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Electromagnetic Waves in Guided and Wireless Media

By Prof. Pradeep Kumar | IIT Kanpur

Learners enrolled: 2807

noc19-ee21-Introduction-Electromagnetic Waves in Guided and Wireless Media



A thorough understanding of propagation and radiation of electromagnetic waves in both wired and wireless media is important in many fields such as microwave and RF engineering, antennas, wireless communications, and fiber-optics. In this course, we discuss guided electromagnetic wave propagation in transmission lines and metallic waveguides, light propagation in optical waveguides, fibers, and free-space. In the final part of the course, we cover basic concepts of antennas and channel models for wireless communications. Pre-requisites include familiarity with vector analysis and vector calculus, electrostatics, and magnetostatics. Assignments include both conceptual and computational problems.

INTENDED AUDIENCE : Undergraduate students and first year graduate students

PREREQUISITES : Vector analysis, Electrostatics, and Magnetostatics

INDUSTRY SUPPORT : Of interest to all companies that deal with electromagnetic waves and wireless communications. In addition, DRDO, ISRO, etc will value the course

Summary

Course Status :	Completed
Course Type :	Elective
Duration :	8 weeks
Category :	<ul style="list-style-type: none"> Electrical, Electronics and Communications Engineering
Credit Points :	2
Level :	Undergraduate/Postgraduate

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Start Date :



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End Date :

Enrollment Ends :

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Exam Date :

25 Apr 2021 IST

Note: This exam date is subjected to change based on seat availability. You can check final exam date on your hall ticket.

This is an AICTE approved FDP course

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Course layout

- Week 1 : Transmission lines
- Week 2 : Applications of transmission lines
- Week 3 : EM waves in free-space
- Week 4 : Diffraction of EM waves
- Week 5 : Guided waves in metallic waveguides
- Week 6 : Guided waves in dielectric waveguides
- Week 7 : Fundamentals of radiation
- Week 8 : Wireless channel modeling

Books and references

Electromagnetic waves, D. H. Staelin et al, 19932. Electromagnetic wave propagation, radiation and scattering, A. Ishimaru, 20173. Fields and waves in modern communication electronics, S. Ramo et. al., Wiley 19934. Digital communications with emphasis on data modems, R. W. Middlestead, 2017.

Instructor bio



Prof. Pradeep Kumar

IIT Kanpur

Dr. Pradeep Kumar K. obtained his PhD from IIT Madras specializing in quantum cryptography. He joined the Department of Electrical Engineering at IIT Kanpur in 2009. He is also associated with the Centre for Lasers & Photonics. At IIT Kanpur he and his students work in the fields of quantum key distribution, nonlinear fiber optics for signal processing, mitigation of linear and nonlinear impairments in coherent optical communications, mode locked fiber lasers and chaos, fiber-optic sensors for undersea applications, and fiber-optic modeling. He is also actively involved in the LIGO-India effort under IndiGO umbrella. His lab develops single-photon detectors, single- and subcarrier RF transceivers, and is currently working on true random number generators. He has published over 40 papers in peer reviewed journals and conferences. He also holds three patents (one granted and two pending). His MOOC courses on NPTEL has been very popular with more than 15000 enrollments from across the country.

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Course certificate



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The course is free to enroll and learn from. But if you want a certificate, you have to register and write the proctored exam conducted by us in person at any of the designated exam centres. **About Swayam** (<https://swayam.gov.in/about>) | **All Courses** | krishnajyothi.n@gmail.com ✓ (/profile)

The exam is optional for a fee of Rs 1000/- (Rupees one thousand only).

Date and Time of Exams: **25 April 2021** Morning session 9am to 12 noon; Afternoon Session 2pm to 5pm.

Registration url: Announcements will be made when the registration form is open for registrations.

The online registration form has to be filled and the certification exam fee needs to be paid. More details will be made available when the exam registration form is published. If there are any changes, it will be mentioned then.

Please check the form for more details on the cities where the exams will be held, the conditions you agree to when you fill the form etc.

CRITERIA TO GET A CERTIFICATE

Average assignment score = 25% of average of best 6 assignments out of the total 8 assignments given in the course.

Exam score = 75% of the proctored certification exam score out of 100

Final score = Average assignment score + Exam score

YOU WILL BE ELIGIBLE FOR A CERTIFICATE ONLY IF AVERAGE ASSIGNMENT SCORE $\geq 10/25$ AND EXAM SCORE $\geq 30/75$. If one of the 2 criteria is not met, you will not get the certificate even if the Final score $\geq 40/100$.

Certificate will have your name, photograph and the score in the final exam with the breakup. It will have the logos of NPTEL and IIT Kanpur. It will be e-verifiable at nptel.ac.in/noc (<http://nptel.ac.in/noc>)

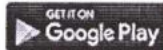
Only the e-certificate will be made available. Hard copies will not be dispatched.

Once again, thanks for your interest in our online courses and certification. Happy learning.

NPTEL team



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Roll No: NPTEL19EE21S51451485

To N KRISHNA JYOTHI
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HYDERABAD



No. of weeks of NPTEL Courses	Equivalence of NPTEL course with regular FDP
4	$\frac{1}{2}$ FDP of one week
8	Full FDP of one week
12	$1\frac{1}{2}$ FDP

Duration of NPTEL course: 8 Weeks



NPTEL-AICTE Faculty Development Programme



(Funded by the Ministry of HRD, Govt. of India)

This certificate is awarded to

N KRISHNA JYOTHI





for successfully completing the course

**Electromagnetic Waves in Guided and
Wireless Media**

with a consolidated score of **75 %**


Prof. Andrew Thangaraj
NPTEL Coordinator
IIT Madras


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Prof. Dileep N. Malkhede
Advisor-I (Research, Institute & Faculty Development)
All India Council for Technical Education

Roll No: NPTEL19EE21S51451485

To validate and check scores: <http://npTEL.ac.in/noc>

The candidate has studied the above course through MOOCs mode, has submitted online assignments and passed proctored exams. This certificate is therefore acceptable for promotions under CAS as per AICTE notifications dated 24th July 2018, similar to other refresher / orientation courses.
F.No. AICTE / RIFD / FDP through MOOCs / 2017-18