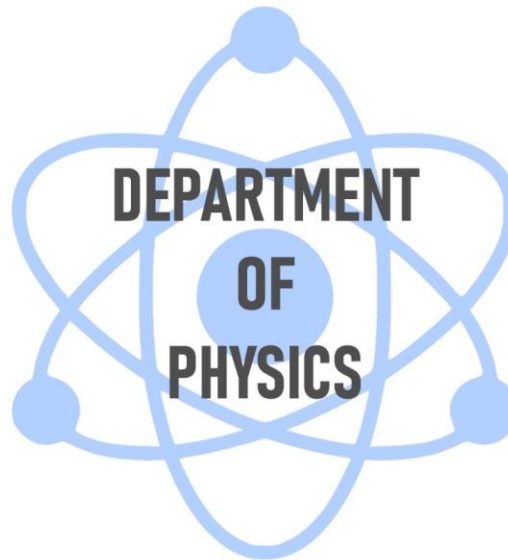




Directorate of Technical Education  
Tamil Nadu

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ANNA UNIVERSITY AFFILIATED GOVERNMENT ENGINEERING COLLEGES - REGULATION 2017

# PH8151 ENGINEERING PHYSICS

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## UNIT I PROPERTIES OF MATTER

9 periods

Elasticity – Stress-strain diagram and its uses - factors affecting elastic modulus and tensile strength – torsional stress and deformations – twisting couple - torsion pendulum: theory and experiment - bending of beams - bending moment – cantilever: theory and experiment – uniform and non-uniform bending: theory and experiment - I-shaped girders - stress due to bending in beams.

## UNIT II WAVES AND FIBER OPTICS

9 periods

Oscillatory motion – forced and damped oscillations: differential equation and its solution – plane progressive waves – wave equation. Lasers : population of energy levels, Einstein's A and B coefficients derivation – resonant cavity, optical amplification (qualitative) – Semiconductor lasers: homojunction and heterojunction – Fiber optics: principle, numerical aperture and acceptance angle - types of optical fibres (material, refractive index, mode) – losses associated with optical fibers - fibre optic sensors: pressure and displacement.

## UNIT III THERMAL PHYSICS

9 periods

Transfer of heat energy – thermal expansion of solids and liquids – expansion joints – bimetallic strips - thermal conduction, convection and radiation – heat conduction in solids – thermal conductivity - Fourier's and Lee's disc method: theory and experiment - conduction through compound media (series and parallel) – thermal insulation – applications: heat exchangers, refrigerators, ovens and solar water heaters.

## UNIT IV QUANTUM PHYSICS

9 periods

Black body radiation – Planck's theory (derivation) – Compton effect: theory and experimental verification – wave particle duality – electron diffraction – concept of wave function and its physical significance – Schrödinger's wave equation – time independent and time dependent equations – particle in a one-dimensional rigid box – tunnelling (qualitative) - scanning tunnelling microscope.

## UNIT V CRYSTAL PHYSICS

9 periods

Single crystalline, polycrystalline and amorphous materials – single crystals: unit cell, crystal systems, Bravais lattices, directions and planes in a crystal, Miller indices – inter-planar distances - coordination number and packing factor for SC, BCC, FCC, HCP and diamond structures - crystal imperfections: point defects, line defects – Burger vectors, stacking faults – role of imperfections in plastic deformation - growth of single crystals: solution and melt growth techniques.

**TOTAL :45 PERIODS**

## **OBJECTIVES**

To enhance the fundamental knowledge in Physics and its applications relevant to various streams of Engineering and Technology.

## **OUTCOMES**

- ❖ The students will gain knowledge on the basics of properties of matter and its applications
- ❖ The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics
- ❖ The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers,
- ❖ The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes
- ❖ The students will understand the basics of crystals, their structures and different crystal growth techniques.

### **TEXT BOOKS:**

1. Bhattacharya, D.K. & Poonam, T. "Engineering Physics". Oxford University Press, 2015.
2. Gaur, R.K. & Gupta, S.L. "Engineering Physics". Dhanpat Rai Publishers, 2012.
3. Pandey, B.K. & Chaturvedi, S. "Engineering Physics". Cengage Learning India, 2012.

### **REFERENCES:**

1. Halliday, D., Resnick, R. & Walker, J. "Principles of Physics". Wiley, 2015.
2. Serway, R.A. & Jewett, J.W. "Physics for Scientists and Engineers". Cengage Learning, 2010.
3. Tipler, P.A. & Mosca, G. "Physics for Scientists and Engineers with Modern Physics". W.H.Freeman, 2007.

**Directorate of Technical Education, Chennai-600025**





**NON-TEQIP Government Engineering Collges**

**PH8151 -Engineering Physics- Video Lecture Topics covered for Semester I (2020-2021)**

Unit No.	College Name	Faculty Name	Mobile Number	Faculty email_ID	Video Lecture Topic	Video Lecture Link	VL QR Code
Unit I	GCE Bodinaya kanur	A.Kubera Raja	6379773350	<a href="mailto:kuberaphysics83@gmail.com">kuberaphysics83@gmail.com</a>	Unit 1 - Properties of Matter Introduction	<a href="https://www.youtube.com/watch?v=Zgaiynx5kSs&amp;t=517s">https://www.youtube.com/watch?v=Zgaiynx5kSs&amp;t=517s</a>	
		A.Kubera Raja	6379773350	<a href="mailto:kuberaphysics83@gmail.com">kuberaphysics83@gmail.com</a>	Unit 1 - Properties of Matter Elasticity stress strain Hooke's law	<a href="https://www.youtube.com/watch?v=BZTxEKBgYic&amp;t=167s">https://www.youtube.com/watch?v=BZTxEKBgYic&amp;t=167s</a>	
		A.Kubera Raja	6379773350	<a href="mailto:kuberaphysics83@gmail.com">kuberaphysics83@gmail.com</a>	Unit 1 Properties of Matter Stress Strain Diagram and its uses	<a href="https://www.youtube.com/watch?v=zXiBiggDjJw&amp;t=13s">https://www.youtube.com/watch?v=zXiBiggDjJw&amp;t=13s</a>	
		A.Kubera Raja	6379773350	<a href="mailto:kuberaphysics83@gmail.com">kuberaphysics83@gmail.com</a>	Unit 1 Properties of Matter Types of Moduli and factors affecting elastic modulus	<a href="https://www.youtube.com/watch?v=8_klR_hYXns">https://www.youtube.com/watch?v=8_klR_hYXns</a>	
		J Abuthahir	7708082399	<a href="mailto:abuthahir@gces.edu.in">abuthahir@gces.edu.in</a>	Unit I Properties of Matter, Torsional Rigidity and twisting Couple	<a href="https://www.youtube.com/watch?v=8FotZg6HA0E&amp;feature=youtu.be">https://www.youtube.com/watch?v=8FotZg6HA0E&amp;feature=youtu.be</a>	
		J Abuthahir	7708082399	<a href="mailto:abuthahir@gces.edu.in">abuthahir@gces.edu.in</a>	Unit I Properties of Matter, Torsional Pendulum theory and expt.	<a href="https://youtu.be/LkW0p15ban4">https://youtu.be/LkW0p15ban4</a>	
		J Abuthahir	7708082399	<a href="mailto:abuthahir@gces.edu.in">abuthahir@gces.edu.in</a>	Unit I, Bending of beams, Cantilever theory and experiment	<a href="https://youtu.be/gIvyI2c3IVA">https://youtu.be/gIvyI2c3IVA</a>	

		N.Manikandan	8883985473	<a href="mailto:manikandan1983414@gmail.com">manikandan1983414@gmail.com</a>	Unit I Properties of Matter Uniform bending theory and experiment	<a href="https://www.youtube.com/watch?v=na81AF1rbfY">https://www.youtube.com/watch?v=na81AF1rbfY</a>	
		N.Manikandan	8883985473	<a href="mailto:manikandan1983414@gmail.com">manikandan1983414@gmail.com</a>	Unit I Properties of Matter Non-uniform bending theory and experiment	<a href="https://www.youtube.com/watch?v=Y80NqVW4-oM">https://www.youtube.com/watch?v=Y80NqVW4-oM</a>	
		N.Manikandan	8883985473	<a href="mailto:manikandan1983414@gmail.com">manikandan1983414@gmail.com</a>	Unit I Properties of Matter I shaped girders Stress due to bending in beams	<a href="https://www.youtube.com/watch?v=0grgiwW4cP8">https://www.youtube.com/watch?v=0grgiwW4cP8</a>	
Unit IIA	GCE Tirunelveli	Mrs.R.Meenakshi	9489191641	<a href="mailto:meenakshi@gcetly.ac.in">meenakshi@gcetly.ac.in</a>	Oscillatory motion	<a href="https://youtu.be/EIhXrpQVXns">https://youtu.be/EIhXrpQVXns</a>	
		Mrs.R.Meenakshi	9489191641	<a href="mailto:meenakshi@gcetly.ac.in">meenakshi@gcetly.ac.in</a>	Damped Oscillation	<a href="https://youtu.be/RdR-u7RGyYE">https://youtu.be/RdR-u7RGyYE</a>	
		Dr.D.Chérine	9944831406	<a href="mailto:cherinedavid@gmail.com">cherinedavid@gmail.com</a>	Forced Oscillation	<a href="https://youtu.be/axdOd5bo3Y0">https://youtu.be/axdOd5bo3Y0</a>	
		Dr.D.Chérine	9944831406	<a href="mailto:cherinedavid@gmail.com">cherinedavid@gmail.com</a>	Plane progressive wave	<a href="https://www.youtube.com/watch?v=eCvquLZhWeU&amp;t=287s">https://www.youtube.com/watch?v=eCvquLZhWeU&amp;t=287s</a>	
		Dr.D.Chérine	9944831406	cherinedavid@gmail.com	Semiconductor Laser	<a href="https://www.youtube.com/watch?v=0oLPOnv0iG0&amp;t=10s">https://www.youtube.com/watch?v=0oLPOnv0iG0&amp;t=10s</a>	
		A Karthikeyan	9894798600	<a href="mailto:karthikeyana82@gmail.com">karthikeyana82@gmail.com</a>	Wave and optics -Laser	<a href="https://youtu.be/0SGwyAiOg8s">https://youtu.be/0SGwyAiOg8s</a>	

<b>Unit II B</b>	<b>GCE Dharmapuri</b>	A Karthikeyan	9894798600	<a href="mailto:karthikeyana82@gmail.com">karthikeyana82@gmail.com</a>	Wave and optics -Laser problems	<a href="https://youtu.be/iJV3L-iz8XQ">https://youtu.be/iJV3L-iz8XQ</a>	
		S.Suganya	9080381393	<a href="mailto:sugan260386@gmail.com">sugan260386@gmail.com</a>	Wave and optics -Fibre optics Part I	<a href="https://drive.google.com/file/d/1uRQ09TmjQ8HU9EFJsfPgZTgeF4ae_heq/view?usp=sharing">https://drive.google.com/file/d/1uRQ09TmjQ8HU9EFJsfPgZTgeF4ae_heq/view?usp=sharing</a>	
		S.Suganya	9080381393	<a href="mailto:sugan260386@gmail.com">sugan260386@gmail.com</a>	Wave and optics -Fibre optics Part II	<a href="https://drive.google.com/file/d/1MhJd5nItj_RVELPJkebc8u0RxPe1UtMS/view?usp=sharing">https://drive.google.com/file/d/1MhJd5nItj_RVELPJkebc8u0RxPe1UtMS/view?usp=sharing</a>	
		S.Suganya	9080381393	<a href="mailto:sugan260386@gmail.com">sugan260386@gmail.com</a>	Wave and optics -Fibre optics Part III	<a href="https://drive.google.com/file/d/1ykIp7sy-jo1_lmx3fFw_qod3rGMQ5USD/view?usp=sharing">https://drive.google.com/file/d/1ykIp7sy-jo1_lmx3fFw_qod3rGMQ5USD/view?usp=sharing</a>	
<b>Unit III</b>	<b>TPGIT</b>	Dr. V. Vetrivelan	9486898120	<a href="mailto:vetri.tpgit@gmail.com">vetri.tpgit@gmail.com</a>	Transfer of heat energy, Expansion of Solids and Liquids, Expansion Joints, Bimetallic strips with application, Conduction, Convection and Radiation	<a href="https://youtu.be/RVOFLdlh4Z0">https://youtu.be/RVOFLdlh4Z0</a>	
		S. Nagarajan	9962282932	<a href="mailto:nagarajan02@gmail.com">nagarajan02@gmail.com</a>	Thermal conductivity of Solids, Bodies in Series, Bodies in Parallel	<a href="https://youtu.be/14cYendCCgs">https://youtu.be/14cYendCCgs</a>	
		S. Nagarajan	9962282932	<a href="mailto:nagarajan02@gmail.com">nagarajan02@gmail.com</a>	Forbes method	<a href="https://youtu.be/t9jCEb9TwsE">https://youtu.be/t9jCEb9TwsE</a>	
		S. Nagarajan	9962282932	<a href="mailto:nagarajan02@gmail.com">nagarajan02@gmail.com</a>	Lee's disc method	<a href="https://youtu.be/OQH3_hWz1OU">https://youtu.be/OQH3_hWz1OU</a>	

		Dr. S. Santhosh	8838375322	<a href="mailto:ssanthosh3088@gmail.com">ssanthosh3088@gmail.com</a>	Thermal insulation and heat exchanger	<a href="https://youtu.be/OZtS9LIG0Qo">https://youtu.be/OZtS9LIG0Qo</a>	
		Dr. S. Santhosh	8838375322	<a href="mailto:ssanthosh3088@gmail.com">ssanthosh3088@gmail.com</a>	Refrigerator	<a href="https://youtu.be/oLpg6FTjSUg">https://youtu.be/oLpg6FTjSUg</a>	
		Dr. S. Santhosh	8838375322	<a href="mailto:ssanthosh3088@gmail.com">ssanthosh3088@gmail.com</a>	Oven	<a href="https://youtu.be/5bvMEWxXI9E">https://youtu.be/5bvMEWxXI9E</a>	
		Dr. S. Santhosh	8838375322	<a href="mailto:ssanthosh3088@gmail.com">ssanthosh3088@gmail.com</a>	Solar water heater	<a href="https://youtu.be/9_CsAVPzKHk">https://youtu.be/9_CsAVPzKHk</a>	
		A.Ramesh	9786474712	<a href="mailto:rameshathvikha@gmail.com">rameshathvikha@gmail.com</a>	Concept of wave function and Schrodinger time independent wave	<a href="https://youtu.be/w8hbhJ3_MfY">https://youtu.be/w8hbhJ3_MfY</a>	
		A.Ramesh	9786474712	<a href="mailto:rameshathvikha@gmail.com">rameshathvikha@gmail.com</a>	Schrodinger time independent wave function and Physical significance of wave equation	<a href="https://youtu.be/vdrC25PjSMs">https://youtu.be/vdrC25PjSMs</a>	
		A.Ramesh	9786474712	<a href="mailto:rameshathvikha@gmail.com">rameshathvikha@gmail.com</a>	Particle in a one dimensional rigid box	<a href="https://youtu.be/5PEj2DnSfBY">https://youtu.be/5PEj2DnSfBY</a>	
		Dr. B. Virgin Jenisha	8344245281	<a href="mailto:bjjenisha@gces.edu.in">bjjenisha@gces.edu.in</a>	Introduction and unit overview	<a href="https://youtu.be/4k9ki8vvwtc">https://youtu.be/4k9ki8vvwtc</a>	
		Dr. B. Virgin Jenisha	8344245281	<a href="mailto:bjjenisha@gces.edu.in">bjjenisha@gces.edu.in</a>	Wave particle duality	<a href="https://youtu.be/sqsVbOODdtE">https://youtu.be/sqsVbOODdtE</a>	

Unit IV	GCE Srirani	Dr. B. Virgin Jenisha	8344245281	<a href="mailto:bvjenisha@gces.edu.in">bvjenisha@gces.edu.in</a>	Electron diffraction	<a href="https://youtu.be/yxLlumZ2JxE">https://youtu.be/yxLlumZ2JxE</a>	
		Dr. B. Virgin Jenisha	8344245281	<a href="mailto:bvjenisha@gces.edu.in">bvjenisha@gces.edu.in</a>	Compton effect - Theory	<a href="https://youtu.be/ErHxyh4iAyk">https://youtu.be/ErHxyh4iAyk</a>	
		Dr. B. Virgin Jenisha	8344245281	<a href="mailto:bvjenisha@gces.edu.in">bvjenisha@gces.edu.in</a>	Compton effect - Experimental verification	<a href="https://youtu.be/i6S1S2bhZwE">https://youtu.be/i6S1S2bhZwE</a>	
		V.Subapriya	9487285039	<a href="mailto:subapriyaphy@gces.edu.in">subapriyaphy@gces.edu.in</a>	black body radiation	<a href="https://youtu.be/GeGFVnjiY_I">https://youtu.be/GeGFVnjiY_I</a>	
		V.Subapriya	9487285039	<a href="mailto:subapriyaphy@gces.edu.in">subapriyaphy@gces.edu.in</a>	Planck's theory	<a href="https://youtu.be/VvwrSRKTxQo">https://youtu.be/VvwrSRKTxQo</a>	
		V.Subapriya	9487285039	<a href="mailto:subapriyaphy@gces.edu.in">subapriyaphy@gces.edu.in</a>	tunnelling and scanning tunnelling microscope	<a href="https://youtu.be/skmUPpcrrKM">https://youtu.be/skmUPpcrrKM</a>	
		V.Subapriya	9487285039	<a href="mailto:subapriyaphy@gces.edu.in">subapriyaphy@gces.edu.in</a>	problems and solutions	<a href="https://youtu.be/yvkXX3sYF4E">https://youtu.be/yvkXX3sYF4E</a>	
		Mr.J.Ayyappan	8610893508	ayyappanphysics@gmail.com	Engineering Physics Unit V – Introduction	<a href="https://youtu.be/RrnZ4r-aly0">https://youtu.be/RrnZ4r-aly0</a>	
		Mr.J.Ayyappan	8610893508	ayyappanphysics@gmail.com	Engineering Physics Unit V – Module I – Lecture I	<a href="https://youtu.be/PqfUWMAsjZc">https://youtu.be/PqfUWMAsjZc</a>	






Unit V	GCE Sengip	Mr.J.Ayyappan	8610893508	ayyappanphysics@gmail.com	Engineering Physics Unit V – Module I – Lecture II	<a href="https://youtu.be/Jsdkn08uhGf">https://youtu.be/Jsdkn08uhGf</a>	
		Mr.J.Ayyappan	8610893508	ayyappanphysics@gmail.com	Engineering Physics Unit V – Module I – Lecture III	<a href="https://youtu.be/CwmKN4JR-Ss">https://youtu.be/CwmKN4JR-Ss</a>	
		Mr.J.Ayyappan	8610893508	ayyappanphysics@gmail.com	Engineering Physics Unit V – Module I – Lecture IV	<a href="https://youtu.be/a1iV14aHj2Q">https://youtu.be/a1iV14aHj2Q</a>	
		Dr.P.Saritha	9443884504	psarithaau@yahoo.com	Engineering Physics Unit V – Module II – Lecture I	<a href="https://youtu.be/2QfMqyAKJuk">https://youtu.be/2QfMqyAKJuk</a>	
		Dr.P.Saritha	9443884504	psarithaau@yahoo.com	Engineering Physics Unit V – Module II – Lecture II	<a href="https://youtu.be/feEHx210CEU">https://youtu.be/feEHx210CEU</a>	
		Dr.P.Saritha	9443884504	psarithaau@yahoo.com	Engineering Physics Unit V – Module II – Lecture III	<a href="https://youtu.be/VLxjHl8Xkos">https://youtu.be/VLxjHl8Xkos</a>	
		Ms.R.Swarna Lakshmi	9715691107	swarna.physics@gmail.com	Engineering Physics Unit V – Module III – Lecture I	<a href="https://youtu.be/6DXfqdXDVY0">https://youtu.be/6DXfqdXDVY0</a>	
		Ms.R.Swarna Lakshmi	9715691107	swarna.physics@gmail.com	Engineering Physics Unit V – Module III – Lecture II	<a href="https://youtu.be/Nd-AkloE-ek">https://youtu.be/Nd-AkloE-ek</a>	
		Ms.R.Swarna Lakshmi	9715691107	swarna.physics@gmail.com	Engineering Physics Unit V – Module III – Lecture III	<a href="https://youtu.be/fEWE2KUzNgc">https://youtu.be/fEWE2KUzNgc</a>	

**Directorate of Technical Education, Chennai-600025**

**NON-TEQIP Government Engineering Collges**

**PH8151 -Engineering Physics- Video Lecture Topics covered for Semester I (2020-2021)**

Unit No.	College Name	Faculty Name	Mobile Number	Faculty email_ID	Video Lecture Topic	Video Lecture Link	VL QR Code
		Ms.G.Indira	9884960811	indira.guna@gmail.com	Engineering Physics Unit V – Module IV – Lecture I	<a href="https://youtu.be/zZJIHbfLXM">https://youtu.be/zZJIHbfLXM</a>	
		Ms.G.Indira	9884960811	indira.guna@gmail.com	Engineering Physics Unit V – Module IV – Lecture II	<a href="https://youtu.be/dUCv5fXPfUk">https://youtu.be/dUCv5fXPfUk</a>	
		Ms.G.Indira	9884960811	indira.guna@gmail.com	Engineering Physics Unit V – Module IV – Lecture III	<a href="https://youtu.be/Y_EHGPJrc0A">https://youtu.be/Y_EHGPJrc0A</a>	
		Ms.R.Swarna Lakshmi	9715691107	swarna.physics@gmail.com	Engineering Physics Unit V – Q & A	<a href="https://youtu.be/7lcCTNxLVJA">https://youtu.be/7lcCTNxLVJA</a>	