

**DEPARTMENT OF INSTRUMENTATION & CONTROL ENGINEERING  
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI**

Course Title	Circuit Theory		
Course Code	ICPC 14	Credits	3
Department	ICE, III Semester Section A	Faculty	Dr. Ramakalyan Ayyagari
Pre-requisites	--		
Other Course Teacher(s)/Tutor(s)	--	Mobile No.	+919443923485
		Email	rkalyn@nitt.edu
Course Type	PROGRAM CORE		
<b>COURSE OVERVIEW</b>			
<p>The emphasis of this course is on the development of the basic ideas of electrical engineering, rather than on giving bland definitions. An additional objective of this course is to encourage the students to develop hierarchical thinking wherein they can see more complex systems as generalizations of simple circuits and techniques. There are no specific pre-requisites for this course; an understanding of elementary calculus and simple matrix methods is necessary and sufficient.</p>			
<b>COURSE OBJECTIVES</b>			
<ol style="list-style-type: none"> <li>1. To introduce and impart problem solving techniques, through linear passive electrical circuits, useful for other core and elective courses of the department.</li> <li>2. To introduce an algorithmic and computer-oriented methods for solving large scale circuits.</li> </ol>			
<b>COURSE OUTCOMES (CO)</b>			
1.	In part I of the course, the student is motivated to study circuits in a systematic manner suitable for engineering analysis and design. Further, the student understands formulating circuit analysis problems in a mathematically tractable way with an emphasis on solving linear systems of equations.		
<b>Alignment with the Program Outcomes: 1, 10, 12</b>			
2.	In part II, the student is exposed to subtle details in the responses of circuits subjected to sudden changes in excitation, and understanding the transient phenomena		
<b>Alignment with the Program Outcomes: 1, 10, 12</b>			
3.	In part III, the student understands the steady-state behavior of circuits, generalization of ideas to complex exponential signals. Further he is goaded to understand circuit theory in a unified framework, learn about input-output modeling, and generalize the concepts to linear systems theory - Control Systems, and Communication Systems.		
<b>Alignment with the Program Outcomes: 1, 10, 12</b>			
4.	In part IV, the student is goaded to understand circuit theory in a unified framework, learn about input-output modeling, and generalize the concepts to linear systems theory - Control Systems, and Communication Systems.		
<b>Alignment with the Program Outcomes: 1, 10, 12</b>			
5.	In part V, the student is introduced to the design of networks, given certain specifications and/or constraints, with a good balance of intuition developed in the earlier parts, and mathematical rigour.		
<b>Alignment with the Program Outcomes: 1, 10, 12</b>			
<b>COURSE TEACHING AND LEARNING ACTIVITIES</b>			

Classes	Dates	Topic(s)	Mode of Delivery	
1 – 2	July 10, 11	Introduction to the course	Board	
3 – 12	July 17, 18, 20, 24, 25, 27, 31, Aug 1	Part I (DC Circuit Analysis)	Board/PPT	
<b>August 3: ASSESSMENT 1: 1 hour test for 15% weight, covering Part I</b>				
13 – 18	Aug 7, 8, 10, 17	Part II (Transients)	Board/PPT	
19 – 24	Aug 21, 22, 24, 28, 29	Part III (AC Circuit Analysis)	Board/PPT	
<b>August 31: ASSESSMENT 2: 1 hour test for 15% weight, covering Parts II &amp; III</b>				
25 – 36	Sep 4, 5, 7, 11, 12, 14, 18, 19, 21	Part IV (s-domain Analysis)	Board/PPT	
<b>September 25: ASSESSMENT 3: 1 hour test for 15% weight, covering Part IV</b>				
37 – 44	Sep 26, Oct 3, 5, 9, 10, 12	Part V (Network Synthesis)	Board/PPT	
<b>October 26: ASSESSMENT 4: 1 hour test for 15% weight, covering Part V</b>				
<ul style="list-style-type: none"> <li>• A detailed course calendar is attached herewith.</li> </ul>				
<b>COURSE ASSESSMENT METHODS</b>				
S.No.	Mode of Assessment	Date	Duration	% Weightage
1 – 4	4 Assessments	Aug 3, Aug 31, Sept 25, Oct 26	60 minutes each	60%
5	Compensatory Assessment	Oct 30	60 minutes	15%
6	End-term Assessment Covering the entire syllabus	Nov 2	120 minutes	40%
7	Re-assessment Covering the entire syllabus	Nov 11	180 minutes	100%
<ul style="list-style-type: none"> <li>• Evaluation will be completed by Nov 6 to facilitate Re-assessment on Nov 11 for students scoring &lt; 35%.</li> <li>• Students can access their answer scripts, for the unlikely event of re-grading, on Nov 6</li> </ul>				
<b>RESULTS WILL BE SUBMITTED TO THE PAC ON November 7, 2017</b>				
<b>ESSENTIAL READINGS:</b>				
<ol style="list-style-type: none"> <li>1. Ramakalyan A., Linear Circuits: Analysis &amp; Synthesis, Oxford Univ. Press, 2005.</li> <li>2. W. Hayt &amp; J.E. Kemmerley, Engineering Circuit Analysis, Tata McGraw Hill, 8/e, 2013.</li> <li>3. Schaum's Outline Series, Electric Circuits, 6/e.</li> </ol>				

<b>COURSE EXIT SURVEY</b>
Feedback from the students during the class committee meetings
Feedback before End-term examination through a questionnaire, for improvements in future.
<b>COURSE POLICY (including attendance, grading, academic honesty, etc.)</b>
<b>ATTENDANCE</b>
<ul style="list-style-type: none"> <li>• 100% attendance, as on <u>October 12, 2017</u>, is mandatory, with an exemption up to 20% on genuine grounds; prior information and approval from the instructor is compulsory. <ul style="list-style-type: none"> <li>○ The only option for students with attendance &lt; 80% is RE-DO.</li> </ul> </li> </ul>
<b>ASSESSMENTS AND GRADING POLICY</b>
<ul style="list-style-type: none"> <li>• A student can be, upon prior approval, absent from only one out of the the continuous assessments 1 – 4, for which he/she is allowed to take the compensatory assessment on</li> </ul>

October 30, 2017. Please note that compensatory assessment is not offered as an improvement test for everyone.

- A student is declared pass upon accumulating a minimum of 35% over all the 5 assessments; grading is done for those students declared passed based on the class average – average and above shall get S, A, and B grades, and below average shall get C, D, and E.
- In case one or more students fail to accumulate the stipulated minimum 35% (at the end of 5 assessments), they are permitted to take a one-time re-assessment for 100%; this is a 3-hour written examination on November 11, 2017, covering the entire syllabus.

#### ACADEMIC HONESTY

- Mid-term and End-term assessments in this course must be strictly individual work.
- However, collaboration by individuals is encouraged at the level of ideas.
  - Feel free to ask each other questions, or brainstorm on solutions, or work together on a board. However, be careful about copying the actual solution. This sort of collaboration at the level of artifacts is permitted if explicitly acknowledged, but this is usually self-defeating.
- The principle behind the collaboration rule is simple:
  - I want you to learn as much as possible; you may learn from me or from each other.
  - The goal of artifacts (programs) is simply to demonstrate what you have learned. So, I'm happy to have you share ideas, but if you want your own points you have to internalize the ideas and then craft them into an artifact by yourself, without any direct assistance from anyone else, and without relying on any idea taken from others (whether at this institute or from the web).

#### ACADEMIC DISHONESTY

For purposes of this class, academic dishonesty is defined as:


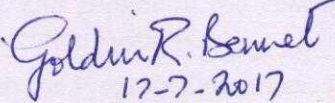

- Any attempt to pass off work on a test that didn't come straight out of your own head.
- Any collaboration on artifacts in which the collaborating parties do not clearly explain exactly who did what, at turn-in time.
- Any activity that has the effect of significantly impairing the ability of another student to learn. Examples here might include destroying the work of others, interfering with their access to resources, or deliberately providing them with misleading information.

#### ADDITIONAL COURSE INFORMATION

All the students are urged to be interactive during the classes. Further, the students are suggested to make a google group for faster dissemination of PPTs, discussions etc. They are free to interact with me over email any time, and if needed meet me in person with prior appointment.

Any changes in the proposed layout of the semester, due to unavoidable circumstances, shall be intimated immediately to the students and to the Chairperson, PAC

#### FOR SENATE'S CONSIDERATION

 Course Faculty Dr. Ramakalyan Ayyagari	 17-7-2017 CC-Chairperson Prof. G.R. Bennet	 18/7/17 HOD Dr. B. Vasuki
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