

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY BATHINDA-151001 (PUNJAB), INDIA

(A State University Estb. by Govt. of Punjab vide Punjab Act No. 5 of 2015 and Approved u/s 2(f) & 12 (B) of UGC; Member AIU)

Department: ELECTRICAL ENGINEERING

Giani Zail Singh Campus College of Engineering & Technology, MRSPTU

Program: M Tech Power System

Subject	Sub Code	Sem	Credit	Duration	ЦТΡ	CO No.	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
SISY						CO1.	Able to calculate voltage phasor at all buses, given the data using various methods of load flow		3								3	2
IAL						CO2.	Able to calculate fault currents in each phase		3		Î				ľ		3	2
EM AN	E1-101		~	0	0 (CO3.	Rank various contingencies according to their severity.			3							3	2
ER SYSTI	MELE	[(1)	4	3 (CO4.	Estimate the bus voltage phasor given various quantities viz. power flow, voltages, taps, CB status etc		3								3	2
POWI						CO5.	Estimate closeness to voltage collapse and calculate PV curves using continuation power flow		3	3							3	2
						CO1.	Understand the modeling of synchronous machine in details.				3					1	3	2
R SYSTEM	EE1-103	1	2		0 4	CO2.	Carry out simulation studies of power system dynamics using MATLAB- SIMULINK, MI POWER.					3				1	3	2
POWEH DYNA	MEL				0	CO3.	Carry out stability analysis with and without power system stabilizer (PSS).		3							1	3	2
						CO4.	Understand the load modeling in power system.				3					1	3	2

COURSE ARTICULATION MATRIX

Subject	Sub Code	Sem	Credit	Duration	ЦТΡ	CO No.	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
						CO1.	Understand research problem formulation, analyze research related information, Follow research ethics.		3	3					2			3
						CO2.	Understand that today's world is controlled by computer, information technology, but tomorrow world will be ruled by ideas, concept, and creativity.	3								3		
ology and IPR	MRMIP-101	1	2	28	2 0 0	CO3.	Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.	3								3		
Research Methode						CO4.	Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.	3								3		
ergy and tion						CO1.	Know about various renewable energy sources.	3								3		
ole En ed Genera	1-156	1	3	40	3 0 0	CO2.	Understand the working of distributed generation system in autonomous / grid connected modes.	3								3		
Renewał System Distribut	MELEE					CO3.	Know the impact of distributed generation on power system	3								3		
						CO1.	Appreciate the difference between smart grid & conventional grid.	3	1							3		
						CO2.	Apply smart metering concepts to industrial and commercial installations.	3				3				3	3	
ds	-157	1	3	40	3 0 0	CO3.	Formulate solutions in the areas of smart substations, distributed generation and wide area measurements.	3			3	2				3	3	
Smart Gri	MELEE1.					CO4.	Come up with smart grid solutions using modern communication technologies	3			3	3				3	3	

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						CO1.	Learn the characteristics of PSDs such as SCRs, GTOs, IGBTs and use them in practical systems.	3			3	1				3	3	
c Converters	58	1	3	40	3 0 0	CO2.	Knowledge of working of multi-level VSIs, DC-DC switched mode converters, Cyclo - Converters and PWM techniques and the ability to use them properly.	3			3	1				3	3	
Powei	EE1-1					CO3.	Acquire knowledge of power conditioners and their applications.	3			3	1				3	3	
High	MEL					CO4.	Ability to design power circuit and protection circuit of PSDs and converters	3			2					3	2	
						CO1.	Appreciate the importance of energy growth of the power generation from the renewable energy sources and participate in solving these problems.	3		3						3	3	1
r Systems	ELEE1-159	1	ю	40	3 0 0	CO2.	Demonstrate the knowledge of the physics of wind power and solar power generation and all associated issues so as to solve practical problems	3		3						3	3	1
Wind and Sola	M					CO3.	Demonstrate the knowledge of physics of solar power generation and the associated issues, identify, formulate and solve the problems of energy crises using wind and solar energy	3		3						3	3	1
iti el	1				•	CO1.	Understand of power distribution system.	3								3		
lectrica ower istribu	ELEE 50	1	б	40	300	CO2.	Study of Distribution automation and its application in practice.	3			3					3	3	
E A O 5	M M					CO3.	To learn SCADA system.	3								3	3	
r Power						CO1.	Knowledge about vector spaces, linear transformation, Eigen values and Eigen vectors of linear operators.	3										3
n Techniques fo	61	1	ю	40	3 0 0	CO2.	To learn about linear programming problems and understanding the simple method for solving linear programming problems in various fields of science and technology.	3	3									3
Optimizatio Engineering	MELEE1-10					CO3.	Acquire knowledge about nonlinear programming and various techniques used for solving constrained and unconstrained nonlinear programming problems.	3	3									3

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		-				CO4.	Understanding the concept of random variables, functions of random variable and their probability distribution.	3										3
						CO5.	Understand stochastic processes and their classification	3	3									3
Vidth PE						CO1.	Appreciate importance of PWM techniques.	3	3							3	2	
v on for rs	-162	1	3	40	$0 \ 0$	CO2.	Implement PWM using different strategies.	3			3						3	2
lati	EE1				\mathfrak{S}	CO3.	Control CSI and VSI using PWM.	3			3						3	2
Pulse Modu Conve	MELI					CO4.	Compare performance of converter for different PWM techniques		3								2	3
ctric I Hybrid hicles e:	aLEE1- S	1	3	40	0 0 8	CO1.	Acquire knowledge about fundamental concepts, principles, analysis and design of hybrid and electric vehicles.	3	3		3					3	3	2
Ele and Vel	ME 163				(1)	CO2.	To learn electric drive in vehicles/traction	3			3	1				3	3	
For aper	01					CO1.	Understand that how to improve your writing skills and level of readability	3							3			3
H	v0-1		-	0	0	CO2.	Learn about what to write in each section.	3							3			3
English Research Writing	MHUMA	1)	3	2 (CO3.	Understand the skills needed when writing a Title Ensure the good quality of paper at very first-time submission	3	3						3			3
						CO1.	Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.	3	3							3	3	
						CO2.	Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.	3	3	3						3	3	
	MCIVE0-101	1	0	30	2 0 0	CO3.	Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.	3	3							3	3	
Disaster Management	I					CO4.	Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in	3	3							3	3	

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for						CO1.	Understanding basic Sanskrit language.	3							1	3		
krit nical vledge	JMA0-	1	0	30	0 0	CO2.	Ancient Sanskrit literature about science & technology can be understood.	3							1	3		
Sans Tech Knov	MHU 102				(1	CO3.	Being a logical language will help to develop logic in students	3			1				1	3		
q	40-				0	CO1.	Knowledge of self-development.	3								3		
alue lucatic	HUM. 13	-	0	30	2 0	CO2.	Learn the importance of Human values.	3								3		
ΕČ	ΣΞ					CO3.	Developing the overall personality	3								3		
						CO1.	Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.	3								3		
				0	0	CO2.	Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.	3								3		
titution of India	JMA0-104	1	0	3(2 0	CO3.	Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.	3	3							3		
Cons	IHM					CO4.	Discuss the passage of the Hindu Code Bill of 1956	3								3		
						CO1.	What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?	3								3		
tudies	.105	1	0	30	2 0 0	CO2.	What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?	3	3							3	3	1
Pedagogy S	MHUMA0-					CO3.	How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?	3	3		1					3	3	1
tress Ianag nent	IHU LA0-	-	0	30	0 0	CO1.	Develop healthy mind in a healthy body thus improving social health also.	3		1	1					3		
or ≤ ⊇ Q.	22				7	CO2.	Improve efficiency	3		1	1					3		

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through ntenment						CO1.	Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life.	3								3		
nality lopment Enligh	MA0-107	1	0	30	2 0 0	CO2.	The person who has studied Geeta will lead the nation and mankind to peace and prosperity.	3								3		
Perso Devel Life Skills	NHN					CO3.	Study of Neetishatakam will help in developing versatile personality of students.	3								3		
of 1	2					CO1.	Learn the importance of Digital Relays.	3								3		
l ttion e Systen	3E1-205	2	33	40	0 0	CO2.	Apply Mathematical approach towards protection.				3						3	
Digita Protec Power	MELF				З	CO3.	Learn to develop various Protection algorithms.				3						3	
amics-II						CO1.	Gain valuable insights into the phenomena of power system dynamics including obscure ones.	3									3	
m Dyn)6	2	33	40	0 0	CO2.	Understand the power system stability problem.		3								3	
er Syste	,EE1-2(З	CO3.	Analyse the stability problems and implement modern control strategies.		3								3	
Powe	MEL					CO4.	Simulate small signal and large signal stability problems.		2			3					3	2
						CO1.	Define the objective, formulate the problem and prepare an action plan for conducting the investigation.			3								
		2	2		0 0 4	CO2.	Then perform the required Experiment/Develop a Simulation Model/Solve the Problem/Develop a Design/Explore the feasibility/Conduct a survey etc. depending upon the action plan.			3	3	3						
ect e:	-210					CO3.	Analyse the results and prepare a written report on the study conducted for presentation to the Department		3						3			
Mini Proj	MELEE1					CO4.	Final seminar, as oral presentation before a departmental committee								3			

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ower						CO1.	Describe various types of regulations in power systems.	3								3		
					0	CO2.	Identify the need of regulation and deregulation.		3								3	
ructured	EE1-264	2	3	40	3 0	CO3.	Define and describe the Technical and Non- technical issues in Deregulated Power Industry	3	3							3		
Restr Syste	MEL					CO4.	Identify and give examples of existing electricity markets	3								3		
cessing						CO1.	Knowledge about the time domain and frequency domain representations as well analysis of discrete time signals and systems.	3	3							3		
Signal Pro		2	ю	40	0 0	CO2.	Study the design techniques for IIR and FIR filters and their realization structures. Design of optimum FIR and IIR filters.				3						3	2
ed Digital	1-265				3	CO3.	Acquire knowledge about the finite word length effects in implementation of digital filters.	3								3		
Advance	MELEE					CO4.	Knowledge about the various linear signal models and estimation of power spectrum of stationary random signals.	3		3						3		1
Ilectrical						CO1.	Formulate the electrodynamics equations of all electric machines and analyze the performance characteristics		3		3						3	3
of E	99	2	З	40	0 0	CO2.	Knowledge of transformations for the dynamic analysis of machines	3	3								3	3
ynamics lachines	ELEE1-2				3	CO3.	Knowledge of determination of stability of the machines under small signal and transient conditions	3		3							3	3
ΩΣ	Σ					CO4.	Study about synchronous machines	3								3		
rical iine yn	.EE1-267	2	б	40	3 0 0	CO1.	To give a systematic approach for modeling and analysis of all rotating machines under both transient and steady state conditions with the dimensions and material used	3	3		3						3	3
Elect Macł Desig	MEL					CO2.	Ability to model and design transformers, three-phase induction motors and alternator.	3			3						3	3
anced o- toller d	EE1-	2	3	40	0 0	CO1.	To learn how to program a processor in assembly language and develop an advanced processor based system.	3			3	3					3	2
Advi Micr Cont Base	MEI 268				3	CO2.	To learn configuring and using different peripherals in a digital system	3			3						3	2

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		Ī				CO3.	To compile and debug a Program	3			3						3	
						CO4.	To generate an executable file and use it	3			3						3	
						CO1.	Describe the basic tasks of supervisory control and data acquisition systems (SCADA) as well as their typical applications.	3								3		
cations	-269				0	CO2.	Acquire knowledge about SCADA architecture, various advantages and disadvantages of each system	3								3		
Applic	LEE1.	2	3	40	300	CO3.	Knowledge about single unified standard architecture IEC 61850	3								3		
System and	ME					CO4.	To learn about SCADA system components: remote terminal units, PLCs, intelligent electronic devices, HMI systems, SCADA server.	3			3	3					3	
SCADA						CO5.	Learn and understand about SCADA applications in transmission and distribution sector, industries etc	3			3						3	1
						CO1.	Acquire knowledge about the harmonics, harmonic introducing devices and effect of harmonics on system equipment and loads.	3	3	3						3	3	2
		0	3	0	0 (CO2.	Develop analytical skills needed for modeling and analysis of harmonics in networks and components		3		3						3	
Quality	1-270			4	3 (CO3.	To introduce the students to active power factor correction based on static VAR compensators and their control techniques.			3	3						3	2
Power (MELEE					CO4.	To introduce the students to series and shunt active power filtering techniques for harmonics.				3						3	2
gence						CO1.	Learn the concepts of biological foundations of artificial neural networks	3								3		
Intelli	71	2	3	40	0 0	CO2.	Learn Feedback networks and radial basis function networks and fuzzy logics.	3								3		3
icial niques	EE1-21				б	CO3.	Identifications of fuzzy and neural networks		3							3		3
Artifi Techı	MEL					CO4.	Acquire the knowledge of GA and EP.	3								3		3

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(Phase-I)						CO1.	Design a meaningful research project that demonstrates spatial thinking and uses the knowledge and skills.				3							3
Project	111	3	10		0 0 20	CO2.	Define and analyse a problem in latest research areas		3	3							2	3
or I ertation	LEE1-3					CO3.	Formulate and write a research proposal.			3					3			3
Majo Diss	MEI					CO4.	Synopsis and its Presentation								3			3
ents						CO1.	Knowledge of various transients that could occur in power system and their mathematical formulation.	3			1						3	
em Transie	72	3	ю	40	3 0 0	CO2.	Ability to design various protective devices in power system for protecting equipment and personnel	1			3						3	1
r Syste	EE1-3					CO3.	Coordinating the insulation of various equipment in power system	1			3						3	
Powe	MEL					CO4.	Modeling the power system for transient analysis.	1	3		3						3	1
ver Devices						CO1.	Acquire knowledge about the fundamental principles of passive and active and reactive power compensation schemes at transmission and distribution level in power systems.	3								3		
and Custom Pov	.1-373	3	3	40	3 0 0	CO2.	Learn various Static VAR Compensation Schemes like Thyristor/GTO controlled reactive power systems; PWM inverter based reactive power systems and their controls	3								3		
FACTS	MELEE					CO3.	To develop analytical modeling skills needed for modeling and analysis of such Static VAR Systems		3		3						3	1
eling						CO1.	Knowledge about load control techniques in industries and its application.	3			1					3	3	
oad Mod	74	3	ю	40	3 0	CO2.	Learn different types of industrial processes and optimize the process using tools like LINDO and LINGO	3									3	3
strial L Control	,EE1-3					CO3.	Apply load management to reduce demand of electricity during peak time				3						3	1
Indu: and (MEL					CO4.	Apply different energy saving opportunities in industries				3						3	1

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						CO1.	To learn linear system modeling, analysis and design so as to obtain the ability to apply the same to engineering problems in a global perspective.	3	3	3	3	1				3	3	2
Systems	E1-375	~	~	0	0	CO2.	Knowledge on carrying out detailed stability analysis of both linear and nonlinear systems	3	3			1				3	3	2
inear	MELE	(1)	(1)	4	3	CO3.	Design observers and controllers for linear systems	3			3	1				3	3	3
cs Of I	I					CO4.	Acquire knowledge of discrete time linear systems modeling, analysis and design.	3	3	3	3	1				3	3	3
Dynami						CO5.	Develop and utilize modern software tools for analysis and design of linear continuous and discrete time systems	3	3		3	3				3	3	3
						CO1.	Students will demonstrate knowledge of data analytics.	3	3							3		
nalytics	91	3	3	40	0 0	CO2.	Students will demonstrate the ability of think critically in making decisions based on data and deep analytics	3	3								3	
Business A	MELEE1-3				3	CO3.	Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making.	3			3						3	1
	93				0	CO1.	Students should able to apply the dynamic programming to solve problems of discreet and continuous variables.	1		3								
ations arch	EE1-3	3	ю	40	3 0	CO2.	Students should be able to apply the concept of non-linear programming.	1	2	3								
Oper Rese	MEL					CO3.	Students should able to carry out sensitivity analysis.	1	3									
roject	1-412	+	9		32	CO1.	Execute a meaningful research project that demonstrates spatial thinking and uses the knowledge and skills.	1	2					3			3	
Major P	MELEE	4	1		0 0	CO2.	Able to learn effectively record data and experiments so that others can understand them.							3	2		3	3

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						CO3.	Communicate the findings by means of a thesis, written in the format specified by the department/institute. Each student will be required to complete a Dissertation and submit a written report on the topic on any of the areas of modern technology related to Electrical Engineering including interdisciplinary fields in the final semester of M. Tech Course.								3			3

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%