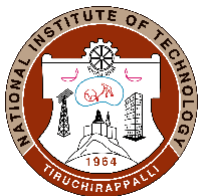




DEPARTMENT OF PHYSICS

COURSE PLAN – PART I			
Name of the programme and specialization	B.Tech. I Semester- Electrical and Electronics Engineering (EEE)		
Course Title	Physics - I		
Course Code	PHIR 11	No. of Credits	3
Course Code of Pre-requisite subject(s)	Nil		
Session	July 2020	Section (if, applicable)	A
Name of Faculty	Dr. Santhosh Kumar M C	Department	Physics
Official Email	santhoshmc@nitt.edu	Telephone No.	04312503611
Name of Course Coordinator(s) (if, applicable)	Dr. R. Sankaranarayanan		
Official E-mail	sankar@nitt.edu	Telephone No.	04312503609
Course Type (please tick appropriately)	<input checked="" type="checkbox"/> Core course	<input type="checkbox"/> Elective course	
Syllabus (approved by Senete)			
<p>Lasers Introduction to Laser-characteristics of Lasers-spontaneous and stimulated emissions – Einstein’s coefficients – population inversion and lasing action – laser systems: He-Ne Laser, semiconductor laser-applications.</p> <p>Fiber Optics Snell’s law-optical fiber – principle and construction – acceptance cone - numerical aperture –types of fibers - fiber optic communication principle – fiber optic sensors.</p> <p>Quantum Mechanics Inadequacy of classical mechanics-black body radiation, photoelectric effect- wave and particle duality of radiation – de Broglie concept of matter waves – electron diffraction – Heisenberg’s uncertainty principle – Schrodinger’s wave equation – eigen values and eigen functions – superposition principle – interpretation of wave function – particle confined in one dimensional infinite square well potential.</p> <p>Nuclear and Particle Physics Nuclear properties and forces - Nuclear models - Shell model - Nuclear reaction - Radioactivity - types and half-life. Fundamental forces - Particle physics - classification of matter - quark model.</p> <p>Physics of Advanced Materials Conductors: classical free electron theory (Lorentz –Drude theory) – electrical conductivity. Superconductors: definition – Meissner effect – type I & II superconductors – BCS theory (qualitative). Nanomaterials: introduction and properties – synthesis – top-down and bottom-up approach – applications</p>			



COURSE OBJECTIVES

To introduce the notions of light matter interaction, fabrication of lasers, light propagation in waveguides, applications of lasers and optical fibers to engineering students.
 To comprehend and explain the concepts of matter waves, wave functions and its interpretation to understand the matter at atomic scale.
 To teach the fundamentals of nuclear forces, models and classification of matter.
 To impart knowledge about the basics of conductors, superconductors, nanomaterials and their applications in science, engineering and technology.

MAPPING OF COs with POs

Course Outcomes	Programme Outcomes (PO) (Enter Numbers only)
1. Know principle, construction and working of lasers and their applications in various science and engineering.	1
2. Explain light propagation in optical fibers, types and their applications.	1
3. Experience and appreciate the behaviour of matter at atomic scale, and to impart knowledge in solving problems in modern science and engineering.	1
4. Understand the role of nuclear and particle physics in applications like radioactivity and nuclear reactions.	1
5. Recognize, choose and apply knowledge to develop materials for specific applications for common needs.	1

COURSE PLAN – PART II

COURSE OVERVIEW

The Physics- I course is offered in the first semester to all circuit branches of engineering. The subject has 3 credit theory.

COURSE TEACHING AND LEARNING ACTIVITIES

(Add more rows)

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	2 nd week of December	Introduction to Laser-characteristics of Lasers-spontaneous and stimulated emissions – Einstein’s coefficients	VC Mode using MStears
2	3 th week of December	Population inversion and lasing action – laser systems: He-Ne Laser	VC Mode using MStears
3	4 th week of December	Semiconductor laser-applications.	VC Mode using MStears
4	5 th week of December 2020	Snell’s law-optical fiber – principle and construction – acceptance cone - numerical aperture	VC Mode using MStears



5	1 st week of January 2021	types of fibers - fiber optic communication principle. fiber optic sensors.	VC Mode using MStears
6	2 nd week of January 2021	Inadequacy of classical mechanics- black body radiation, photoelectric effect. wave and particle duality of radiation – de Broglie concept of matter waves – electron diffraction- Heisenberg's uncertainty principle – Schrodinger's wave equation	VC Mode using MStears
7	3 rd week of January 2021	Eigen values and Eigen functions – superposition principle – interpretation of wave function – particle confined in one dimensional infinite square well potential.	VC Mode using MStears
8	4 th week of January 2021	Nuclear properties and forces - Nuclear models - Shell model - Nuclear reaction- Radioactivity - types and half-life.	VC Mode using MStears
9	1 st week of February 2021	Fundamental forces - Particle physics - classification of matter - quark model.	VC Mode using MStears
10	2 nd week of February 2021	Conductors: classical free electron theory (Lorentz –Drude theory) – electrical conductivity.	VC Mode using MStears
11	3 rd week of February 2021	Superconductors: definition – Meissner effect – type I & II superconductors – BCS theory (qualitative).	VC Mode using MStears
12	4 th week of February 2021	Nanomaterials: introduction and properties – synthesis – top-down and bottom-up approach – applications.	VC Mode using MStears
13	1 st week of March 2021	Compensation Assessment	
13	2 nd week of March 2021	Final Assessment	



COURSE ASSESSMENT METHODS (shall range from 4 to 6)				
S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Cycle Test -I	2 nd week of January 2021	1 Hour	30
2	Quiz/Objective Test	1 st week of February 2021	30 minutes	10
3	Cycle Test - II	3 rd week of February 2021	1 Hour	30
CPA	Compensation Assessment*	1 st week of March 2021	1 hour	30/10 - Appropriate weightage will be taken
4	Final Assessment *	2 nd Week of March 2021	2 hour	30
*mandatory; refer to guidelines on page 4				
COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)				
Questionnaire about the effectiveness of the delivery method, topics and the knowledge gained.				
COURSE POLICY (including compensation assessment to be specified)				
<u>MODE OF CORRESPONDENCE (email/ phone etc)</u>				
<u>e-mail: santhoshmc@nitt.edu, Phone: 9443843014</u>				
<u>COMPENSATION ASSESSMENT</u>				
One descriptive compensation test for a duration of one hour is given with portions of cycle test-I and Objective Test/Quiz.				
<u>Final Examination</u>				
Minimum 20% marks for final the assessment is mandatory for successful completion of the course.				
<u>ATTENDANCE POLICY</u> (A uniform attendance policy as specified below shall be followed)				
<ul style="list-style-type: none">➤ At least 75% attendance in each course is mandatory.➤ A maximum of 10% shall be allowed under On Duty (OD) category.➤ Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.				



ACADEMIC DISHONESTY & PLAGIARISM

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.
- The above policy against academic dishonesty shall be applicable for all the programmes.

ADDITIONAL INFORMATION, IF ANY

Book for Reference

1. Laser Fundamentals, William T. Silfvast, 2nd edn, Cambridge University press, New York (2004).
2. Concepts of Modern Physics, Arthur Beiser, Tata McGraw-Hill, New Delhi (2010).
3. Fundamentals of Physics, R. Shankar, Yale University Press, New Haven and London (2014).
4. Fundamentals of Physics II, R. Shankar, Yale University Press, New Haven and London (2016).
5. Introduction to Nanotechnology, C.P. Poole and F.J. Owens, Wiley, New Delhi (2007).
6. Introduction to Solid State Physics, 8th Edition, Charles Kittel, John Wiley & Sons, NJ, USA (2005).

FOR APPROVAL

Course Faculty

CC- Chairperson _____ HOD _____



Guidelines

- a) The number of assessments for any theory course shall range from 4 to 6.
- b) Every theory course shall have a final assessment on the entire syllabus with at least 30% weightage.
- c) One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered.
- d) The passing minimum shall be as per the regulations.

B.Tech. Admitted in				P.G.
2018	2017	2016	2015	
35% or (Class average/2) whichever is greater.		(Peak/3) or (Class Average/2) whichever is lower		40%

- e) Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.
- f) Absolute grading policy shall be incorporated if the number of students per course is less than 10.
- g) Necessary care shall be taken to ensure that the course plan is reasonable and is objective.