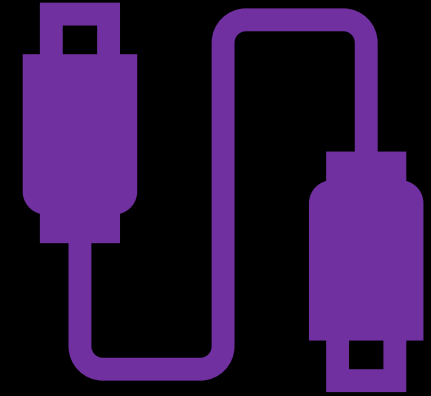**Bhartiya vidya Bhavan's**
Sardar Patel Institute of Technology
Department of Electronics and Telecommunication

Innovation in Teaching learning 2022-2023

Pallavi Nair

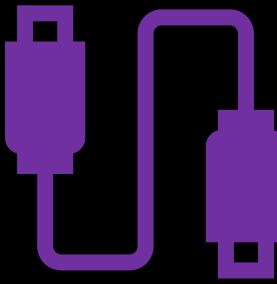## PROGRAM ELECTIVE COURSES:

Microwave Communication

&

Optical Fiber Communication

Six months (24th January 2023 to 5th May 2023)

**Class: B.E./T.E. EXTC/ETRX**

Sem VI, Sem VIII

Course Code: 1Y
Course Name: Optical Fiber Communication

Teaching Scheme (Hrs/week)			Credits Assigned			
L	T	P	L	T	P	Total
2	-	2	2	-	1	3
Examination Scheme						
Theory Marks						
ISE		MSE		ESE		Total
Theory: 20		20		100		67%
Lab: 80		-		20		33%

Course Code: 1T12
Course Name: Microwave Communication Lab

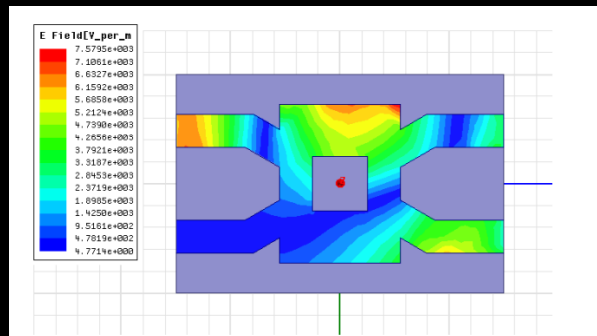| Teaching Scheme (Hrs/week)			Credits Assigned			
L	T	P	L	T	P	Total
2	-	2	2	-	1	3
Examination Scheme						
Practical Marks						
ISE		MSE		ESE		Total Weightage
Theory: 20		20		100		67%
Lab: 80		-		20		33%

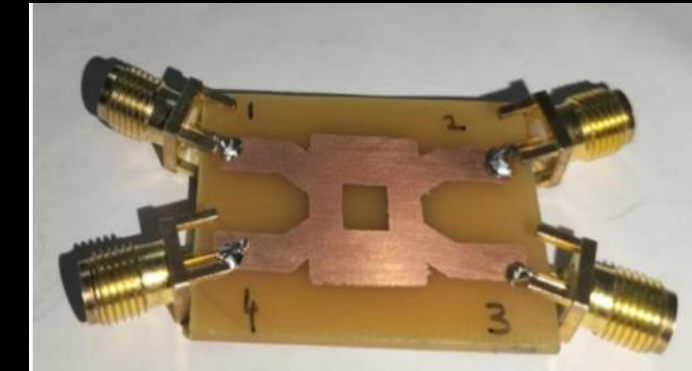**Mini Project: Microwave Communication**
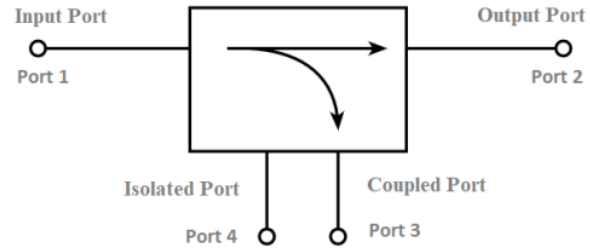
Selection of a passive device to design.
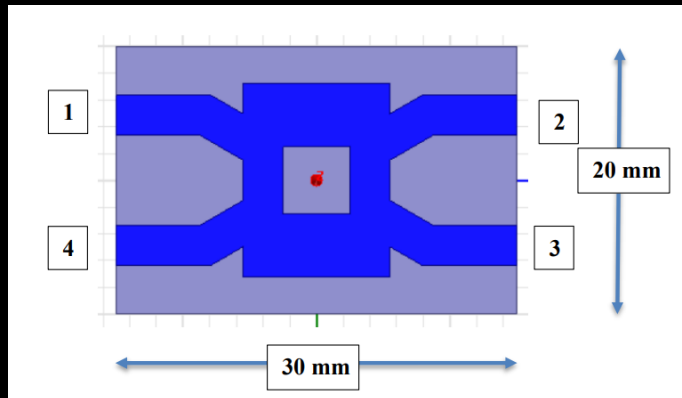
Conceptional design.

Simulation.

Fabrication.

S11

Testing

What they did

What they actually did

Remember & Understand	Apply	Analyse	Evaluate	Create
Recalled and comprehended microwave theory, concepts, and component properties.	Utilized theoretical knowledge to design passive components with specific parameters.	Broke down the design into critical components, analyze simulation results, and identify design considerations.	Assessed the performance of the fabricated components through comparison with simulation results.	Synthesized theoretical understanding and practical skills to fabricate, test, and experimentally validate designed components.

What everyone achieved

Course Outcomes were realized	Skill Enhancement	Real-world Application	Problem-solving Abilities	Collaboration and Teamwork

Evaluation Method

Division over entire semester	Phase 1:Feb Topic Selection	Phase 2:Mar Simulation Results (3 Marks)	Phase 3:April Fabrication and Testing

1.Simulation Results (3 Marks): Submission of accurate image, dimensions, and S-parameters reflecting effective simulation.

2.Fabrication and Testing (3 Marks): Successful physical realization, thorough testing, and faculty verification of the designed microwave passive component.

3.Graphs of Simulation vs Measured Results (1 Mark): Clear graphical representation comparing simulation outcomes with actual measurements.

4.Submission Time (2 Marks): Timely submission of all components and punctuality in adhering to the specified deadline.

5.Report and Viva Working (1 Mark): Inclusion of comprehensive working details, design images, tables, and graphs in the report, and effective preparation for Viva Voce.

Feedback

Semester	Subject	Percentage feedback
Sem 6	Microwave Communication	86.54%
Sem 6	Microwave Communication Lab	86.84%

LD student Testimony

Respected Pallavi ma'am,

Being a student with Learning Disability, ma'am I found you very accommodating and a keen motivator with respect to my studies. You were my tutor for my earlier semester and also my current tutor for my final B.Tech. Your interaction with me at regular intervals has encouraged me to develop a special affinity for the related subject.

You always had a word of appreciation for things well performed which itself guided me to concentrate and excel in my endeavours. I consider you as a most ideal tutor for students with Learning Disabilities joining the hallowed portals of this institute for years to come.

Regards
Trupti Gopinath

Case study : Optical Fiber Communication

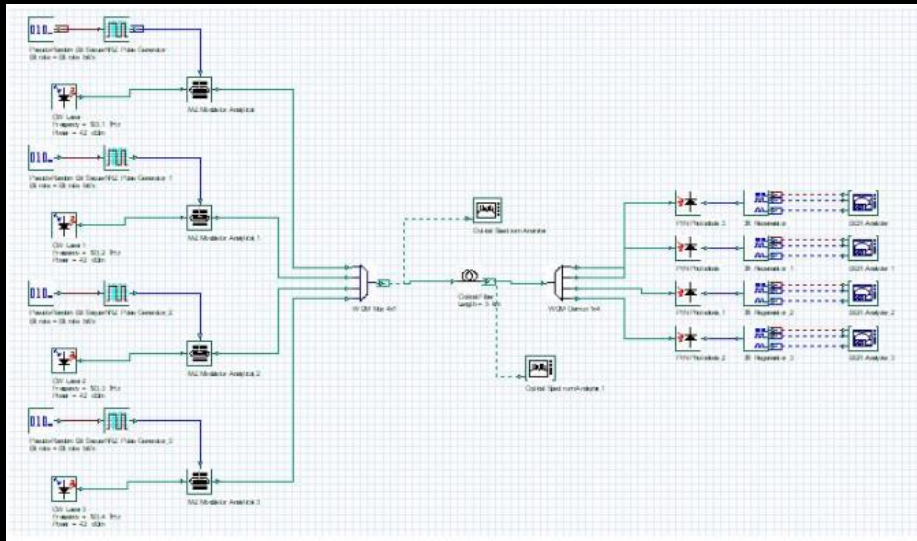| Choose topic	Understand the theory	Implement code to validate behaviour/concept	Inference & documentation	Viva

Sample WDM Network Implementation
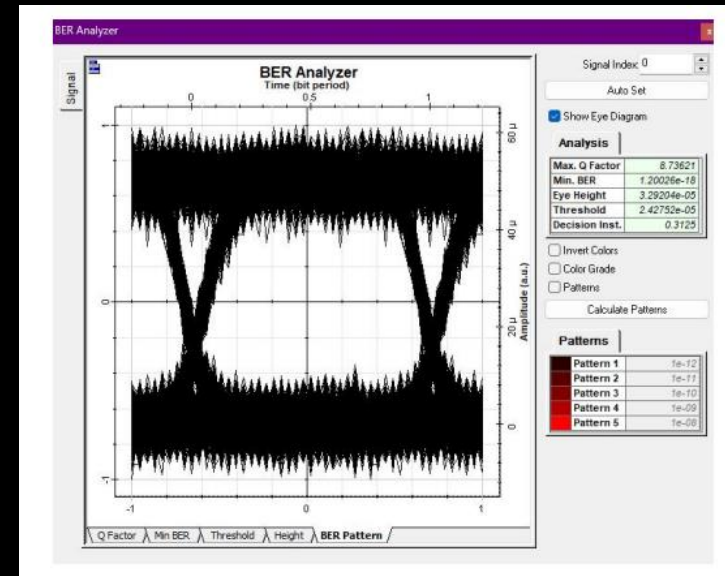
Parameter impact study and analysis

What they actually did

Remember & Understand	Apply	Analyse	Evaluate	Report
Grasped theoretical concepts related to the chosen problem in optical fiber communication (dispersion, non-linear effects, DWDM/WDM, or SONET/SDH).	Applied theoretical knowledge to create a block diagram or flow diagram representing the chosen problem's impact in an optical communication system.	Implemented code or simulation tools (Matlab, Scilab, Python) to analyze and showcase the effects of the selected problem, emphasizing pulse dispersion, non-linear impacts, or network protocols.	Evaluated the results obtained from simulations or code, providing a critical discussion in the report about the impact of dispersion, non-linear effects, or network protocols on optical fiber communication systems..	Developed a comprehensive report that includes code, results, and a conclusive summary, synthesizing the theoretical understanding and practical application of the chosen optical communication problem..

Course Outcomes were realized	Skill Enhancement	Real-world Application	Problem-solving Abilities	Collaboration and Teamwork

Evaluation Method

Simluation Code (3 marks)	Couldn't do the simulations/plagiarised results 0 points	Could do the simulation but with lots of help and numerous errors 1 points	Completed simulation with minor problems 2 points	Completed without errors and little help 3 points
Effect in study : Theory (1 marks)	Poorly written theory and plagiarised data 0 points	Theory written with errors/ Enough explanation is not given 0.5 points	Properly explained theory with in depth analysis 1 points	
Block diagram or flow diagram(1 marks)	No block diagram 0 points	block diagram with errors 0.5 points	correct block diagram 1 points	
Results and discussion (1mark)	Results and graphs are not aligned with the theory 0 points	Results and graphs have errors 0.5 points	Results and graphs are proper 1 points	
Submission time (2mark)	Submitted after the deadline 0 points	Submitted on time 2 points		
Documentation (1 mark)	Document has lots of formattting errors and spelling errors 0 points	Document is properly made 1 points		
Ethics (1marks): Citation/ references) / plagiarism check	Proper Citations and references not mentioned, (25% and above) 0 points	All citations and references are mentioned properly (below 25%) 1 points		

Feedback

Sem 6	Optical Fiber Communication	86.66%

Weekly Lecture takeaway. Please write anything you remember. This will strengthen your knowledge. (Ex: I learned about resonator, they signify... etc. Please write in detail)

31 responses

I learnt about advantages and disadvantages of optical fibers.
Learnt about ray theory, modal analysis, V number, types of fibers, Group and Phase velocities.

We studied the basics and origin of optical fibres, ray theory,TIR,NA,etc , the bessels function, revised the maxwells equation and learnt about skew rays and modal analysis.

Learned about applications of optical fibre, calculations regarding numerical aperture and various angles associated with the fibre. Bessel function and ray and modal analysis

In the past 2 weeks, we have studied about different parameters of optical fibers such as numerical aperture, acceptance angle, different types of rays (skew and meridonial), ray theory and modal analysis, V number and different modes

Any other suggestion

31 responses

No

NA

-

None

I appreciate the inclusion of graphics and animations of the concepts being taught, makes the visualisation process easier.

Teaching is effective and the point is communicated well.

Learnings: The case study and mini-project facilitated experiential learning, allowing students to practically apply theoretical knowledge. Engaging in real-world scenarios nurtured critical thinking, problem-solving skills, and effective teamwork.

Effective Evaluation for the future: Utilizing detailed rubrics ensured transparent assessment criteria, guiding students to meet expectations. Incorporating continuous assessment, peer review, and reflective components could provide a comprehensive evaluation approach, fostering a deeper understanding of the subject matter and encouraging ethical practices.

Thank you

Pallavi Nair