



NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE PLAN – PART I

Name of the programme and specialization	M.Tech - Communication Systems		
Course Title	Fiber Optics and Communication Laboratory		
Course Code	EC608	No. of Credits	02
Course Code of Pre-requisite subject(s)	None		
Session	January 2019	Section (if, applicable)	A / B
Name of Faculty	Dr. R. K. JEYACHITRA	Department	Electronics and Communication Engineering
Email	jeyachitra@nitt.edu	Telephone No.	0431 2503320
Name of Course Coordinator(s) (if, applicable)	-		
Official E-mail		Telephone No.	
Course Type	<input checked="" type="checkbox"/> Core course	<input type="checkbox"/> Elective course	

Syllabus (approved in BoS)

List of Experiments

1. Measurement of Numerical Aperture
2. Measurement of Attenuation and Bending Loss in Multimode Glass Fiber
3. a) Study of BER and Q-factor Measurement
b) Study of Wavelength Division Multiplexing Links
4. Characterization of Erbium Doped Fiber Amplifier
5. Study of Four Wave Mixing Fiber Non-linearity
6. Study the Characteristics of AWGN and BSC channels
7. Study of Digital Modulation Schemes
a) BPSK Modulator and Demodulator
b) 16-Quadrature Amplitude Modulator and Demodulator
8. Study of Error Control Codes
a) Convolutional Encoder and Decoder
b) Cyclic Encoder and Decoder
9. Orthogonal Frequency Division Multiplexing (OFDM) 802.11a
10. Study of Path Loss in Wireless Propagation Models
11. Study of Rayleigh and Rician Fading channels
12. Study Experiments:
 - a. Analog And Voice Communication through Optical Link
 - b. Study of Sampling and Reconstruction Technique
 - c. Study of network simulator-GLOMOSIM
 - d. Study of Wireless Digital Communication System using Wicomm-T

Reference:

LAB MANUALS and Supplier manuals are distributed among students.



COURSE OBJECTIVES	
<ul style="list-style-type: none"> ➤ To prepare the students understand the various process and subsystems involved in the optics and communication systems. ➤ To enable the students gain the knowledge of different encoding and multiplexing technologies in the fiber optics and wireless communication systems. ➤ To design optics and communication systems to serve a defined purpose. 	
MAPPING OF COs with POs	
Course Outcomes	Programme Outcomes (PO) (Enter Numbers only)
At the end of the course student will be able	
1. Understand the basic concepts and advancements in fiber optic technology and wireless communication systems	PO1, PO2, PO3, PO6, PO5, PO8, PO9
2. Understand the concept of the optical amplifier	PO1, PO2, PO5, PO10
3. Study and analysis on modulation, encoding and decoding techniques and channel characteristics of fiber optics and wireless communication systems	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO10
4. Interpret the fiber optic and wireless communication system models by using the simulation software	PO1, PO2, PO3, PO5, PO6, PO7, PO8, PO10, PO11
5. Analyze the operating principle of WDM solutions systems and Effect of nonlinearity in optical fiber	PO1, PO2, PO5, PO10

COURSE PLAN – PART II			
COURSE OVERVIEW			
<p>Students get exposure to the fundamentals and advance level of optical and communication systems. Course includes series of hardware and software experiments which provide hands-on-experience needed to master the basic concepts and laboratory techniques of fiber optics and communication technologies. Students acquire the knowledge of enabling modules and models in wireless communication systems. The lab is well equipped with computers, optical simulation software (such as OPTSIM and Photonics CAD), communication simulation software (such as COMMSIM and MATLAB), to support a strong academic and research activity in this area.</p>			
COURSE TEACHING AND LEARNING ACTIVITIES			
S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	I WEEK	Instruction class	Lecture C&T/ PPT or Any suitable mode
2	II WEEK	Measurement of Numerical Aperture	LAB EXERCISE



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3	III WEEK	Measurement of Attenuation and Bending Loss in multimode glass fiber	LAB EXERCISE	
4	IV WEEK	a) Study of BER and Q-factor Measurement b) Study of Wavelength Division Multiplexing Links		
5	V WEEK	Characterization of Erbium Doped Fiber Amplifier		
6	VI WEEK	Study of Four Wave Mixing Fiber Non-linearity		
7	VII WEEK	Study the Characteristics AWGN and BSC channels		
8	VIII WEEK	Study of Digital Modulation Schemes a) BPSK Modulator and Demodulator b) 16-Quadrature Amplitude Modulator and Demodulator		
9	IX WEEK	Study of Error Control Codes a) Convolutional Encoder and Decoder b) Cyclic Encoder and Decoder		
10	X WEEK	Orthogonal Frequency Division Multiplexing (OFDM) - 802.11a		
11	XI WEEK	Study of Path Loss in Wireless Propagation Models		
12	XII WEEK	Study of Rayleigh and Rician Fading channels		
13	XIII WEEK	a) Analog And Voice Communication through Optical Link b) Sampling and Reconstruction Technique		
14	XIV WEEK	c) Study of network simulator-GLOMOSIM d) Study of Wireless Digital Communication System using Wicomm-T		
15	XV WEEK	Compensation Lab Session		
END SEMESTER				LAB EXERCISE



COURSE ASSESSMENT METHODS (shall range from 4 to 6)				
S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	OBSERVATION	To be submitted every week while coming to the lab	-	15
2	RECORD	To be submitted every next week after completion of experiment	-	20
3	PERFORMANCE AND CONDUCTION	Every Lab session	-	05
4	VIVA VOCE (WRITTEN TEST)	One week prior to the end semester	60 Minutes	30
5	END SEMESTER EVALUATION	-	90 Minutes	30
COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)				
<ul style="list-style-type: none"> • Feedback from the students during class committee meetings. • Individual Subject feedback through MIS website at the end of the semester. 				
COURSE POLICY (preferred mode of correspondence with students, policy on attendance, compensation assessment, academic honesty and plagiarism, etc.)				
<u>MODE OF CORRESPONDENCE (email/ phone etc.)</u>				
<ul style="list-style-type: none"> ➤ All the students are advised to check their NITT WEBMAIL regularly. All the correspondence (schedule of classes/ schedule of assessment/ course material/ any other information regarding this course) will be done through their webmail only. ➤ Queries (if required) to the course teacher shall only be emailed to the email id specified by the teacher. 				
<u>ASSESSMENT</u>				
<ul style="list-style-type: none"> ➤ Attending all the assessments is MANDATORY for every student. ➤ Finally, every student is expected to score minimum 40% of mark including all assessments to pass the course. Otherwise the student would be declared fail and 'F' grade will be awarded. Further he can take up only FORMATIVE ASSESSMENT. 				



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ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

- 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 HONESTY & 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

The faculty is available for consultation at times as per the intimation given by the faculty.

FOR APPROVAL

Course Faculty  CC-Chairperson  HOD 
(Dr. R.K. Jayachidram) (B. REBEKA)



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.