

Sapthagiri College of Engineering
(Affiliated to Visvesvaraya Technological University, Belagavi& Approved by AICTE, New Delhi) #14/5, Chikkasandra, Hesaraghatta Main Road, Bengaluru - 560057

Phone:080-28372800/1/2

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Fax: 080-28372797

Department of Electrical and Electronics Engineering

Subject: POWER SYSTEM PROTECTION

Subject Code: 15EE72

Academic Year: 2018-19

bject:	POWER SYSTEM	PROTECTION	Sui	oject Code: 15EE/2	•	Academic 1 c	ш.	2010 17	
Sl. No.	Syllabus	Curriculum	Deployment Strategy and Tool	Cross-cutting issues integrated	PO, PSO and CO	Attainments		Attainment Verification	
1.	Power System Protection	 Empower students through the concepts of Power System 	Chalk and Talk method		PO1: Engineering knowledge: Apply the knowledge of	POA1: 73% POA2: 73% POA12: 73%	1.	Results Formative	of and
		Protection. Instruct the	2. PPT	Social Accountability	mathematics, science, engineering fundamentals, and an			Summative Assessment	
		importance of power system as a social responsibility.		,	engineering specialization for the	2.	2.	Assignment	
		■ Teach the students about the need for well-protected power			solution of complex engineering problems.	-			
		system for overall development of a			PO2: Problem analysis: Identify,				
		country. Create awareness in students about	-		formulate, research literature, and analyze complex				
		protection in power system for the			engineering problems reaching substantiated				
		economic development of the nation.			conclusions using first principles of				
			10		mathematics, natural sciences, and				
			13		engineering sciences. PO12: Life-long learning: Recognize				
		0"	Principal		the need for, and have the preparation				
			iri College of Eng sandra, Hesaraghatt Bangalore-560 057		and ability to engage in independent and life-long learning in				



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voltage Engineering, Industrial Drives and

Micro controller.

Department of Electrical and Electronics Engineering the broadest context of technological change. PSO1: The PSOA1: 68% application of PSOA3: 73% fundamental knowledge to identify, formulate and investigate various real time problems of Electrical Machines. Power Electronics, Control System, High Voltage Engineering, Power System and Micro controller. PSO3: The utilization of knowledge regarding project management techniques and sustainable technologies for developing projects in various applications like Renewable energy, Power systems, High

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Depar	tment of Electrical and Electro	nics Engineering		
		CO1: Students will	COA1: 84%	
		be able to discuss the	COA2: 93%	
	*	components of	COA3: 83%	
		protection schemes,	COA4: 76%	
		relay terminologies	COA5: 94%	
		and classification and	COA6: 94%	
		performance of		
	8	protective relays.		
		CO2: Students will		
		be able to explain		
		about the		
		characteristics,		
		various schemes and		
		different forms of		
		overcurrent		
		protection.		
		CO3: Students will		
		be able to explain the		
		working of distance		
		relays and the effects		
		of arc resistance,		
		power swings, line		
		length and source		
		impedance on	п	
		performance of		
		distance relays.		
		CO4: Students will		
		be able to discuss		
	1/	pilot protection and		
		its types,		
0	Principal	construction,		
Sapth	agiri College of Engineering kasandra, Hesaraghatta Pool	operating principles	F	
Chiki	kasandra U Engineering	and performance of		
	Rasandra, Hesaraghatta Road, Bangalore: 560 057	differential relays and		
	Bangalore 560 057	protection of		



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Creating tomotrow	Department of Electrical	and Electronics Engineering	
*		generators, transformers and bus	
		zone.	
		CO5: Students will	
		be able to explain the	
		principle of circuit	
		interruption in	

different types of circuit breakers. CO6: Students will be able to discuss the construction and operating principle of different types of fuses, protection against overvoltage and Gas Insulated Substation (GIS).

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Curriculum Plan Diary (CPD):

SI. No.	Date	Topic / Chapter / Module	Curriculum	Deployment Strategy and Tool	PO, PSO and CO	Attainments	Attainment Verification
1.	14-08-18 to 04-09-18	Module-1: Chapter-1: Introduction to power system protection Chapter-2: Relay construction and operating principles Chapter-3: Overcurrent Protection	 Empower students through the concepts of Power System Protection. Create awareness in students about protection in power system for the economic development of the nation. Teach the students about the need for well-protected power system for overall development of a country. 	1. Chalk and Talk method 2. PPT	PO1: Engineering knowledge PO2: Problem analysis PO12: Life-long learning PSO1 PSO3 CO1: Students will be able to discuss the components of protection schemes, relay terminologies and classification and performance of protective relays. CO2: Students will be able to explain about the characteristics, various schemes and different forms of overcurrent protection.	POA1: 89% POA2: 89% POA12: 89% PSOA1: 89% PSOA3: 75% COA1: 84% COA2: 93%	 Results of Formative and Summative Assessment Assignment
2.	05-09-18 to 27-09-18	Module-2: Chapter-1: Overcurrent	Empower students through the concepts of	1. Chalk and Falk method	PO1: Engineering knowledge PO2: Problem analysis	POA2: 74%	Results of Formative and Summative Assessment



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		protection (Continued) Chapter-2: Distance Protection	Power System Protection. Instruct the importance of power system as a social responsibility. Create awareness in students about protection in power system for the economic development of the nation.	2. PPT	PO12: Life-long learning PSO1 PSO3 CO2: Students will be able to explain about the characteristics, various schemes and different forms of overcurrent protection. CO3: Students will be able to explain the working of distance relays and the effects of arc resistance, power swings, line length and source		• Assignment
				,	power swings, line length and source impedance on performance of distance relays.		
3.	29-09-18 to 16-10-18	Module-3:	• Instruct the importance of	■ Chalk and Talk	PO1: Engineering knowledge	POA2: 51%	Results of Formative and
		Chapter-1: Pilot Relaying Schemes Chapter-2:	power system as a social responsibility. • Create	method • PPT	PO2: Problem analysis PO12: Life-long learning	POA12: 51%	Summative Assessment Assignment
		Chapter-2:	awareness in				



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	Т	D:001			Ta Electronics Engi		
		Differential	students about		PSO1	PSOA1: 51%	
		Protection	protection in		PSO3	PSOA3: 76%	
		Chapter 2	power system			a	
		Chapter-3:	for the				
		Rotating	economic				
		machines	development				
		protection	of the nation.				
		Chapter-4:	Teach the				
		Transformer					
			students about		CO4: Students will	COA4: 76%	
		and bus zone	the need for		be able to discuss		
		protection	well-		pilot protection and		2
			protected		its types,		*
			power system		construction,		
			for overall		operating principles		
			development	1	and performance of		į.
			of a country.		differential relays		¥ 1
					and protection of		
					generators,		
					transformers and bus		
				1)	zone.		
4.	17-10-18 to		■ Instruct the		PO1: Engineering	DOA 1 · 0/19/	
77.	31-10-18	Module-4:		 Chalk and Talk 		POA1: 94% POA2: 63%	 Results of Formative and
	31-10-16	Circuit	importance of	method	knowledge		Summative Assessment
		Breakers	power system	method	PO2: Problem	POA12: 94%	Summative Assessment
		Breakers	as a social	■ PPT	analysis		
			responsibility.	on to comp	PO12: Life-long		 Assignment
			■ Create		learning		
			awareness in				
			students about				
			protection in	Princi			e e
			power system	TIME	has		
			for the	apthagiri College	ofEngineering		
			economic	Chikkasandra, Hes	PSOBNA INVITA	PSOA1: 63%	
			development	Bangalore-	PS037	PSOA3: 63%	
			of the nation.				
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			Departmen	it of Liectifical at	id Electronics Engi	neemig	
			■ Teach the		CO5: Students will	COA5: 94%	
	,		students about		be able to explain the		
			the need for	1	principle of circuit		
		**	well-		interruption in		
			protected		different types of		
			power system		circuit breakers.		
			for overall		To the Market America Green County Control of Control o		
			development				
			of a country.				
5.	03-11-18 to	N.C. 1. 1	 Empower 	- 01 11 1 1 1 1 1	PO1: Engineering	POA1: 63%	P 1/ CP / 1
	20-11-18	Module – 5:	students	Chalk and Talk	knowledge	POA2: 94%	Results of Formative and
		Chapter-1:	through the	method		POA12: 63%	Summative Assessment
	=	Fuses	concepts of	■ PPT	analysis		2 and 2 content and and an action of the content of
		Chapter-2:	Power System	• PPT	PO12: Life-long		 Assignment
		Protection	Protection.		learning		
		against	■ Teach the		PSO1	PSOA1: 63%	1
		overvoltages	students about		PSO3	PSOA3: 94%	7
		overvoltages	the need for	040			,
		Chapter-3:	well-				
		Modern trends	protected		CO6: Students will	COA6: 94%	-
		in power	power system		be able to discuss the	COA0. 9470	1
		system	for overall		construction and		
		protection	development		operating principle		
			of a country.				
			■ Create		of different types of	14	
			awareness in		fuses, protection		
			students about	я 1	against overvoltage		
			protection in		and Gas Insulated	=	
			power system	1	Substation (GIS).		
			for the		principal .		
			economic		Timepar	ng	
			development	~ Pagiri C	ollege Candineeri		
			of the nation.	and and	MASSICULAR TO		7
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Bangalore-560 05.



DEPARTMENT OF CIVIL ENG... ¿ERING SAPTHAGIRI COLLEGE OF ENGINEERING

CURRICULUM PLAN FOR THE ACADEMIC YEAR: ODD 2015-16 (15 SCHEME)

Sl.No. Syllabus	Curriculum	Deployment Strategy	Cross-cutting issues integrated	PO, PSO and CO	Attainments	Attainment Verification
Strength of Materials	basic concepts of the stresses and strains for different materials and strength of structura elements. To know the development or internal forces and resistance mechanism for one dimensional and two dimensional structural elements. Analyse and understand different internal forces and stresses induced dut to representative loads on structural elements. Determine slope and deflections of beam Evaluate the behaviour of torsion members, column and struts	1. Chalk and Talk method 2. PPT 3. YouTube video https://youtu.be/ICDZ 5uLGrl4 https://youtu.be/CDK 2SwS92Kk https://youtu.be/Uahf UvcS24o https://youtu.be/xGP GrS-k6eo https://youtu.be/9- EZ3eyFsBk	• Business Ethics • Human values	knowledge: Apply the knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems PO2: Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations. PO12: Life-long learning Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broades context of technological change		Results or Formative and Summative Assessment Assignment Demonstrating through a project

	PSO1: Expertise in Design and technical areas of Civil Engineering such as Design of RCC Structures, Design of Steel Structures, Design of Composite Structures Materials and pre-stressed concrete structures with a focus on research and innovation. PSO2: Ability of problem solving by adopting analytical, numerical and experimental skills with awareness of societal impact. CO1: Students will be able to evaluate the basic concepts of the stresses and
Principal Sapthagiri College of Engineerir Chikkasandra, Hesaraghatta Road, Bangalore- 560 057	strains for different materials and strength of structural elements CO2: Students will be able to evaluate the development of internal forces and resistance mechanism for one dimensional and two dimensional structural elements CO3: Students will be able to analyse different internal forces and stresses induced due to representative loads on structural elements CO4: Students will be able to evaluate slope and deflections of beams

SLN o.	Date	Topic/Chapter/Module	Curriculum	Deployment Strategy and Tool	PO, PSO and CO	Attainments	Attainment Verification
	1-08-2018 to 20-08-2018	Module-I. Simple Stresses and Strain	Understand the basic concepts of the stresses and strains for different materials and strength of structural elements	Chalk and Talk method https://voutu.be/CDK2 SwS92KK	PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems PO2: Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. PSO2: Ability of problem solving by adopting analytical, numerical and experimental skills with awareness of societal impact CO1: Students will be able to evaluate the basic concepts of the stresses and strains for different materials and strength of structural elements	COA1:95%	 Results of Formative and Summative Assessment Assignment Demonstrating through a project
		5	apthagiri College d En Chikkasandra, Hesaraghe Bangalore- 560 05	ua Road,			1 14

23-08-2018	Module-2 Cirapter-1: Compound Stresses Chapter-2: Thin and Thick Cylinders	development of internal forces and resistance mechanism for one dimensional and two	Z3eyFsB engineering specialization through	tive and ative ament
		Principal Sapthagiri College of En Chikkasandra, Hesaragha Bangalore- 560 05	ta Road	

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14-09-2018 to 5-10-2018	Module-3 Chapter-1: Shear Force and Bending Moment in Beams	Analyse and understand different internal forces and stresses induced due to representative loads on structural elements.	* Chaik and Talk method * https://youtu.b	knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems PO2: Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. PSO2: Ability of problem solving by adopting analytical, numerical and experimental skills with		Formative and Summative Assessment
		Sapthagiri Coll Chikkasandra,	incipal ege of Engineeri Hesaraghatta Road ore- 560 057		COA1:95%	

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	10-10-2688 to 2-11-2018	Module-4 Chapter-E Bending and Shear Stresses in Beams Chapter-2: Torsion in Circular Shaft	different internal forces and stresses induced due to representative loads on structural elements Evaluate the habitant of tarsion members,	Talk method	knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the lution of complex engineering problems PO2: Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and	POA1:80%	Formative and Summative Assessment
eneritari distructurisi respetivista del sessione del consistenci como di successivi di sessioni del consistenci					PSO2: Ability of problem solving by adopting analytical, numerical and experimental skills with awareness of societal impact CO4: Students will be able to evaluate slope and deflections of beams		
tenand tenanticum acte filicit interior presentation or presentation of the control of the contr			at the counti	plicipal ollege of Enginee ra, Hesaraghatta Roa galore- 560 057	ng.		

·	7 = 11-2019	Module-5		Decoming stope and	• Chalk and	* NUCLEAR CONTRACTOR C	POAT:80%	Results of Formative and
	113	Claritie It		deflect mass leams	Talk method	knowledge: Apply the knowledge of		Summative
	28-11-2018	of Basins		Induste the buhaviour	https://youtu.b	mathematics, science,	- 1924 V 2 1 1 2 1	Assessment
				of columns and struts	e/ICDZ5uLGrI	engineering		Assignment
		Chapter-2:	Columns		4	fundamentals, and an engineering specialization		Demonstrating through a project
	and the second	and Struts		Total Control of the		to the a lution of complex		intough a project
	and in control of					engineering problems		
		4. 19. 19. 19. 19. 19. 19. 19. 19. 19. 19				PO2: Problem analysis:		
						Identify, formulate,		
						research literature, and analyze complex		
						engineering problems		
						reaching substantiated		
		Witten Marie				conclusions using first		
	No.	1				principles of mathematics.		
		1				natural sciences, and	acceptant of the second of the	
	فانت	l .				engineering sciences.	i) yanabira	6
				Name of Street		PSO2: Ability of problem	PSOA1:80%	
						solving by adopting		
	inamii 136					analytical, numerical and		
	and the second	in the state of th				experimental skills with		
		time Cir				awareness of societal		
	National Property and Property					impact		
		and the same of th				CO5: Students will be able	COA1:95%	
						to evaluate the behaviour of		
						torsion members, columns		
		primaria.				and struts		·
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		inchiance in the second						
	1	\$		V.		No.		

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CURRIC JLUM PLANNING -DYNAMICS OF MACHA, £RY (15ME52)

SI.N o.	Syllabus / Course	Curriculum	Deployment Strategy and Tool	Cross-cutting issues integrated	PO, PSO and CO	Attainments	Attainment Verification
	Dynamics of Machinery	 Understand concept and principles behind analysis of components of mechanisms. Analyze forces in components of mechanisms Analyze various components of mechanisms for balancing. Analyze various characteristics of the governor and gyroscope. Understand the concept and types vibrations apply principle of super position to addition of motion Analyze free vibration of single degree of freedom systems. Analyze forced vibration of single degree of freedom system. 	1. Chalk and Talk method 2. PPT 3. YouTube videos 4.NPTEL videos	Human Values Environmental issues	PO1: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. PO2: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. PO3:Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations PO9: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings. PO12: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	PO1-80% PO2-80% PO3- 53% PO9-53% P012- 53%	1. Results of Formative and Summative Assessment 2. Assignment 3. Course end survey
	-				PSO1: Expertise in specialized areas of Mechanical Engineering such as Design, Thermal, Materials and Manufacturing Engineering with a focus on research and innovation. PSO2: Ability of problem solving by adopting analytical, numerical and experimental skills with awareness of societal impact for mechanical engineering.	PSO1-80% PSO2-80%	
					CO 1: Analyze simple mechanisms subjected to static and dynamic force. CO2: Analyze the balancing of rotating and reciprocating masses. CO3: Analyze various characteristics of the governor and gyroscope. CO4: Explain the basics of vibration and apply principle of super position to addition of motion CO5: Analyze free vibration of single degree of freedom systems. CO6: Analyze forced vibration of single degree of freedom systems.	CO1-83% CO2-84% CO3-85% CO4- 84% CO5- 74% CO6 - 74%	

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DYNAMICS OF MACHINERY (15ME52) D...RY

SI.N o.	Date	Topic/Chapter/Mod ule	Curriculum	Deployment Strategy and Tool	PO, PSO and CO	Attainments	Attainment Verification
1.	1/8/18 to 29/8/18	Module-1 Chapter1: Static force Analysis Chapter2: Dynamic force Analysis	 To provide concept of equilibrium and force analysis. Able to determine various forces in elements of mechanisms through graphical method Analyze static and dynamic forces in mechanisms, which is essential for design process. 	Chalk and Talk method PPT	PO1, PO2, PO3, PO9, PO12 PSO1, PSO2 CO1: Able to analyze simple mechanisms subjected to static and dynamic force	CO1-83%	 Results of Formative and Summative Assessment Assignment Course end survey
2.	30/8/18 to 15/9/18	Module-3 Chapter1: Governors Chapter2: Gyroscopes	To provide basic knowledge of governor and gyroscopes Analyze characteristics of different types of governors Analyze gyroscopic effects.	 Chalk and Talk method You tube Videos 	PO1, PO2, PO3, PO9, PO12 PSO1, PSO2 CO3: Able to analyze various characteristics of the governor and gyroscope.	CO3-85%	 Results of Formative and Summative Assessment Assignment Quiz Course end survey
3.	22/9/18 to 6/10/18	Module-2 Chapter1: Balancing of Rotating Masses: Chapter2: Balancing of Reciprocating Masses	 To provide concept of balancing. Draw force polygon and couple polygon and determine unknown values Analyze balancing of rotating and reciprocating masses. 	 Chalk and Talk method You tube videos 	PO1, PO2, PO3, PO9, PO12 PSO1, PSO2 CO2: Able to analyze the balancing of rotating and reciprocating masses.	CO2-84%	 Results of Formative and Summative Assessment Assignment Quiz Course end survey
4.	10/10/18 to 27/10/18	Module-4 Chapter-1: Introduction to vibration Chapter-2: Undamped free Vibrations	 To provide basic knowledge of vibration. Addition of SHM analytically and graphically Apply Newton's, Energy and Raleigh methods to Analyze spring mass systems. 	 Chalk and Talk method PPT NPTEL videos 	PO1, PO2, PO3, PO9, PO12 PSO1, PSO2 CO 4: Able explain the basics of vibration and apply principle of super position to addition of motion CO5: Able to analyze free vibration of single degree of freedom systems.	CO4- 84% CO5- 74%	Results of Formative and Summative Assessment Assignment Quiz Course end survey
5.	31/10/18 to 20/11/18	Module-5 Chapter-1: Damped free Vibrations Chapter-2: Forced Vibrations	 To provide basic knowledge of damped and forced vibration. Analyze damping and forced vibration characteristics Apply Newton's, energy and Raleigh methods to Analyze spring mass systems. 	 Chalk and Talk method PPT NPTEL videos 	PO1, PO2, PO3, PO9, PO12 PSO1, PSO2 CO5: Able to analyze free vibration of single degree of freedom systems. CO6: Able to analyze forced vibration of single degree of freedom system.	CO6 - 74%	 Results of Formative and Summative Assessment Assignment Quiz Course end survey