



DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGG

COURSE PLAN – PART I			
Name of the programme and specialization	B.Tech / Electrical and Electronics Engineering		
Course Title	EEPC 21 Power Electronics		
Course Code	EEPC 21	No. of Credits	3
Course Code of Pre-requisite subject(s)	Electron devices, Circuit theory, Electrical machines.		
Session	Jan. 2020	Section (if, applicable)	NA
Name of Faculty	Sundareswaran K	Department	EEE
Email	kse@nitt.edu	Telephone No.	8300902458
Name of Course Coordinator(s) (if, applicable)	NA		
E-mail	NA	Telephone No.	NA
Course Type	<input checked="" type="checkbox"/> Core course <input type="checkbox"/> Elective course		
Syllabus (approved in BoS)			
<p>Power Semiconductor Devices –power diodes, power transistors, SCRs, TRIAC, GTO, power MOSFETs, IGBTs-Principles of operation, characteristics, ratings, protection and gate drive circuits.</p> <p>Controlled rectifiers- single- phase and three-phase- power factor improvement (qualitative treatment)-dual converters.</p> <p>DC-DC converters- Buck, Boost, Buck-Boost types with circuit configuration and analysis.</p> <p>DC-AC converters-1-phase/3- phase, VSI, CSI, frequency and voltage control.</p> <p>AC-AC converters- single/three phase controllers, phase control, PWM AC voltage controller, Principle of ON-OFF control and cyclo-converters. Introduction to Matrix converters</p>			
COURSE OBJECTIVES			
<p>This course aims to equip the students with a basic understanding of modern power semiconductor devices, various important topologies of power converter circuits for specific types of applications. The course also equips students with an ability to understand and analyze non-linear circuits involving power electronic converters</p>			
COURSE OUTCOMES (CO)			
Course Outcomes			Aligned Programme Outcomes (PO)
Upon completion of the course,			
1. The student will be able to understand the principle of operation of commonly employed power electronic converters.			4,8,9
2. The student will be capable of analyzing non -linear circuits with several power electronic switches.			1,2,7,14
3. The student will be equipped to take up advanced courses in Power Electronics and its application areas.			8,10,12,13



COURSE PLAN – PART II

COURSE OVERVIEW

Power electronics is the technology that bridges two divisions of Electrical Engineering, namely Electric Power and Electronics. Power Electronics finds wide applications in motor drives, renewable power generation systems, regulated power supplies, HVDC and FACTS. This syllabus discusses four major power converters AC-DC, DC-AC, DC-DC and AC-AC conversion techniques. The subject is expected to help the students in designing and analysing power electronics circuits for electric power applications.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	Week 1-3	Power Semiconductor Devices –power diodes, power transistors, SCRs, TRIAC, GTO, power MOSFETs, IGBTs-Principles of operation, characteristics, ratings, protection and gate drive circuits.	Lecture/PPT
2	Week 4-6	Controlled rectifiers- single- phase and three-phase- power factor improvement (qualitative treatment)-dual converters.	Lecture/PPT
3	Week 7-9	DC-DC converters- Buck, Boost, Buck-Boost types with circuit configuration and analysis.	Lecture/PPT
4	Week 10-12	DC-AC converters-1-phase/3- phase, VSI, CSI, frequency and voltage control.	Lecture/PPT
5	Week 13-15	AC-AC converters- single/three phase controllers, phase control, PWM AC voltage controller, Principle of ON -OFF control and cyclo-converters. Introduction to Matrix converters	Lecture/PPT

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Written Examination	End of 6 th week	1 hour	30
2	Written Examination	End of 12 th week	1 hour	30
3	Assignment/Seminar/Mini project	End of 13 th week		10
CPA	Compensation Assessment*	End of 14 th week	1 hour	
4	Final Assessment *	16 th week	2 hours	30

*mandatory; refer to guidelines on page 4



COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

As per the directions from the academic section.

COURSE POLICY (compensation assessment policy to be specified)

COMPENSATION ASSESSMENT POLICY

Compensation assessment is only for those who have a valid medical or any other contingency. Prior approval for absence either in person or over telephone/e-mail is required.

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

- **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 if any

FOR APPROVAL

Course Faculty

[Signature]

CC-Chairperson

[Signature]

HOD

[Signature]



Guidelines

- a) The number of assessments for any theory course shall range from 4 to 6.
- b) Every theory course shall have a final assessment on the entire syllabus with at least 30% weightage.
- c) One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered.
- d) The passing minimum shall be as per the regulations.

B.Tech. Admitted in				P.G.
2018	2017	2016	2015	
35% or (Class average/2) whichever is greater.		(Peak/3) or (Class Average/2) whichever is lower		40%

- e) Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.
- f) Absolute grading policy shall be incorporated if the number of students per course is less than 10.
- g) Necessary care shall be taken to ensure that the course plan is reasonable and is objective.