

## Department of Electronics & Telecommunication Engineering

Academic Year – 2020-21	Class: Third Year
Semester – I	Date : 02- 09/11/2020
CO : 5	PO: 1,2,9,10,12

### Innovative Teaching Methods

#### Title of Innovation method/activity: Collaborative Jigsaw

1. **Name of Faculty:** Ms. Sarika M. Jagtap

2. **Subject:** Digital Communication

#### 3. Objective of Method:

1. Acquire the various Concept of pass band model & different digital modulation techniques and ability to share acquired knowledge.
2. Comparison coherent BPSK, BFSK and QPSK.

#### 4. Topic Covered through Activity:

1. Pass band transmission model, Signal space diagram, Generation and detection
2. Error Probability derivation and Power spectra of coherent BPSK, BFSK and QPSK.
3. Generation and detection, Error Probability derivation and Power spectra of coherent BPSK
4. Generation and detection, Error Probability derivation and Power spectra of coherent BFSK
5. Generation and detection, Error Probability derivation and Power spectra of coherent QPSK.
6. Geometric representation, Generation and detection of - M-ary PSK, M-ary QAM and their error
7. Geometric representation, Generation and detection of - M-ary PSK, M-ary QAM and their error
8. Probability, Non-coherent BFSK, DPSK.

#### 5. Description of method with Benefits (8 – 10 lines) :

- Jigsaw is a collaborative learning technique that gives students practice in the **acquisition** and **presentation of new material**, in **review**, and in **informed debate**. **Interdependence** and **status equalization** are developed.
- **The method :**
  - Each student on the team becomes an “expert” on one topic
  - “Experts” group with members from other teams assigned the corresponding expert topic.
  - Upon returning to their teams, each one, in turn, teaches the group.

#### Roles and Responsibilities

- **Teacher**
  - Provide the Introduction to all the topic.

- Aware the student about the length, Breadth, Depth of Topic
- Provide the Study Material and appropriate guide lines at every stage
- Remain available all the time during all stages of process.
- Prepare assessment methodology.
- **Student**
  - Go through all the material provided on particular topic
  - Once topic assigned understand and gain expertise on topic through collaboration.
  - Actively participate in group and contribute by means of discussion, hand-out
  - Share the expertise topic when joins a new group.
- **Group**
  - Develop the guidelines to establish group.(i.e. Decide the roll of all participants)
  - Every group should gain the expertise on particular topic.
  - Prepare at least one page Hand-out / Report which cover all the details corresponding to the topic.
  - While preparing the report make sure all the content are covered.
  - Appropriate references should be given.
  - Grammatical mistake should be checked.
  - Develop the guidelines with which every group member can share the topic they learn

## 6. Assessment Tools & Rubrics:

- **Quiz (25 Marks - 50%)**
  - Individual performance would be checked through the quiz.
- **One Page Report (10 %)**
  - Group Report would be checked by teacher according to the rubrics.
- **Hand out / Presentation Video (10 %)**
  - Every student would rate understanding of all topics which reflect the communication skill of particular group through polling.
- **Communication Skill (10%)**
- **Contents Material (10%)**
- **Team Work (10%)**
  - Final Marks Obtained =  $(0.5 * (\text{Quiz Marks} / 30) + 0.1(\text{Report Marks} + \text{Handout} / \text{Presentation} + \text{Communication Skill} + \text{Contents of topic} + \text{Team work}))$

### Rubrics for Assessment of One Page Report / Hand out

Criteria	Excellent (5- 4)	High (3)	Moderate (2)	Slight (1)
Team Work (10 %)	Effective teamwork	Somewhat effective teamwork	Not Effective Teamwork	Not Effective Teamwork
Communication Skill (10 %)	Effective (Interact with participants)	Somewhat effective Low voice level	Not Effective	Not Effective
Topic Content (10 %)	Highly relevant and concise	Highly Relevant	Moderately Relevant	Slightly Relevant
Presentation (10 %)	Neat , Clean Diagrams &	Diagrams	Explanation	
Writing Skill (10 %)	Grammatically Correct	Grammatically Correct	Poorly Written	Poorly Written

Marks for One-page Report:

<b>OUT OF 10 MARK</b>					
SN	Group No	Topic Content (60 %)	References (20 %)	Writing Skill (20 %)	Final Marks (100 %)
1.	G1	6	1	1	80
2.	G2	6	1	1	80
3.	G3	5	1	1	70
4.	G4	5	1	2	80
5.	G5	6	1	1	80
6.	G6	7	2	1	100
7.	G7	6	1	1	80
8.	G8	7	1	1	90
9.	G9	7	1	1	90
10.	G10	6	1	1	80
11.	G11	6	2	2	100
12.	G12	5	1	1	70

## 7. Evaluation Sheet

**Final Marks = 0.5 \* Quiz + 0.1 \* ( Team Work + Presentation + Communication Skill + Content + One Page Report )**

Sr. No	Roll No	Group No	Name Of Student	Topic	Quiz (25)	Team Work (05)	Presentation (05)	Communication Skill (05)	Content (05)	One Page Report (05)	Total Marks (50)
01	62		Bhagyashri Sonar	<b>Binary Amplitude</b>	22	04	03	03	04	03	39
02	14		Anushka Chavan		25	04	03	03	04	03	42

03	47	01	Sejal Pawar	<b>Shift Keying</b>	23	04	03	03	04	03	40
04	26		Kanchan Kapse		24	04	03	03	04	03	41
05	69		Prajakta Thakare		00	04	03	03	04	03	17
06	65		Sakshi Sonawane		22	04	03	03	04	03	39
07	67	02	Shubham suryawanshi	<b>Binary Frequency Shift Keying</b>	24	04	04	03	05	03	43
08	40		Anisha panpatil		24	04	04	03	05	03	43
09	23		Ritesh jadhav		24	04	04	03	05	03	43
10	12		Mallikaraje bhosale		24	04	04	03	05	03	43
11	30		Shubham kulkarni		22	04	04	03	05	03	41
12	17		Saurabh dhige		12	04	04	03	05	03	31
13	36	03	Kshitij Malsane	<b>Quadrature Phase Shift Keying</b>	25	03	03	04	03	03	41
14	54		Sumit Salke		23	03	03	04	03	03	39
15	71		Siddarth Todkar		22	03	03	04	03	03	38
16	58		Mahesh Sawant		00	03	03	04	03	03	16
17	56		Rohini Sanap		22	03	03	04	03	03	38
18	49		Tanuja Prajapati		24	03	03	04	03	03	40
19	61	04	Priyanka Shouche	<b>Quadrature Amplitude Shift Keying</b>	25	04	04	04	05	04	46
20	68		Mahima Tekale		24	04	04	04	05	04	45
21	21		Renu Guraddi		24	04	04	04	05	04	45
22	20		Gayatri Gunjal		25	04	04	04	05	04	46
23	25		Sakshi Kapadnis		24	04	04	04	05	04	45
24	04		Shruti Avhad		24	04	04	04	05	04	45
25	63	05	Vaaideehi Sonavani	<b>Binary Phase Shift Keying</b>	23	03	03	03	03	03	38
26	29		Khyati Kshirsagar		00	03	03	03	03	03	15
27	44		Pradnya Patil		25	03	03	03	03	03	40
28	27		Rutuja Karate		00	03	03	03	03	03	15
29	37		Manasi Mehetre		24	03	03	03	03	03	39
30	53		Sneha Raundal		24	03	03	03	03	03	39
31	45	06	Shubham Patil	<b>M-Ary Phase Shift Keying</b>	23	05	05	04	05	05	47
32	05		Shubham Avhad		23	05	05	04	05	05	47
33	11		Himanshu Bhamare		24	05	05	04	05	05	48
34	33		Pracheta Kuwar		24	05	05	04	05	05	48
35	31		Parag Kulthe		23	05	05	04	05	05	47
36	24		Shivam Junghare		21	05	05	04	05	05	45
37	50	07	Pragya Rai	<b>Binary Phase Shift Keying.</b>	23	04	05	04	05	04	45
38	07		Shweta Bagade		24	04	05	04	05	04	46
39	15		Esha Chokhar		23	04	05	04	05	04	45
40	51		Pratiksha Rajule		23	04	05	04	05	04	45
41	55		Nimisha Salunkhe		21	04	05	04	05	04	43
42	19		Vaishnavi Gawande.		25	04	05	04	05	04	47
43	03	08	Rinku Ahire	<b>M-Ary FSK</b>	00	04	04	03	03	03	17
44	48		Rohini Pendharkar		00	04	04	03	03	03	17
45	13		Rutuja Bule		24	04	04	03	03	03	41
46	35		Sakshi Malode		00	04	04	03	03	03	17
47	38		Sonal More		00	04	04	03	03	03	17
48	42		Kaveri Patil		23	04	04	03	03	03	40

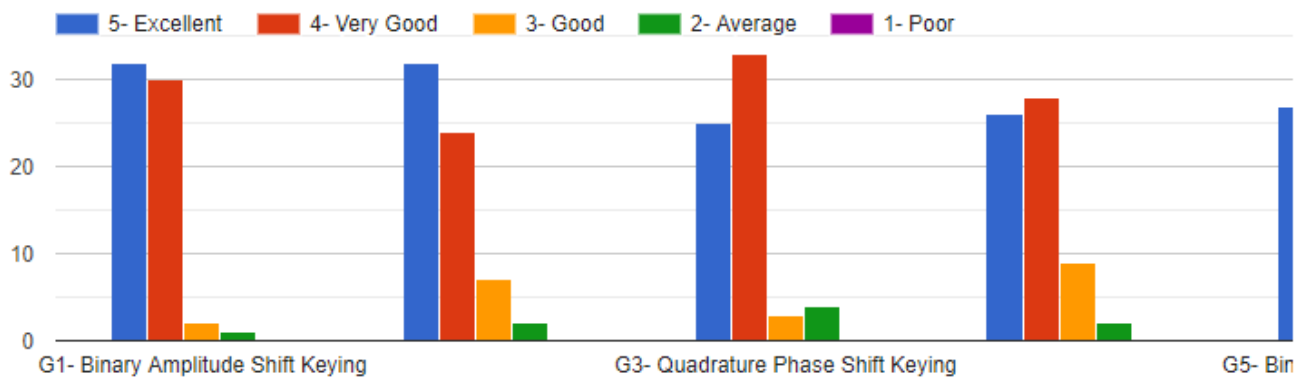
49	43	09	Kunal Patil	<b>M Ary Constant Envelope (PSK)</b>	24	04	04	03	03	03	41	
50	06		Ravindra Awari		22	04	04	03	03	03	39	
51	18		Ravi Gaikwad		23	04	04	03	03	03	40	
52	32		Rohan Kumbhakarn		13	04	04	03	03	03	30	
53	01		Ravi Aderao		00	04	04	03	03	03	17	
54	09	10	Niraj Bari	<b>Amplitude Shift Keying</b>	22	03	04	03	04	03	39	
55	46		Vikrant Patil		24	03	04	03	04	03	41	
56	28		Mayur Katkar		24	03	04	03	04	03	41	
57	70		Prajwal Tikhe		23	03	04	05	04	03	42	
58	10		Shreyas Barudwale		24	03	04	03	04	03	41	
59	66		Parag Suryawanshi		00	03	04	03	04	03	17	
60	59	11	Saurabh Shewale	<b>QAM Compariso ns And Applicatio n.</b>	24	05	05	05	05	05	49	
61	16		Pratik Datir		23	05	05	05	05	05	48	
62	60		Sonal Shirsath		22	05	05	05	05	05	47	
63	22		Diksha Jadhav		22	05	05	05	05	05	47	
64	39		Devyani Pagar		20	05	05	05	05	05	45	
65	34		Piyush Mahale		23	05	05	05	05	05	48	
66	41		Sarang Panse		21	05	05	05	05	05	46	
67	02	12	Ruthik Admane	<b>Pass Band Transmiss ion Model</b>	24	04	04	04	04	03	43	
68	64		Jay Sonawane		22	04	04	04	04	04	03	41
69	08		Vrunda Bankar		24	04	04	04	04	04	03	43
70	72		Harshal Yeole		25	04	04	04	04	04	03	44
71	57		Ankita Sapnar		24	04	04	04	04	04	03	43
72	52		Rutu Raka		00	04	04	04	04	04	03	19

SN	Result Analysis	
1	<b>Total Student Present Student</b>	<b>73</b>
2	<b>Number of Student Scoring above 60%</b>	<b>62</b>
3	<b>Percentage of student Scoring above 60%</b>	<b>84.93</b>

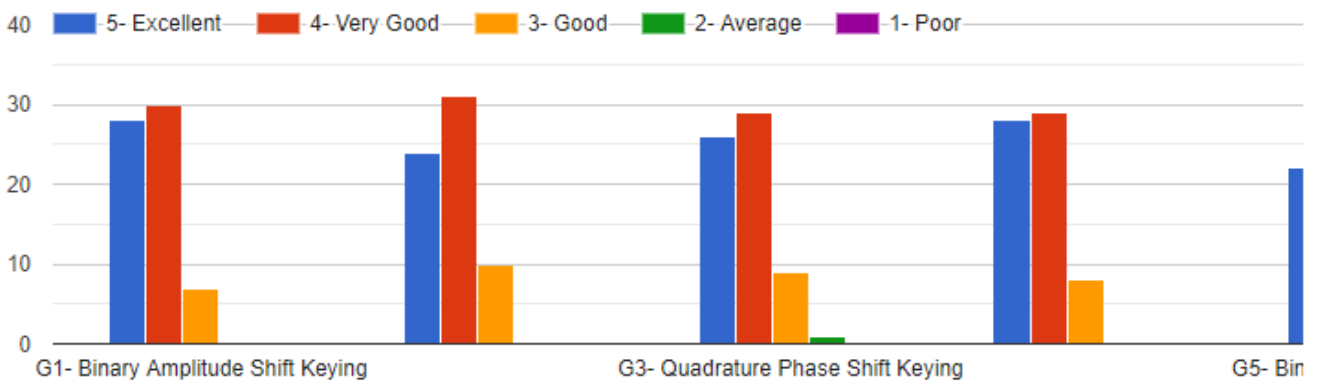
### 8. Impact Analysis

SN	4- Excellent	3- High	2- Moderate	1- Slight
How Much do you find explanation or notes or presentation material OR Video of particular topic helpful (CO3)	31	30	02	01
How Much do would rate understanding of topic (CO3)	27	30	07	00
Does the covered topic are helpful to understand the concept (PO9)	28	32	04	00
Does the group members communicate effectively on given topic ( PO10)	61-Yes	03- No		
Does the content of covered topic will be remember for life long ( PO12)	54-Yes	10-No		
Would You Like To Participate in This Methodology again	62-YES	02 - No		

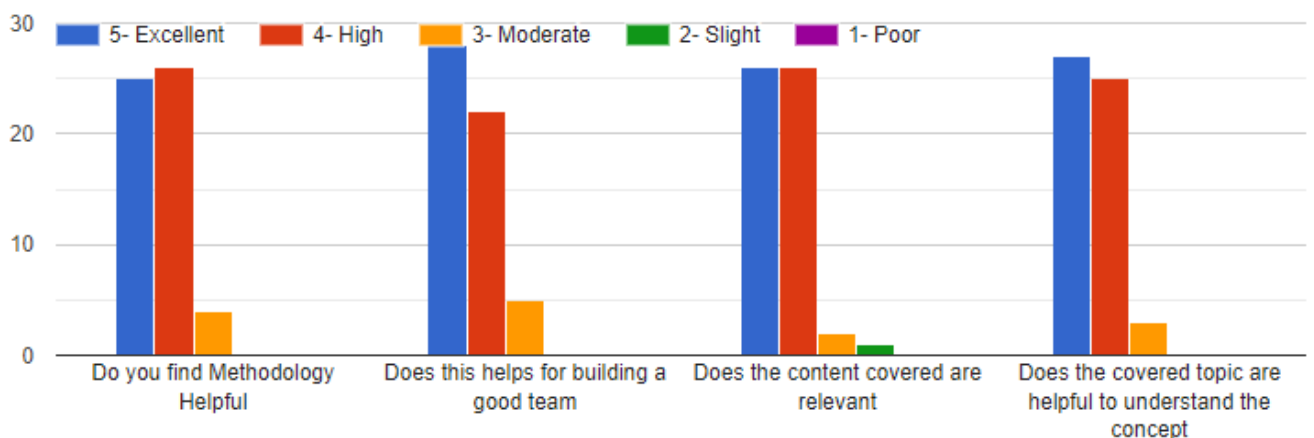
How Much do you find explanation or notes or presentation material OR Video of particular topic helpful (CO3)



How Much do would rate understanding of topic (CO3)

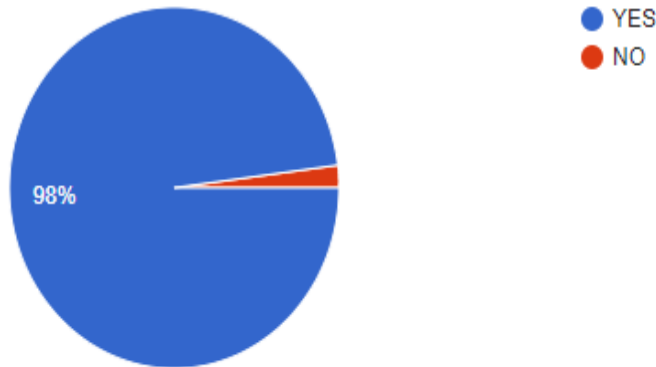


Rate Your Learning Experience (PO9)



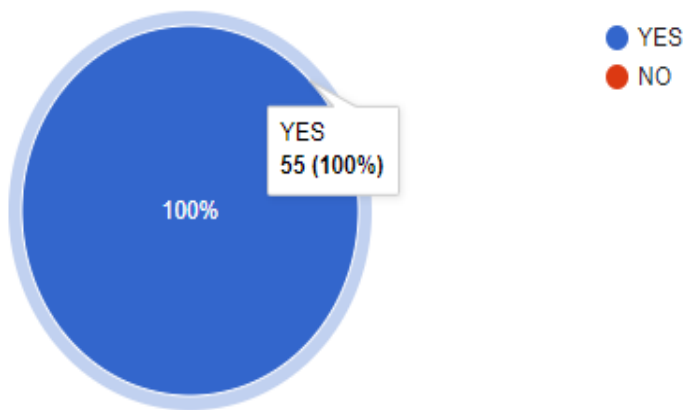
Does the group members communicate effectively on given topic ( PO10)

50 responses



Does the content of covered topic will be remember for life long ( PO12)

55 responses



### 9. Activity Picture

The collage consists of four screenshots from a Google Meet session:

- Top Left:** A slide titled "Modulation of ASK" showing a block diagram of ASK modulation. The input is a bit stream "01010". The carrier wave is  $\cos \omega t$ . The output is  $\phi_{ASK} = m(t) \cos \omega t$ . Notes indicate that for a '1', there is a +ve voltage, and for a '0', there is no voltage.
- Top Right:** A slide titled "FSK MODULATION INDEX" with the formula  $m = \frac{\Delta f}{f_c}$  or  $\Delta f(T)$ . It defines  $\Delta f$  as the frequency deviation between  $f_0$  and  $f_1$ ,  $f_b$  as the bit rate, and  $T$  as the bit time, which is the reciprocal of the bit rate.
- Bottom Left:** A slide titled "Demodulation of ASK" showing a block diagram. The input is  $m(t) \cos \omega t$ . It passes through a "LPF" (Low Pass Filter) to produce  $m(t)$ . Notes mention that ASK is efficient and that the envelope is not as low as in other modulation schemes.
- Bottom Right:** A screenshot of a presentation slide titled "The BPSK algorithm" with a diagram showing a signal waveform. The waveform has a high level for '1' and a low level for '0'. A question asks: "The BPSK signal has '1' volts and '0' volts respectively to represent '1' and '0'?"

Recorded Video Link :

[https://drive.google.com/file/d/1Zd3zSplkpwPvESuB\\_54EGejYsNjHlxqk/view](https://drive.google.com/file/d/1Zd3zSplkpwPvESuB_54EGejYsNjHlxqk/view)

[https://drive.google.com/file/d/1OPHV-Y25LqoR25WYJEeE3i2gkElBp\\_0j/view](https://drive.google.com/file/d/1OPHV-Y25LqoR25WYJEeE3i2gkElBp_0j/view)

[https://drive.google.com/file/d/1TcOIApXv18neTnECeSbNdwUf78Fo\\_RgA/view](https://drive.google.com/file/d/1TcOIApXv18neTnECeSbNdwUf78Fo_RgA/view)

<https://drive.google.com/file/d/1DG8m7ngeoKi79z5IkKu79kFLI6r0EaU5/view>

[https://drive.google.com/file/d/1WaWIGNcb3okPTmnCbKx\\_T9nVGwHKD4GB/view](https://drive.google.com/file/d/1WaWIGNcb3okPTmnCbKx_T9nVGwHKD4GB/view)

**10. For review and critique contact: e-mail address of faculty and HOD**

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