



**DEPARTMENT OF ELECTRICAL AND ELECTRONICS
ENGINEERING NATIONAL INSTITUTE OF TECHNOLOGY,
TIRUCHIRAPPALLI**

COURSE PLAN – PART I			
Name of the programme and	M.Tech , Power Elcetronics		
Course Title	Power Converters		
Course Code	EE651	No. of Credits	3
Pre-requisite (s)	Power Electronics in UG		
Session	July 2020	Section (if, applicable)	-
Name of Faculty	Dr. Sundareswaran K	Department	Electrical and Electronics Engineering
Email	kse@nitt.edu	Telephone No.	8300902458
Name of Course Coordinator(s)	-		
E-mail		Telephone No.	
Course Type	√	Core course	Elective course
Syllabus (approved in BoS)			
<p>Analysis of power semiconductor switched circuits with R, L, RL, RC loads, d.c. motor load, battery charging circuit.</p> <p>Single-Phase and Three-Phase AC to DC converters-half controlled configurations-operating domains of three phase full converters and semi-converters –Reactive power considerations.</p> <p>Analysis and design of DC to DC converters-Control of DC-DC converters, Buck converters, Boost converters, Buck-Boost converters, Cuk converters</p> <p>Single phase and Three phase inverters, Voltage source and Current source inverters, Voltage control and harmonic minimization in inverters.</p> <p>AC to AC power conversion using voltage regulators, choppers and cyclo-converters, consideration of harmonics, introduction to Matrix converters</p> <p>Reference Books</p> <ol style="list-style-type: none"> 1. Ned Mohan, Undeland and Robbin, 'Power Electronics: converters, Application and design', John Wiley and sons. Inc, Newyork, 2006. 2. RashidM.H., 'PowerElectronics-Circuits,DevicesandApplications',PrenticeHall India, NewDelhi, 2009. 3. P.CSen., 'Modern Power Electronics', Wheelerpublishing Company, 1stEdition, New Delhi, 2005. 			
COURSE OBJECTIVES(CB)			
To give a systematic approach for transient and steady state analysis of all power electronic converters with passive and active loads.			

COURSE OUTCOMES (CO)	
Course Outcomes	Aligned Programme Outcomes (PO)
Upon completion of the course, the students will be able to	
1. To study and analyze transient response of basic power electronic circuits.	1,2,3
2. To understand the working of commonly used power Converters.	4,5,7
3. To analyze and design various power converter systems.	6,8,9,10,11

COURSE PLAN – PART II

COURSE OVERVIEW

The subject Power converters introduces various power converter topologies and systematically deals with the steady state and transient analysis of power electronic circuits with a vast variety of load components including active and passive elements. The basic converters include ac to dc, dc to ac, dc to dc and ac to ac power electronic circuits. The subject aims to establish fundamental engineering basics for power electronic circuit analysis, design, operation and control.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	Week 1 to 3	Analysis of power semiconductor switched circuits with R, L, RL, RC loads, d.c. motor load, battery charging circuit.	Lecture / PPT or any online mode
2	Week 4 to 6	Single-Phase and Three-Phase AC to DC converters-half controlled configurations-operating domains of three phase full converters and semi-converters –Reactive power considerations.	Lecture / PPT or any online mode
3	Week 7 to 9	Analysis and design of DC to DC converters-Control of DC-DC converters, Buck converters, Boost converters, Buck-Boost converters, Cuk converters	Lecture / PPT or any online mode
4	Week 10 to 12	Single phase and Three phase inverters, Voltage source and Current source inverters, Voltage control and harmonic minimization in inverters.	Lecture / PPT or any online mode
5	Week 13 to 15	AC to AC power conversion using voltage regulators, choppers and cyclo-converters, consideration of harmonics, introduction to Matrix converters	Lecture / PPT or any online mode

COURSE ASSESSMENT METHODS (shall range from 4 to 6)				
S. No	Mode of Assessment	Week/Date	Duration	% Weightage
1	1 st Assessment(Online mode) (1 st and 2 nd Units)	End of 6 th Week	1 hour	30
2	2 nd Assessment (Online mode) (3 rd and 4 th Units)	End of 12 th Week	1 hour	30
3	Assignment/ Seminar	End of 13 th week		10
4	Compensation Assessment Online Mode	End of 14 th Week	1 hour	
5	Final Assessment (Online Mode)	16 th Week	2 hours	30
* Attending all the assessments (Assessment 1-3 and 5) are MANDATORY for every student.				
COURSE EXIT SURVEY				
<ul style="list-style-type: none"> • Feedback from the students during the class committee meetings • Anonymous feedback through questionnaire (Mid semester & End of the Semester) 				
COURSE POLICY				
<u>MODE OF CORRESPONDENCE</u>				
<ol style="list-style-type: none"> 1. All the students are advised to check their NITT WEBMAIL or group email id (if any) regularly. All the correspondence (schedule of classes/schedule of assessment/course material/any other information regarding this course) will be done through email only. 2. Queries if any can be emailed to the course teachersishajpsimon@gmail.com 				
<u>COMPENSATION ASSESSMENT POLICY</u>				
<ol style="list-style-type: none"> 1. If any student is not able to attend 1st Assessment / 2nd Assessment due to genuine reason, student is permitted to attend the Compensation Assessment with 30% weightage (30 marks). 2. In any case, compensation test will not be considered as an improvement test. 				
<u>ATTENDANCE POLICY</u> (A uniform attendance policy as specified below shall be followed)				
<ul style="list-style-type: none"> • At least 75% attendance in each course is mandatory. • A maximum of 10% shall be allowed under On Duty (OD) category. • Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade. 				

ACADEMIC DISHONESTY & PLAGIARISM

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

The above policy against academic dishonesty shall be applicable for all the programmes.

ADDITIONAL INFORMATION

- Be aware of the M.Tech regulations in the institute website for passing minimum, redo, formative assessment, grades, credits etc.

FOR APPROVAL

Course Faculty Indabati

Ankur
Dr. Ankur Singh Rana

CC-Chairperson _____ HOD _____