristorised Power Controller", New Edge International Publishers, 1st								
3	Edition Reprint, 2005.								
	Useful Links								
1									

CO-PO Mapping														
		Programme Outcomes (PO) PSO												
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1				3					2					
CO2					3									
CO3				3					2					
CO4			3		2				2					
								_						

The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO, and preferably to only one PO.

Assessment
There are three components of lab assessment, LA1, LA2 and Lab ESE.
IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%

Assessment	Based on	Conducted by	Typical Schedule	Marks
	Lab activities,		During Week 1 to Week 8	
LA1	attendance,	Lab Course Faculty	Marks Submission at the end of	30
	journal		Week 8	
	Lab activities,		During Week 9 to Week 16	
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30
	journal		Week 16	
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19	
Lab ESE	journal/	External Examiner as	Marks Submission at the end of	40
	performance	applicable	Week 19	

Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.

Syllabus Prepared By	Dr. D. S. More
Syllabus Checked By	Dr. Mrs. A. S. Karvekar

# **Multidisciplinary Minor**

	W	alchand Col	lege of Enginee	ering, Sangli						
(Government Aided Autonomous Institute)										
	AY 2023-24									
		Co	urse Information							
Program	Programme         B.Tech. (Electrical Engineering)									
Class, S	Semester	Second Year B.	Tech., Sem IV							
Course	Code	7MDEL221								
Course	Name	Multi-Disciplin	ary Minor I : Electri	ical Machines						
Desired	l Requisites:	Fundamentals of	of Electrical Enginee	ering						
Tea	iching Scheme	2.502	Examinatio	on Scheme (Marks)						
Lecture	e 3 Hrs/week	MSE	ISE	ESE	Total					
Tutoria	ul -	30	20	50	100					
			C	redits: 3						
		~								
		C	ourse Objectives							
1	To make students up	nderstand operation	on and performance	e of ac and dc machines.						
2	To make students le	arn characteristic	s of ac and dc mach	nines.						
3	To develop skills to	choose ratings of	ac and dc machines	s for various applications						
At the e	UOU and of the course, the	rse Outcomes (	<b>D) with Bloom's</b>	l axonomy Level						
	Explain the construct	ction and working	$\frac{1}{2}$ principle of A C a	nd DC Machines	Understand					
C02	Examine the various	s characteristics of	f A.C. and D.C. ma	chines.	Apply					
CO2	Analyze the perform	nance of A.C. and	D.C. machines for	various applications.	Analyze					
CO4	Evaluate the efficient	ncv and regulation	n of transformers an	d machines for optimal	Evaluate					
	design.	, ,		1						
					1					
Modul	e	Мо	dule Contents		Hours					
	DC Motors									
	Review of Con	,								
I	Armature Rea	, 6								
	Applications, PC									
	D.C. Shunt and S	D.C. shunt and series motor, Thyristor based speed control for D.C. motor.								
	Single Phase Tr	ansformer								
	Construction an	d type EMF eq	uation phasor diag	ram equivalent circuit						
	efficiency. loss	es. regulation. H	Experimental deter	mination of equivalent						
II	circuit parameter	rs and calculation	of efficiency and re	egulation, Introductionto	6					
	three Phase Tran	sformer, Connec	tion of three Phase T	Fransformer,						
	Applications of Transformers									
	Single-Phase In	duction Motor								
ш	Double revolvir	g field theory a	nd principle of ope	eration. Construction and	1					
	operation of spli	t-phase, capacitor	r start, capacitor run	, and shaded pole motors	. 0					
	Comparison of s	ingle-phase moto	rs and applications.							
	Three Phase In	duction Motor								
	Construction, Ty	pes, Working, Sp	peed equation, Torq	ue equation, Starting						
IV	torque, Concept	of full load torqu	e, torque speed char	racteristics, Power	7					
	stages in motor.	Induction Genera	itor.							

	Synchronous Machines	
	Alternator, Construction of Alternator, Synchronous Motor, Equivalent	
	Circuit, Motor on load, Pull-Out Torque, Motor Phasor Diagram, Mechanical	
	Power Developed by Motor, Power Factor of Synchronous Motor, Application	
V	of Synchronous Motor, Comparison of Synchronous Motor with	7
	Induction Motor.	
	Special-Purpose Electric Machines	
	Stepper motor-Variable-Reluctance Motor, Permanent Magnet Motor, Hybrid	
	Stepper Motor, Servomechanism, D.C. Servomotors, A.C. Servomotors,	
VI	Switched Reluctance Motor, Permanent Magnet D.C. Motor, Brushless D.C.	7
	Motor. Selection and Sizing of Motors based on applications.	,
	Text Books	
1 S. J. C. 2011, I	hapman, "Electric Machinery Fundamentals", Tata Mc Graw Hill publication, 4th SBN: 9780071070522	Edition,
2 M. G. S ISBN:	Say. "Performance Design of AC Machines", CBS Publishers, 3rd Edition, 2017, 9788123910277	
	References	
J SK Bh	attacharya, "Electrical Machines", Tata Mc Graw Hill, 3rd Edition, 2010,	
ISBN:	9789332902855	
2 J. B. G	upta, "Electrical Machines", SK Kataria and Sons, 2013, ISBN: 9789350140550	
I		
	Useful Links	
1 https://	/nptel.ac.in/courses/108/102/108102146/	
2 https://	/nptel.ac.in/courses/108/105/108105155/	
3 https://	/nptel.ac.in/courses/108/105/108105131/	

	CO-PO Mapping														
		Programme Outcomes (PO) PSO													
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3														
CO2		2													
CO3		2													
CO4			2												
The streng	gth of 1	nappir	ig is to	be wri	tten as	1,2,3;	Where	e, 1:Lo	w, 2:M	ledium	, 3:Hig	h			
Each CO	of the	course	must r	nap to	at leas	t one P	Ю.								

Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

Syllabus Prepared By	Mr. A. N. Inamdar
Syllabus Checked By	

### **Mandatory Courses**

		Walo	chand College	of Engineering, Sa	ngli	
			(Government Aided	d Autonomous Institute)		
			Course	2024-25 Information		
Progra	mme		B Tech Electrica	I Engineering		
Class.	Semester		Second Year B. T	ech., Sem. IV		
Course	e Code		7ESEL201			
Course	e Name		Signals and Syste	ms		
Desire	d Requisit	tes:	Engineering Math	nematics III		
	Teaching	Scheme		Examination Scheme	e (Marks)	
Lectur	e	3 Hrs./week	MSE	ISE	ESE	Total
Tutori	al		30	20	50	100
				Credits: 3		
			Course	Objectives		
1	This cour	se intends to de	velop an understan	ding of the basic concepts	of signals and	1 systems
-	It will ma	ke students to le	arn signal and syste	em operations and analysis	techniques su	ch as convolution
2	for contin	nuous and discre	ete time.			
•	It will ma	ake students to	study and analyze	the continuous time sign	als and syster	ns in laplace and
3	fourier do	omain.		C C	-	-
4	It will m	ake students to	study and analyze	the discrete time signals	and systems	in z-domain and
-	discrete t	ime fourier dom	ain.			
A 1	1 6 1	Course	Outcomes (CO) w	vith Bloom's Taxonomy	Level	
At the	end of the	course, the stud	ents will be able to	,		
CO		Cours	a Autcoma Statan	aantle	Bloom's	Bloom's Taxonomy
CO		Cours	e Outcome Staten			Description
CO1	Explain t	he mathematica	l principles of conti	nuous time, discrete		
	time syste	ems and applica	tions of signal proc	essing techniques.	11	Understanding
CO2	Use mat	hematical conc	epts for signal an	d system response like	ш	Applying
	convoluti	on.			111	Apprying
CO3	Calculat	e the response	of linear systems	in continuous time	IV	Analyzing
	domain u	using tools lap	lace transform and	d fourier transform.		T many 2mg
CO4	Calculate	the response of	linear systems in d	liscrete time domain	IV	Analyzing
	using too	ls z- transform a	and discrete time to	urier transforms.		
Modu	ام		Modula	<sup>r</sup> ontonts		Hours
WIUUU	Intro	duction to Sign	als and Systems			IIIUIIS
Ŧ	Conti	nuous and Disci	ete time signals, st	andard signals, signal rep	resentation,	
1	classi	fication of signa	lls, systems – Introc	luction , representation, cl	assification,	8
	Linea	r, Time invarian	t, causal, BIBO sta	ble, Static, dynamic.		
	Time	Domain Analy	sis of Continuous	and Discrete Time Syste	ems	
II	Zero s	state and Zero in	iput response, Impu	ilse response, Convolution	n integral and	6
	Convo	olution sum, gra	phical representatio	n of convolution.	toma	
	Fouri	er pointain Ana er series Expon	ential form Dirichl	let Conditions Frequency	domain	
m	repres	sentation of peri	odic signals. Fourie	er Transform representation	on of	6
	aperio	dic signals, Pro	perties of CTFT, C	onvolution – time and fre	quency	Ŭ
	doma	in, system respo	nse using CTFT.			
	Lapla	ce Transform	Analysis of Signal	s and System		
IV	Defin	ition, Properties	, magnitude and ph	ase, Solution of different	al equation.	7
	Trans	ter function, Po	les and Zeroes, Init	al conditions, System and	alysis using	, ,
		e transform with	n and without initia	i conditions, Stability in s	-domain.	
	Repre	er Domain And sentation of CT	signals using Sam	oles Nymist Sampling T	i heorem	
	Discre	ete time Fourier	Transform. Repres	entation of aperiodic secu	ience.	6
	Prope	rties of DTFT: t	ime reversal, Conv	olution. System response	using DTFT	

Course Contents for S Y B Tech Programme, Department of Electrical Engineering, AY2024-25

VI	<b>Z Transform Analysis of Discrete Time Signals and Systems</b> Definition, Properties, Solution of difference equation. Transfer function, Poles and Zeroes, System analysis using Z-Transform with and without initial conditions, Stability analysis using z-plane.	6
	Textbooks	
1	A.V. Oppenheim, A.S. Willsky, S.H. Nawab, "Signals and Systems", Prentice Ha	all, 1997.
2	B. P. Lathi, "Linear systems and signals", Oxford University press, 2005.	
	References	
1	Simon Haykin, Barry Van Veen, "Signals and systems", Wiley, 2003.	
2	M. J. Roberts, "Signals and systems", Tata McGraw Hill, 2005.	
	Useful Links	
1		

	CO-PO Mapping													
		Programme Outcomes (PO) PSO												
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3													
CO2	3													
<b>CO3</b>		3												
CO4		3												
The stren	gth of n	napping	g is to b	be writt	ten as 1	: Low,	2: Med	ium, 3:	High					

Each CO of the course must map to at least one PO.

#### Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

Syllabus Prepared By	Mr. A.B. Patil
Syllabus Checked By	Mrs. S.P. Diwan

W	alchand College of Engineering, Sangli (Government Aided Autonomous Institute)					
	AY 2024-25					
	Course Information					
Programme	B.Tech. (All branches)					
Class, Semester	Second Year B. Tech., Sem - II					
Course Code	7AE201	;				
Course Name	Employability Skills Development (ESD)					
Desired Requisites:	-					

Teaching	s Scheme	Examination Scheme (Marks)						
Lecture	4Hrs/week	ISE	MSE	ESE	Total			
Tutorial	-	20	30	50	100			
Practical	201							
Interaction	-		Cred	lits: 2				

	Course Objectives	
1	To improve the problem-solving skills of students	
2	To understand the approach towards problem solving	
3	Understanding the sectional cut-offs for different companies	
	Course Outcomes	
CO1	Ability to improve the accuracy percentage	
CO2	Understand the current changing recruitment trends	21 Z
CO3	Understanding the differential marking scheme in papers	
CO4	Performance improvement in competitive exams like CAT, GATE	
Modul	e Module Contents	Hours
wrodu	A transfer to the transfer to	livurs
I	Arithmetic I Ratio, Proportion, Mark Up & Discount, Averages, Mixtures & Alligations, Simple & Compound Interest	6

Ш	Arithmetic II	8
	Percentages, Profit & Loss, Time & Work, Time, Speed & Distance, Boat & Streams, Linear Races s	
	Numbers	141
11	Cyclicity, Remainders, Cyclicity of Remainders, Indices, Factors, LCM, HCF	4
878-84	Permutation, Combination, Probability	10.00
Ш	Fundamental principal of counting, Arrangements, Selection, Grouping, Distribution, Independent Events, Conditional Probability, Binomial Distribution	6
1.000	Logical Reasoning	6
IV	Clocks, Calendars, Games & Tournaments, Analytical Puzzles, Binary Logic, Blood relations, Directions, Coding, Decoding, Seating Arrangement (Linear, Circular & Rectangular) Verbal Ability I	
17		
v	Vocabulary - Synonyms, Antonyms, Analogies Reading Comprehension, Para Jumbles	0
VI	Verbal Ability II	4
	Parts of Speech, Tenses, Subject Verb Agreement	
	Text Books	
1	Quantitative Aptitude - Abhijit Guha	
2	Quantitative Aptitude - Sarvesh Agarwal	
	References	
1	Quicker Maths - M. Tyra	
2	Quantitative Aptitude - Chandresh Agarwal	
3	Puzzles to puzzle you - Shakuntala Devi	
	Useful Links	
1	www.campusgate.co.in	
2	www. Lofoya.com	
-	www.brainbashers.com	
3	www.oruniodshots.com	

					CO-I	PO Ma	pping	6							
Programme Outcomes (PO)													PSO		
1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
										3					
						2									
								3							
									3						
	1	1 2	1 2 3	P 1 2 3 4	Progra 1 2 3 4 5 	CO-I           Programme O           1         2         3         4         5         6           1         2         3         4         5         6           1         2         3         4         5         6           1         2         3         4         5         6           1         2         3         4         5         6           1         1         1         1         1         1         1	CO-PO Ma           Programme Outcom           1         2         3         4         5         6         7           1         2         3         4         5         6         7           1         2         3         4         5         6         7           1         2         3         4         5         6         7           1         2         3         4         5         6         7           1         2         3         4         5         6         7           1         2         3         4         5         6         7           1         2         3         4         5         6         7           1         2         3         4         5         6         7	CO-PO Mapping           Programme Outcomes (PO           1         2         3         4         5         6         7         8           1         2         3         4         5         6         7         8           1         2         3         4         5         6         7         8           1         2         1         2         1         2         1	CO-PO Mapping           Programme Outcomes (PO)           1         2         3         4         5         6         7         8         9           1         2         3         4         5         6         7         8         9           1         2         3         4         5         6         7         8         9           1         2         3         4         5         6         7         8         9           1         2         3         4         5         6         7         8         9           1         2         3         4         5         6         7         8         9           1         2         1         2         2         3         3         3	CO-PO Mapping           Programme Outcomes (PO)           1         2         3         4         5         6         7         8         9         10           1         2         3         4         5         6         7         8         9         10           1         2         3         4         5         6         7         8         9         10           1         2         3         2         1 <td>CO-PO Mapping           Programme Outcomes (PO)           1         2         3         4         5         6         7         8         9         10         11           1         2         3         4         5         6         7         8         9         10         11           1         2         3         4         5         6         7         8         9         10         11           1         2         3         2         1         3         3           1         1         1         1         3         3         1</td> <td>CO-PO Mapping           Programme Outcomes (PO)           1         2         3         4         5         6         7         8         9         10         11         12           1         2         3         4         5         6         7         8         9         10         11         12           1         2         3         4         5         6         7         8         9         10         11         12           1         2         3         4         5         6         7         8         9         10         11         12           1         2         3         2         1         3         1         1           1         1         1         2         1         1         1         1           1         1         1         1         2         1</td> <td>CO-PO Mapping           Programme Outcomes (PO)           1         2         3         4         5         6         7         8         9         10         11         12         1           1         2         3         4         5         6         7         8         9         10         11         12         1           1         2         3         4         5         6         7         8         9         10         11         12         1           1         2         3         4         5         6         7         8         9         10         11         12         1           1         2         3         1         2         1</td> <td>CO-PO Mapping           Programme Outcomes (PO)         PSO           1         2         3         4         5         6         7         8         9         10         11         12         1         2           1         2         3         4         5         6         7         8         9         10         11         12         1         2           1         2         3         4         5         6         7         8         9         10         11         12         1         2           1         1         1         2         1         1         3         1         1         2           1         1         2         2         1         1         1         1         2           1         1         1         2         3         1</td>	CO-PO Mapping           Programme Outcomes (PO)           1         2         3         4         5         6         7         8         9         10         11           1         2         3         4         5         6         7         8         9         10         11           1         2         3         4         5         6         7         8         9         10         11           1         2         3         2         1         3         3           1         1         1         1         3         3         1	CO-PO Mapping           Programme Outcomes (PO)           1         2         3         4         5         6         7         8         9         10         11         12           1         2         3         4         5         6         7         8         9         10         11         12           1         2         3         4         5         6         7         8         9         10         11         12           1         2         3         4         5         6         7         8         9         10         11         12           1         2         3         2         1         3         1         1           1         1         1         2         1         1         1         1           1         1         1         1         2         1	CO-PO Mapping           Programme Outcomes (PO)           1         2         3         4         5         6         7         8         9         10         11         12         1           1         2         3         4         5         6         7         8         9         10         11         12         1           1         2         3         4         5         6         7         8         9         10         11         12         1           1         2         3         4         5         6         7         8         9         10         11         12         1           1         2         3         1         2         1	CO-PO Mapping           Programme Outcomes (PO)         PSO           1         2         3         4         5         6         7         8         9         10         11         12         1         2           1         2         3         4         5         6         7         8         9         10         11         12         1         2           1         2         3         4         5         6         7         8         9         10         11         12         1         2           1         1         1         2         1         1         3         1         1         2           1         1         2         2         1         1         1         1         2           1         1         1         2         3         1	

Each CO of the course must map to at least one PO.

### Assessment

The assessment is based on the MCQ test which will be conducted online through the platform and it will be a proctored test. No negative marking will be there in the test. Test will be of 60 minutes with 20 questions each on Quantitative Aptitude, Logical Reasoning & Verbal Ability

	Walchand College of Engineering, Sangli (Government Aided Autonomous Institute)							
			AY 2024-25					
			Course Information					
Programme	9	B.Tech. (All Br	canches)					
Class, Seme	ester	Second Year B	. Tech., Sem III & IV					
Course Cod	le	7IK201						
Course Nan	ne	Introduction to	Ancient Indian Technology					
Desired Rec	quisites:	General curiosi	ty, maturity expected from adult stu	dent.				
Teachi	ng Scheme		Examination Scheme (	Marks)				
Lecture	02 Hrs/week MSE ISE ESE			Total				
Tutorial	0 Hrs/week 30 20 50				100			
			Credits: 2					
			~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~					
1		. 10 1	Course Objectives		· · · · · ·			
1	The course is de	esigned for under	graduate students, interested in lear	ning about th	e ancient Indian			
2	The chiestine in	ch is the hallmar	k of glorious indian civilization.	dian taalan al	aning that say he			
2	adopted in mod	ern time	i nature centric aspects of ancient in	dian technolo	ogies that can be			
3	The course is to express the students to ensight spinnes and technologies which can be derived by the							
5	modern technological development							
		Course Outcome	es (CO) with Bloom's Taxonomy I	evel				
At the end o	f the course, the s	tudents will be al	ble to.					
со		Course Outco	Course Outcome Statement/s Bloom's Taxonomy Level					
CO1	Name the ancie	nt Indian technol	Remenbering					
CO2	Comprehend the relevance	e concept of Inc	lian traditional knowledge and its	2	Understanding			
CO3	Explain the Ind	ian contribution t	to the world at large	2	Understanding			
CO4	Judge the ancie	nt Indian technol	ogy.	5	Evaluating			
Module		Μ	odule Contents		Hours			
I	Introduction: W What is science	Thy are ancient Ir ? How is it differ	ndian science and technology relevation rent from technology? .	ant today?	4			
п	Philosophy of technology? An science and tec	ancient Indian ncient Indian Sc hnology?.	technology, how is different fro ientific methods. Glimpses of anc	m modern ient Indian	4			
III	Material techno Making and cra	ology in ancient I ftsmanship, Woo	ndia : Mining, Metals and Metallu otz Steel Technology	rgy, Iron	5			
IV	Extraction of Z Ceramic Techn	inc in ancient In ology.	dia, Glass making, Bead making T	echniques,	4			
V	Water Harvesti construction, Sa	ng Technology, anitation from an	Irrigation Systems. Town planning cient India period.	Building	5			
VI	Agriculture and Textile Technology in context of ancient India i.e Bharat. 4							

						Te	xtbook	s						
1	Tran Title Aero	Transcript of the NPTEL course available at <u>https://archive.nptel.ac.in/courses/101/104/101104065</u> /. Title of the course "Introduction To Ancient Indian Technology" by Prof. D.P. Mishra Department of Aerospace Engineering, IIT Kanpur												
References														
Image: Contract of the sector of the course introduction To Ancient Indian Technology" by Prof. D.P. Mishra Department of Aerospace Engineering, IIT Kanpur														
Useful Links														
1	1 https://archive.nptel.ac.in/courses/101/104/101104065/													
CO-PO Mapping														
	Programme Outcomes (PO) PSO							50						
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
<u>CO1</u>	2					1								
CO2	1					2						1		
CO3	1					2			1					
The strength o	f mappi	ng is to	be wri	itten as	1: Low,	2: Med	lium, 3	: High						
Each CO of th	e course	e must	map to	at least	one PO	).								
						Asse	ssmen	t						
The assessmen	it is bas	ed on N	ASE, IS	SE and	ESE.									
MSE shall be	typicall	y on m	odules	1 to 3.										
ISE shall be ta	ken thro	oughou	t the se	mester	in the fo	orm of t	teacher	's asses	sment.	Mode of	of assessme	nt can b	be Test	5,
assignments, o	oral, sen	ninar et	tc. and i	is expe	cted to r	nap at l	least or	e highe	er order	PO.				
ESE shall be o	n all m	odules	with ar	ound 3	0 - 40%	weight	age on	module	es 1 to 3	3 and 60	) - 70% we	ightage	on mo	lules
4 to 6.					1		<b>E E C E</b>			120	100/		-	
For passing a t	For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed and Min. 40% marks in ESE are													
needed. (ESE shall be a separate head of passing)														

INTRACT Hadde Handom Model Histon Responses for the second seco						
Course Information         Course Information         Programme       B. Tech. Electrical Engineering         Class, Semester       Second Year B. Tech., Sem IV         Course Code       7VSEL271         Course Name       Advance Simulation Lab         Desired Requisites:       NIL         Teaching Scheme       Examination Scheme (Marks)         Practical       2 Hrs/ Week       LA1       LA2       Lab ESE       Tota         Lecture       1       30       30       40       100         Course Objectives         This course intends to provide advance knowledge of MATLAB, PSIM and ETAP software f         developing modelling and programming techniques.         It intends to impart skills to implement different tool boxes of MATLAB Simulink, PSIM and for electrical engineering application						
Programme       B. Tech. Electrical Engineering         Class, Semester       Second Year B. Tech., Sem IV         Course Code       7VSEL271         Course Name       Advance Simulation Lab         Desired Requisites:       NIL         Teaching Scheme       Examination Scheme (Marks)         Practical       2 Hrs/ Week       LA1       LA2       Lab ESE       Tota         Itecture       1       30       30       40       100         Course Objectives         This course intends to provide advance knowledge of MATLAB, PSIM and ETAP software f developing modelling and programming techniques.         1       It intends to impart skills to implement different tool boxes of MATLAB Simulink, PSIM and for electrical engineering application       It intends to impart skills to implement different tool boxes of MATLAB Simulink, PSIM and for electrical engineering application						
Second Year B. Tech., Sem IV         Course Code       7VSEL271         Course Name       Advance Simulation Lab         Desired Requisites:       NIL         Teaching Scheme       Examination Scheme (Marks)         Practical       2 Hrs/ Week       LA1       LA2       Lab ESE       Tota         Practical       2 Hrs/ Week       LA1       LA2       Lab ESE       Tota         Practical       2 Hrs/ Week       LA1       LA2       Lab ESE       Tota         Practical       2 Hrs/ Week       LA1       LA2       Lab ESE       Tota         Lecture       1       30       30       40       100       Course Objectives         Tota         Course Objectives       Course Objectives       Tota         Advance knowledge of MATLAB, PSIM and ETAP software f       developing modelling and programming techniques.       It intends to impa						
Course Code       7VSEL271         Course Name       Advance Simulation Lab         Desired Requisites:       NIL         Examination Scheme (Marks)         Practical       2 Hrs/ Week       LA1       LA2       Lab ESE       Tota         Lecture       1       30       30       40       100         Tris course intends to provide advance knowledge of MATLAB, PSIM and ETAP software for developing modelling and programming techniques.         It intends to impart skills to implement different tool boxes of MATLAB Simulink, PSIM and ETAP Software for electrical engineering application						
Course Name       Advance Simulation Lab         Desired Requisites:       NIL         Teaching Scheme       Examination Scheme (Marks)         Practical       2 Hrs/ Week       LA1       LA2       Lab ESE       Tota         Practical       2 Hrs/ Week       LA1       LA2       Lab ESE       Tota         Lecture       1       30       30       40       100         It intends to provide advance knowledge of MATLAB, PSIM and ETAP software for developing modelling and programming techniques.       It intends to impart skills to implement different tool boxes of MATLAB Simulink, PSIM and for electrical engineering application       It intends to impart skills to implement different tool boxes of MATLAB Simulink, PSIM and ETAP software for electrical engineering application       It intends to impart skills to implement different tool boxes of MATLAB Simulink, PSIM and ETAP software for electrical engineering application       It intends to impart skills to implement different tool boxes of MATLAB Simulink, PSIM and ETAP software for electrical engineering application						
NIL         Examination Scheme (Marks)         Examination Scheme (Marks)         Practical       2 Hrs/ Week       LA1       LA2       Lab ESE       Tota         Practical       2 Hrs/ Week       LA1       LA2       Lab ESE       Tota         Lecture       1       30       30       40       100         Course Objectives         This course intends to provide advance knowledge of MATLAB, PSIM and ETAP software for developing modelling and programming techniques.         1       This course intends to impart skills to implement different tool boxes of MATLAB Simulink, PSIM and ETAP software for electrical engineering application	1					
Teaching Scheme       Examination Scheme (Marks)         Practical       2 Hrs/ Week       LA1       LA2       Lab ESE       Tota         Lecture       1       30       30       40       100         Lecture       1       30       30       40       100         Lecture       1       30       30       40       100         Course Objectives         This course intends to provide advance knowledge of MATLAB, PSIM and ETAP software for developing modelling and programming techniques.         1       This course intends to impart skills to implement different tool boxes of MATLAB Simulink, PSIM and the programming techniques.         2       It intends to impart skills to implement different tool boxes of MATLAB Simulink, PSIM and the programming techniques.	1					
Teaching Scheme       Examination Scheme (Marks)         Practical       2 Hrs/ Week       LA1       LA2       Lab ESE       Tota         Lecture       1       30       30       40       100         Lecture       1       30       30       40       100         Course Objectives         This course intends to provide advance knowledge of MATLAB, PSIM and ETAP software for developing modelling and programming techniques.         1       It intends to impart skills to implement different tool boxes of MATLAB Simulink, PSIM and for electrical engineering application       It intends to impart skills to implement different tool boxes of MATLAB Simulink, PSIM and For electrical engineering application						
Practical2 Hrs/ WeekLA1LA2Lab ESETotaLecture1303040100Credits: 2Course ObjectivesThis course intends to provide advance knowledge of MATLAB, PSIM and ETAP software for developing modelling and programming techniques.1It intends to impart skills to implement different tool boxes of MATLAB Simulink, PSIM and for electrical engineering application						
Lecture       1       30       30       40       100         Credits: 2         Course Objectives         I Summer intends to provide advance knowledge of MATLAB, PSIM and ETAP software for developing modelling and programming techniques.         1 It intends to impart skills to implement different tool boxes of MATLAB Simulink, PSIM and ETAP software for electrical engineering application						
Credits: 2         Course Objectives         This course intends to provide advance knowledge of MATLAB, PSIM and ETAP software for developing modelling and programming techniques.         2       It intends to impart skills to implement different tool boxes of MATLAB Simulink, PSIM and for electrical engineering application						
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2 It intends to impart skills to implement different tool boxes of MATLAB Simulink, PSIM and for electrical engineering application	01					
	I ETAP					
3 To solve complex electrical engineering problems with different tool boxes of MATLAB Sim PSIM and ETAP for electrical engineering application.	ulink,					
4 To design complex electrical systems with MATLAB Simulink, PSIM and ETAP software's.						
Course Outcomes (CO) with Bloom's Taxonomy Level						
At the end of the course, the students will be able to,						
CO Course Outcome Statement/s Bloom's Blo Level Description	om's momy ription					
CO1 Grasp the aspects of MATLAB simulation, PSIM, ETAP and OPAL- RT simulation tools II Under						
CO2 Solve complex mathematical equations using MATLAB. III Apr	olying					
CO3 Construct MATLAB, PSIM, ETAP and OPAL-RT software-based IV Ana projects.	lysing					
CO4Design complex electrical systems using MATLAB, PSIM, ETAP and OPAL-RT.VICre	ating					
List of Experiments / Lab Activities/Topics						
<ol> <li>Nodelling of complex electrical systems with MATLAB.</li> <li>Modelling and analysis of power systems with MATLAB.</li> <li>Study of fault analysis using MATLAB.</li> <li>Study of built-in library examples of electrical engineering with ETAP.</li> <li>Modelling of electrical systems with ETAP and simulation tools.</li> <li>Modelling and analysis of power systems with ETAP.</li> <li>Modelling and simulation of power flow diagram in ETAP.</li> <li>Study of interface and built-in library of PSIM.</li> <li>Modelling of electrical systems with PSIM.</li> <li>Introduction to OPAL-RT (real time digital simulator).</li> <li>Modelling of electrical systems with MATLAB and OPAL-RT (software in loop).</li> </ol>						
<ol> <li>8. Study of interface and built-in library of PSIM.</li> <li>9. Modelling of electrical systems with PSIM.</li> <li>10. Introduction to OPAL-RT (real time digital simulator).</li> <li>11. Modelling of electrical systems with MATLAB and OPAL-RT (software in loop).</li> </ol>						
<ul> <li>8. Study of interface and built-in library of PSIM.</li> <li>9. Modelling of electrical systems with PSIM.</li> <li>10. Introduction to OPAL-RT (real time digital simulator).</li> <li>11. Modelling of electrical systems with MATLAB and OPAL-RT (software in loop).</li> </ul>						

### References

1	"Matlab programming for Engineers", Stephen Chapman, Thomson Learning publication, 3rd				
1	Edition.				
2	"Power System Transient Analysis", Theory and Practice using simulation programs, Power				
2	System, Eiichi Haginomori Junichi Arai, WILEY Publication.				
3	User manual of ETAP, PSIM and OPAL-RT.				
Useful Links					

MATLAB Programming for Numerical Computation: https://nptel.ac.in/courses/103106118

CO-PO Mapping														
	Programme Outcomes (PO)									PSO				
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2				1									
CO2	1	2												
CO3			3		2									2
CO4	3	3	2											
The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High														

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Each CO of the course must map to at least one PO, and preferably to only one PO.

1

Assessment
There are three components of lab assessment, LA1, LA2 and Lab ESE.
IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%

Assessment	Based on	Conducted by	Typical Schedule	Marks
	Lab activities,		During Week 1 to Week 8	
LA1	attendance,	Lab Course Faculty	Marks Submission at the end of	30
	journal		Week 8	
	Lab activities,		During Week 9 to Week 16	
LA2	attendance,	Lab Course Faculty	Marks Submission at the end of	30
	journal		Week 16	
	Lab activities,	Lab Course Faculty and	During Week 18 to Week 19	
Lab ESE	journal/	External Examiner as	Marks Submission at the end of	40
	performance	applicable	Week 19	

Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.

Syllabus Prepared By	Mr. S. S. Medhekar
Syllabus Checked By	Dr. R. P. Hasabe