



DEPARTMENT OF DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE PLAN – PART I			
Name of the programme and specialization	B.TECH. AND ELECTRICAL AND ELECTRONICS ENGINEERING		
Course Title	ANALOG ELECTRONIC CIRCUITS		
Course Code	EEPC16	No. of Credits	4
Course Code of Pre-requisite subject(s)	EEPC13		
Session	January 2022	Section (if, applicable)	A
Name of Faculty	Dr A Rakesh Kumar	Department	EEE
Official Email	arakesh@nitt.edu	Telephone No.	9840360047
Name of Course Coordinator(s) (if, applicable)			
Official E-mail		Telephone No.	
Course Type (please tick appropriately)	<input checked="" type="checkbox"/> Core course	<input type="checkbox"/> Elective course	
Syllabus (approved in BoS)			
<p>Small signal amplifiers - biasing circuits of BJT and FET transistors, analysis and design of BJT and FET amplifiers, chopper stabilized amplifiers, case studies – application of current amplifiers in SCR firing circuits and power supplies.</p> <p>Large signal amplifiers – analysis and design of class A and class B power amplifiers, class C and class D amplifiers, thermal considerations, tuned amplifiers.</p> <p>Feedback amplifiers – gain with feedback – effect of feedback on gain stability, distortion, bandwidth, input and output impedances; topologies of feedback amplifiers, case studies – application of negative feedback in dc-dc converters.</p> <p>Oscillators – Barkhausen criterion for oscillation – Hartley & Colpitt's oscillators – phase shift, Wien bridge and crystal oscillators - Clapp oscillator – oscillator amplitude stabilization.</p> <p>Pulse circuits – attenuators – RC integrator and differentiator circuits – diode clampers and clippers – multivibrators - Schmitt Trigger- UJT Oscillator, case studies – application of UJT oscillator in SCR firing circuits and opto-electronic control circuits.</p>			
COURSE OBJECTIVES			
To give a comprehensive exposure to all types of amplifiers and oscillators constructed with discrete components such as BJTs and FETs. This helps to develop a strong basis for building linear and digital integrated circuits.			
MAPPING OF COs with POs			
Course Outcomes	Programme		



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Upon completion of the course, the student will be able to	Outcomes (PO) (Enter Numbers only)
1. Understand the working of different types of amplifier, oscillator and multivibrator circuits.	2,3,8,9
2. Design BJT and FET amplifier and oscillator circuits.	1,2,8,9
3. Analyze transistorized amplifier and oscillator circuits.	1,2,8,9
4. Understand the applications of different types of amplifier, oscillator, attenuators and multivibrator circuits.	1,2,3,8,9

COURSE PLAN – PART II

COURSE OVERVIEW

This course introduces the applications of analog electronics devices and circuits. Emphasis is placed on biasing, analysis and design of small signal and large signal amplifiers, frequency response analysis, concept of feedback, sinusoidal waveform generators and wave shaping circuits. Case studies are also included in order to bridge the gap between theoretical analysis and practical applications.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	Week 1 2 Contact Hours 29 th Dec to 31 st Dec '21	Introduction - Small signal amplifiers	Chalk and Talk
2	Week 2 4 Contact Hours 03 rd Jan to 07 th Jan '22	Biasing circuits of BJT and FET transistors - Analysis and design of BJT and FET amplifiers	Chalk and Talk
3	Week 3 3 Contact Hours 10 th Jan to 13 th Jan '22	Chopper stabilized amplifiers, case studies – application of current amplifiers in SCR firing circuits and power supplies.	Chalk and Talk
4	Week 4 4 Contact Hours 17 th Jan to 21 st Jan '22	Large signal amplifiers – analysis and design of class A and class B power amplifiers,	Chalk and Talk
5	Week 5 3 Contact Hours 24 th Jan to 28 th Jan '22	Class C and class D amplifiers, thermal considerations, tuned amplifiers.	Chalk and Talk
6	Week 6 4 Contact Hours 31 st Jan to 04 th Feb '22	Feedback amplifiers – gain with feedback – effect of feedback on gain stability, distortion,	Chalk and Talk
7	Week 7 4 Contact Hours 7 th Feb to 11 th Feb '22	Effect of feedback on bandwidth, input and output impedances Second assessment	Chalk and Talk



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8	Week 8 4 Contact Hours 14 th Feb to 18 th Feb '22	Topologies of feedback amplifiers.	Chalk and Talk
9	Week 9 3 Contact Hours 21 st Feb to 23 rd Feb '22	Case studies – application of negative feedback in dc-dc converters.	Chalk and Talk
10	Week 10 3 Contact Hours 01 st Mar to 04 th Mar '22	Oscillators – Barkhausen criterion for oscillation. Third assessment	Chalk and Talk
11	Week 11 4 Contact Hours 07 th Mar to 11 th Mar '22	Hartley & Colpitt's oscillators – phase shift.	Chalk and Talk
12	Week 12 3 Contact Hours 14 th Mar to 17 th Mar '22	Wien bridge and crystal oscillators.	Chalk and Talk
13	Week 13 4 Contact Hours 21 st Mar to 25 th Mar '22	Clapp oscillator – oscillator amplitude stabilization.	Chalk and Talk
14	Week 14 4 Contact Hours 28 th Mar to 01 st Apr '22	Pulse circuits – attenuators – RC integrator and differentiator circuits – diode clampers and clippers	Chalk and Talk
15	Week 15 4 Contact Hours 04 th Apr to 08 th Apr '22	Multivibrators - Schmitt Trigger- UJT Oscillator Compensation assessment	Chalk and Talk
16	Week 16 1 Contact Hours 11 th Apr '22	Closure of all Class works and assessments	Chalk and Talk

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	First assessment – Class Assignment	Week 2 03 rd Jan to 13 th Jan '22		10
2	Second assessment – First class test	Week 7 09 th Feb to 11 th Feb '22	One hour 15 minutes	30
3	Third assessment - Second class test	Week 10-11 04 th Mar to 08 th Mar '22	One hour 15 minutes	30
CPA	Compensation Assessment	Week 15 7 th Apr to 8 th Apr '22	One hour 15 minutes	30



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4	Final Assessment	19 th Apr to 25 th Apr '22	One and half hour	30
ESSENTIAL READINGS: Textbooks, Reference books, website address, journals, etc Text Books: <ol style="list-style-type: none"> 1. Jacob Millman, 'Microelectronics', McGraw Hill, 2nd Edition, Reprinted, 2009. 2. David A Bell, 'Fundamentals of Electronic Devices and Circuits', Oxford University Press, Incorporated, 2009. 3. Allen Mottershead, 'Electronic Devices and Circuits-An Introduction', PHI, 18th Reprint, 2006. 				
Reference Books: <ol style="list-style-type: none"> 1 Thomas L. Floyd, David M. Buchla, 'Electronics Fundamentals', Pearson Prentice Hall, 7th Edition, 2010. 2 Robert.L.Boylestad, 'Electronic Devices and Circuit Theory', Pearson, 10th Edition, 2009. 3 Sedra Smith, 'Microelectronic Circuits', Oxford University Press, 6th Edition, 2010. 4 Jacob Millman and Christos C. Halkias, 'Integrated Electronics: Analog and Digital Circuits and Systems', 2nd Edition, Tata McGraw Hill Education, 2011. 				
COURSE EXIT SURVEY <ol style="list-style-type: none"> 1. Feedback from the students during class committee meetings 2. Anonymous feedback through questionnaire (Mid of the semester & End of the semester) 3. End semester feedback on course outcomes 				
COURSE POLICY <ol style="list-style-type: none"> 1. Attending all the assessments mandatory for every student 2. One compensation assessment will be conducted for those students who are being physically absent for the assessment 1 and/or 2, only for the valid reason. 3. At any case CPA will not be considered as an improvement test. 4. Absolute/Relative grading will be adopted for the course. 				
ATTENDANCE POLICY (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 <ul style="list-style-type: none"> ➤ 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 				



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Academic office.

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

ADDITIONAL INFORMATION, IF ANY

FOR APPROVAL

Course Faculty 04-01-2022 CC- Chairperson Anessa Farhan HOD (1/6) 05/01/2022

Guidelines

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

B.Tech. Admitted in				P.G.
2019/2018	2017	2016	2015	
35% or (Class average/2) whichever is greater.		(Peak/3) or (Class Average/2) whichever is lower		40%

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