DEPARTMENT of Mechanical Engineering

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN - PARTI								
programme and specialization	B.Tech Electrical and Electricae and Electricae and Electricae and	ctronics Enginee	ring					
Course Title	Physics							
Course Code	PHIR11	No. of Credits	3					
Course Code of Pre- requisite subject(s)	Nil							
Session	July 2023	Section (if, applicable)	Α					
Name of Faculty	Dr. R. Justin Joseyphus	Department	Physics					
Email	rjustinj@nitt.edu	Telephone No.	3614					
Name of Course Coordinator(s) (if, applicable)	Dr.T. Sonamani Singh,	Dept of Physics						
E-mail	takhel@nitt.edu	Telephone No.						
Course Type	v Core course	Elective cou	rse					
Syllabus								
Lasers								
Introduction to Laser-cha	aracteristics of Lasers-sponta	neous and stimulat	ted emissions –					
Einstein's coefficients –	population inversion and las	ing action – laser s	ystems: He-Ne Laser,					
semiconductor laser-app	lications.							
Fiber Optics								
Snell's law-optical fiber	Snell's law-optical fiber – principle and construction – acceptance cone - numerical aperture –							
types of fibers - fiber optic communication principle – fiber optic sensors.								
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Quantum Mechanics	tic communication principle	– fiber optic sensor						
Quantum Mechanics Inadequacy of classical r	tic communication principle nechanics-black body radiati	- fiber optic sensor	ffect- wave and particle					
Quantum Mechanics Inadequacy of classical r duality of radiation – de	tic communication principle nechanics-black body radiati Broglie concept of matter wa	- fiber optic sensor on, photoelectric e aves - electron diff	ffect- wave and particle raction – Heisenberg's					
Quantum Mechanics Inadequacy of classical r duality of radiation – de uncertainty principle – S superposition principle	tic communication principle mechanics-black body radiati Broglie concept of matter wa chrodinger's wave equation	- fiber optic sensor on, photoelectric e aves – electron diff – eigen values and	ffect- wave and particle raction – Heisenberg's eigen functions –					
Quantum Mechanics Inadequacy of classical r duality of radiation – de uncertainty principle – S superposition principle – infinite square well poter	tic communication principle mechanics-black body radiati Broglie concept of matter wa chrodinger's wave equation - interpretation of wave funct	 fiber optic sensor on, photoelectric e aves – electron diff eigen values and ion – particle confi 	ffect- wave and particle fraction – Heisenberg's eigen functions – ined in one dimensional					
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Superconductors: 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.

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COURSE PLAN – PART II

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COURSE OVERVIEW

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The Physics- I theory course is offered in the second semester to the EEE branch. The subject has 3 credit theory weightage. The course introduces modern Physics principles applicable to engineering subjects.

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COURS	SE TEACHIN	G AND LEARNING	ACTIVITIES		
S.No.	Week/Con tact Hours		Торіс		Mode of Delivery
1	3 h/ week First three weeks	Lasers Introduction to Las and stimulated emi population inversion Ne Laser, semiconomic	ser-characteristics of ssions – Einstein's on and lasing action ductor laser-applica	f Lasers-spontaned coefficients – – laser systems: H tions.	ous Chalk and Talk Ie-
2	One week 3 h/ week	Fiber Optics Snell's law-optical acceptance cone - r fiber optic commun	fiber – principle an numerical aperture - nication principle –	d construction – -types of fibers - fiber optic sensors	Chalk and Talk
3	5 th – 7 th week 3 h/ week	Quantum Mechania Inadequacy of class photoelectric effect – de Broglie conce – Heisenberg's und equation – eigen va principle – interpre confined in one dir	cs sical mechanics-bla t- wave and particle pt of matter waves - certainty principle – alues and eigen func etation of wave func nensional infinite so	ck body radiation, duality of radiation – electron diffracti Schrodinger's wa ctions – superposit tion – particle quare well potentia	on Chalk and ve Talk ion
4	8 th – 10 th week 3 h/ week	Nuclear and Particl Nuclear properties model - Nuclear re - Radioactivity - ty Particle physics - c	le Physics and forces - Nuclea action pes and half-life. Fu lassification of matu	ur models - Shell undamental forces ter - quark model.	Chalk and Talk
5	11 th – 13 th week 3 h/ week	Physics of Advance Conductors: classic theory) – electrical definition – Meissr BCS theory (qualit properties – synthe – applications.	ed Materials cal free electron the conductivity. Supe her effect – type I & ative). Nanomateria ssis – top-down and	ory (Lorentz –Dru rconductors: II superconductor ils: introduction ar bottom-up approa	de rs – Chalk and rd Talk/ppt ch
COURS	SE ASSESSN	IENT METHODS (s	hall range from 4 t	to 6)	
S.No.	Mode o	f Assessment	Week/Date	Duration	% Weightage
1	Asse (Offline Qu	ssment - I iz/short answers)	5 th -6 th week	60 min	25
2	Asse (Offline Qu	ssment - II iz/short answers)	11-12 th week	60 min	25
3	Asse: As	ssment - III signment	13-14 th week	60 min	10
СРА	Compensa	tion Assessment*	14-15 th week	60 min	25
4	Final / (Sem	Assessment ester Exam)*	As per the Institute timetable	120 min	40

	Theory weightage	100
*mandatory; refer to guidelines on p All the assessments shall be conducted submitted.	age 4 d in offline mode. Handwritten assignm	ents have to be
COURSE EXIT SURVEY (mention the be assessed)	e ways in which the feedback about t	he course shall
Questionnaire about the effectiveness of shall be undertaken at the end of the co	of the delivery method, topics and the k ourse	nowledge gained
COURSE POLICY (preferred mode or assessment policy to be specified)	f correspondence with students, cor	npensation
MODE OF CORRESPONDENCE (ema	ail/ phone etc)	
Can be contacted through phone 2503	614.	
COMPENSATION ASSESSMENT PO	LICY	
Only one compensation assessment is be submitted to the class teacher on c be conducted before the Final assessm	allowed at the end of the course. A recompletion of Assessment III, for the Conent.	equest letter has to PA. The CPA shal
ATTENDANCE POLICY (A uniform att	endance policy as specified below shal	l be followed)
At least 75% attendance in ea	ch course is mandatory.	
A maximum of 10% shall be a	llowed under On Duty (OD) category	Ι.
Students with less than 65% assessment and shall be aware	of attendance shall be prevented fro ded 'V' grade.	om writing the fina
ACADEMIC DISHONESTY & PLAGIA	RISM	
Possessing a mobile phone, of from others during an assessment	arrying bits of paper, talking to other ent will be treated as punishable dishor	students, copying nesty.
Zero mark to be awarded for students get the same penalty of	the offenders. For copying from and of zero mark.	other student, both
The departmental disciplinary chairperson and the HoD, as m the punishment if the student Academic office.	committee, including the course fact embers shall verify the facts of the mal is found guilty. The report shall be	ulty member, PAC practice and awarce submitted to the
The above policy against acade	mic dishonesty shall be applicable to a	II the programmes
ADDITIONAL INFORMATION		_

Dr R Justin Josey	phus	Н	11/2		1210
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Guidelines					
a) The number of	fassessments for	any theory cou	rse shall range fi	om 4 to 6.	
b) Every theory of	course shall have	a final assess	ment on the ent	ire syllabus with	n at least
30% weightage	8.		need in access	ents (other th	an final
c) One compense assessment) is	sation assessments mandatory. Only	nt for absente genuine cases	of absence shall	be considered.	
d) The passing m	inimum shall be a	s per the regula	ations.		
	B.Tech. A	Admitted in		P.G.	
2018	2017	2016	2015		
35% or (C	lass average/2)	(Peak/3) or (Class Average/2)	40%	
whichever	is greater.	Whichever is it			
e) Attendance pol uniform for all t	icy and the policy he courses.	on academic	dishonesty & pla	agiarism by stu	dents are
f) Absolute gradin than 10.	ng policy shall be i	ncorporated in	Ine number of st		
a) Necessary care	e shall be taken	to ensure that	t the course pla	an is reasonab	le and is
objective.			t the final asses	sment exam as	per 2019
 h) A minimum of 2 regulation. 	0 % mark is requ	ired for pass a			
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