Vision of the Institute

To be among the best of the institutions for engineers and technologists with attitudes, skills and knowledge and to become an epicenter of creative solutions.

Mission of the Institute

To achieve and impart quality education with an emphasis on practical skills and social relevance.

Vision of the Department

To impart technical knowledge and skills required to succeed in life, career and help society to achieve self sufficiency.

Mission of the Department

- To become an internationally leading department for higher learning.
- To build upon the culture and values of universal science and contemporary education.
- To be a center of research and education generating knowledge and technologies which lay groundwork in shaping the future in the fields of electrical and electronics engineering.
- To develop partnership with industrial, R&D and government agencies and actively participate in conferences, technical and community activities.

Programme Educational Objectives (B.Tech. – EEE)

This programme is meant to prepare our students to professionally thrive and to lead.

During their progression:

Graduates will be able to

PEO 1: Have a successful technical or professional career, including supportive and leadership roles on multidisciplinary teams.

PEO 2: Acquire, use and develop skills as required for effective professional practices.

PEO 3: Able to attain holistic education that is an essential prerequisite for being a responsible member of society.

PEO 4: Engage in life-long learning, to remain abreast in their profession and be leaders in our technologically vibrant society.

Programme Outcomes (B.Tech. – EEE)

At the end of the Programme, a graduate will have the ability to

PO 1: Apply knowledge of mathematics, science, and engineering.

PO 2: Design and conduct experiments, as well as to analyze and interpret data.

PO 3: Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

PO 4: Function on multi-disciplinary teams.

PO 5: Identify, formulates, and solves engineering problems.

PO 6: Understanding of professional and ethical responsibility.

PO 7: Communicate effectively.

PO 8: Broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.

PO 9: Recognition of the need for, and an ability to engage in life-long learning.

PO 10: Knowledge of contemporary issues.

PO 11: Utilize experimental, statistical and computational methods and tools necessary for engineering practice.

PO 12: Demonstrate an ability to design electrical and electronic circuits, power electronics, power systems; electrical machines analyze and interpret data and also an ability to design digital and analog systems and programming them.

PEOs & POs Mapping

Programme Educational Objectives (PEOs)	Programme Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
1	M	M	-	-	H	-	-	H	H	-	H	H
2	-	-	M	M	H	H	H	-	-	-	-	H
3	-	-	-	-	H	H	M	M	M	M	H	H
4	-	-	-	M	M	H	M	H	H	-	M	H

* H: Strongly Correlating (3); M: Moderately Correlating (2)& L: Weakly Correlating (1)

HOD-EEE

COURSE OBJECTIVES

Academic **Y**ear : **2018-2019**

Semester : **I**

Name of the Program: **B.Tech** Year: **IV** Section: **A/B**

Course/Subject: **Power Semiconductor Drives** Course Code:**GR15A4022**

Name of the Faculty: **Dr. Dola Gobinda Padhan** Dept.: **EEE**

Designation: **PROFESSOR**

On completion of this Subject/Course the student shall be able to:

S.No	Objectives
1	To provide students with a strong back ground in different types of electrical drives.
2	To train the students to have the solid foundation in mathematical and technical concepts required to engineering problems.
3	To prepare the students to excel in post graduate programs or to succeed in industry.
4	To provide a foundation in the theory and applications of electrical machinery and their different types with respect to their control.

Signature of HOD Signature of faculty

Date: Date:

Note: Please refer to Bloom's Taxonomy, to know the illustrative verbs that can be used to state the objectives.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

COURSE OUTCOMES

Academic **Y**ear : 2018-2019

Semester : I

Course/Subject: Power Semiconductor Drives Course Code:GR15A4022

Name of the Faculty: Dr. Dola Gobinda Padhan Dept.: EEE

Designation: PROFESSOR

The expected outcomes of the Course/Subject are:

S.No	Outcomes
1	Apply suitable controlling method for different electrical appliances.
2	Derive the speed-torque expression of DC motor drive fed by Single phase converters
3	Analyse the performance characteristics of DC Motor drive fed by Three Phase Converters.
4	Understand four quadrant operation of DC drives
5	Build control methodology for DC motors by Choppers.
6	Develop control methods for induction motor drive from stator side or rotor side
7	Articulate the concepts of separate control and self control of synchronous motor drives..

Signature of HOD

Date:

Signature of faculty

Date:

Note: Please refer to Bloom's Taxonomy, to know the illustrative verbs that can be used to state the outcomes.

LIST OF VARIOUS MAPPINGS/MATRIX COURSE

1. **Program Educational Objectives (PEOs) – Vision/Mission Matrix** (Indicate the relationships by mark "X")

PEO's	Mission of the department			
	Higher Learning	Contemporary Education	Technical Knowledge	Research
Graduates will have a successful technical or professional careers, including supportive and leadership roles on multidisciplinary teams	X	X	X	X
Graduates will be able to acquire, use and develop skills as required for effective professional practices		X	X	
Graduates will be able to attain holistic education that is an essential prerequisite for being a responsible member of	X		X	
Graduates will be engaged in life-long learning, to remain abreast in their profession and be leaders in our technologically vibrant	X		X	X

2. **Program Educational Objectives(PEOs)-Program Outcomes(POs) Relationship Matrix**
(Indicate the relationships by mark "X")

P-Outcomes / PEOs	a	B	c	d	e	f	g	H	i	j	K	L
1	X	X			X			X		X		X
2	X	X			X			X			X	
3			X	X	X	X	X					X
4					X	X	X	X	X	X	X	X

3. **Course Objectives-Course Outcomes Relationship Matrix** (Indicate the relationships by mark “X”)

Course-Outcomes / Course-Objectives	1	2	3	4	5	6	7
1	X						
2	X	X	X	X			
3	X				X	X	X
4	X				X	X	X

4. Course Objectives-Program Outcomes(POs) Relationship Matrix (Indicate the relationships by mark “X”)

P-Outcomes / C-Objectives	a	b	c	d	e	F	g	H	i	J	K	l
1	X				X		X	X	X	X	X	
2	X	X	X	X	X	X	X	X			X	
3	X	X	X	X	X	X	X	X	X		X	X
4	X	X	X	X	X	X	X	X		X	X	

5. Course Outcomes-Program Outcomes(POs) Relationship Matrix (Indicate the relationships by mark “X”)

P-Outcomes / C-Outcomes	a	b	c	d	E	f	g	h	i	J	k	l
1	x		x					x				x
2	x	x			x							x
3	x		x					x				
4		x	x									x
5			x									x
6	x										x	
7	x	x			x							x

5. Courses (with title & code)-Program Outcomes (POs) Relationship Matrix
(Indicate the relationships by mark "X")

P-Outcomes / Courses	a	b	c	d	E	f	g	h	i	J	k	l
Power Semiconductor Drives	X	X	X	X	X	X	X	X	X	X	X	X

6. Program Educational Objectives (PEOs)-Course Outcomes Relationship Matrix
(Indicate the relationships by mark "X")

P-Objectives (PEOs) / Course-Outcomes	1	2	3	4
1	X		X	
2	X		X	
3	X	X		
4	X		X	
5	X	X		X
6	X	X		X
7	X	X		X

7. **Assignments and Assessments - Program Outcomes (POs) Relationship Matrix**
(Indicate the relationships by mark “X”)

P-Outcomes / Assessments	a	b	c	d	E	f	g	h	i	J	k	l
Mid Exam	X		X		X			X			X	
Assignments	X	X		X	X	X		X			X	
Seminars/ Conferences	X	X	X	X			X		X	X	X	
Project Work	X	X		X	X	X		X			X	
Main Exam	X		X		X			X			X	
Behavioral Observation	X	X	X	X	X	X	X				X	X

8. **Assignments and Assessments – Program Educational Objectives (PEOs) Relationship Matrix**
(Indicate the relationships by mark “X”)

P-Outcomes / Assessments	1	2	3	4
Mid Exam	X	X		X
Assignments	X	X	X	
Seminars/ Conferences	X	X		X
Project Work	X	X	X	
Main Exam	X		X	X
Behavioral Observation	X		X	X

GUIDELINES TO STUDY THE COURSE / SUBJECT

Academic **Y**ear : 2018-2019

Semester : I

Name of the Program: B.Tech ……EEE…… Year: ……IV….. Section: A / B

Course/Subject: ……Power Semiconductor Drives…… Course Code: GR15A4022

Name of the Faculty: ……Dr. Dola Gobinda Padhan……..Dept.: …EEE……

Designation: PROFESSOR.

Guidelines to study the Course/ Subject: Power Semiconductor Drives

Course Design and Delivery System (CDD):

The Course syllabus is written into number of learning objectives and outcomes.

These learning objectives and outcomes will be achieved through lectures, assessments, assignments, experiments in the laboratory, projects, seminars, presentations, etc.

Every student will be given an assessment plan, criteria for assessment, scheme of evaluation and grading method.

The Learning Process will be carried out through assessments of Knowledge, Skills and Attitude by various methods and the students will be given guidance to refer to the text books, reference books, journals, etc.

The faculty be able to –

Understand the principles of Learning

Understand the psychology of students

Develop instructional objectives for a given topic Prepare course, unit and lesson plans

Understand different methods of teaching and learning Use appropriate teaching and learning aids

Plan and deliver lectures effectively

Provide feedback to students using various methods of Assessments and tools of Evaluation

Act as a guide, advisor, counselor, facilitator, motivator and not just as a teacher alone

Signature of HOD

Date:

Signature of faculty

Date:

COURSE SCHEDULE

Academic **Y**ear : 2018-2019

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A

Course/Subject: ……**Power Semiconductor Drives**……Course Code: GR15A4022

Name of the Faculty: ……..**Dr. Dola Gobinda Padhan**……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

The Schedule for the whole Course / Subject is:

S. No.	Description	Duration (Date)		Total No. Of Periods
		From	To	
1.	Phase Controlled converter fed DC motors	27/6/18	21/6/18	17
2.	Four Quadrant Operation of DC Drives	23/7/18	30/7/18	8
3.	Control of DC motors by Choppers	4/8/18	20/8/18	11
4.	Control of Induction Motor	22/8/18	8/10/18	22
5.	Control of Synchronous Motor	13/10/18	29/10/18	12

Total No. of Instructional periods available for the course: ..……70……. Hours / Periods

ILLUSTRATIVE VERBS FOR STATING INSTRUCTIONAL OBJECTIVES

These verbs can also be used while framing questions for Continuous Assessment Examinations as well as for End – Semester (final)Examinations

ILLUSTRATIVE VERBS FOR STATING GENERAL OBJECTIVES/OUTCOMES

Know Comprehend	Understand Apply	Analyze Design	Generate Evaluate

ILLUSTRATIVE VERBS FOR STATING SPECIFIC OBJECTIVES/OUTCOMES:

A. COGNITIVE DOMAIN (KNOWLEDGE)

1	2	3	4	5	6
Knowledge	Comprehension Understanding	Application of knowledge & comprehension	Analysis Of whole w .r.t. its Constituents	Synthesis	Evaluation Judgment
Define	Convert	Change	Breakdown	Categorize	Appraise
Identify	Defend	Compute	Differentiate	Combine	Compare
Label	Describe (a	Demonstrate	Discriminate	Compose	Conclude
List	Procedure)	Deduce	Distinguish	Compose	Contrast
March	Distinguish	Manipulate	Separate	Create	Criticize
Reproduce	Estimate	Modify	Subdivide	Devise	Justify
Select	Explain why/how	Predict		Design	Interpret
State	Extend	Prepare		Generate	Support
	Generalize	Relate		Organize	
	Give examples	Show		Plan	
	Illustrate	Solve		Rearrange	
	Infer			Reconstruct	
	Summarize			Reorganize	
				Revise	

B. AFFECTIVE DOMAIN (ATTITUDE)		C. PSYCHOMOTOR DOMAIN (SKILLS)				
Adhere	Resolve	Bend	Dissect	Insert	Perform	Straighten
Assist	Select	Calibrate	Draw	Keep	Prepare	Strengthen
Attend	Serve	Compress	Extend	Elongate	Remove	Time
Change	Share	Conduct	Feed	Limit	Replace	Transfer
Develop		Connect	File	Manipulate	Report	Type
Help		Convert	Grow	Move Precisely	Reset	Weigh
Influence		Decrease	Increase	Paint	Set	

SCHEDULE OF INSTRUCTIONS
COURSE PLAN

Academic **Y**ear : 2018-2019

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: ……..**Dr. Dola Gobinda Padhan**……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

S.No	Reference Text Books	Author
T1	Fundamentals of electrical drives	G.K.Dubey
T2	Power electronics circuits , devices and applications	M.H.Rashid

Unit No.	Lesson No.	Date	No. of Periods	Topics / Sub-Topics	Objectives	Outcomes	References (Text Book, Journal…) Page Nos.: ___to ____
1.	1.1	27/6/18	1	Introduction to Thyristor controlled Drives	1	1	T1 Page No. 97 to 98
	1.2	30/6/18	2	single phase semi controlled converters connected to d.c. separately excited motors continuous current operation	2	2	T1 page No. 98 to 99
	1.3	02/7/18	1	Voltages and current waveforms speed and torque expressions speed torque characteristics	2	3	T1 page No. 98 to 99
	1.4	04/7/18	2	single phase fully controlled converters connected to d.c. separately excited motors continuous current operation	4	3	T1 page no. 107 to 110
	1.5	09/7/18	1	Voltages and current waveforms speed and torque expressions speed torque characteristics	2	3	T1 page n.107 to 110
	1.6	09/7/18	2	Problems on converter feed d.c. motors.	2	3	T1 page no. 102 to 107 & 110 to 111

	1.7	11/7/18	1	Three phase semi controlled converter Connected to d.c. separately excited motors	1	2	T1 page no. 111 to 114
	1.8	14/7/18	2	Voltages and current waveforms speed and torque expressions speed torque characteristics	2	2	T1 page no. 111 to 114
	1.9	18/7/18	1	Three phase fully controlled converter connected to d.c. separately excited motors	2	4	T1 page no. 111 to 114
	1.10	18/7/18	2	Voltages and current waveforms speed and torque expressions speed torque characteristics	4	4	T1 page no. 111 to 114
	1.11	21/7/18	2	Problems on three phase converter feed d.c. motors.	3	4	T1 page no. 111 to 114
2	2.1	23/7/18	1	Introduction to four quadrant operation motoring operations	1	1	T1 page no 12 to 14
	2.2	25/7/18	2	electrical braking plugging , dynamic braking	2	5	T1 page no 68 to 75
	2.3	25/7/18	1	regenerative braking operations	2	5	T1 page no 68 to 75
	2.4	28/7/18	1	Four quadrant operation of D.C. motos by dual converters	3	5	T1 page no.114 to 117
	2.5	30/7/18	1	closed loop control of DC motor (block diagram only)	3	2	T1 Page no.131 to 133
	2.6	30/7/18	2	Problems on braking methods	2	5	T1 page no 68 to 75
3	3.1	4/8/18	1	Single quadrant, two quadrant four quadrant chopper fed dc separately excited motors continuous current operation	1	1	T1 page no.128 to 131
	3.2	8/8/18	2	out put voltage and current waveforms speed torque expressions speed torque characteristics	2	6	T1 page no.128 to 131
	3.3	8/8/18	1	Single quadrant, two quadrant and four quadrant chopper fed dc series motors continuous current operation	1	6	T1 page no.128 to 131
	3.4	13/8/18	2	Output voltage and current waveforms speed torque expressions speed torque characteristics	2	2	T1 page no.128 to 131
	3.5	18/8/18	2	four quadrant chopper fed dc separately excited and series motors	3	6	T1 page no.128 to 131
	3.6	18/8/18	2	problems on chopper fed d.c. motors	2	6	T1 page no.128 131

	3.7	20/8/18	1	closed loop operation (block diagram only)	3	6	T1 Page no.131 to 133
4	4.1	22/8/18	1	Variable voltage characteristics of Induction motors	1	1	T1 page no. 183
	4.2	27/8/18	2	control of induction motor by Ac voltage controllers	4	7	T1 page no. 184
	4.3	29/8/18	1	Waveforms speed torque characteristics.	2	7	T1 page no. 184
	4.4	01/9/18	1	Variable frequency characteristics of induction motors	1	7	T1 page no. 187
	4.5	01/9/18	1	variable frequency control of induction motor by voltage source inverter	2	7	T1 page no. 186 to 194
	4.6	19/9/18	2	Current source inverter – cyclo converters	3	7	T1 page no.197 & 205 to 208
	4.7	22/9/18	1	speed torque characteristics	2	7	T1 page no. 206
	4.8	26/9/18	2	PWM control – comparison of VSI and CSI operations	3	1	T1 page no. 209
	4.9	29/9/18	2	numerical problems on induction motor drives	2	2	T1 page no. 184 to 207
	4.10	29/9/18	1	closed loop operation of induction motor drives (block diagram only)	4	1	T1 page no. 198& 208
	4.11	01/10/18	2	Static rotor resistance control	1	2	T1 page no. 214 to 217
	4.12	01/10/18	2	slip power recovery – static scherbius drive	2	2	T1 page no.218 to 221
	4.13	03/10/18	1	static Kramer drive	1	2	T1 page no.221 to 223
	4.14	06/10/18	1	performance and speed torque characteristics	4	2	T1 page no. 218 to 223
	4.15	08/10/18	2	Advantages applications – problems	2	2	T1 page no. 218 to 223
5	5.1	13/10/18	2	operations of self controlled synchronous motors by VSI and CSI cycloconverters	1	2	T2 page no 12 to 14
	5.2	15/10/18	2	Load commutated CSI fed synchronous motor – operation – waveforms	2	1	T2 page no 68 to 75
	5.3	17/10/18	1	speed torque characteristics – applications- advantages	1	2	T2 page no 68 to 75
	5.4	20/10/18	2	numerical problems	2	1	T2 page no.114

							to 117
	5.5	22/10/18	1	Closed loop control operation of synchronous motor drives(block diagram only)	3	2	T2 Page no.131 to 133
	5.6	24/10/18	1	variable frequency control	1	2	T2 page no 68 to 75
				cycloconverters			
	5.7	27/10/18	1	PWM techniques,	3	1	T2 page no 68 to 75
	5.8	27/10/18	1	PWM – VFI	3	1	T2 page no 68 to 75
	5.9	29/10/18	1	PWM –CSI	3	1	T2 page no 68 to 75
				Advanced topics			
		29/10/18	2	SPWM Techniques	3	1	
		31/10/18	2	Non linear current controllers	3	1	
		03/11/18	2	Previous papers discussion	3	1	
		05/11/18	2	Extra problems	2	1	

Signature of HOD

Date:

Signature of faculty

Date:

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.
2. ADDITIONAL TOPICS COVERED, IF ANY, MAY ALSO BE SPECIFIED IN BOLD
3. MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

COURSE COMPLETION STATUS

Academic **Y**ear : 2018-2019

Semester : I

Name of the Program: B.Tech ……**EEE**…… Year: ……**IV**…….. Section: **A/B**

Course/Subject: ……**Power Semiconductor Devices**…… Course Code: GR15A4022

Name of the Faculty: ……**Dr. D G Padhan**……..Dept.: ……**EEE**

Designation: PROFESSOR.

Actual Date of Completion & Remarks, if any

Units	**Remarks**	**No. of Objectives Achieved**	**No. of Outcomes Achieved**
Unit 1	21/7/18	1,2,4	1,2,3
Unit 2	30/7/18	1,2,3,4	2,4
Unit 3	18/8/18	1,2,3	1,2,5
Unit 4	8/10/18	1,2,3	1,2,6
Unit 5	29/10/18	1,2,4	1,7

Signature of HOD

Date:

Signature of faculty

Date:

Note: After the completion of each unit mention the number of Objectives & Outcomes Achieved.

SYLLABUS

Academic **Y**ear : 2018-2019

Semester : I

Name of the Program: B.Tech ……**EEE**…… Year: ……**IV**…….. Section: **A/B**

Course/Subject: ……**Power Semiconductor Devices**…… Course Code: GR15A4022

Name of the Faculty: ……**Dr. D G Padhan**……..Dept.: ……**EEE**

Designation: PROFESSOR.

UNIT I : Phase Controlled Converter Fed DC-Motor Drives:

Introduction to Thyristor controlled Drives, single phase semi and fully controlled converters connected to d.c. separately excited and d.c. series motors – continuous current operation – output voltage and current waveforms – speed and torque expressions – speed-torque – characteristics – problems on converter feed d.c. motors . Three phase semi and fully controlled connected to d.c. separately excited and d.c series motors - output voltage and current waveforms – speed and torque expressions – speed –torque characteristics – problems.

UNIT II : Four Quadrant operation of DC Drives

Introduction to four quadrant operation – motoring operations, electrical braking – plugging , dynamic braking and regenerative braking operations. Four quadrant operation of D.C. motos by dual converters – closed loop control of DC motor (block diagram only)

UNIT IV: Control of DC motors by choppers

Single quadrant, two quadrant and four quadrant chopper fed dc separately excited and series motors – continuous current operation – out put voltage and current waveforms – speed torque expressions – speed torque characteristics – problems on chopper fed d.c. motors – closed loop operation (block diagram only)

UNIT IV : Control Of Induction Motors

Variable voltage characteristics – control of induction motor by Ac voltage controllers – waveforms – speed torque characteristics. Variable frequency characteristics – variable frequency control of induction motor by voltage source and current source inverter and cyclo converters – PWM control – comparison of VSI and CSI operations - speed torque characteristics – numerical problems on

induction motor drives - closed loop operation of induction motor drives (block diagram only). Static rotor resistance control – slip power recovery – static scherbius drive – static Kramer drive – their performance and speed torque characteristics – advantages applications – problems.

Unit V: Control of Synchronous Motors

Separate control & self control of synchronous motors – operations of self controlled synchronous motors by VSI and CSI cycloconverters. Load commutated CSI fed synchronous motor – operation – waveforms – speed torque characteristics – applications- advantages and numerical problems on induction motor drives (block diagram only) , variable frequency control , cycloconverters – PWM – VFI , CSI.

Text books :

1. Fundamentals of electrical drives – by G K Dubey narosa Publications
2. Power electronics circuits , devices and applications by M.H.Rashid , PHI.

Reference Books:

1. M D Singh and K B Kanchandani, Power Electronics Tata Mc Graw-Hill Publishing Company, 1998.

2. B. K. Bose, Modern Power Electronics and AC Drives by PHI.

3. Vedam Subrahmanyam, Thyristor Control of Electric Drives Tata Mc Graw-Hill Publications.

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

TIME TABLE

Academic **Y**ear : 2018-2019

Semester : I

Name of the Program: B.Tech ……**EEE**…… Year: ……**IV**…….. Section: **A/B**

Course/Subject: ……**Power Semiconductor Devices**…… Course Code: GR15A4022

Name of the Faculty: ……**Dr. D G Padhan**……..Dept.: ……**EEE**

Designation: PROFESSOR.

DAY/ HOUR	9:00-9:45	9:45-10:40	10:40-11:30	11:30-12:00	12:00-12:45	12:45-1:30	1:30-2:15	2:15-3:00
MONDAY				BREAK	PSD 2304 Dr DGP			
TUESDAY					PSD 2304 Dr DGP			
WEDNESDAY								
THURSDAY					PSD(TUT) 2304 Dr DGP			
FRIDAY								
SATURDAY								

SCHEDULE OF INSTRUCTIONS
UNIT PLAN

Academic **Y**ear : 2018-2019

Semester : I UNIT NO. I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: ……..**Dr. D G Padhan**……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No.	Date	No. of Periods	Topics / Sub - Topics	Objectives	Outcomes	References (Text Book, Journal…) Page Nos.: ____ to ____
1.	1.1	27/06/18	Introduction to Thyristor controlled Drives	1	1	T1 Page No. 97 to 98
	1.2	30/06/18	single phase semi controlled converters connected to d.c. separately excited motors continuous current operation	2	2	T1 page No. 98 to 99
	1.3	02/07/18	Voltages and current waveforms speed and torque expressions speed torque characteristics	2	3	T1 page No. 98 to 99
	1.4	04/07/18	single phase fully controlled converters connected to d.c. separately excited motors continuous current operation	4	3	T1 page no. 107 to 110
	1.5	06/07/18	Voltages and current waveforms speed and torque expressions speed torque characteristics	2	3	T1 page n.107 to 110
	1.6	09/07/18	Problems on converter feed d.c. motors.	2	3	T1 page no. 102 to 107 & 110 to 111

Lesson No.	Date	No. of Periods	Topics / Sub - Topics	Objectives	Outcomes	References (Text Book, Journal…) Page Nos.: ____ to ____
	1.7	11/07/18	Three phase semi controlled converter connected to d.c. separately excited motors	1	2	T1 page no. 111 to 114
	1.8	14/07/18	Voltages and current waveforms speed and torque expressions speed torque characteristics	2	2	T1 page no. 111 to 114
	1.9	18/07/18	Three phase fully controlled converter connected to d.c. separately excited motors	2	4	T1 page no. 111 to 114
	1.10	18/07/18	Voltages and current waveforms speed and torque expressions speed torque characteristics	4	4	T1 page no. 111 to 114
	1.11	21/07/18	Problems on three phase converter feed d.c. motors.	3	4	T1 page no. 111 to 114

Signature of HOD

Date:

Signature of faculty

Date:

SCHEDULE OF INSTRUCTIONS
UNIT PLAN

Academic **Y**ear : 2018-2019

Semester : I UNIT NO. II

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No.	Date	No. of Periods	Topics / Sub - Topics	Objectives	Outcomes	References (Text Book, Journal…) Page Nos.: ____to ____
2	2.1	23/07/18	Introduction to four quadrant operation motoring operations	1	1	T1 page no 12 to 14
	2.2	25/07/18	electrical braking plugging , dynamic braking	2	5	T1 page no 68 to 75
	2.3	25/07/18	regenerative braking operations	2	5	T1 page no 68 to 75
	2.4	28/07/18	Four quadrant operation of D.C. motos by dual converters	3	5	T1 page no.114 to 117
	2.5	30/07/18	closed loop control of DC motor (block diagram only)	3	2	T1 Page no.131 to 133
	2.6	30/07/18	Problems on braking methods	2	5	T1 page no 68 to 75

Signature of HOD Signature of faculty

Date: Date:

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.
2. ADDITIONAL TOPICS COVERED, IF ANY, MAY ALSO BE SPECIFIED IN BOLD
3. MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

SCHEDULE OF INSTRUCTIONS
UNIT PLAN

Academic **Y**ear : 2018-2019

Semester : I UNIT NO. III

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No.	Date	No. of Periods	Topics / Sub - Topics	Objectives	Outcomes	References (Text Book, Journal…) Page Nos.: ____to ____
3	3.1	04/08/18	Single quadrant, two quadrant four quadrant chopper fed dc separately excited motors continuous current operation	1	1	T1 page no.128 to 131
	3.2	08/08/18	out put voltage and current waveforms speed torque expressions speed torque characteristics	2	6	T1 page no.128 to 131
	3.3	08/08/18	Single quadrant, two quadrant and four quadrant chopper fed dc series motors continuous current operation	1	6	T1 page no.128 to 131
	3.4	13/08/18	output voltage and current waveforms speed torque expressions speed torque characteristics	2	2	T1 page no.128 to 131
	3.5	18/08/18	four quadrant chopper fed dc separately excited and series motors	3	6	T1 page no.128 to 131
	3.6	18/08/18	problems on chopper fed d.c. motors	2	6	T1 page no.128 to 131
	3.7	20/08/18	closed loop operation (block diagram only)	3	6	T1 Page no.131 to 133

SCHEDULE OF INSTRUCTIONS
UNIT PLAN

Academic **Y**ear : 2018-2019

Semester : I UNIT NO. IV

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No.	Date	No. of Periods	Topics / Sub - Topics	Objectives	Outcomes	References (Text Book, Journal…) Page Nos.: ____to ____
4	4.1	22/08/18	Variable voltage characteristics of Induction motors	1	1	T1 page no. 183
	4.2	27/08/18	control of induction motor by Ac voltage controllers	4	7	T1 page no. 184
	4.3	29/08/18	Waveforms speed torque characteristics.	2	7	T1 page no. 184

	4.4	01/09/18	Variable frequency characteristics of induction motors	1	7	T1 page no. 187
	4.5	01/09/18	variable frequency control of induction motor by voltage source inverter	2	7	T1 page no. 186 to 194
	4.6	19/09/1	Current source inverter – cyclo converters	3	7	T1 page no.197 & 205 to 208
	4.7	22/09/18	speed torque characteristics	2	7	T1 page no. 206
	4.8	26/09/18	PWM control – comparison of VSI and CSI operations	3	1	T1 page no. 209
	4.9	29/09/18	numerical problems on induction motor drives	2	2	T1 page no. 184 to 207
	4.10	29/09/18	closed loop operation of induction motor drives (block diagram only)			T1 page no. 198& 208
	4.11	01/10/18	Static rotor resistance control	1	2	T1 page no. 214 to 217
	4.12	01/10/18	slip power recovery – static scherbius drive	2	2	T1 page no.218 to 221
	4.13	03/10/18	static Kramer drive	1	2	T1 page no.221 to 223
	4.14	06/10/18	performance and speed torque characteristics	4	2	T1 page no. 218 to 223
	4.15	08/10/18	Advantages applications – problems	2	2	T1 page no. 218 to 223

Signature of HOD

Date:

Signature of faculty

Date:

Note: 1. ENSURE THAT ALL TOPICS SPECIFIED IN THE COURSE ARE MENTIONED.
2. ADDITIONAL TOPICS COVERED, IF ANY, MAY ALSO BE SPECIFIED IN BOLD
3. MENTION THE CORRESPONDING COURSE OBJECTIVE AND OUT COME NUMBERS AGAINST EACH TOPIC.

SCHEDULE OF INSTRUCTIONS
UNIT PLAN

Academic **Y**ear : 2018-2017

Semester : I UNIT NO. V

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No.	Date	No. of Periods	Topics / Sub - Topics	Objectives	Outcomes	References (Text Book, Journal…) Page Nos.: ____ to ____
5	5.1	13/10/18	operations of self controlled synchronous motors by VSI and CSI cycloconverters	1	2	T2 page no 12 to 14
	5.2	15/10/18	Load commutated CSI fed synchronous motor – operation – waveforms	2	1	T2 page no 68 to 75
	5.3	19/10/18	speed torque characteristics – applications- advantages	1	2	T2 page no 68 to 75
	5.4	20/10/18	numerical problems	2	1	T2 page no.114 to 119
	5.5	22/10/18	Closed loop control operation of synchronous motor drives(block diagram only)	3	2	T2 Page no.131 to 133
	5.6	24/10/18	variable frequency control cycloconverters	1	2	T2 page no 68 to 75
	5.7	27/10/18	PWM techniques,	3	1	T2 page no 68 to 75
	5.8	27/10/18	PWM – VFI	3	1	T2 page no 68 to 75
	5.9	29/10/18	PWM –CSI	3	1	T2 page no 68 to 75

Signature of HOD Signature of faculty

Date: Date:

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: ……27/6/18…….

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**……Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **1.1** Duration of Lesson: 45min

Lesson Title: Introduction to thyristor controlled Drives

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Different types of electric drives used in industrial applications
2. What are the different types of converters used in drives?

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
15 min.: Introduction to electrical Drives
20 min.: thyristor controlled drives
5min.: Doubts clarification and Review of the class.

Assignment / Questions: what are the different electric drives used in industrial applications (Obj:1/Out:1)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: .. 30/6/18…

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**……Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **1.2** Duration of Lesson: 90min

Lesson Title: single phase semi controlled converters connected to d.c. separately excited motors continuous current operation

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Semi converter operation
2. Control of dc motor connected to it and is operation

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
25 min.: Introduction to semi converters and its operation
50 min.: operation of separately excited dc motor connected to semiconverter
10min.: Doubts clarification and Review of the class.

Assignment / Questions: performance of semi converter based dc motor in continous conduction mode (Obj: 2,/Out:2)

Signature of faculty

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Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: ……2/7/18….

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**……Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **1.3** Duration of Lesson: 45min

Lesson Title: Voltages and current waveforms speed and torque expressions speed torque characteristics

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Variation of speed torque characteristics with firing angle
2. Variation of average output voltage of converter with firing angle
3. Study the modes of operation(current) with firing angle

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
15 min.: Converter voltage and current waveforms discussion
20 min.: Speed torque expressions and characteristics discussion 5min.: Doubts clarification and Review of the class.

Assignment / Questions: differentiate various mode of operation of converter with firing angle (Obj: 2 /Out:3)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: …4/7/18…….

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022
Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **1.4** Duration of Lesson: 90min

Lesson Title: single phase fully controlled converters connected to d.c. separately excited motors continuous current operation

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Operation of fully controlled converter
2. Behaviour of separately excited dc motor with this converter

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER
TEACHING POINTS :

5 min.: Taking attendance
25 min.: operation of fully controlled converter
50 min.: operation of motor with this converter
10min.: Doubts clarification and Review of the class.

Assignment / Questions: explain the behavior of motor with converter. (Obj:4 /Out:3)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: ……6/7/18…….

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **1.5** Duration of Lesson: 45min

Lesson Title: Voltages and current waveforms speed and torque expressions speed torque characteristics.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Variation of speed torque characteristics with firing angle
2. Variation of average output voltage of converter with firing angle
3. Study the modes of operation(current) with firing angle

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
15 min.: Introduction to electrical machines
20 min.: role of electrical machines in daily applications & in industry 5min.: Doubts clarification and Review of the class.

Assignment / Questions: differentiate various mode of operation of converter with firing angle (Obj: 2 /Out:3)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: …9/7/18…….

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **1.6** Duration of Lesson: 90min

Lesson Title: Problems on converter feed d.c. motors.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Clearly observe operation of drives with different converters.
2. Ability solves problems related in real time environment.

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
25 min.: discussion on problems
50 min.: solving problems.
10min.: Doubts clarification and Review of the class.

Assignment / Questions: how to formulate a real time problem. (Obj:2 /Out:3)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: ……11/7/18…….

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **1.7** Duration of Lesson: 45min

Lesson Title: Three phase semi controlled converter connected to d.c. separately excited motors

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Operation of three phase semi controlled converter
2. Performance of d.c separately excited motor connected semi converter

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
15 min.: semi converter
20 min.: d.c. motor operation connected to three phase semi converter 5min.: Doubts clarification and Review of the class.

Assignment / Questions: advantages of semi converters over fully controlled converters (Obj: 1/Out: 2)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 14/7/18.

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **1.8** Duration of Lesson: 90min

Lesson Title: Voltages and current waveforms speed and torque expressions speed torque characteristics

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Variation of speed torque characteristics with firing angle
2. Variation of average output voltage of converter with firing angle
3. Study the modes of operation(current) with firing angle

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance

25 min.: discussion on output waveforms of converters. 50 min.: speed and toque expressions and characteristics.

10min.: Doubts clarification and Review of the class.

Assignment / Questions: Explain speed torque characteristics of DC motor (Obj: 2,/Out:2)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 18/07/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **1.9** Duration of Lesson: 45min

Lesson Title: Three phase fully controlled converter connected to d.c. separately excited motors

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Operation of three phase fully controlled converter
2. Behavior of separately excited dc motor with this converter

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
25 min.: operation of fully controlled converter
50 min.: operation of motor with this converter
10min.: Doubts clarification and Review of the class.

Assignment / Questions: explain the operation of three phase controlled converter connected to d.c. separately excited motor (Obj:2 ,/Out:4)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: ..18/7/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **1.10** Duration of Lesson: 90min

Lesson Title: Voltages and current waveforms speed and torque expressions speed torque characteristics

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Variation of speed torque characteristics with firing angle
2. Variation of average output voltage of converter with firing angle
3. Study the modes of operation(current) with firing angle

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
25 min.: converters output waveforms discussion (voltage and current)
50 min.: speed torque expressions and speed torque characteristics discussion 10min.: Doubts clarification and Review of the class.

Assignment / Questions: derive the speed torque characteristics (Obj:2 ,/Out:2)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: . 21/7/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **1.11** Duration of Lesson: 90min

Lesson Title: Problems on three phase converter feed d.c. motors.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Clearly observe operation of drives with different converters.
2. Ability solves problems related in real time environment.

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
25 min.: discussion on problems
50 min.: solving problems.
10min.: Doubts clarification and Review of the class.

Assignment / Questions: different problems in tutorial sheets (Obj: 3/Out:4)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 23/7/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **2.1** Duration of Lesson: 45min

Lesson Title: Introduction to four quadrant operation motoring operations

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Different modes of operation of drive
2. Ability to change from one quadrant operation of other quadrant

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
15 min.: what are the modes of operation of drives 20 min.: four quadrant operation of drives
5min.: Doubts clarification and Review of the class.

Assignment / Questions: explain four quadrant operation of motors. (Obj:1 /Out:1)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: ..25/07/18...

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **2.2** Duration of Lesson: 90min

Lesson Title: electrical braking: plugging, dynamic braking

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. How braking can be obtain on electrical side
2. Able to make fast braking (plugging)

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
25 min.: electrical braking
50 min.: concept of plugging , dynamic braking
10min.: Doubts clarification and Review of the class.

Assignment / Questions: explain different types electrical braking (Obj: 2 /Out:5)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 25/7/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **2.3** Duration of Lesson: 45min

Lesson Title: regenerative braking operations

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Advantages of regeneration

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
15 min.: disadvantages with plugging , dynamic braking
20 min.: concept of regenerative braking and its advantages
10min.: Doubts clarification and Review of the class.

Assignment / Questions: explain regenerative braking of drives (Obj: 2,/Out:5)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: ……28/7/18…….

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **2.4** Duration of Lesson: 45min

Lesson Title: Four quadrant operation of D.C. motos by dual converters

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Operation dual converter
2. Modes of operation of dual converters
3. Advantages of circulating current mode.

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
15 min.: operation of dual converter
20 min.: modes of operation of dual converter
10min.: Doubts clarification and Review of the class.

Assignment / Questions: explain four quadrant operation of DC using dual converter (Obj: 3,/Out:5)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: . .30/7/18..

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **2.5** Duration of Lesson: 45min

Lesson Title: closed loop control of DC motor (block diagram only)

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Control of DC motor in real time
2. Involvement of control applications in Drives

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
15 min.: explain on open loop and closed loop controls
20 min.: block diagram of closed loop control
5min.: Doubts clarification and Review of the class.

Assignment / Questions: explain closed loop operation of DC drive (Obj:3 ,/Out:2)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date:30/7/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **2.6** Duration of Lesson: 90min

Lesson Title: Problems on braking methods

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Clearly observe operation of drives with different converters.
2. Ability solves problems related in real time environment.

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
25 min.: discussion on problems
50 min.: solving problems.
10min.: Doubts clarification and Review of the class.

Assignment / Questions: problems in tutorial sheets (Obj:2 ,/Out:5)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: ..04/08/18….

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **3.1** Duration of Lesson: 45min

Lesson Title: Single quadrant, two quadrant four quadrant chopper fed dc separately excited motors continuous current operation

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Different chopper circuits used in control of DC motor
2. How to obtain different quadrant of operation

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
15 min.: chopper circuits
20 min.: operation of DC motor in single, two & four quadrants
5min.: Doubts clarification and Review of the class.

Assignment / Questions: explain single , two and four quadrant operation of DC motor (Obj:1 /Out:1)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 8/8/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: 3.2 Duration of Lesson: 90min

Lesson Title: Output voltage and current waveforms speed torque expressions & characteristics

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Able to understand how voltage and currents varies from one quadrant to other
2. Able to understand how speed torque characteristics are moving from one quadrant to other

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
25 min.: voltage and current waveforms explanation
50 min.: speed torque expressions & characteristics
10min.: Doubts clarification and Review of the class.

Assignment / Questions: derive voltage & speed torque expressions of DC motor (Obj: 2,/Out:6)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 8/8/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **3.3** Duration of Lesson: 90min

Lesson Title: Single quadrant, two quadrant and four quadrant chopper fed dc series motors continuous current operation

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Different chopper circuits used in control of DC series motor
2. How to obtain different quadrant of operation

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
25 min.: chopper circuits
50 min.: operation of DC series motor in single, two & four quadrants 10min.: Doubts clarification and Review of the class.

Assignment / Questions: explain single, two and four quadrant operation of chopper drives (Obj:1 ,/Out:6)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 13/8/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **3.4** Duration of Lesson: 90min

Lesson Title: output voltage and current waveforms speed torque expressions speed torque characteristics

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Able to understand how voltage and currents varies from one quadrant to other

2. Able to understand how speed torque characteristics are moving from one quadrant to other

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
25 min.: voltage and current waveforms explanation
50 min.: speed torque expressions & characteristics
10min.: Doubts clarification and Review of the class.

Assignment / Questions: derive voltage & speed torque curves of chopper drives (Obj:2 /Out:2)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 18/8/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **3.5** Duration of Lesson: 90min

Lesson Title: four quadrant chopper fed dc separately excited and series motors

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Different modes of operation of drive
2. Ability to change from one quadrant operation of other quadrant

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
25 min.: what are the modes of operation of drives 50 min.: four quadrant operation of drives
10min.: Doubts clarification and Review of the class.

Assignment / Questions: explain four quadrant operation chopper drive (Obj: 3 /Out:6)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 18/8/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **3.6** Duration of Lesson: 90min

Lesson Title: problems on chopper fed d.c. motors

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Clearly observe operation of drives with different converters.
2. Ability solves problems related in real time environment.

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
25 min.: discussion on problems
50 min.: solving problems.
10min.: Doubts clarification and Review of the class.

Assignment / Questions: problems in tutorial sheets (Obj:2 /Out:6)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 20/8/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: 3.7 Duration of Lesson: 45min

Lesson Title: closed loop operation (block diagram only)

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Control of DC motor in real time
2. Involvement of control applications in Drives

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
15 min.: explain on open loop and closed loop controls
20 min.: block diagram of closed loop control
5min.: Doubts clarification and Review of the class.

Assignment / Questions: explain closed loop operation of chopper drive (Obj: 3,/Out:6)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 22/8/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **4.1** Duration of Lesson: 90min

Lesson Title: Variable voltage characteristics of Induction motors

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Able to understand variation of starting torque and max.torque with voltage
2. Able to control voltage depending on load requirement

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
15 min.: Derivation of torque expression in terms of stator voltage
20 min.: variable voltage characteristics of induction motor
5min.: Doubts clarification and Review of the class.

Assignment / Questions: obtain variable characteristics of induction motor (Obj: 1,/Out:1)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 27/8/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **4.2** Duration of Lesson: 90min

Lesson Title: control of induction motor by Ac voltage controllers

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Operation of three phase AC voltage control

2. Variation of output voltage with firing angle control

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
25 min.: AC voltage controller explanation
50 min.: Control of induction motor with AC voltage controller
10min.: Doubts clarification and Review of the class.

Assignment / Questions: explain operation of induction motor connected to AC voltage controller (Obj: 4,/Out:7)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: . 29/8/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **4.3** Duration of Lesson: 45min

Lesson Title: Waveforms speed torque characteristics

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Output waveforms of AC voltage controller
2. Variation of speed torque curves with AC voltage controller

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance

15 min.: output waveforms of AC voltage controller 20 min.: speed torque curves of AC voltage controller

5min.: Doubts clarification and Review of the class.

Assignment / Questions: Derive speed torque characteristics of induction motor (Obj:2 ,/Out:7)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: …1/9/18….

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: …….. **Dr. D G Padhan** ……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **4.4&4.5** Duration of Lesson: 90 min

Lesson Title: Variable frequency characteristics of induction motors

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Variable frequency control of induction motor
2. Variation of speed with frequency

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
25 min.: Introduction to variable frequency control
50 min.: Variable frequency characteristics of induction motor 10min.: Doubts clarification and Review of the class.

Assignment / Questions: explain variable frequency characteristics of induction motors (Obj:1,2 ,/Out:7)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 19/09/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: ……..**Dr. D G Padhan**……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **4.6** Duration of Lesson: 90min

Lesson Title: Current source inverter – cyclo converters

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Able to design current source inverter
2. Application of cyclo converters in induction motor applications

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
45 min.: operation of CSI
30 min.: operation of cyclo converter
10min.: Doubts clarification and Review of the class.

Assignment / Questions: explain operation of CSI (Obj:3 ,/Out:7)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 22/9/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: ……..**Dr. D G Padhan**……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **4.7** Duration of Lesson: 45 min

Lesson Title: speed torque characteristics

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Variation of speed torque curves with frequency
2. Constant torque with variable frequency control

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
15 min.: speed torque characteristics
20 min.: operation with variable frequency
10min.: Doubts clarification and Review of the class.

Assignment / Questions: explain speed torque characteristics for variable frequency scheme (Obj:2 /Out:7)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 26/9/18.

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: ……..**Dr. D G Padhan**……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **4.8** Duration of Lesson: 90min

Lesson Title: PWM control – comparison of VSI and CSI operations

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Advantages of PWM control
2. Merits and demerits of VSI and CSI

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
25 min.: Introduction to PWM control
50 min.: comparison of VSI and CSI
10min.: Doubts clarification and Review of the class.

Assignment / Questions: explain Pulse Width Modulation (Obj: 3/Out:1)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 26/9/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: ……..**Dr. D G Padhan**……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **4.9** Duration of Lesson: 90min

Lesson Title: numerical problems on induction motor drives

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Clearly observe operation of drives with different converters.
2. Ability solves problems related in real time environment.

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
25 min.: discussion on problems
50 min.: solving problems.
10min.: Doubts clarification and Review of the class.

Assignment / Questions: problems in tutorial sheets (Obj: 2/Out:2)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 22/9/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: ……..**Dr. D G Padhan**……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **4.10** Duration of Lesson: 45 min

Lesson Title: closed loop operation of induction motor drives (block diagram only)

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Control of induction motor in real time
2. Involvement of control applications in Drives

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
15 min.: explain on open loop and closed loop controls
20 min.: block diagram of closed loop control
5min.: Doubts clarification and Review of the class.

Assignment / Questions: explain closed loop control of induction motor drives (Obj:4 /Out:1)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 1/10/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: ……..**Dr. D G Padhan**……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: 4.11 Duration of Lesson: 90min

Lesson Title: Static rotor resistance control

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Rotor resistance control scheme of induction motor
2. Static control of resistance using chopper drive

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
25 min.: Introduction to rotor resistance control 50 min.: Static rotor resistance control
10min.: Doubts clarification and Review of the class.

Assignment / Questions: static rotor resistance scheme of speed control (Obj: 1,/Out:2)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 1/10/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: ……..**Dr. D G Padhan**……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **4.12** Duration of Lesson: 90min

Lesson Title: slip power recovery – static scherbius drive

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Slip power recovery
2. Different control techniques on rotor

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
25 min.: Introduction to slip power recovery
50 min.: operation of static scherbius drives
10min.: Doubts clarification and Review of the class.

Assignment / Questions: explain concept of slip power recovery scheme (Obj:2 ,/Out:2)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 3/10/18,6/10/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: ……..**Dr. D G Padhan**……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **4.13&4.14** Duration of Lesson: 90min

Lesson Title: Static Kramer drive & performance and speed torque characteristics

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Control of speed on rotor side
2. Control of speed torque curves using rotor resistance

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
25 min.: Introduction to static Kramer drive
50 min.: operation & speed torque characteristics
10min.: Doubts clarification and Review of the class.

Assignment / Questions: explain static Kramer drive (Obj:1 ,/Out:2)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 8/10/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: ……..**Dr. D G Padhan**……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **4.15** Duration of Lesson: 90min

Lesson Title: Advantages applications – problems

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Clearly observe operation of drives with different converters.
2. Ability solves problems related in real time environment.

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
25 min.: discussion on problems
50 min.: solving problems.
10min.: Doubts clarification and Review of the class.

Assignment / Questions: different applications of induction motor drives (Obj:2 ,/Out:2)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 13/10/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: ……..**Dr. D G Padhan**……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **5.1** Duration of Lesson: 90min

Lesson Title: operations of self controlled synchronous motors by VSI and CSI

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Control of synchronous motor with VSI
2. Control of synchronous motor with CSI

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
25 min.: Introduction to self control of synchronous motor
50 min.: VSI & CSI operation of synchronous motor
10min.: Doubts clarification and Review of the class.

Assignment / Questions: explain about self controlled synchronous motor (Obj:1 ,/Out:2)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 15/10/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: ……..**Dr. D G Padhan**……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **5.2** Duration of Lesson: 90min

Lesson Title: Load commutated CSI fed synchronous motor – operation – waveforms

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Load commutation in drives application
2. Synchronous motor control using CSI

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
25 min.: Introduction to load commutation
50 min.: operation of synchronous motor with CSI
10min.: Doubts clarification and Review of the class.

Assignment / Questions: explain the load commutation of CSI fed synchronous motor drive (Obj:2 /Out:1)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 17/10/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: ……..**Dr. D G Padhan**……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **5.3** Duration of Lesson: 45 min

Lesson Title: speed torque characteristics – applications- advantages

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Able to drive motor at different load conductions
2. Different applications of synchronous drives

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
15 min.: speed torque characteristics
20 min.: applications & advantages
5 min.: Doubts clarification and Review of the class.

Assignment / Questions: speed torque characteristics of CSI fed synchronous motor (Obj:1 ,/Out:2)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 20/10/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: ……..**Dr. D G Padhan**……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: 5.4 Duration of Lesson: 90min

Lesson Title: numerical problems

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Clearly observe operation of drives with different converters.
2. Ability solves problems related in real time environment.

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
25 min.: discussion on problems
50 min.: solving problems.
10min.: Doubts clarification and Review of the class.

Assignment / Questions: problems in tutorial sheets (Obj: 2,/Out:1)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 22/10/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: ……..**Dr. D G Padhan**……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: 5.5 Duration of Lesson: 90min

Lesson Title: Closed loop control operation of synchronous motor drives (block diagram only)

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Control of induction motor in real time
2. Involvement of control applications in Drives

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
15 min.: explain on open loop and closed loop controls
20 min.: block diagram of closed loop control
5min.: Doubts clarification and Review of the class.

Assignment / Questions: closed loop operation of synchronous motor drives (Obj:3 /Out:2)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 24/10/18 & 27/10/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: ……..**Dr. D G Padhan**……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **5.6&5.7** Duration of Lesson: 90min

Lesson Title: variable frequency control cycloconverters & PWM techniques,

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Variable frequency schemes of cycloconverters
2. Different PWM techniques

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
25 min.: Introduction to variable frequency of cyclo controller 50 min.: PWM techniques
10min.: Doubts clarification and Review of the class.

Assignment / Questions: different PWM techniques (Obj: 1,3,/Out:1,2)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

LESSON PLAN

Academic **Y**ear : 2018-2019 Date: 27/10/18 & 29/10/18

Semester : I

Name of the Program: B.Tech ……**EEE** …… Year: ……**IV**…….. Section: A/B

Course/Subject: ……**Power Semiconductor Drives**…… Course Code: GR15A4022

Name of the Faculty: ……..**Dr. D G Padhan**……..Dept.: …**E.E.E**……

Designation: **PROFESSOR**

Lesson No: **5.8&5.9** Duration of Lesson: 90min

Lesson Title: PWM –VSI & PWM CSI

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Operation of PWM VSI
2. Operation of PWM CSI

TEACHING AIDS : LCD PROJECTOR, WHITEBOARD, MARKER, DUSTER

TEACHING POINTS :

5 min.: Taking attendance
35 min.: operation of PWM VSI
40 min.: operation of PWM CSI
10min.: Doubts clarification and Review of the class.

Assignment / Questions: operation of PWM operated VSI & CSI (Obj:3 ,/Out:1)

Signature of faculty

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

ASSIGNMENT SHEET – 1

Academic **Y**ear : 2018-2019 Date: 4/8/18

Semester : I

Name of the Program: B.Tech ……EEE…… Year: …IV …….. Section: A/B

Course/Subject: ……Power Semiconductor Drives……..

Name of the Faculty: ……Dr. D G Padhan…… ..Dept.: EEE

Designation : PROFESSOR

This Assignment corresponds to Unit No. / Lesson ……I to IV….

Q1. Derive the Speed, Torque Equations of a fully controlled converter connected to separately excited D.C motor with continuous current operation with necessary waveforms

Q2. Explain the basic operational aspects of three phase fully controlled converters with neat sketches of the waveforms and the circuit diagram. What is the effect of free wheeling diode?

Q3. Describe the relative merits and demerits of the following types of braking for dc motors: mechanical braking, dynamic braking and regenerative braking with neat diagram

Q4. A dc supply of 200v supplied power to separately excited dc motor via a class A thyristors chopper. The motor has an armature circuit resistance of 0.33Ω and inductance of 11mH. The chopper is fully on at the rated motor speed 1200rpm when the armature current is 20A. If the speed is to be reduced to 800rpm with the load torque constant, calculate the necessary duty cycle. If the chopper frequency is 500Hz, is the current continuous?

Please write the Questions / Problems / Exercises which you would like to give to the students and also mention the Objectives/Outcomes to which these Questions / Problems / Exercises are related.

Objective Nos. 2,4

Outcome Nos.: 1, 3, 4, 5

Signature of HOD
Date:

Signature of faculty
Date:

ASSIGNMENT SHEET – 2

Academic **Y**ear : 2018-2019 Date: 22/10/18

Semester : I

Name of the Program: B.Tech ……EEE…… Year: …IV …….. Section: A/B

Course/Subject: ……Power Semiconductor Drives……..

Name of the Faculty: ……Dr. D G Padhan…… ..Dept.:EEE

Designation : PROFESSOR

This Assignment corresponds to Unit No. / Lesson ……V to VIV…….

Q1. Describe the open-loop and closed loop methods of speed control of a synchronous motor using VSI.

Q2. Discuss the operation of an Induction motor fed from a variable frequency supply for the following two different modes.

i) Below the rated frequency ii) above the rated frequency. Also plot the torque-slip characteristics for above two modes of operation

Q3. A dc chopper controls a dc series motor. The supply voltage being 220 V dc, the field and armature resistances are 0.2 and 0.3 ohm respectively. If the back emf of the motor be 180 V, average armature current of 50 A, find the smooth and continuous armature current, the input power from source, the input resistance of the chopper drive and motor speed. Assume, duty cycle of the chopper to be 0.5 and motor voltage constant to be 0.02

Q4. . Explain the principle of operation of self control of synchronous motor fed from VSI source.

Please write the Questions / Problems / Exercises which you would like to give to the students and also mention the Objectives/Outcomes to which these Questions / Problems / Exercises are related.

Objective Nos. 2, 4

Outcome Nos.: 1, 2, 6, 7

Signature of HOD
Date:

Signature of faculty
Date:

TUTOTIAL SHEET - 1

Academic **Y**ear : 2018-2019 Date: 21/7/18

Semester : I

Name of the Program: B.Tech ……EEE…… Year: ……IV…….. Section: A/B

Course/Subject: ……Power Semiconductor Drives……..

Name of the Faculty: …Dr. D G Padhan…… Dept.:EEE.

Designation : PROFESSOR.

This Tutorial corresponds to Unit No. / Lesson …I….

Q1. 200V, 875 r.p.m , 150A separately excited D.C motor has an armature resistance of 0.06 Ω fed from 1-Ø fully controlled rectifier with an a.c voltage of 220V 50 Hz assume continuous conduction mode. Calculate firing for (a) rated motor torque and at speed of 750 r.p.m (b) rated motor torque & speed of - 500 r.p.m (c) calculate motor speed for firing angle 180^0 & rated torque.

Q2. A 220V , 1500 r.p.m 10A, separately excited D.C. motor is connected to 1- Ø fully controlled converter with AC source voltage of 230V, 50Hz, Ra = 2 Ω. Assume continuous conduction mode, calculate firing angle for (a) half of the rated torque and speed 500 r.m.p (b) rated motor torque & speed -1000 r.p.m.

Q3. A 220V , 960 rpm , 12.8 A separately excited dc motor has armature circuit resistance and inductance of 2 Ω and 150mH, respectively. It is fed from a single –phase half controlled rectifier with an ac voltage of 230V , 50Hz . calculate (i) Motor torque for $\alpha = 60^0$ and speed N = 600 rpm. (ii) motor speed for $\alpha = 60^0$ and T = 20N-m.

Q4.A 220V,1200rpm , 15A separately excited motor has armature resistance and inductance of 1.8Ω and 32mH respectively. This motor is controlled by a single phase fully – controlled rectifier with an ac source voltage of 230V, 50Hz. Identify the modes and calculate developed torques for:

(i) $\alpha = 60^0$ and speed = 450 rpm

(ii) $\alpha = 60^0$ and speed = 1500 rpm

Q5. A 230V , 650rpm , 100A separately excited dc motor has armature circuit resistance and inductance of 0.08Ω and 8mH respectively. Motor is controlled by a single phase half controlled rectifier with source voltage of 230V, 50Hz. Identify the modes of operation and calculate speeds for

(i) $\alpha = 60^0$ and torque = 1000 N –m.

(ii) $\alpha = 120^0$ and speed = 1000 N-m.

Please write the Questions / Problems / Exercises which you would like to give to the students and also mention the Objectives/Outcomes to which these Questions / Problems / Exercises are related.

Objective Nos.: 2

Outcome Nos.: 3

Signature of HOD

Date:

Signature of faculty

Date:

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

TUTOTIAL SHEET - 2

Academic **Y**ear : 2018-2019 Date: 30/7/18

Semester : I

Name of the Program: B.Tech ……EEE…… Year: ……IV…….. Section: A/B

Course/Subject: ……Power Semiconductor Drives……..

Name of the Faculty: …Dr. D G Padhan…… Dept.:EEE.

Designation : PROFESSOR.

This Tutorial corresponds to Unit No. / Lesson ……II…….

Q1. A 220V, 1500rpm, 50A separately excited motor with armature resistance of 0.5Ω, is fed from a 3 – phase fully controlled rectifier. Available ac source has a line voltage of 440 V, 50Hz. A star – delta connected transformer is used to feed the armature so that motor terminal voltage equals to rated voltage when converter firing angle is zero.

(i) Calculate transformers turns ratio

(ii) Determine the value of firing angle when : (a) motor is running at 1200 rpm and rated torque; (b) when motor is running at – 800 rpm and twice the rated torque. (assume continuous conduction)

Q2.A 220V, 1500rpm, 50A separately excited motor with armature resistance of 0.5Ω, is fed from a 3 – phase half controlled rectifier. Available ac source has a line voltage of 440 V, 50Hz. A star – delta connected transformer is used to feed the armature so that motor terminal voltage equals to rated voltage when converter firing angle is zero.

(i) Calculate transformers turns ratio

(ii) Determine the value of firing angle when : (a) motor is running at 1200 rpm and rated torque; (b) when motor is running at – 800 rpm and twice the rated torque. (assume continuous conduction)

Objective Nos.: 3

Outcome Nos.: 4

Signature of HOD
Date:

Signature of faculty
Date:

TUTOTIAL SHEET - 3

Academic **Y**ear : 2018-2019 Date: 18/8/18

Semester : I

Name of the Program: B.Tech ……EEE…… Year: ……IV…….. Section: A/B

Course/Subject: ……Power Semiconductor Drives……..

Name of the Faculty: …Dr. D G Padhan…… Dept.:EEE.

Designation : PROFESSOR.

This Tutorial corresponds to Unit No. / Lesson ……III…….

Q1. A 220V, 200A, 800rpm, dc separately excited motor has an armature resistance of 0.06 Ω . The motor armature is fed from a variable voltage source with an internal resistance of 0.04 Ω . calculate internal voltage of the variable voltage source when the motor is operating in regenerative braking at 80% of the rated motor torque and 600rpm.

Q2. A 220V dc series motor runs at 1000rpm and an armature current of 100A when driving a load with a constant torque. Resistances of the armature and field windings are 0.05Ω each. Find the magnitude and direction of motor speed and armature current if the motor terminal voltage is reversed and the number of turns in field winding is reduced to 80%.

Q3. A 220V dc series motor runs at 1000rpm and an armature current of 100A when driving a load with a constant torque. Resistances of the armature and field windings are 0.05Ω each, is operated under dynamic braking mode at twice the rated torque and 800 rpm. Calculate the value of braking current and resistor.

Q4. A dc shunt motor has the armature resistance of 0.04Ω and the field winding resistance of 10Ω. Motor is coupled to an overhauling load with a torque of 400N-m. following magnetization curve was measured at 600 rpm.

Field current	**2.5**	**5**	**7.5**	**10**	**12.5**	**15**	**19.5**	**20**	**22.5**
Back e.m.f	25	50	73.5	90	102.5	110	116	121	125

Motor is braked by self-excited dynamic braking with a braking resistance of 1Ω. At what speed motor will hold the load?

Q4. A 220V, 970rpm, 100A dc separately excited motor has an armature resistance of 0.05 Ω. It is braked by plugging from an initial speed of 1000rpm. Calculate (a) resistance to be placed in armature circuit to limit braking current to twice the full load value.
(b) Braking torque and (c) torque when speed has fallen to zero.

Q5. A 220V, 1500rpm , 50A separately excited motor with armature resistance of 0.5 Ω , is fed from a circulating current dual converter with ac source voltage (line) = 165V. determine converter firing angles for the following operating points:

(i) Motoring operation at rated motor torque and 1000rpm.
(ii) Braking operation at rated motor torque and 1000 rpm.
(iii) Motoring operation at rated torque and – 1000 rpm.
(iv) Braking operation at rated motor torque and – 1000 rpm.

Please write the Questions / Problems / Exercises which you would like to give to the students and also mention the Objectives/Outcomes to which these Questions / Problems / Exercises are related.

Objective Nos.: 2

Outcome Nos.: 5

Signature of HOD

Date:

Signature of faculty

Date:

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

TUTOTIAL SHEET - 4

Academic **Y**ear : 2018-2019 Date: 1/9/18

Semester : I

Name of the Program: B.Tech ……EEE…… Year: ……IV…….. Section: A/B

Course/Subject: ……Power Semiconductor Drives……..

Name of the Faculty: …Dr. D G Padhan…… Dept.:EEE.

Designation : PROFESSOR.

This Tutorial corresponds to Unit No. / Lesson ……IV…….

Q1. A 230V, 960rpm , and 200A separately excited dc motor has an armature resistance of 0.02Ω . the motor is fed from a chopper which provides both motoring and braking operations. The source has a voltage of 230V. assuming continuous conduction.

(i) Calculate duty ratio of chopper for motoring operation at rated torque and 350rpm.

(ii) Calculate duty ratio of chopper for braking operation at rated torque and 350 rpm.

(iii) If the maximum duty ratio of chopper is limited to 0.95 and maximum permissible motor speed obtainable without field weakening and power fed to the source.

Q2. For the above problem motor is now operated in dynamic braking with chopper control with a braking resistance of 2Ω.

(i) Calculate duty ratio of chopper for a motor speed of 600 rpm and braking torque of twice the rated value.

(ii) What will be the motor speed for a duty ratio of 0.6 and motor torque equal to twice its rated torque?

Q3. A 220V , 24A, 100rpm, separately excited dc motor has an armature resistance of 2Ω. Motor is controlled by a chopper with frequency of 500 Hz and source voltage of 230V. calculate the duty ratio for 1.2 times rated torque and 500 rpm.

Q4. A 230V separately excited dc motor takes 50A at a speed of 800 rpm. It has armature resistance of 0.4Ω. this motor is controlled by a chopper with an input voltage of 230V and frequency of 500Hz. Assuming continuous conduction throughout, calculate the plot speed – torque characteristics for:

(i) Motoring operation at duty ratio of 0.3 and 0.6

(ii) Regenerative braking operation at duty ratio of 0.7 and 0.4

Q5. A 230V, 1200rpm, 15A separately excited motor has an armature resistance of 1.2Ω. Motor is operated under dynamic braking with chopper control. Braking resistance has a value of 20Ω.

(i) Calculate duty ratio of chopper for motor speed of 1000rpm and braking torque equal to 1.5 times rated motor torque.

(ii) What will be the motor speed f

Please write the Questions / Problems / Exercises which you would like to give to the students and also mention the Objectives/Outcomes to which these Questions / Problems / Exercises are related.

Objective Nos.: 2

Outcome Nos.: 6

Signature of HOD

Date:

Signature of faculty

Date:

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electrical & Electronics Engineering

TUTOTIAL SHEET – 5

Academic **Y**ear : 2018-2019 Date:8/10/18

Semester : I

Name of the Program: B.Tech ……EEE…… Year: ……IV…….. Section: A/B

Course/Subject: ……Power Semiconductor Drives……..

Name of the Faculty: …Dr. D G Padhan…… Dept.:EEE.

Designation : PROFESSOR.

This Tutorial corresponds to Unit No. / Lesson ……IV…….

Q1. A 2.8 kW, 400V, 50Hz , 4 pole , 1370 rpm, delta connected squirrel cage induction motor has following parameters referred to the stator : Rs = 2Ω, R'r = 5Ω, Xs =Xr = 5Ω, Xm = 80Ω. Motor speed is controlled by stator voltage control. When driving a fan load it runs at rated speed at rated voltage. Calculate (i) motor terminal voltage, current and torque at 1200 rpm and (ii) motor speed , current and torque for the terminal voltage of 300V.

Q2. A Y- connected squirrel cage induction motor has following ratings and parameters:

400V, 50Hz , 4-pole , 1370 rpm, Rs = 2Ω, R'r = 3 Ω, Xs = Xr' = 3.5Ω.

Motor is controlled by a voltage source inverter at a constant V/f ratio. Inverter allows frequency variation from 10 to 50 Hz. i. Obtain a plot between the breakdown torque and frequency ii. Calculate starting torque and current of this drive as a ratio of their values when motor is started at rated voltage and frequency.

Q3. A Y-connected squirrel cage induction motor has following ratings and parameters:

400V, 50Hz, 4-pole, 1370rpm, Rs = 2Ω, R'r = 3Ω, Xs = X'r = 3.5Ω , Xm = 55Ω

It is controlled by a current source inverter at a constant flux. Calculate (i) motor torque, speed and stator current when operating at 30Hz and rated slip speed. (ii) inverter frequency and stator current for motor torque and motor speed of 1200rpm.

Objective Nos.: 2

Outcome Nos.: 2

Signature of HOD Signature of faculty

Date: Date:

TUTOTIAL SHEET - 6

Academic **Y**ear : 2018-2019 Date: 29/10/18

Semester : I

Name of the Program: B.Tech ……EEE…… Year: ……IV…….. Section: A/B

Course/Subject: ……Power Semiconductor Drives……..

Name of the Faculty: …Dr. D G Padhan…… Dept.:EEE.

Designation : PROFESSOR.

This Tutorial corresponds to Unit No. / Lesson ……V…….

Q1. A 3-phase , 400V, 6-pole , 50Hz, delta –connected , slip ring induction motor has resistance of 0.2 Ω and leakage reactance of 1Ω per phase referred to stator. When driving a fan load it runs at full load at 4% slip. What resistance must be inserted in the rotor circuit to obtain a speed of 850 rpm. Neglect stator impedance and magnetizing branch, stator to rotor turns ratio is 2.2.

Q2. A 440V, 50Hz, 6-pole , Y-connected wound rotor motor has the fallowing parameters:

Rs = 0.5Ω , R'r = 0.4Ω, Xs = X'r = 1.2Ω, Xm = 50Ω. Stator to rotor turns ratio is 3.5

Motor is controlled by static rotor resistance control. External resistance is chosen such that the breakdown torque is produced at standstill for a duty ratio of zero. Calculate the value of external resistance. How duty ratio should be varied with speed so that the motor accelerates at maximum torque.

Q3. A 440V, 50Hz, 970rpm, 6-pole , Y-connected , 3-phase wound rotor induction motor has fallowing parameters referred to the stator: Rs = 0.1Ω , R'r = 0.08Ω, Xs = 0.3 Ω, X'r = 0.4Ω . The stator to rotor turns ratio is 2. Motor speed is controlled by static scherbius drive. Drive is designed for a speed range of 25% below the synchronous speed. Maximum value of firing angle is 165^0. Calculate (i) transformer turns ratio (ii) torque for a speed of 780rpm and $\alpha = 140^0$ (IV) firing angle for half the rated motor torque and speed of 800 rpm.

Objective Nos.: …2…
Outcome Nos.: …2,1...

Signature of HOD
Date:

Signature of faculty
Date:

EVALUATION STRATEGY

Academic **Y**ear : 2018-2019

Semester : I

Name of the Program: B.Tech ……EEE…… Year: ……IV…….. Section: A/B

/ B /C Course/Subject: ……Power Semiconductor Drives ……

Name of the Faculty: ……Dr. D G Padhan……..Dept.:……EEE…….

Designation : PROFESSOR

1. TARGET:

A) Percentage for pass: 95

b) Percentage of class: 95

2. COURSE PLAN & CONTENT DELIVERY

(Please write how you intend to cover the contents: i.e., coverage of Units/Lessons by lectures, design, exercises, solving numerical problems, demonstration of models, model preparation, experiments in the Lab., or by assignments, etc.)

3. METHOD OF EVALUATION

3.1 ☐ Continuous Assessment Examinations (CAE-I, CAE-II)

3.2 ☐ Assignments/Seminars

3.3 ☐ Mini Projects

3.4 ☐ Quiz

3.5 ☐ Semester/End Examination

4. List out any new topic(s) or any innovation you would like to introduce in teaching the subjects in this Semester.

……Current Control Techniques……..

Signature of HOD

Date:

Signature of faculty

Date:

RESULTS ANALYSIS

Academic Year	Subject	Total No.of Students Appeared	Total no.of students passed	Total no.of students failed	<60%	60% to 70%	>70%	Pass%
2018-2019	PSD	140	132	8	3	10	119	94.28
2016-2017	PSD	140	134	6	54	44	36	95.71
2015-2016	PSD	127	117	10	28	29	59	92.12