

# Electrodynamics-Paper-II

M.Sc Physics (Previous)

(Remaining Course Work Contents for the Session - 2019-20)

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Note: All MSc. (Prev./Final) students are instructed to make a Gmail account and send an email to my above email address so that Google Class Room Invitation may be sent. Also send your Mobile number in the Email.

Dear Students

As we all know that due to the Covid-19 viral pandemic the world is at halt so as our country. This locked down situation may persists for some time due to wide spread of the virus. The HEC and UoP has announced to offer the online Teaching Courses ( A synchronous Mode – The Teaching Material will be provided for download And Videos of Teaching Material with Audio Lectures will be posted) to complete the remaining courses.

The switching process from Class Room Teaching to The online Teaching environment is a big uphill task which needs the conversion of all class room Teaching Material to the Computer Slides PDF MS Office files which requires a lot of time. Due to the short time I am going put the Class Room Teaching Course material on handwritten PDF files and Power point slides and will be posted on our website for the students. We are also in the process of preparing the videos of the posted Teaching Material with Audio Lectures . Since video recording is a time taking process the completed video lectures will be uploaded on the various Web Drives in my case it will be Google Drive and YoTube.

Note: The codes below assigned to topics are not official. I have assigned these codes for the Classification of my online Teaching Material. The Abbreviations carry the information of Main Titles of the Syllabus Sections below are the abbreviations:

EMWP-S#: Electromagnetic Wave Propagation-Section#

EMWG-S#: Electromagnetic Wave Guides- Section#

EMPF-S#: Electromagnetic Potential Formulation- Section#

EMREL-S#: Electromagnetic Relativity- Section#

EMPR-S# Electromagnetic Problems-S#

( Problems related to respective Topics)

<b>Online Teaching Material Code</b>	<b>Title of the Topic</b>
EMWP-S1	Maxwell's Equations, Displacement Field Vector.
EMWP-S2	Maxwell's Equations for harmonically varying fields.
EMWP-S3	EM-Wave equation in $\vec{E}$ & $\vec{H}$ fields .
EMWP-S4	Plane EM-Wave equation ( Linearly Polarized).
EMWP-S5	Energy of an EM-Wave
EMWP-S6	Poynting Theorem & Poynting Vector.
EMWP-S7	EM-Wave equation in a linear homogenous medium (Space dependent)
EMWP-S8	Solution of Plane EM- wave (Monochromatic) equation in a non-conducting medium.
EMWP-S9 (a)	Solution of Plane EM- wave (Monochromatic) equation in a conducting medium.
EMWP-S9 (b)	Wave Vector $\vec{k}$ and wave number
EMWP-S10	Reflection & Refraction of Plane EM-Wave at the boundary of free space and non-conducting interface (Normal Incidence case)

Online Teaching Material Code	Title of the Topic
EMWP-S11	Reflection & Refraction of Plane EM-Wave at the boundary of free space and conducting interface (Normal Incidence case)
EMWP-S12 <b>(Ammended)</b>	The sum of the Reflection and Transmission Coefficients for two non-conduction Transparent media is a Unity. $R_n + T_n = 1$
EMWP-S13	Boundary Conditions for E & B field vectors across the interface of two media.
<b>Revised :</b> EMWD-S1	<b>New Topics Added</b> EM -Waves dispersion . Frequency dependence of $\epsilon$ – prmitivity , $\mu$ – permeability & $\sigma$ – conductivity of a medium
EMWD-S2	EM –Waves Dispersion in non-conducting medium
EMWD-S3	EM –Waves Dispersion in conducting medium
EMWD-S4	EM –Waves Dispersion in dilute medium (Plasma)

<b>Online Teaching Material Code</b>	<b>Title of the Topic</b>
EMWG-S1	Wave Guides. Propagation of EM-waves between two parallel conducting planes.
EMWG-S2	Attenuation in two Parallel conducting planes.
EMWG-S3	Phase Velocity and Group Velocity.
EMWG-S4	Propagation of EM-waves inside a rectangular conducting Wave Guide.
<b>EMWG-S5</b> Rev2:(added)	Skin Effect & Skin Depth, Penetration of high frequency EM-Fields in to a good conductor.
<b>EMWG-S6</b> Rev2:(added)	Internal impedance of a conducting medium.
EMPF-S1	Potential Formulations for $U$ & $\bar{A}$ potentials.
EMPF-S2	Gauge Transformations.
EMPF-S3	Coulomb's Gauge and Lorentz Gauge.

<b>Online Teaching Material Code</b>	<b>Title of the Topic</b>
EMREL-S1	Frame of References , Invariance and Covariance
EMREL-S2	Special Theory of Relativity and the Break down of Classical Physics
EMREL-S3	Galilean Transformation
EMREL-S4	Lorentz Transformation of Space Time Coordinates.
EMREL-S5	Length Contraction & Time Dilation
EMREL-S6	Relativistic Doppler Effect
EMREL-S7	Simultaneity
EMREL-S8	Relativistic Transformation of velocity, Acceleration, mass , Force Momentum , energy etc
EMREL-S9	Four dimensional operator Space and Time .

The End