

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE OUTLINE TEMPLATE			
Course Title	ANTENNAS AND PROPAGATION		
Course Code	ECPC22	No. of Credits	03
Department	Electronics and Communication Engineering	Faculty	Dr.D.Sriram Kumar
Pre-requisites Course Code	ELECTRODYNAMICS AND ELECTROMAGNETIC WAVES (ECPC12)		
Course Coordinator(s) (if, applicable)			
Other Course Teacher(s)/Tutor(s) E-mail	Temporary Faculty Santhana Mahalingam .M	Telephone No.	srk@nitt.edu 9443494495 sandal@nitt.edu 9442756453
Course Type	Core course		
COURSE OVERVIEW			
Students will be introduced to antennas, their principle of operation, analysis and their applications. The course provides introduce the student to wave propagation over ground, through troposphere and ionosphere, propagation effects in radio frequencies.			
COURSE OBJECTIVES			
To impart knowledge on basics of antenna theory and to analyze and design a start of art antenna for wireless communication			
COURSE OUTCOMES (CO)			
Course Outcomes	Aligned Programme Outcomes (PO)		
CO1: select the appropriate portion of electromagnetic theory and its application to antennas	PO1,PO3,PO4,PO6,PO7		
CO2: distinguish the receiving antennas from transmitting antennas, analyze and justify their characteristics	PO1,PO3,PO4,PO6,PO7, PO11		
CO3: assess the need for antenna arrays and mathematically analyze the types of antenna arrays	PO1,PO3,PO4,PO6,PO7, PO11,PO12		
CO4: distinguish primary from secondary antennas and analyze their characteristics by applying optics and acoustics principles	PO1,PO3,PO4,PO6,PO7, PO11,PO12		
CO5: outline the factors involved in the propagation of radio waves using practical antennas	PO1,PO3,PO4,PO6		
COURSE TEACHING AND LEARNING ACTIVITIES			

S.No.	Week	Topic	Mode of Delivery
1.	2 nd Week of July (10/07/17 to 14/07/17) 4 Contact Hours	Radiation fundamentals. Potential theory. Helmholtz integrals.	Lecture C&T/ PPT or any suitable mode
2.	3 rd Week of July (17/07/17 to 21/07/17) 4 Contact Hours	Radiation from a current element. Basic antenna parameters. Radiation field of an arbitrary current distribution	
3.	4 th Week of July (24/07/17 to 28/07/17) 4 Contact Hours	Small loop antennas. Receiving antenna. Reciprocity relations	
4.	1 st Week of August (31/07/17 to 04/08/17) 4 Contact Hours	Receiving cross section, and its relation to gain. Reception of completely polarized waves. Linear antennas	
5.	2 nd Week of August (07/08/17 to 11/08/17) 4 Contact Hours	Current distribution. Radiation field of a thin dipole.	
6.	3 rd Week of August (14/08/17 to 18/08/17) 4 Contact Hours	Folded dipole. Feeding methods, Baluns. ASSESSMENT-1	
7.	4 th Week of August (21/08/17 to 25/08/17) 4 Contact Hours	Antenna arrays. Array factorization.	
8.	5 th Week of August (28/08/17 to 01/09/17) 4 Contact Hours	Array parameters. Broad side and end fire arrays	
9.	1 st Week of September (04/09/17 to 08/09/17) 4 Contact Hours	Uda arrays Log-periodic arrays. Aperture antennas. Fields as sources of radiation.	
10.	2 nd Week of September (11/09/17 to 15/09/17) 4 Contact Hours	Horn antennas. Babinet's principle	
11.	3 rd Week of September (18/09/17 to 22/09/17) 4 Contact Hours	Microstrip antennas. ASSESSMENT-2	
12.	4 th Week of September (25/09/17 to 29/09/17) 4 Contact Hours	Wave Propagation: Propagation in free space. Propagation around the earth,	
13.	1 st Week of October (02/10/17 to 06/10/17) 4 Contact Hours	surface wave propagation, structure of the ionosphere,	
14.	2 nd Week of October (09/10/17 to 13/10/17) 4 Contact Hours	propagation of plane waves in ionized medium, Determination of critical frequency	
15.	3 rd Week of October (16/10/17 to 20/10/17) 4 Contact Hours	MUF. Fading, tropospheric propagation, Super refraction REASSESSMENT	

COURSE ASSESSMENT METHODS				
S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1.	ASSESSMENT-1	3 rd Week of August	60 Minutes	20
2.	ASSESSMENT-2	3 rd Week of September	60 Minutes	20
3.	ASSIGNMENT, SEMINAR(Optional)			15
4.	SPOT QUIZ(Written)			5
5.	REASSESSMENT-2	3 rd Week of October	60 Minutes	
6.	END ASSESSMENT	2 nd Week of November	60 Minutes	40

ESSENTIAL READINGS : Textbooks, reference books Website addresses, journals, etc

Text Books

1. R.E.Collin, "Antennas and Radio Wave Propagation", McGraw – Hill, 1985.
2. W.L.Stutzman&G.A.Thiele , "Antenna Theory and Design", Wiley.

Reference books

1. K.F.Lee, "Principles of Antenna Theory", Wiley, 1984.
2. F.E. Terman , "Electronic Radio Engineering (4/e)", McGraw Hill.
3. J.R. James, P. S. Hall, and C. Wood, "Microstrip Antenna Theory and Design", IEE, 1981.
4. C. A.Balanis, "Modern Antenna Handbook", Wiley India Pvt. Limited, 2008.

Websites

1. www.antenna-theory.com
2. www.rfwireless-world.com
3. <https://www.microwaves101.com>

National Programme on Technology Enhanced Learning (NPTEL),MOOC,Coursera.

Online Courses:

<https://swayam.gov.in/course/3754-applied-engineering-electromagnetics>

Mc Graw Hill Access Engineering Library (<http://www.accessengineeringlibrary.com>)

COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)

Feedback from the students during class committee meetings

Anonymous feedback through questionnaire

COURSE POLICY (including plagiarism, academic honesty, attendance, etc.)

CORRESPONDENCE

1. All the students are advised to check their NITT WEBMAIL regularly. All the correspondence (schedule of classes/ schedule of assessment/ course material/ any other information regarding this course) will be done through their webmail only.
2. Queries (if required) to the course teacher shall only be emailed to the email id specified by the teacher.

ATTENDANCE

3. Attendance will be taken by the faculty in all the contact hours. Every student should maintain minimum 75 % physical attendance in these contact hours along with assessment criteria to attend the end semester examination.
4. Any student, who fails to maintain 75% attendance need to appear for the compensation assessment (CPA). Student who scores more than 60 % marks in the CPA along with assessment criteria will be eligible for attending the end semester examination.
5. Those students who have attendance lag and also missed any of the continuous assessments (CAs) can appear for CPA to get eligibility for writing the end semester examination as quoted in Pt. 2. Their scores in the CPA WILL NOT be taken into account for computing marks for CA.
6. Students not having 75% minimum attendance at the end of the semester and also fail in CPA (scoring less than 60%) will have to RE DO the course.

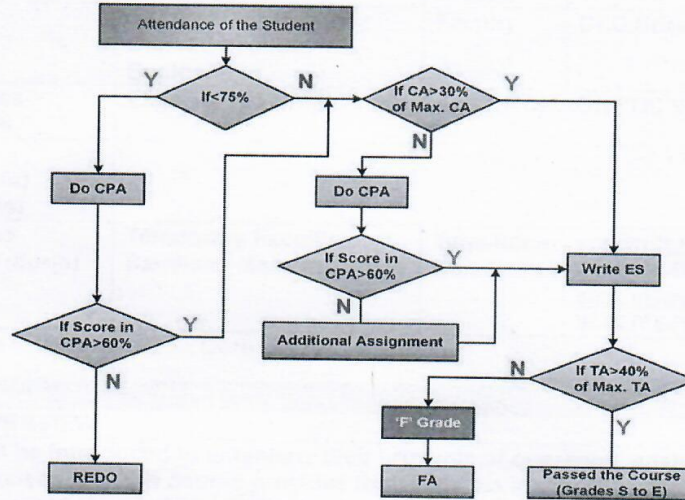
ASSESSMENT

7. Attending all the assessments are MANDATORY for every student.
8. If any student is not able to attend any of the continuous assessments (CAs : Mid-semester test, Quizzes, Lab experiment) due to genuine reason, student is permitted to attend the compensation assessment (CPA) with 20 % weightage. (This is not valid for students who have attendance lag also. Refer Pt. 3 under Attendance)
9. At any case, CPA will not be considered as an improvement test.
10. Students are expected to score minimum 30% of the maximum mark of the class in the CAs to attend the end semester examination in addition to the attendance requirement. Otherwise the student is permitted to attend CPA and is expected to score more than 60% marks to get eligibility to appear for end semester examination. However, the score in CPA WILL NOT be considered for computing marks for CA.

Student who fails to score 60% in CPA will take up additional assignments to get eligibility for writing End Semester examination.

11. Finally, every student is expected to score minimum 40% of the maximum mark of the class in the total assessment (1, 2, 3, 4 and 5) to pass the course. Otherwise the student would be declared fail and 'F' grade will be awarded. Further he can take up only FORMATIVE ASSESSMENT.

Refer the following flow chart for more clarity:



CA: Continuous Assessment Mark of a student TA: Total Assessment Mark of a student

Max.CA : Maximum Continuous Assessment Mark of the class

Max.TA : Maximum Total Assessment Mark of the class

FA : Formative Assessment ES: End Semester CPA: Compensation Assessment

ACADEMIC HONESTY & PLAGIARISM

1. All the students are expected to be genuine during the course work. Taking of information by means of copying simulations, assignments, looking or attempting to look at another student's paper or bringing and using study material in any form for copying during any assessments is considered dishonest.
2. Tendering of information such as giving one's program, simulation work, assignments to another student to use or copy is also considered dishonest.
3. Preventing or hampering other students from pursuing their academic activities is also considered as academic dishonesty.
4. Any evidence of such academic dishonesty will result in the loss of marks on that assessment. Additionally, the names of those students so penalized will be reported to the class committee chairperson and HoD of the concerned department.
5. Students who honestly producing ORIGINAL and OUTSTANDING WORK will be REWARDED.

ADDITIONAL COURSE INFORMATION

Queries may also be emailed to the Course Coordinator directly at srk@nitt.edu

FOR SENATE'S CONSIDERATION

Course Faculty Shraw

CC-Chairperson Th

HOD Ray